

Clarifying the Effort-Reward Imbalance Model: The role of personality

By

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ABSTRACT

The Effort-Reward Imbalance (ERI) model is currently one of the most popular work stress models used in empirical research. A well-validated framework (Hanson, Schaufeli, Vrijkotte, Plomp, & Godaert, 2000; Li, Yang, Cheng, Siegrist, & Cho, 2005), the ERI model considers the role of situational, personal and social factors in the aetiology of workplace strain. There is substantial evidence to support the detrimental effects of a high effort-low reward condition on employee health outcomes such as cardiovascular disease (for a review see van Vegchel, de Jonge, Bosma, & Schaufeli, 2005). However, there are a number of remaining conceptual and practical issues that, if addressed, could strengthen our understanding of the relationship between the ERI model and employee strain. Firstly, individual differences that are associated with increased reactivity to control-limiting work conditions (i.e., high effort and low reward) are central to the ERI model. Nonetheless, there is inconsistent support for the moderating effects of the overcommitment component of the ERI model, and the relevance of additional individual differences (i.e., Type A dimensions) as moderators of effort and reward has not been examined comprehensively. Secondly, although ERI theory conceptualises reward according to a multi-dimensional definition, the bulk of empirical research tends to utilise a composite reward indicator (Siegrist & Peter, 1996). It is unlikely that all forms of reward are equally important for all forms of strain, yet little empirical research has investigated the relevance of the reward dimensions to diverse employee outcomes. The third major area where greater clarity is required involves the research designs used to investigate the ERI model. The vast majority of studies utilise a ratio indicator to operationalise the effort-reward relationship despite recent evidence to suggest that additive and multiplicative terms are more likely to yield significant effects. Further, the relevance of the full ERI model (i.e., including individual differences) to more work-oriented outcomes is an under-researched area. Finally, the ERI literature continues to expand although the majority of studies that examine psychological and organisational outcomes tend to utilise cross-sectional designs limiting the extent to which causality can be determined.

The main objective of this thesis was to test the relevance of an augmented ERI-Type A model both to general mental health (i.e., psychological distress) and work-specific (i.e., job satisfaction, affective commitment and absenteeism) employee strains. This thesis also is intended to contribute to the ERI literature by utilising a multi-dimensional reward measure, operationalising the ERI model hypotheses using additive and multiplicative terms, and testing the relationship of the ERI-Type A model both to short- and long-term strains. This thesis consisted of three inter-related studies. Study 1 was a cross-sectional study based on a large sample of police officers. A factor analytic procedure was utilised to examine the relationship between the current overcommitment scale of the ERI model and the Type A profile, as measured with the Jenkins Type A scale and a subscale of the Cook Medley Hostility measure. The results confirmed there was a clear separation between overcommitment and the Type A scales included in this research.

Given the differentiation between overcommitment and Type A, the focus of Study 2 was to examine the extent to which an augmented ERI-Type A model could predict short-term strains among a sample of operational police officers. Another objective of Study 2 was to address a number of gaps identified in the literature with respect to the research designs of previous studies. Study 2 therefore involved an examination of the independent reward dimensions and the additive and interaction effects of an extended ERI-Type A model in relation to both individual- and organisationally-focused outcomes. Preliminary analyses confirmed the existence of three dimensions of reward representing esteem, status (e.g., salary, job position relative to training), and job security rewards. Hierarchical multiple regression analyses were then conducted to test the study hypotheses. Providing support for the extended ERI-Type A model developed in this research, the findings of Study 2 identified that the reward dimensions were differentially related to the study outcomes, where esteem rewards were the most significant predictor of officer strains. Status rewards were the only form of occupational resources that buffered the effects of effort on employee outcomes, again providing support for the separation of the reward component into individual dimensions. The overcommitment component was associated with greater psychological distress and lowered job satisfaction, although was not directly associated with the other outcomes. There was also little support for its role as a moderator of the stressor-strain relationship. A number of

significant interactions between the effort and reward variables and Type A dimensions were identified suggesting that, to predict individual reactivity to work stressors specified in the ERI model, a broader view of individual differences as moderators within the ERI framework may be warranted. Consistent with expectations, the achievement striving dimension of Type A had a generally protective effect, providing a buffer against detrimental conditions such as high effort. In comparison, the impatience-irritability dimension acted to exacerbate the negative effects of high effort or low reward. In addition to its role as a modifier of work conditions, the Type A profile was also more strongly associated with the work-based outcomes of this research than the overcommitment component, further supporting the augmentation of the ERI model with the Type A profile.

The focus of Study 3 was the repeated analysis of the study model, along with an assessment of the potential long-term effects of the augmented ERI-Type A model. There was only modest support for the lagged-effects of the model developed in this research. The status and security reward dimensions were associated with changes in employee strain, while achievement striving and expressive hostility were also associated with reduced affective commitment to the organisation at T2. The repeated cross-sectional analyses at T2 identified similar results to the T1 analyses particularly with respect to the main effects suggesting that the influence of both the ERI and Type A variables are stable, although may have a primarily short-term influence. In particular, the esteem and security reward dimensions were consistent predictors of officer psychological distress, job satisfaction and affective commitment. Similarly, the Type A components displayed consistent relationships with the strain outcomes included in the current research and a number of moderating effects were identified, further supporting the expansion of the ERI model with the Type A profile. The finding that a conditional effect of status rewards on the relationship between effort and distress was also significant at T2 provided some support for an effort-reward interaction, although distress was associated with a condition of low effort-low reward more so than the traditional high effort-low reward relationship. Finally, reverse-causal analyses identified that there was some support for strain-stressor associations, and an occupational socialisation effect with respect to overcommitment.

Overall, the results of the current research support the refinement of the ERI model. The findings suggest that the individual difference component of the ERI can be extended to provide additional explanatory power, particularly with respect to strain outcomes that are more work-oriented. Utilising a multi-dimensional measure of rewards and operationalising the ERI model hypotheses with additive and multiplicative terms can also provide improved insights into the relationship between the ERI variables, important individual differences and diverse measures of strain. The main implications from the current research point to occupational resources as a crucial element in employee strain reduction strategies. In particular, the findings suggest that efforts to reduce occupational stress should take into account workplace support networks and processes associated with employee recognition. The results of the current research also suggest that individual differences are highly relevant in employee reactions to effort and reward at work. Certain positions and work conditions may be especially stress inducing for employees who display 'Type A' qualities. Appreciating the preferences of individual employees should therefore be a fundamental consideration for management.

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CHAPTER 1: Introduction

Statement of the Problem

A large body of research indicates that exposure to adverse psychosocial working conditions can have a significant effect on individual and organisational functioning (e.g., Burke & Richardson, 1995; Cooper, Dewe, & O'Driscoll, 2001; LaMontagne, Keegel, Louie, & Ostry, 2010). Popular work stress models such as the Demand Control model (Karasek, 1979), Warr's Vitamin model (Warr, 1994), and the 'injustice as stressor' theory (Judge & Colquitt 2004) focus on working conditions that are thought to be detrimental to employee health and wellbeing. However parsimonious, work-oriented models have been criticised for their failure to consider the role of individual differences or stable person-characteristics in the stress process (e.g., Daniels & Guppy, 1994) and their assumptions that the mere presence (or absence) of a given environmental factor will lead to employee strain (e.g., Peeters, Buunk, & Schaufeli, 1995). The Effort-Reward Imbalance (ERI) model of work stress (Siegrist, 2001) attempts to address some of the criticisms of the work-oriented job stress theories by addressing complex socio-emotional processes within the workplace, and has explicitly included individual differences in the form of a cognitive-motivational pattern (termed 'overcommitment').

The ERI model was developed in the early 1990s and focuses on the social exchange process at work. The central argument of the ERI model is that where an imbalance exists between a high level of perceived work demand (effort) and a low level of perceived resources (rewards), an increased risk of ill-health and distress is likely (Siegrist, 1996). Further, a personal need for control over the environment and a resulting overcommitment to work is thought to influence employee health directly, and lead to employees reacting to distinct control-limiting conditions (i.e., high effort and low reward) with greater psychological and physiological arousal (Siegrist, 2002a; Siegrist, Peter, Junge, Cremer, & Seidel, 1990).

The existing literature strongly supports the effort-reward imbalance hypothesis and its effects on employee psychological and physical health outcomes (for a review see van Vegchel, de Jonge, Bosma, & Schaufeli, 2005). However, there are three major issues surrounding the ERI that if reconciled, would strengthen the relevance of the model. Firstly, the importance of individual differences is emphasised throughout the ERI literature, and the inclusion of a personal, trait-like coping

pattern is a key aspect that differentiates the ERI model from other similar perspectives such as equity theory (Adams, 1965) or distributive justice (Greenberg, 1990). Yet ERI research provides inconsistent support for the theoretically proposed moderating role of overcommitment. Further, previous work has rarely assessed additional personality traits or coping mechanisms theoretically related to the model (i.e., Type A behaviour), limiting our knowledge of the way that individual differences are involved in moderating employees' responses to effort-reward imbalances.

The second area in which ERI research needs to be strengthened is in relation to the measurement of the reward component. Although the ERI conceptualises reward according to a multi-dimensional definition, the bulk of empirical research tends to utilise a composite reward indicator (Siegrist & Peter, 1996). A key concern with a composite measure is that the aggregated structure limits our knowledge of the differential effects that independent reward transmitters may have within the workplace. For instance, it is possible that some forms of reward may be a more effective compensation for perceived workplace demands or, similarly, that particular forms of reward may have a stronger effect for certain outcomes (e.g., psychological distress versus job satisfaction) and/or for particular groups of employees (e.g., Type A versus Type B). Emerging evidence certainly indicates that the reward dimensions of the ERI model may have differing effects depending upon the outcome in question (e.g., Lang, Bliese, Adler, & Holzl, 2010; van Vegchel, de Jonge, Bakker, & Schaufeli, 2002), reinforcing the need to examine the rewards specified in the ERI model, independently of their combined effects.

The third major area where greater clarity is required involves the research designs used to investigate the ERI model. The literature involving the ERI model has grown substantially over the previous two decades and, consistent with the origins of the ERI model, the vast majority of studies tend to focus on physical or psychological health as the end-point. Research examining the relationship between the full ERI model (i.e., including individual differences) and more organisationally- or behaviourally-based outcomes is less common. Similarly, the use of a ratio indicator (i.e., reward/effort) is the most commonly used method to operationalise an imbalance, although authors have recently advocated that an additive model or multiplicative terms (i.e., reward \times effort) provide greater power to detect significant

effects (e.g., Prekel, Meinel, Kuielka, Haug, & Fischer, 2007; van Vegchel, De Jonge, & Landsbergis, 2005). The latter models also give researchers the opportunity to examine the ERI model components, and their relationships to each other, in detail. Finally, the bulk of ERI research that is focused on psychological or organisationally-focused outcomes tends to utilise cross-sectional study designs, effectively limiting the extent to which causal relationships can be determined (e.g., Dragano et al., 2008; Kinman & Jones, 2007; Kinnunen, Feldt, & Makikangas, 2008). Longitudinal designs provide valuable information on the causal pathways and temporal associations between individual and organisational stressors and employee strain. Longitudinal studies are therefore necessary to test the long-term associations between the ERI model and diverse employee strains.

Our knowledge of work stress generally, and the ERI model specifically, may be strengthened by clarifying the ERI model according to these three aforementioned shortcomings. The focus of this thesis therefore is to examine the role of individual differences within the ERI, and assess the relative importance of differential reward transmitters, to predict a broad range of health- and work-based indicators of employee strain.

Background and Objectives of the Current Research

The ERI model posits that individual characteristics are likely to influence employee reactions to distinct control-limiting conditions, represented in the ERI model as high effort and low reward. Siegrist (1996) argued that a high need for control, and associated overcommitment in the workplace, was connected with a greater reactivity to stressors. The current overcommitment measure appears to have maintained a strong relationship with employee experiences of strain and ill health (see van Vegchel et al, 2002), although the role of overcommitment as a moderator of stressor-strain relationships is inconclusive.

Based significantly on the Type A profile, overcommitment has been described as a trait-like coping variable that represents those cognitive, emotional, and motivational components of Type A suspected of triggering enhanced arousal to the demands and rewards of work (Appels, Siegrist, & De Vos, 1997; Siegrist, Wege, Puhlhofer, & Wahrendorf, 2009). The most recent version of overcommitment is described as the ‘inability to withdraw from work obligations’ (Siegrist et al., 2004), and while many authors continue to refer to overcommitment as a variable that

reflects the Type A profile (e.g., Krause, Ruglies, & Maslach, 2010; van Vegchel et al., 2002; Vrijkotte, van Doornen, & de Geus, 1999), alterations to the measurement scale have resulted in a conceptual divide between overcommitment and Type A. An initial aim of this thesis therefore is to assess the extent to which overcommitment maintains any connection with the Type A profile.

The ERI model proposes that overcommitment acts as a moderator of the stressor-strain process. However, existing research provides inconsistent support for the exacerbating effects of a high level of overcommitment. This mixed support may be the result of an incomplete view of the key individual differences that are related to employee reactivity to workplace stressors, and provides a major impetus for the current study. The overall purpose of the proposed research therefore, is to investigate the role of individual differences within the ERI model, and to assess the utility of an augmented ERI-Type A model to predict the strain experienced by a sample of Australian operational police officers. The measures of job strain included in the current study include health (i.e., psychological distress), attitudinal (i.e., job satisfaction, organisational commitment) and behavioural outcomes (i.e., absenteeism).

This thesis also aims to overcome some of the limitations associated with previous work, and builds on the findings of recent research that have suggested a number of model refinements and improvements. In extending the existing ERI literature, this thesis aims to address the need for greater specificity by investigating the reward dimensions of the ERI model, and their influence both as independent predictors of employee strain and as buffers of the relationship between workplace demands and strain outcomes. This thesis also aims to examine how the model components are related to a broad range of employee outcomes, both in the short- and long-term.

Significance of the Research

This research will make five important contributions to the job stress literature. Firstly, this study will help clarify the construct validity of the overcommitment component of the ERI model in relation to the Type A profile. Clarifying this is important for future research and for practical applications of the ERI model. A conceptual separation between overcommitment and Type A would indicate that research findings emphasising the relationship between the Type A profile and

overcommitment might be misinformed. From a practical perspective, a failure to separate these constructs may result in stress prevention/reduction strategies that exacerbate, rather than improve, adverse psychosocial working conditions.

The second major contribution of the current investigation is to extend the literature involving the role of individual differences in employee reactions to effort-reward conditions. Little is known about the interaction between key personality variables related to a high need for control and stressors defined within the ERI model. A key aim of this thesis therefore is to augment the ERI model with the Type A profile and assess the relative contributions of overcommitment and Type A to officer strain and employee reactions to high effort-low reward conditions.

Recent work has also acknowledged that there is a need for greater specificity, where particular forms of reward may have greater relevance for different outcomes or for certain groups of employees. Providing that rewards are associated with employee strain outcomes, the third area in which this thesis will contribute to the existing literature is in identifying the relevance of the individual reward dimensions and the additive, as well as interaction, relationships among the ERI model variables. These findings will provide valuable knowledge on the relative importance of the model components, and will add to our understanding of the way different rewards may be associated with particular employee outcomes.

The fourth contribution of the current study involves the inclusion of outcome variables that have a more immediate effect on organisational functioning. Work-specific attitudes such as job satisfaction or organisational commitment are more relevant to the operational imperatives of managers than more distant strain indicators such as cardiovascular disease. These work-based outcomes are also more amenable to change and, by highlighting those conditions and attributes that are closely associated with these outcomes, the results of the current study can provide opportunities for managers to improve employee attitudes and behaviours. The use of a broader range of strain indicators in the current study therefore ensures that the results of the proposed research are highly relevant to the goals of supervisors, team leaders, human resources practitioners and other personnel with people-management responsibilities.

The fifth and final contribution of the current study involves the use of longitudinal data to assess the temporal associations between the ERI model and

employee strain. A number of authors strongly support the use of longitudinal data in occupational stress research (Mitchell & James, 2001; Ployhart & Vandenberg, 2010; Zapf, Dormann, & Frese, 1996) although existing work-based ERI research is largely cross-sectional. The analysis of longitudinal data will therefore provide valuable knowledge on both the short- and long-term relationships between an augmented ERI model and employee psychological health, work attitudes and employee absenteeism.

Overview of the Research

The current investigation consists of three inter-related studies. The studies were conducted over an 18-month period between October of 2006 and April of 2008 with a sample of operational police officers working in a large Australian law enforcement agency. A paper-based questionnaire was developed for use in this study, consisting of well-validated scales designed to assess the study variables along with questions relating to general demographic information. The same questionnaire was used for both survey periods.

A total of 897 ($N = 3310$) employees returned completed questionnaires in T1, while 885 ($N = 3278$) participants completed the survey in Time 2. Further, 554 (62%) participants provided their employee number at T1, and 499 (56%) officers provided their employee number at T2, enabling their responses to be matched against absenteeism records. The longitudinal sample consisted of 195 participants who supplied their employee number at both survey periods.

Study 1 was designed to investigate the extent to which the overcommitment component of the ERI and the Type A behaviour profile are distinct constructs. Study 1 was based on a cross-sectional sample of police officers (T1 sample), and utilised an exploratory factor analytic procedure to determine the level of construct overlap. The results confirmed that there was a clear separation between overcommitment and the Type A scales included in this research.

Given the differentiation between overcommitment and Type A, the focus of Study 2 was to examine the degree to which an augmented ERI model, that integrated the Type A profile, could predict the strain experienced by a sample of operational officers. Study 2 also aimed to address a number of gaps that were identified in the literature with respect to the existing ERI research. In particular, the potential differential importance of the reward components and their role as buffers

of perceived work demands, or their importance for particular groups of employees, was examined.

Preliminary analyses confirmed the existence of three dimensions of reward representing esteem, status (e.g., salary, job position relative to training), and job security rewards. Hierarchical multiple regression analyses were then conducted to test the augmented ERI-Type A model and the specific study hypotheses. Providing support for the extended model developed in this research, the findings of Study 2 identified that the Type A dimensions improved prediction of all four strain outcomes, psychological distress, satisfaction, commitment, and absenteeism. Further, the reward dimensions were differentially related to the outcome variables, where esteem rewards were the most significant predictor across distress, satisfaction, and commitment. Status rewards were the only form of occupational resources that buffered the effects of effort on employee outcomes, again providing support for the separation of the reward component into individual dimensions.

The focus of Study 3 was the repeated analysis of the ERI-Type A model developed for this study, along with an assessment of the potential long-term effects associated with the study model. A limitation of this research was the small number of participants whose responses could be matched across the T1 and T2 survey periods. Because of the relatively small number of matched respondents, the longitudinal analysis was limited to the assessment of lagged effects, the association between stressors measured at T1, and the change in levels of strain recorded from T1 to T2. There was little support for the lagged-effects of the model developed in this research. Only one reward dimension, security rewards, was associated with changes in employee strain, while achievement striving was also associated with less commitment at T2.

A repeated cross-sectional analysis using the T2 sample was also conducted in Study 3 to validate the findings from the initial cross-sectional analyses. The results revealed similar findings to T1, particularly with respect to the main effects, suggesting that the influence of both the ERI and Type A variables are stable although may have a primarily short-term influence. In particular, the consistent effects of esteem and security rewards, and the differential effects of the Type A components, along with their numerous moderating effects, supports the study model utilised in this research.

The findings from the current study provide critical insights into the influence of personality within the ERI model. Overall, the findings suggest that a broader view of the individual differences relevant within the ERI model is warranted. The findings also suggest that the ERI model requires a number of refinements and that these should be taken into account in future research involving this model. In particular, the use of a multi-dimensional reward indicator along with the consideration of additive and lower-order terms can provide valuable information on the experiences of strain and ill health.

CHAPTER 2: Literature Review

Preliminary remarks

Occupational stress is a widespread phenomenon that can have significant consequences for both individuals and organisations. Recent reports indicate that work stress is the fifth most common work compensation claim in Australia and accounts for the greatest number of days lost each year (ASCC, March 2009). The substantial costs associated with work stress have led to an expansive body of research that is dedicated to better understanding the causes and consequences of occupational strains, as well as the strategies for preventing or reducing the ill effects of work stress. The first section of this chapter introduces the concept of stress and the causes and outcomes of stress within the workplace. A brief overview and critical analysis of some of the more influential perspectives within the work stress literature then will be presented and the model tested in this thesis will be subsequently introduced.

The concept of stress and occupational strain

Stress is a broad concept that, like many terms, has varied meanings between and even within disciplines. ‘Stress’ may refer to a stimulus, a response to a stimulus or the physiological and psychological consequences of that response (Kemeny, 2003). Contemporary organisational stress researchers use the term ‘strain’ to define work stress that negatively affects employee health, wellbeing, or job performance. Environmental conditions that have the potential to create strain (e.g., excessive work demands, limited opportunities) are described as stressors.

Response-based paradigms view stress as a physical response pattern that is relatively consistent across environmental factors, while stimulus-based frameworks suggest that stress is dependent upon the presence of specific stressors in the environment (Cooper, 1998; Mason, 1975). According to a stimulus-based perspective, stress is measured in an additive manner where the extent of exposure to ‘stressors’ in the environment will determine the level of stressful experience. Early views of workplace stress assumed a direct approach whereby environmental characteristics were measured objectively and assumed to influence all employees in an equivalent manner. Particular elements of the work environment such as the physical conditions (e.g., excessive noise or heat), number of working hours, or

promotional opportunities (e.g., Jewell, 1998), were typically identified as key contributors to employee strain reactions.

Response-based models assert that stress is a generalised response of any organism to an external threat or 'stressor', whether real or perceived (Selye, 1936). The focus of response-based models thus lies primarily on the overt manifestation of stress rather than an internal process. One of the most influential stress response models is the General Adaptation Syndrome (GAS) developed by Selye (1936) early in the twentieth century. Selye determined that after exposure to a stressor or threat in the environment organisms were likely to progress through a well-defined set of physical responses. Specifically, Selye argued that three distinct stages were involved: alarm, resistance, and exhaustion. The alarm stage involves an initial perception of an environmental stressor resulting in disruption to homeostasis; resistance will then follow although only until the body's resources are depleted in which case exhaustion will eventuate. It is important to note that response models do not necessarily assume that all stress is harmful. Selye (1936) later expanded his stress model to reflect the complex nature of stress. Selye distinguished between harmful or undesirable stress which he termed 'distress', while positive, motivating, and beneficial stress was termed 'eustress'.

Despite the advances made in stress research by assuming a stimulus or response-based approach, there are critical components of the stress process that cannot be captured by these perspectives. In particular, work stress models that focus solely on objective job characteristics are often criticised for their overly simplistic designs and lack of specificity in relation to individual perceptions and reactions to workplace stressors (Mark & Smith, 2008). Simple stressor-strain approaches assume that individuals are passive agents and tend to view the relationship between stressors and strains as static and direct. In this sense, there appears to be little consideration of the cognitive processes that precede the appraisal of stressors, or of the individual differences that may influence the perception of environmental characteristics (Hart & Cooper, 2001). Dynamic, reciprocal, or reverse-directional relationships are theoretically excluded on an *a priori* basis and little attention is given to the potential cognitive factors that may intervene in the stress process.

Much of the work stress literature now considers stimulus- or response-based models inadequate for addressing the stress process (Cooper et al., 2001; Hart &

Cooper, 2001). Recent approaches to occupational stress emphasise the interactions that take place between the individual and their environment. Cox and Mackay (1976) suggest that stress is the result of a dynamic transaction between the individual and the environment, and that stress results from the individual's cognitive assessment that the environmental demands exceed personal resources to deal with those demands (Cox, Griffiths, & Rial-Gonzalez, 2000). The transactional model of stress and coping provided by Lazarus and Folkman (1984) is a well-known example of an interactional model and suggests that the experience of stress is a consequence of a complex series of transactions between the individual and the environment. This transactional model views individual cognitive appraisal of environmental factors and the subsequent evaluation of available internal coping resources as necessary intermediary stages in the development of strain. Accordingly, the subjective nature of stress and the role of individual appraisal are emphasised where individual differences in perceptions are considered integral in determining the relationship between environmental stressors and employee strain reactions. Ultimately, the experience of strain is a result of a dynamic and complex relationship between personal and environmental variables (Cooper & Cartwright, 1994; Hart & Cooper, 2001).

The Effort-Reward Imbalance model

The Effort-Reward Imbalance (ERI) model is currently one of the most popular work stress models and considers the role of situational, personal, and social factors in the aetiology of workplace strain. Johannes Siegrist and his colleagues (Siegrist, Dittmann, Rittner, & Weber, 1982) initially developed the ERI model in early 1980s because of a growing gap in the literature surrounding the causes of cardiovascular disease. In particular, they were interested in how the work environment could affect the experience of distress and ill health. The notion of social exchange and reciprocity in the work setting is the central focus of the ERI model. Siegrist and his colleagues (Siegrist, 1995b; Siegrist & Klein, 1990) viewed the social environment as a crucial element in the development and progression of disease and illness and suggested that the work role serves particular, crucial functions within an employed adult's life. Specifically, work allows the individual to create and maintain self-regulatory functions such as self-esteem (experienced through formal and informal reward structures), self-efficacy (achieved through work-related performance

activities) and social identity (belonging to a social network) (Siegrist, 1996, 1998). Additionally, work is viewed as a type of social contract, based on the premise of reciprocity with fair and equal exchanges between employees and employers (Siegrist, 1996; Siegrist & Marmot, 2004).

Siegrist (2000, p. 1287) argues that the work role offers opportunities to maintain crucial self-regulatory functions by providing a means of “contributing and performing, of being rewarded and esteemed and of belonging to some significant group”. The basis of the ERI model is psycho-physiological whereby the failure to maintain adequate social status or to retain essential resources is hypothesised to create excessive activation of the nervous system – a precursor for particular forms of hypertension (Siegrist et al., 1982). Two main components of the work environment are identified in the model: effort and reward. The balance between these factors is considered critical to maintaining employee health (Siegrist, 2001). Ultimately, effort at work is expended based on the notion of an informal socially prescribed exchange process in which the organisation contributes in terms of rewards (Siegrist, 1996). Effort refers to workplace demands and can reflect actual or perceived workplace pressure. Three main work-related rewards are identified in the model: money, esteem, and status control. Status control, being one of the more crucial components of the effort-reward theory, comprises those components of work that help to maintain self-regulatory needs (Siegrist, 1996). Job stability, the relative availability of promotional prospects and position within the work hierarchy, contributes to an individual’s sense of status control. According to the model, threats to the continuity of the social role (i.e., threats to an individual’s status control or self-esteem) produce emotional distress that ultimately increases the risk of physical and psychological illness (Siegrist, 1996). Extended failure to maintain these self-regulatory needs can result in a state of ‘active distress’ and activation of the autonomic nervous system (Siegrist et al., 1986). Chronic activation of the body’s defence mechanisms may lead to physical illness or mental distress (Esler & Kaye, 2000).

The Sociological Origins of the ERI Model

The ERI model has elements in common with both equity theory (Adams, 1965) and the mechanisms of distributive justice (Folger & Konovsky, 1989) although there is little mention of either framework in the initial development of the ERI

model (e.g., Peter & Siegrist, 1997; Siegrist, 1996; Siegrist, Siegrist, & Weber, 1986). In a similar approach to the ERI model, equity theory and distributive justice are based on social exchange theory. A subset of a broader exchange framework, social exchange theory represents an influential explanation of interpersonal behaviour and relationships (Chadwick-Jones, 1976). The principle argument of social exchange is that a set of universal norms and principles govern interpersonal interactions. Social exchange theory is relevant to all exchanges, and is especially prominent within an occupational context (Adams, 1965; Blau, 1964). Employees are expected, and indeed choose, to commit themselves to groups and organisations where their maintained commitment is dependent upon reciprocal, equitable exchanges. The norm of reciprocity is the most relevant exchange principle to the effort-reward imbalance model. Specifically, the norm of reciprocity states that the exchange relationship should benefit the parties involved equally and that, through mutual reinforcement, beneficial actions are continued (Gouldner, 1959; Homans, 1958, 1961).

Equity theory highlights the importance of perceived fairness and equity in exchange relationships. Inequity results when an employee perceives that the ratio of their inputs to outcomes is unequal when compared to that of their co-workers (Adams, 1965). Importantly, equity theory highlights individuals' perceptions of their outcomes when compared to their contributions or inputs, rather than in the absolute value of the outcomes themselves (Jepsen & Rodwell, 2010). Equity theory consists of four propositions. The first is that individuals will seek to maximise their outcomes in terms of their perceived input/output ratio. The second is that groups will develop equitable systems of reward allocation and will induce equitable behaviour among group members by making it more profitable to act in an equitable manner. The third proposition is that individuals participating in an inequitable relationship will experience distress proportionate to their level of inequity. Individuals in overpayment conditions may feel guilt or shame, while those in underpayment conditions may feel anger or humiliation. The fourth and final proposition is that individuals who perceive themselves to be in an inequitable relationship will attempt to reduce or eliminate their distress by restoring equity either through psychological (e.g., cognitive dissonance) or behavioural (e.g., reduced inputs) means (Walster, Walster, & Berscheid, 1978). This final proposition

is directly relevant to employee-organisation relations where inequitable employer-employee exchanges are thought to influence attitudes and behaviour. Employees who perceive inequitable workplace conditions are likely to distance themselves physically or psychologically from the organisation whether in the form of increased absenteeism, reduced commitment or increased cynicism (e.g., Leiter & Stright, 2009).

Similar to equity theory, distributive justice focuses on the allocation of resources and the subjective, rather than objective, perceptions of the fairness of resource allocations (Greenberg, 1990). Distributive justice was a central concern of early social exchange theorists and economic sociologists. Homans (1961), for instance, argued that the parties to an exchange would each assess the ratio or proportion between an individual's inputs and outcomes. Ultimately, an equal reward-for-investment ratio is expected. The extent to which the investment-return ratio departs from a fair exchange will determine the extent of dissatisfaction with the exchange.

There is considerable conceptual overlap between equity theory, distributive justice and the ERI model. All three perspectives consider the interaction that occurs between the situation and the individual, and the perceived balance between inputs and outputs, as critical determinants of employee strain reactions. Despite these similarities between earlier notions of equity and the current ERI model, Siegrist and Marmot (2004) noted that there are a number of key differences. Firstly, the ERI model argues that only conditions of high effort and low reward are associated with distress although equity theory considers nonreciprocity in both directions as potentially stressful (Adams, 1965). Secondly, the ERI model does not explicitly mention a 'referent' unlike equity theory that suggests that individuals will make comparisons with others to determine whether their input/output ratio is fair. By removing the need to identify a referent the ERI model avoids unnecessary complexity and issues typically faced when applying equity theory in an occupational context (Taris, Kalimo, & Schaufeli, 2002). Further, the ERI model specifies that individual differences related to a need for control are likely to have a significant influence on employee reactions to inequitable conditions.

Individual differences in the ERI model

The experience of an inequitable relationship is thought to elicit negative emotional reactions, and thus leads to excessive activation of the autonomic nervous

system, increasing the risk of cardiovascular disease. However, it is unclear why an individual would remain in such harmful, stress-inducing conditions. Siegrist (1996) argues that while in ideal work situations an individual would not remain in a potentially damaging high cost/low gain condition, in reality a number of personal and social constraints exist which affect worker choices. In particular, Siegrist (1996) identifies those employees with low occupational status control as a group likely to remain in high effort/low reward conditions. Low status control groups (e.g., blue-collar workers) may be faced with limited job opportunities and/or limited job security, thus as a result are not likely to reduce their output regardless of their reward structure. Alternatively, those in high status control groups may remain in effort-reward imbalance conditions when there is an expectation of future gains (e.g., while rewards in terms of money and esteem are poor, promotional prospects are perceived to be good). In view of these contextual constraints and possibilities, the ERI model is applicable to a range of working populations including those involving low and high status groups. Further, the personal and social circumstances that lead to people being in high cost/low reward work situations are often difficult to change. These situations are therefore likely to be chronic and affect people's health and wellbeing over long periods.

Need for control and overcommitment. A further feature of the ERI model that is linked to sustained high effort/low reward conditions is the concept of an individual's 'need for control' and tendency toward overcommitment to work. Consistent with the transactional model of stress, the importance of individual perceptions often is stressed in occupational health research. For instance, Sparks et al. (2001) note that when investigating the effect of organisational climate, researchers and practitioners need to consider employee perceptions rather than simple experiences as not all employees will perceive work demands as challenges. Considered the 'person-specific' component, overcommitment is a central element of the ERI model. A high level of overcommitment is thought to independently predict poor health outcomes as well as exacerbate the negative effects of an effort-reward imbalance (Siegrist, 1996). Previously referred to as both 'intrinsic effort' and 'need for control', the overcommitment aspect of the model has been altered significantly throughout the course of the ERI model's development. The importance of control as

a source of internal motivation has however, remained a central concern of the ERI model (1995b).

Early descriptions of ‘overcommitment’ referred to an internal need for control and posited that a personal desire for control over the environment was likely to influence employee health (Siegrist, 1996). The need for control scale of the ERI model was developed from, and based substantially on, the Type A construct. Specifically, the need for control component was introduced as ‘critical coping’ behaviour and referred to the Type A’s tendency to respond to environmental threats with greater reactivity than their Type B counterparts (Matschinger, Siegrist, Siegrist, & Dittmann, 1986; Siegrist, 1996). Employees who report a high internal need for control are thought to suffer from a perceptual distortion as a result of their internal motivational drivers, namely their greater desire for control, approval and esteem in the workplace (Siegrist, 1998). This pattern of critical coping is ‘activated’ upon exposure to environmental demand or challenge and results in vigorous striving to regain and maintain control (Siegrist, 1994). Ultimately, employees with a high need for control are thought to respond to environmental challenges with an excessive amount of effort (in relation to reward) to maintain or regain control (Siegrist, 1994). This persistent desire to preserve control over the environment leads highly overcommitted employees to underestimate the amount of effort they exert, and overestimate the rewards they receive, thus exacerbating the harmful effects an effort-reward imbalance (Peter & Siegrist, 1997, 1999).

The ERI model has been gradually developed and refined throughout the previous two decades until it reached its current form. The original formulation of the ERI model considered the need for control concept an internal form of ‘effort’ that contributed to the overall level of demands and obligations felt by an employee. Thus, need for control was originally termed ‘intrinsic effort’ and included as a sub-component of the global effort construct (see Figure 1).

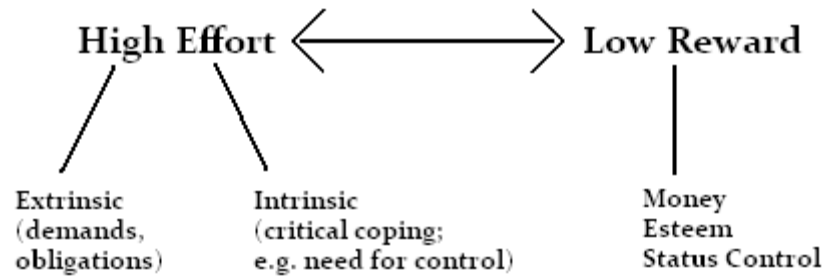


Figure 1. Original formulation of the ERI model (Source: Siegrist, 1996)

A subsequent redesign of the ERI model led to the separation of ‘need for control’ from the global effort indicator. The definition and role of the need for control construct was also modified. The most current form of the ERI model renamed need for control to overcommitment and considers this component an independent predictor of employee outcomes as well as a moderator of people’s reactions to effort-reward imbalance at work. That is, overcommitment is thought to directly influence employee strain, while also influencing employee strain indirectly through its potential to modify the effects of employee effort and reward (see Figure 2).

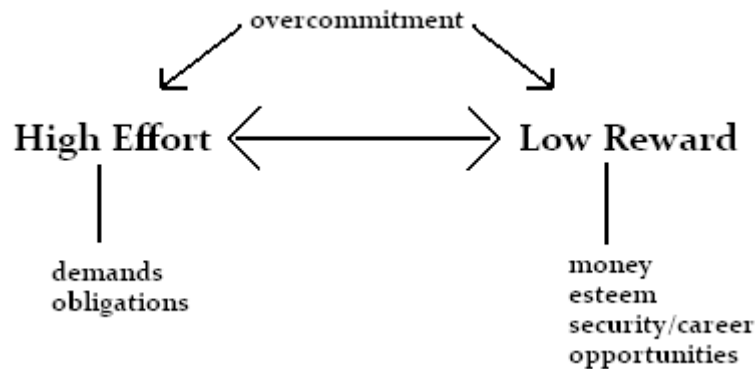


Figure 2. Current formulation of the ERI model (Source: Peter & Siegrist, 1999)

Because of these modifications, the current ERI model makes three hypotheses (Peter & Siegrist, 1999, p. 444); the extrinsic, the intrinsic and the interaction hypotheses. The extrinsic ERI hypothesis states that the risks to employee wellbeing are increased when an imbalance exists between the effort an employee exerts in their job and the rewards they receive in relation to those efforts (i.e., there is a high effort/low reward relationship). The intrinsic hypothesis states that the risk

of negative employee outcomes is increased in those individuals characterized by a high level of overcommitment regardless of their effort/reward status. Finally, the interaction hypothesis states that the greatest risk to employee outcomes is expected when individuals have both a high ERI and high overcommitment.

Critical overview of ERI studies

Investigations involving the ERI model were limited during the first decade after its introduction, although its popularity soon grew. The ERI model is now a commonly used and well-validated work stress framework (Hanson, Schaufeli, Vrijkotte, Plomp, & Godaert, 2000; Li, Yang, Cheng, Siegrist, & Cho, 2005). A critical analysis of the relevant occupational stress literature utilising the ERI model is presented in the sections that follow. This review is organised according to the hypotheses derived from ERI theory: the extrinsic imbalance hypothesis, the intrinsic overcommitment hypothesis, and the interaction hypothesis. The review of the literature is then followed by a critical discussion of the key issues and limitations surrounding the existing ERI research and the ways that the current research addresses these limitations.

The extrinsic ERI hypothesis. The core argument of the ERI model, the extrinsic ERI hypothesis, deals with the balance between employee effort and reward. That is, an imbalance between perceived high effort and low rewards is thought to lead to significant job strain, and therefore represents a risk factor for poor employee health and wellbeing. The relationship between a high effort-low reward condition and employee outcomes has been examined in a wide variety of settings, using a range of study designs and samples (for meta-analyses see Tsutsumi & Kawakami, 2004; van Vegchel, de Jonge, Bosma et al., 2005). Not surprisingly, given the medical sociological heritage of the ERI model, the majority of existing research focuses on physical health outcomes (van Vegchel, de Jonge, Bosma et al., 2005). It was not until 1998 that the ERI was applied to other psychological and behavioural outcomes (Van Vegchel, 2005). In their review of ERI research conducted in the period from 1986 to 2003, van Vegchel and colleagues (2005) described 45 studies that had investigated the ERI model hypotheses. The majority were conducted using either physical ($n = 25$) or psychological ($n = 19$) health outcomes while only seven tested the ERI on job-related well-being (e.g., job satisfaction) and just three utilised behavioural end-points (e.g., turnover).

Health outcomes. The strongest findings to support the extrinsic ERI hypothesis are identified in relation to cardiovascular disease (CVD) outcomes. Typically, cardiovascular health is studied either by directly assessing CVD incidence or through the assessment of CVD symptoms and risk behaviours (Tsutsumi & Kawakami, 2004; van Vegchel, de Jonge, Bosma *et al.*, 2005). Reviews of the literature vary with regard to the odds ratios associated with an effort-reward imbalance and CVD although the range is typically between a 1.22 to 8.98-fold increase in risk of CVD incidence (van Vegchel, de Jonge, Bosma *et al.*, 2005).

Recent studies also report the effects of an imbalance on physical outcomes such as musculoskeletal injuries (e.g., Gillen *et al.*, 2007; Joksimovic, Starke, Knesebeck, & Siegrist, 2002) and body mass index (e.g., Kouvonen, Kivimaki, Cox, Cox, & Vahtera, 2005; Ostry, Radi, Louie, & LaMontagne, 2006), as well as health-related behaviour such as smoking status and intensity (e.g., Kouvonen, Kivimaki, Virtanen, Pentti, & Vahtera, 2005), or physical inactivity and alcohol use (Kouvonen, Kivimaki, Elovainio, *et al.*, 2006; Kouvonen, Kivimaki, Virtanen *et al.*, 2006). The vast majority of studies examining an effort-reward imbalance and physical health outcomes or health behaviours find considerable support for the negative effects of a combined high effort-low reward condition.

The presence of an imbalance also appears to be significantly related to mental health outcomes. A number of cross-sectional studies indicate that exposure to imbalance can lead to a short-term elevated risk of depressive symptoms (e.g., Dragano *et al.*, 2008; Godin & Kittel, 2004; Niedhammer, Chastang, David, Barouhriel, & Barrandon, 2006; Sakata *et al.*, 2008), anxiety (Godin & Kittel, 2004), general mental wellbeing (Calnan, Wadsworth, May, Smith, & Wainwright, 2004), and psychiatric disorders (Niedhammer *et al.*, 2006). Evidence for the long-term effects of an effort-reward imbalance on mental health is continuing to emerge and a number of studies provide firm support for the effects of chronic imbalance. A recent meta-analytical review focusing on the longitudinal relationship between psychosocial work factors and mental health identified that an effort-reward imbalance was highly relevant to the experience of common mental disorders (Stansfeld & Bridget, 2006). Prospective research conducted using the Whitehall II data also tends to support a significant long-term effect of an imbalance on mental health and overall mental wellbeing (Stansfeld, Bosma, Hemingway, & Marmot,

1998; 1999). Particularly strong support is provided by more recent work conducted by Shimazu and de Jonge (2008) and Kivimaki and colleagues (2007), where the effects of an imbalance on psychological distress exists even after time-lags of 1-year or more.

Evidence has also begun to emerge to support the effects of an imbalance on additional psychological outcomes such as burnout or somatisation. A number of studies report significant effects of an effort-reward mismatch on burnout indicators such as emotional exhaustion (e.g., Bakker, Killmer, Siegrist, & Schaufeli, 2000; de Jonge, Bosma, Peter, & Siegrist, 2000; Laschinger & Finegan, 2008) and depersonalisation (Laschinger & Finegan, 2008). A high effort-low reward condition has also been related to chronic fatigue and somatisation (Godin, Kittel, Coppieters, & Siegrist, 2005), reinforcing the harmful nature of an effort-reward imbalance.

Work-related outcomes. The ERI model has been successfully expanded to predict psychological health outcomes, and the presence of an effort-reward imbalance appears to be highly detrimental for psychological conditions such as depression and anxiety. More recently, the ERI model has also been developed with respect to more work-based attitudes and behaviours such as job satisfaction and absenteeism. A review conducted by van Vegchel et al. (2005) reported only seven studies that assessed the ERI model's relevance to work-specific strain outcomes (e.g., job satisfaction, intention to quit) and only three studies that considered behavioural outcomes. Since their review however, the ERI literature has continued to grow and there is some strong evidence to indicate that a greater imbalance between perceived high effort and low reward is associated with increased physical and psychological withdrawal from the organisation (e.g., Lang et al., 2010; Stordeur, D'Hoore, & Group, 2007; Van Vegchel, De Jonge, Meijer, & Hamers, 2001).

A high effort-low reward interaction effect has been found in studies that investigate employee outcomes such as job satisfaction (de Jonge et al., 2000; Li et al., 2005; van Vegchel, De Jonge, & Landsbergis, 2005; Van Vegchel et al., 2001), turnover intentions (Derycke et al., 2010; Lang et al., 2010), general job stress (Lee et al., 2009), or intended early retirement (Siegrist, Wahrendorf, Von dem Knesebeck, Jurges, & Borsch-Supan, 2006). An interaction effect between effort and reward has also been demonstrated with a number of work-based behavioural

outcomes such as absenteeism (Ala-Mursula, Vahtera, Linna, Pentti, & Kivimäki, 2005; Godin & Kittel, 2004; Griep, Lucia, Chor, Toivanen, & Landsbergis, 2010; Hanebuth, Meinel, & Fischer, 2006; Head et al., 2007; Schreuder, Roelen, Koopmans, Moen, & Groothoff, 2010), turnover (Stordeur et al., 2007) and job performance (Wang, Schmitz, Smailes, Sareen, & Patten, 2010).

The evidence to support the effects of an imbalance on work-based attitudinal and behavioural outcomes is compelling although not all studies find consistent support. For example, Kinman and Jones (2007) and Willis et al. (2008) tested the ERI model and its association with work-family conflict. Their results found no support for an imbalance and problems between the work-family interface. Godin and Kittel (2004) identified a significant effect of an ERI on absence duration however there was no effect of an imbalance on absence frequency. Similarly, Peter and Siegrist (1997) found no support for a combined high effort-low reward condition on sickness absence.

Some authors have suggested that an effort-reward imbalance may be associated with psychological withdrawal outcomes more so than positive employee attitudes such as dedication or engagement (e.g., Kinnunen et al., 2008). Supporting this view, de Jonge and Hamers (2000) reported that while an ERI was associated with an increased risk of emotional exhaustion, there was no effect of an imbalance on work motivation. Similarly, Kinnunen and colleagues (2008) reported that a greater ERI ratio was associated with an increase in turnover intentions, although there was no association with employee engagement.

Overall, there appears to be some inconsistency in the literature with respect to the role of an effort-reward imbalance in the prediction of work attitudes and behaviours. The inconsistent findings evident in these studies may suggest that the interaction between effort and reward is a stronger predictor of health outcomes than work-related strain. However, the inconsistencies may also reflect differences in the research designs, choices of measurement tools, and the methods used to test the ERI model's extrinsic hypothesis. Many researchers choose to use proxy measures of the ERI model components which may be problematic, not only in terms of comparability of results between studies but also in the interpretation of the results. Further, an interaction term can be created in a number of ways and can lead to results that are more diverse. Further empirical research is needed to address the

concerns raised above and to tackle these and other limitations identified in the ERI literature. The limitations of existing ERI research and associated implications are discussed in more detail in Chapter 3.

The intrinsic ERI hypothesis. The ERI model attempts to rectify some of the criticisms of other work stress frameworks, such as the Demand-Control model (Karasek, 1979) by including an individual difference component (Siegrist, 2002b). The earliest version of the ERI model specified that a personal need for control over the environment was associated with an increased risk to health (the intrinsic hypothesis) and that, when combined with distinct control-limiting conditions (i.e., a high effort-low reward condition), represented the greatest threat to employee functioning (the interaction hypothesis). The measurement scale representing need for control was later altered and subsequently renamed as “overcommitment”. Existing evidence to support the intrinsic hypothesis of the ERI model is limited in comparison with the evidence base regarding the extrinsic hypothesis. Many studies omit the individual difference component of the model preferring to focus on the more situational aspects. The literature is also mixed with respect to its use of either the original or current form of overcommitment, making comparisons between studies difficult.

Reviews of the ERI literature involving cardiovascular disease, or risk factors for cardiovascular disease, have generally identified significant direct relationships between overcommitment and cardiovascular disease and/or associated risk factors (e.g., hypertension) (see Tsutsumi & Kawakami, 2004; van Vegchel, de Jonge, Bosma et al., 2005). Greater need for control or overcommitment has been linked with increased risk of myocardial infarction (Appels, 1989; Kuper, Singh-Manoux, Siegrist, & Marmot, 2002), coronary heart disease (Kuper et al., 2002) and high heart rate (Hanson, Godaert, Maas, & Meijman, 2001). van Vegchel et al. (2005) report that highly overcommitted employees had increased odds ratios for CVD between 1.18 and 4.53. Existing research also suggests that greater levels of overcommitment are associated with a higher incidence of mental distress. For instance, overcommitment is identified as a risk factor for burnout (Bakker et al., 2000; Willis et al., 2008), general mental health (Calnan, Wainwright, & Almond, 2000; Kuper et al., 2002), depression (Dragano et al., 2008; Tsutsumi, Kayaba, Theorell, & Siegrist,

2001), anxiety (Godin & Kittel, 2004), and psychiatric disorders (Niedhammer et al., 2006).

In comparison to the ERI literature focusing on generalised health outcomes, the effect of overcommitment on more work-specific outcomes is rarely the focus of empirical research and the evidence to support the effects of an overcommitment on work-related indicators of strain is relatively sparse. van Vegchel et al. (2005) report that up until 2005 only two of seven studies examined job-related well-being (i.e., job satisfaction and burnout), and only one out of three studies investigating employee behaviour (i.e., sickness absence), tested the intrinsic overcommitment hypothesis. Both studies that tested the intrinsic hypothesis in relation to job-related well-being found support for the detrimental effects of overcommitment, although there was no support for the intrinsic hypothesis in relation to employee behaviour. Since 2005, research has continued to investigate the ERI model and its relevance to work attitudes and behavioural outcomes although the intrinsic hypothesis is still rarely investigated with many studies omitting the person-specific component (e.g., De Jonge & Hamers, 2000; Head et al., 2007; Lewig & Dollard, 2003; Siegrist et al., 2006; van Vegchel, De Jonge, & Landsbergis, 2005; Van Vegchel et al., 2001).

Studies that do include a test of the intrinsic hypothesis have found that a high level of overcommitment is associated with decreased job satisfaction (Li et al., 2005), greater work-family conflict (Kinman & Jones, 2007) and increased absenteeism (Godin & Kittel, 2004; Schreuder et al., 2010). However, similar studies have also found no evidence of a relationship with work attitudes and behaviours such as turnover intentions (Derycke et al., 2010; Kinnunen et al., 2008) and sickness absences (Griep et al., 2010; Hanebuth et al., 2006; Peter & Siegrist, 1997).

Overall, previous research tends to find consistent and relatively strong support for the effects of a high need for control or overcommitment on physical and mental health outcomes. In comparison, ERI research addressing more organisationally oriented measures is relatively sparse and far too inconsistent to come to any conclusions regarding the influence of overcommitment on work-based attitudes and behaviours. The literature covered in this section indicates that more research is required to assess the relationship between the ERI model, overcommitment, and work-based outcomes. The inconsistencies in the literature may be the result of differences in measurement scales or research designs, or may suggest that

overcommitment is less relevant in the prediction of employee attitudes and behaviours when compared to health outcomes. A number of methodological and conceptual issues that are relevant to the intrinsic hypothesis of the ERI model are identified in Chapter 3 of this thesis and will be explicitly addressed in the current research.

The interaction hypothesis of the ERI. The interaction hypothesis of the ERI model was not a major focus of earlier ERI research. However, internal psychological dispositions related to a high need for control are thought to intensify the reaction to control-limiting conditions at work (Siegrist et al., 1982). That is, a high level of overcommitment is expected to moderate and exacerbate the effects of high effort-low reward conditions. In terms of health outcomes, the reviews undertaken by van Vegchel et al. (2005) and Tsutsumi et al. (2004) identified just five studies that tested the interaction between an imbalance and overcommitment, and physical health indicators such as cardiovascular disease. Notably, none of these studies found support for the interaction hypothesis. Further, despite the inclusion of all components of the ERI model in their research designs, none of the studies that investigated behavioural outcomes tested an interaction effect. Studies that assessed work-related or psychological outcomes such as employee wellbeing and job satisfaction investigated the interaction with greater frequency, although their support was mixed. Only three of seven investigations that assessed the interaction between overcommitment and an effort-reward imbalance found any evidence of an effect. Specifically, de Jonge et al.'s (2000) cross-sectional study of Dutch workers supported the moderating effect in relation to employee reports of both job dissatisfaction and emotional exhaustion, while Bakker et al. (2000) also found evidence of an interaction between an ERI and overcommitment for burnout.

In the years since the reviews of Tsutsumi et al. (2004) and van Vegchel et al. (2005) the literature surrounding the ERI model has continued to grow. However, examination of the interaction hypothesis is less frequent when compared to the extrinsic hypothesis. In many cases, all components of the ERI model are included in a study's design and yet the interaction hypothesis is not tested (e.g., Dragano et al., 2008; Eller & Netterstrom, 2007; Griffen, Grenier, Stansfeld, & Marmot, 2007; Janzen, Muhajarine, Zhu, & Kelly, 2007; Niedhammer et al., 2006; Sakata et al., 2008; Shulz et al., 2009; Watanabe, Tanaka, Aratake, Kato, & Sakata, 2008). The

findings of empirical studies that have included a test of the interaction hypothesis have found varied support for the proposed conditional effects of overcommitment. A study by Takaki et al. (2006) tested the interaction between an imbalance and overcommitment among a sample of Japanese information-technology workers. They found that those employees who reported a high effort-low reward condition along with a high level of overcommitment were more likely to report heightened fatigue than those with a lower level of overcommitment. Similarly, a study of 130 Australian members of the public demonstrated an $ERI \times$ overcommitment interaction effect on driving anger, such that highly overcommitted individuals who reported an imbalance were likely to experience greater driving anger than their less overcommitted counterparts (Hoggan & Dollard, 2007).

An interaction effect has also been demonstrated with a range of work-related outcomes. For instance, Griep et al. (2010) identified a significant moderating effect of overcommitment on the relationship between an effort-reward imbalance and sickness absence. Kinman and Jones (2008) also identified a significant interaction effect when investigating work-life conflict among a sample of university employees, while Kinnunen et al. (2008) found considerable support for an interaction when investigating turnover intentions, engagement, and absorption.

However, not all studies support the interaction effect. von Kanel and Kudielka (2009) found no evidence of an ERI-by-overcommitment effect when examining blood coagulation within a sample of teachers. Prekel et al. (2007) also found no support for the moderating effects of overcommitment on an effort-reward imbalance when examining physical and mental health, vital exhaustion, depressed mood or sleep problems. Contradictory findings are also often reported between studies that investigate the interaction hypothesis using the same or similar outcomes. For example, while Kinman and Jones (2007) identified that an interaction between effort, reward, and overcommitment predicted greater work-life conflict among academic staff, a study conducted by Willis et al. (2008) found no association between the $ERI \times$ overcommitment interaction and work-family conflict among a sample of police officers. Research conducted by Weyers et al. (2006) investigated the effects of an interaction on nurse psychological wellbeing and found considerable support for the proposed exacerbating influence of high overcommitment. In contrast, Kinman and Jones (2007) found no support for an interaction effect on

levels of psychological distress. Similarly, Derycke et al. (2010) could not identify an interaction between an ERI and overcommitment for turnover intentions, while Kinnunen et al. (2008) reported a significant moderating effect for both turnover intentions and work engagement. Conflicting results were also identified between two studies investigating nurse burnout. Bakker et al. (2000) supported an ERI \times overcommitment interaction effect yet Chu et al. (2008) found no evidence for moderation.

Ultimately, it appears that support for the interaction effect is mixed and results to date are somewhat inconclusive. The number of studies that include a test of the interaction hypothesis has increased over time although there are conflicting findings and the extent to which an interaction is relevant across different strain outcomes is uncertain. The inconsistent findings evident in the literature warrant further investigation of the interaction effect proposed by Siegrist (2002b), and suggest that to provide a comprehensive test of the moderation effects a range of outcomes should be investigated.

Conclusions

This chapter provided a critical overview of the existing ERI research and the extent to which the ERI model and the extrinsic, intrinsic and interaction hypotheses have been examined in the literature. This research generally provided strong support for the effects of an effort-reward imbalance on both physical and psychological health outcomes. However, evidence supporting the ERI model is less robust when work-specific attitudes and behaviours are the focal outcomes. Individual differences within the ERI model also are investigated with far less frequency when compared to the situational components. The next chapter will critically evaluate the ERI research focusing on the limitations and areas for advancement. The current research and study hypotheses then will be introduced.

CHAPTER 3: Evaluating, Clarifying & Extending the ERI Model

This chapter links the theoretical and empirical research reviewed in the previous chapter to the current research. In the following sections, the limitations of the existing research are explored and the rationale for the current research is developed. It is argued that the ERI model has significant utility as a work stress model and yet there remain a number of theoretical and conceptual issues that, if addressed, will help to strengthen the ERI model and expand the existing literature. Firstly, previous research is limited with respect to the extent to which the role of individual differences in the ERI model are adequately explored, particularly with respect to work related outcomes. Secondly, the measurement tools used in previous studies have been questioned with regard to their consistency and their ability to capture the conceptual properties of the key components of the ERI model. A third criticism relates to the typical operationalisation of an imbalance and the strength of existing methods to identify significant relationships between the effort, reward and overcommitment measures and employee outcomes. Finally, the research methods used within the job stress literature in general, and within research investigating the ERI model in particular, have been criticised for the extensive use of solely cross-sectional designs and reliance on self-report measures. If research is to continue to produce relevant and practically applicable findings, there is a need for further research to examine both the short- and long-term effects of the full ERI model, including consideration of individual differences that are theoretically and historically linked to the ERI model. The final section of the current chapter will provide an overview of the proposed research and detail the aims and hypotheses of the current study.

Limited knowledge of the role of individual differences in the ERI

The ERI model variables and predicted interactions closely resemble a transactional approach to work stress. Both organisational conditions and individual differences play critical roles, and this interplay is emphasised throughout the literature (Mark & Smith, 2008). Moreover, the role of personal characteristics in coping with threats to control is a central argument that distinguishes the ERI model from other similar work stress perspectives such as equity theory (Adams, 1965) or distributive justice (Greenberg, 1990). Siegrist (2000) notes that the interpretation of work strain without consideration of the individual processes that determine their

subjective experience of strain does not, and cannot, adequately describe the complex stressor-strain process. The inclusion of individual differences is therefore an essential aspect of the ERI model, and adds a unique dimension to an otherwise context-based framework.

The review of research in the previous chapter identified that investigations focusing on the role of individual differences in the ERI model, and their influence on the stressor-strain process, are underrepresented in the literature. Furthermore, of the studies that have tested for the effects of an overcommitment or the interaction between an effort-reward imbalance and overcommitment, the results are ambiguous. The gradual development of the ERI model and the refinement of the overcommitment construct has resulted in considerable inconsistencies between studies and potential confusion regarding the critical aspects of personality that are associated with increased reactivity to high effort-low reward conditions. The following section will focus on the major conceptual and operational issues involving the person specific component of the ERI model. The subsequent section will then address some of the limitations of previous ERI research before specifying how these issues are addressed in the current study.

The origins of overcommitment: need for control and Type A behaviour.

The conceptualisation and operationalisation of overcommitment has undergone considerable changes since the ERI model's introduction. Early theoretical work on the ERI model argued that there was substantial evidence in the literature to suggest that an internal motivational source enhanced the stress-response of employees faced with limited environmental control (Siegrist, 1996). According to previous descriptions, overcommitment reflected those "cognitive, emotional, and motivational components within the global concept of Type A behaviour that are suspected of triggering enhanced arousal in demanding situations" (Siegrist, 1996, p. 29). In particular, overcommitment was associated with those aspects of the Type A personality that reflect a high need for control, an excessive preoccupation with approval and esteem, and an inability to withdraw from work obligations (Hanson et al., 2000; van Vegchel, de Jonge, Bakker & Schaufeli, 2002). The underlying cognitive-motivational pattern of Type As was thought to be an essential contributor to hyper-reactivity when faced with distinct control-limiting conditions such as high effort and low reward (Matschinger et al., 1986).

Conceptual work by Glass (1977) suggested that the Type A profile represents a coping style that is motivated by a strong personal desire to gain and maintain control over the environment. Particular behaviours exhibited by Type As such as extreme competitiveness, easily aroused hostility, or achievement striving, were thought to be elicited in response to demanding and threatening situations. According to Glass (1977), when Type As are presented with a threat to control, their initial response is to increase efforts to assert or regain control, although repeated failures are likely to result in withdrawal and feelings of helplessness. Prolonged exposure to uncontrollable situations such as the experience of high effort and low reward conditions within the workplace therefore are thought to elicit negative behaviours characteristic of Type As, and lead to an increased risk of poor health and overall functioning. Research findings are indeed consistent with Glass' expectations. Repeated or prolonged exposure to threatening environmental conditions is associated with greater stress and enhanced arousal among Type As (Brunson & Matthews, 1981a; Howard, Cunningham, & Rechnitzer, 1986).

The conceptual and historical links between overcommitment and the Type A profile are clear, and current research continues to refer to overcommitment as an individual difference variable that reflects critical components of Type A such as the need for esteem and approval and the tendency to strive toward continuously high achievement (Hoggan & Dollard, 2007; Siegrist, 2008). Consistent with the motivational basis of the Type A profile, the original 'need for control' concept evolved from a critical analysis of the global Type A pattern. Specifically, Siegrist (1996, p. 29) states that "need for control specifies those cognitive, emotional, and motivational components within the global concept of Type A behaviour that are suspected of triggering enhanced arousal in demanding situations". The Type A's tendency toward hyper-reactivity in the face of environmental stressors is therefore explicitly linked to the ERI model. Despite these representations in the literature, the extent to which the current operationalisation of overcommitment continues to represent aspects of the Type A profile requires clarification. The overcommitment measure has undergone considerable changes since it initially was introduced and the inconsistent moderating role of overcommitment in the empirical literature may suggest that overcommitment represents only a partial view of those aspects of personality that are associated with a high need for control and increased reactivity to

environmental stressors.

Measuring overcommitment. Siegrist (1995a, p. 229) notes that there are many possible approaches toward defining the critical characteristics that lead to a high internal need for control. Characteristics such as “achievement motivation, hardiness, global type A behaviour, or subcomponents such as hostility” are cited as having relevance to employee motivation in the work setting. In particular, components related to excessive work commitment, a need for approval and latent hostility were identified as individual characteristics that are thought to lead to a greater level of intrinsic effort. The most current form of the ERI-Q presented by Siegrist et al. (2004) recommends the use of the short measurement scale representing the ‘inability to withdraw from work obligations’ to operationalise overcommitment.

The literature review presented in the previous chapter identified that evidence supporting the direct effects of overcommitment on employee health is strong. In comparison, the literature is highly inconsistent with respect to the intrinsic and interaction hypotheses, particularly when work-oriented attitudinal or behavioural measures are the focal outcomes. van Vegchel et al. (2005) reported that only twelve of 45 studies could be identified that investigated the interaction effect. The scales used to operationalise overcommitment within these studies varied substantially, some utilised the original need for control scale (Bakker, Demerouti, De Boer, & Schaufeli, 2003; Hanson et al., 2000; Vrijkotte et al., 1999), others the current overcommitment scale (Van Vegchel et al., 2001) and two studies used single-item proxy measures (de Jonge et al., 2000; Kuper et al., 2002). Recent empirical work tends to use the recommended overcommitment measure with greater frequency (Hoggan & Dollard, 2007; Kinman & Jones, 2008; Kinnunen et al., 2008; Weyers et al., 2006; Willis et al., 2008) although results remain mixed regarding the existence of a moderating effect.

Many studies operationalise overcommitment with the use of proxy indicators or reduced-item scales that appear to measure only particular elements of the construct (e.g., de Jonge et al., 2000; Ertel, Eberhard, Ullsperger, Von dem Knesebeck, & Siegrist, 2005; Stansfeld et al., 1999). However, most authors attempt to measure overcommitment with the use of items that overlap with the original theoretical understanding of an ‘overcommitment’. In particular, the use of components of the Type A profile is common. For instance, the Whitehall II studies often are cited as

strong evidence for the pathogenic nature of a high level of overcommitment or need for control. Indeed, the results suggest that employee health is substantially influenced by a high level of overcommitment, particularly among males (e.g., Steptoe, Siegrist, Kirschbaum, & Marmot, 2004). The measure included in the Whitehall II study was however, comprised of items that reflected the Type A personality profile and hostility (for further details see Bosma, Peter, Siegrist, & Marmot, 1998). The results of the Whitehall II studies suggest a strong effect of ‘overcommitment’ on employee health, although these results can be attributed to the Type A profile.

More recent research also tends to identify the Type A profile as an overlapping construct with the current overcommitment measure (e.g., van den Heuvel, van der Beek, Blatter, & Bongers, 2007; Vrijkotte et al., 1999; Vrijkotte, Van Doornen, & De Geus, 2004) although the extent to which the current overcommitment scale can be considered a representation of the Type A profile requires clarification. The self-report measure designed to reflect overcommitment has been altered substantially since its initial inception reducing its size and altering the item wording. The original overcommitment scale (i.e., the need for control scale) was developed from the Type A construct and measured four aspects: “(a) need for approval, (b) competitiveness and latent hostility, (c) impatience and disproportionate irritability, and (d) personal inability to withdraw from work obligations” (Siegrist, 1996, p. 32). Factor analyses identified that the total need for control scale could be separated into two factors, ‘immersion’, and ‘vigour’. Investigations utilising the total need for control scale demonstrated that the immersion factor was significantly correlated with Type A behaviour along with a measure of vital exhaustion; however, the vigour factor was not associated with either of these measures. The immersion factor also differentiated between patients who reported a prior episode of acute myocardial infarction and healthy controls, while the vigour factor did not (Appels et al., 1997). Thus, it was concluded that ‘immersion’ was associated with an increased risk of ill health (de Jonge et al., 2000). Subsequent analyses failed to replicate the hypothesized internal structure of the immersion factor, and considerable reliability issues emerged (Appels et al., 1997). Therefore, in an attempt to improve its psychometric properties and enhance the scale’s parsimony, the overcommitment scale was reduced to six items. The aim of improved reliability was accomplished with the new scale

achieving a high level of internal consistency (Hanson et al., 2000) while maintaining a strong association between overcommitment and health.

The short measurement scale now recommended for applied research comprises only six items of the original scale, and most of these items relate to the inability to withdraw from work (Siegrist et al., 2004). Specifically, a recent analysis (Fahlen, 2008) comparing the current and the original scales identified that there was a high correlation (.77) between the two measures. This correlation differed however, when the dimensions of the original measure, and their relationship with the short overcommitment scale were examined independently. The strongest association was identified between the 'inability to withdraw from work obligations' dimension and the current scale (.91), although moderate correlations were also identified with 'disproportionate irritability' (.58), 'need for approval' (.50), and competitiveness (.39).

The relevance of the Type A construct to the ERI model is evident, although the extent to which Type A continues to be represented in the ERI model is uncertain. Original ERI research operationalised overcommitment using measures that represented the Type A behaviour construct including elements such as competitiveness and disproportionate irritability although a reduction in items now appears to have removed many of those cognitive, motivational and behavioural aspects specific to the Type A profile. Accordingly, components of the Type A pattern may have relevance to employee experiences of stress within the context of the ERI model, in addition to the contribution made by the current overcommitment scale.

The history of Type A behaviour. Type A behaviour has been an integral individual difference variable in occupational stress research for a number of decades. The construct initially was developed by Friedman and Rosenman (1959) as a result of their work with coronary heart disease patients. From as early as the 1700s clinicians documented their observations on the personality characteristics that they believed were associated with coronary disease (Jenkins, 1975) and, while it was generally accepted that personality had an influence on the development and/or maintenance of coronary disease, it was not until Friedman and Rosenman (1974) developed the concept of the Type A coronary-prone behaviour pattern that a unified 'type' was identified.

The Type A profile is generally described as a constellation of personality traits and a particular personal coping style which is characterised by chronic and extreme time urgency, impatience, restlessness, hyper-alertness, competitiveness, desire for recognition and advancement, aggressiveness and free-floating hostility (Friedman & Rosenman 1974; Jenkins 1975; Burke, 1985). Numerous observational, prospective, and retrospective studies throughout the last half of the twentieth century also seemed to substantiate the hypothesised relationship between the Type A construct and poor coronary health (Jenkins, 1975). Most notably, the Western Collaborative Group Study (WCGS), in which over three-thousand healthy middle-aged men participated, was a longitudinal prospective study originally conducted in 1960 and continuing over the following nine years (Rosenman et al., 1975; Rosenman et al., 1966; Rosenman et al., 1964).

The results of the WCGS study suggested that the Type A behaviour pattern was associated with decreased coronary health even after controlling for traditional risk factors such as smoking. As a consequence of these strong findings, the Review Panel on Coronary-Prone Behaviour and Coronary Heart Disease (1981) from the National Heart, Lung and Blood Institute, determined that the Type A behaviour pattern was an independent risk factor for CHD. This same review however, also identified a number of limitations of the previous research. In particular, they noted important methodological limitations such as the typical one-dimensional focus of research involving the Type A pattern, which lacked consideration of environmental, cognitive, genetic, and social factors that act in tandem with individual dispositions to determine outcomes. Subsequent research has suggested that the global Type A profile should not be considered an independent risk factor for cardiovascular ill-health, although some dimensions (e.g., hostility) are thought to play a key role in the development and progression of cardiovascular diseases (Myrtek 2001, 2006) suggesting that empirical research should focus on the dimensions of Type A behaviour. Further, the interaction between Type A dimensions and environmental conditions is likely to provide a more accurate depiction of the way that personality influences stress and health (Bolger & Zuckerman, 1995).

The dimensions of Type A and work stress. Type A behaviour was originally constructed to represent a single unified type however more recent research tends to advocate the use of multiple components to represent the Type A profile (Barling &

Charbonneau, 1992). Specifically, Type A, as measured by the Jenkins Activity Survey, is comprised of two main components, achievement striving and impatience-irritability (Spence, Helmreich, & Pred 1987), although hostility is also a key component of the Type A construct (Lee, Jamieson, & Earley 1996; Rosenman 1991) and authors suggest its inclusion in tests of the Type A profile (Lee, Jamieson, & Earley, 1996a). These aspects of Type A also have been shown to have differential effects on employee outcomes, further supporting the independence of the Type A components (Bluen, Barling, & Barns, 1990).

The achievement striving dimension of Type A reflects an individual focus on achievement and approval (Spence, Helmreich, & Pred, 1987). Individuals characterized by a high level of achievement striving are typically described as serious workers and active individuals (Bluen et al., 1990). Highly achievement-oriented employees are thought to view environmental demands as challenges rather than threats (Ward & Eisler 1987), and often perform well in occupational pursuits (e.g., Barling & Charbonneau 1992). A greater level of achievement striving is consistently associated with positive work outcomes such as greater engagement (Hallberg, Johansson, & Schaufeli, 2007), job satisfaction (Day & Jreige, 2002), and occupational commitment (Jepson & Forrest, 2006). In comparison, achievement striving is negatively associated with outcomes such as emotional exhaustion (Hallberg et al., 2007) or psychological strain (Jex, Adams, Elaqua, & Bachrach, 2002).

The impatience-irritability component of Type A refers to extreme time urgency and a preoccupation with completing more in less time (Spence et al., 1987). Highly impatient and irritable employees are believed to be motivated by the belief that resources are scarce and there is limited time to complete tasks (Burke, 1985; Friedman, 1996; Price, 1982), therefore they are far more likely to act competitively and prefer to work at a faster rate than their counterparts do. The impatience-irritability component appears to have a consistent and negative influence on employee outcomes and is related to poor employee health (Barling & Charbonneau, 1992; Spence et al., 1987), lowered job satisfaction and greater general stress (Day & Jreige, 2002), poor levels of engagement, and greater emotional exhaustion and cynicism (Hallberg et al., 2007).

Hostility while difficult to define generally refers to those cognitive, motivational and affective components of personality that predispose an individual to react with anger, disgust, frustration, contempt and resentment (Siegman, Dembroski, & Ringel 1987). A distinction can be made between cognitive, affective, and behavioural forms of hostility. Cognitive hostility refers to negative beliefs about others and the world. Cognitively hostile individuals appear to be motivated by a belief that the world is inherently unjust, with no universal moral principles (Burke 1985). A high level of cognitive hostility is likely to result in attributional biases that lead the hostile individual to interpret other's behaviour as antagonistic or threatening, and therefore leads to aggressive reactions to perceived transgressions of others. Affective hostility consists of a number of emotional states such as anger, aggression, resentment, or disgust. Behavioural hostility is represented by an outward display of hostility and may be a clear violation of societal norms or may be a more subtle expression of hostility such as antagonistic behaviour. Research tends to support the association between behavioural hostility and health risks, and suggests that subtle forms of antagonism are strongly associated with health outcomes (Barefoot, 1992; Barefoot & Lipkus, 1994). The Type A-form of hostility specifically refers to a trait-like characteristic and is focused on a behavioural expression of hostility and the typically antagonistic interpersonal style of hostile individuals rather than the cognitive or affective experience of hostility (Rosenman 1991).

Type A as a moderator of the stressor-strain relationship. Type A individuals are thought to be motivated by a need to control their environment and an excessive preoccupation with esteem such that stressors or environmental factors that limit or impede their control and/or their social status are particularly salient for Type As (Glass 1977; Glass & Carver 1980; Matthews 1982). Appels (1989) argued that a need for control was such an integral part of the Type A behaviour that a lack of control could make the Type A individual susceptible to myocardial infarction. However, the successful Type A individual was unlikely to experience increased risk. Perceived threats or challenges to control are therefore more likely to induce increased psychological and physiological reactions among Type As as a result of the disproportionate emphasis on maintaining a personal sense of control.

Evidence suggests that the influence of Type A on employee outcomes can vary depending upon the context and the perceived, or actual, controllability of the situation (e.g., Benight & Kinicki, 1988; Brunson & Matthews, 1981b). Type As show a considerable preference for obtaining and maintaining control over situations (Glass & Carver, 1980; Strube, Berry, & Moergen, 1985) and their reactions to environmental challenges and conditions that represent a source of stress are far greater than their Type B counterparts (e.g., Fichera & Andreassi, 1998; Humphries, Carver, & Neumann, 1983; Rhodewalt & Davison, 1983).

Much of the previous research that considers the Type A profile as a moderator of the stressor-strain relationship tends to focus on a global indicator rather than the independent dimensions (Brief, Rude, & Rabinowitz, 1983a, 1983b; Iwata, Suzuki, Saito, & Abe, 1992; Jamal, 1990; Jamal & Badawi, 1995; Keenan & McBain, 1979). However, recent research suggests that specific Type A dimensions may have considerably different effects on employee reactions to perceived work stressors. The achievement striving dimension appears to have a protective role in the experience of stress while impatience-irritability and hostility are viewed as the toxic components (Birks & Roger, 2000). One study of particular note is that conducted by Day and Jreige (2002). Using the Jenkins Activity Survey, Day and Jreige identified that there was generally a negative effect of impatience-irritability, and a positive effect of achievement striving, on employee satisfaction and stress. However, when combined with work stressors such as low job control and high role ambiguity a greater level of impatience-irritability acted to amplify or exacerbate the negative effects of work stressors. In comparison, a high level of achievement striving acted to mitigate the dissatisfying and stress-inducing effects of work conditions such as low job control.

Research has also demonstrated an increased level of stress-reactivity among highly hostile individuals (Diamond et al., 1984; Ganster, Schaubroeck, Sime, & Mayes, 1991; Rhodes, Harrison, & Demaree, 2002). For instance, hostility has been found to moderate the relationship between job enrichment and health care costs (Dwyer & Fox, 2000). Dwyer and Fox reported that health care costs were higher among those employees who reported greater hostility and the negative effects were exacerbated when employees also reported high levels of responsibility and skill utilisation. Additional research also demonstrates the reactivity of hostile employees to work stressors. Kivimaki et al. (1998) identified that among hostile individuals

exposed to work stressors such as job insecurity or changes in job demands, sickness absence was significantly increased.

In summary, the findings from previous Type A research suggest that impatience-irritability, hostility and achievement striving are likely to have differential effects on employee strain outcomes and employee reactivity to workplace stressors. The use of a global Type A measure may therefore misrepresent those components of the Type A profile that are associated with increased strain or disease-risk. Achievement striving appears to be associated with lowered strain, and may act as a protective factor. In contrast, both impatience-irritability and hostility are consistently associated with poor employee outcomes and appear to exacerbate employee reactivity to the experience of stress at work. The relevance of Type A dimensions to the ERI model has not been extensively tested, although the experience of an effort-reward imbalance may be particularly stressful for those employees characterised by a high level of impatience-irritability or hostility, while employees characterised by a high level of achievement striving may be less likely to react to poor conditions such as high effort and low reward. The current overcommitment measure appears to share little overlap with these Type A dimensions. Thus, the identification of additional personality dimensions that are associated with increased reactivity to effort and reward would provide rationale to expand the current overcommitment measure and may enhance the overall predictive utility of the ERI model.

Methodological refinements of the ERI model

Evidence to support the ERI model has grown substantially over the previous two decades and the ERI model is now considered an important work stress framework. However, a number of criticisms have developed in the literature and authors have suggested that greater specification and clarification of the ERI model is necessary (e.g., Kasl, 1996; van Vegchel, De Jonge, & Landsbergis, 2005). The methods used to operationalise the effort-reward relationship, the use of a uni-dimensional indicator to represent the multi-dimensional reward construct, the reliance on cross-sectional designs and proxy measures of effort and reward, and the focus on physical health outcomes are all aspects of the existing ERI literature that have been subjected to criticisms in the literature. The following sections detail these criticisms and

provide a rationale for clarifying and extending the ERI model according to the specified areas.

The operationalisation of the effort-reward relationship. A major criticism of the existing ERI literature concerns the operationalisation of an imbalance. Siegrist and Marmot (2004) recommend operationalising the extrinsic ERI hypothesis by constructing a ratio term to reflect the presence or absence of a high effort-low reward condition. Under a ratio interaction term, it is the proportion of job resources in relation to job demands that will influence the level of strain felt by the employee (Edwards & Cooper, 1990). Accordingly, high strain jobs are defined by high effort-low reward conditions, while relatively low amounts of strain are represented in the opposite condition. According to ERI theory (Siegrist et al., 2004), a ratio greater than one, represents an inequitable relationship in which the employee is unfairly disadvantaged, while a ratio of one or less than one indicates that there is either a balance between inputs and outputs or a condition that benefits the employee (Peter et al., 1998). Consistent with Siegrist's notion of effort-reward imbalance, van Vegchel, and colleagues (2005) note that the most common form of interaction utilised in ERI research is the ratio term. Empirical studies tend to either retain the ratio as a continuous measure (occasionally also applying a logarithmic transformation) or dichotomise the ratio and create subgroups to represent "imbalanced" and "balanced" groups.

A number of criticisms are relevant to the operationalisation of an effort-reward imbalance with a ratio or subgroups approach. A number of authors have questioned the precise meaning of an 'imbalance' and the methods that should be used to operationalise the relationship between effort and reward (Prekel et al., 2007; van Vegchel, De Jonge, & Landsbergis, 2005). Despite recommendations to use a ratio indicator (i.e., reward/effort), authors have recently advocated that an additive model or multiplicative terms (i.e., reward \times effort) provide greater power to detect significant effects (Prekel et al., 2007; van Vegchel, De Jonge, & Landsbergis, 2005). Previous research has found support for the effects of an ERI operationalised with either a ratio or subgroup comparisons (de Jonge et al., 2000; Kuper et al., 2002; Vrijkotte et al., 1999) although there are considerable issues associated with these approaches. First, subgroup comparisons require authors to divide a sample according to levels of one or more variables, effectively reducing a continuous

measure to a categorical one. Applied to the ERI model, producing dichotomised effort and reward scales, or groups based on ratios, results in a substantial loss of information, variance and power, and a number of authors criticise the practice (Cohen, 1978; MacCallum, Zhang, Preacher, & Rucker, 2002; Royston, Altman, & Sauerbrei, 2006).

The second concern associated with the use of either a ratio or subgroups approach relates to the extent to which this method of operationalising the ERI hypotheses can adequately address the research questions posed by the ERI model. ERI theory presumes that the co-existence of high effort and low reward have a greater influence on employee health and wellbeing than the effects of simple job characteristics (Siegrist, 2008). To demonstrate this effect, higher-order terms such as the interaction between effort and reward should only be considered significant where improved model fit can be shown over a simple or lower-order (e.g., additive) model (Cohen, 1978). Studies that use a ratio or subgroups approach to model the interaction between effort and reward have rarely partialled out the main effects prior to testing a combined indicator (Griffen et al., 2007; Kivimaki et al., 2007; Vrijkotte et al., 1999). Because the main effects are not controlled, disproportionate weight is given to the combination of work stressors (Fox, Dwyer, & Ganster, 1993) and may have led to an overly liberal test of the effort-reward interaction relationship.

A third concern connected to the operationalisation of an effort-reward imbalance relates to the use of cut-off points in empirical research. Authors have criticised the relatively arbitrary choice of a cut-off point to determine balanced and imbalanced employees. Findings reported by Lehr et al. (2010) suggest that the proposed cut-off point may not appropriately classify individuals according to their disease-risk. Illustrating the potential issues associated with ratio cut-off points, Lehr reported that a 0.715, rather than a 1.0, cut-off was the optimal point to determine the prevalence of mood disorders among their study sample. The finding that a cut-off point of one may misclassify individuals raises concerns over the results of previous studies and presents a number of issues for future research. Studies that have utilised a subgroups approach based on the ratio indicator may have underestimated the effects of workplace demands or occupational resources. Lehr et al. (2010) suggest that an optimal cut-off point of less than one may indicate that effort and reward are not

related one-to-one, where a greater level of reward may be needed to balance the effects of a single-unit change in effort.

The final criticism regarding the way in which the imbalance is operationalised concerns the practical utility of a ratio indicator over different forms of interactions. van Vegchel and colleagues (2005) note that while a ratio is the recommended method to represent an imbalance, additive and multiplicative terms can be used to test the extrinsic hypothesis and may provide greater power to detect significant effects. Three studies (Prekel et al., 2007; van Vegchel, De Jonge, & Landsbergis, 2005; Willis et al., 2008) could be identified that included a test of different formulations of the extrinsic hypothesis. In all cases, the results supported a multiplicative or additive model over the traditional ERI ratio term. Additive and multiplicative models eliminate potential complications associated with cut-off points or subgroups approaches. They also enhance power to detect interactions by preserving continuous measures and retaining all information in the independent variables. Using additive and multiplicative methods may therefore strengthen ERI research and lead to a more detailed understanding of the specific pathways through which effort and reward relate to each other and to employee strain.

Alternative effort-reward combinations. Alternative combinations of effort and reward may also be relevant to employee strain, although the use of a ratio limits the extent to which research can investigate the relative importance of effort and reward, and whether alternative combinations of effort and reward might be differential predictors of employee outcomes. The ERI model chiefly considers conditions of high effort-low reward (i.e., underpayment inequity) as critical to employee health and wellbeing and does not typically consider other possible formulations. Accordingly, conditions whereby an employee unfairly benefits (i.e., where there is overpayment inequity) or where there is a balance (e.g., high effort-high reward) are often excluded *a priori* in tests of the ERI model. Despite this, alternative work conditions may also be significant predictors of strain. For instance, Kasl (1996) has previously voiced concerns over the representation of a negative effort-reward imbalance, suggesting that this aspect of the ERI model requires further clarification. Kasl notes that ERI theory views a discrepancy between high educational attainment and low occupational status as a source of stress. In comparison, consistent with the proposed distressing nature of an overpayment

condition, the occupational psychology literature suggests that detrimental effects are expected in the opposite condition where occupational status exceeds educational attainment. Accordingly, an effort-reward imbalance reflecting reduced upward mobility (i.e., high effort-low status rewards) is viewed as a negative imbalance within the ERI model and yet excessive occupational status (i.e., low effort-high status rewards) may in fact be associated with greater distress and greater health risks. The ERI model also does not consider low effort as a potential stressor. However, the effects of underload or skill under-utilisation on employee health outcomes such as coronary heart disease (Frankenhaeuser, 1991; Melamed, Ben-Avi, & Green, 1995) or affective and behavioural outcomes (Coburn, 1975; Ganster et al., 1991) are noted in the literature. Low effort at work or conditions that represent under-utilisation may therefore represent a considerable risk factor for employee strain.

Previous research based on equity theory also suggests that alternative combinations of effort and reward may influence employee strain. There are clear similarities between the ERI model and equity theory (Adams, 1965). In particular, the imbalance between costs and gains is the central focus of both perspectives. In contrast to the ERI model, equity theory argues that cost-gain imbalances in either direction should result in stressful experience. Adams (1965) noted, while conditions of underpayment inequity are likely to result in the greatest levels of distress, overpayment can also lead to increased negative affect. The effects of underpayment inequity on distress and dissatisfaction are well-documented (Edwards & Simmons, 1969; Lawler, 1967; Pritchard, Dunnette, & Gorgenson, 1972). Reinforcing Adam's proposition, evidence also tends to support the notion that overpayment is distressing albeit to a lesser extent than an underpayment condition (e.g., Carrell & Dittrich, 1978; Perry, 1993). Previous research suggests that there is a higher 'threshold' for overpayment inequity compared to an underpayment condition (Greenberg, 1986) implying that the disparity between effort and reward that is needed to induce the distressing effects of overpayment may be greater than in conditions that represent underpayment.

Empirical evidence provides some support for the proposition that different combinations of effort and reward may have detrimental effects for employees. For instance, studies have shown that combinations of effort and reward that reflect a

condition of overpayment (i.e., low effort-high reward; Van Vegchel, 2005) underutilisation (i.e., low effort-low reward; Tobiasz-Adamczyk & Brzyski, 2005) or an effort-reward balance (van Vegchel et al., 2002) may be associated with negative affect or increased health risks. Illustrating the potential influence that overpayment may have on employees, de Jonge et al. (2000) identified that among employees who reported a low effort and high reward condition, emotional exhaustion was seven times as high as that for employees who reported high effort and low reward. Further, directly contrasting the traditional ERI hypothesis two prior studies (van Vegchel et al., 2002; Van Vegchel et al., 2001) identified that an effort-reward balance was associated with an increased risk of physical symptoms, and emotional exhaustion.

The use of a ratio to operationalise an imbalance conceals potentially distressing and harmful conditions, and may misrepresent overpayment or balanced conditions as beneficial to employee health or job attitudes. A condition reflecting overpayment rarely has been tested in ERI research despite the potentially distressing nature of low effort-high reward. Similarly, particular conditions such as a low effort-low reward condition may signify employee withdrawal from the workplace, and may be important to outcomes such as psychological health or absenteeism, while conditions that represent overpayment or excessive occupational status may also be stress inducing for employees. Further research is needed to address the potential effects of different effort-reward combinations on employee strains.

Multi-dimensional rewards in the ERI model. Previous authors have suggested that existing ERI research is limited by its use of a uni-dimensional indicator to operationalise the reward component (e.g., van Vegchel et al., 2002). Rewards in the ERI model are represented by a combination of tangible and intangible rewards that may have differential effects on employee outcomes. Despite this, very little research examines whether some forms of reward are more important than others are, and whether this is dependent upon particular contexts or characteristics of employees.

The ERI Questionnaire developed for research assesses three distinct reward indicators: esteem rewards, financial rewards, and promotion prospects/job security (Siegrist et al., 2004). Esteem rewards refer to feelings of respect from colleagues and supervisors, as well as perceptions of recognition in the workplace. Financial rewards refer to judgements about salary levels, while promotion prospects and job

security consider the relative stability of job conditions and future opportunities for employees. Examinations of the proposed factor structure of the ERI model's reward scale have found inconsistent results. The esteem component appears to be stable across studies although the financial, security and promotion items of rewards vary with regard to their interrelationships. Siegrist et al., (2004) noted that empirically it is difficult to distinguish between financial and career-related aspects. The results of factor analyses typically support this view, with some studies suggesting a combined salary and promotions factor (e.g., De Jonge, van der Linden, Schaufeli, Peter, & Siegrist, 2008) and others indicating that a combined promotion and security rewards factor, and a separate financial rewards factor, provide the best fit (Hanson et al., 2000).

Siegrist and Peter (1996) tended to advocate the use of an aggregate reward measure to model an effort-reward interaction, although they also acknowledge the existence of separate reward systems. The global reward indicator appears to be highly relevant for a range of employee outcomes and a main effect of reward has been demonstrated for physical health (Eller & Netterstrom, 2007; Peter et al., 1998), psychological health (Griffen et al., 2007; Niedhammer et al., 2006), and behavioural withdrawal outcomes (Griep et al., 2010; Peter & Siegrist, 1997). However, the multi-dimensional nature of rewards provides additional opportunity to examine how occupational resources may influence various employee strain outcomes.

Practically, the separation of the reward construct in to its component parts provides substantial opportunity for addressing workplace design. A greater understanding of the way that different rewards might influence employee work attitudes and behaviours can ensure that HR systems are designed to address the key issues. According to traditional theories of work stress and motivation (Herzberg, Mausner, & Snyderman, 1959; Maslow, 1970), different rewards or resources are likely to have diverse effects on employees. The significance of rewards can change over time or between outcomes and, while increasing particular forms of reward such as social support may lead to proportionate increases in wellbeing or satisfaction, the mere presence or absence of other rewards such as salary may be more important to employee strain outcomes (Herzberg et al., 1959; Maslow, 1970). Further, some forms of reward may be a more effective compensation for perceived workplace demands. The role of compensation in organisations is complex and may not

necessarily follow a linear relationship where effort and reward are relative to each other. For instance, changes to employee conditions or increases in workplace demands may need to be compensated with a substantial increase in salary to motivate employees to maintain their increased effort levels.

Particular forms of reward may also have a stronger effect for certain outcomes (e.g., psychological distress versus job satisfaction) and/or for particular groups of employees (e.g., Type A versus Type B) (van Vegchel et al., 2002). For instance, esteem rewards may be a stronger predictor of psychological wellbeing or affective responses to work because of the central role of social integration in health and satisfaction (Cohen & Wills, 1985; House, Landis, & Umberson, 1988; Kessler & McLeod, 1985). Similarly, the internal motivational system of Type As may mean that these employees place greater emphasis on incentives related to performance or esteem (e.g., recognition from supervisors or colleagues). Therefore, a major concern with an aggregated reward measure is that it limits our knowledge of these potential differential effects that independent reward transmitters may have within the workplace.

To-date very few studies consider the reward dimensions of the ERI model and their differential effects on employee outcomes. However, the available evidence provides compelling support for the separation of the composite reward measure (Lang et al., 2010; van Vegchel et al., 2002). Three studies could be identified that explicitly considered the influence of reward dimensions within the ERI model. The findings suggest that particular forms of reward may be stronger predictors of strain than others are, although there is considerable inconsistency in the results. For instance, research conducted by van Vegchel et al. (2002) identified that esteem and security rewards had a stronger effect on psychosomatic complaints and physical health symptoms than the salary component whereas Lang et al. (2010) identified that financial reward was the strongest predictor of employee depression. Similar inconsistencies are identified regarding employee withdrawal. For instance, Schrueder et al. (2010) identified that only items from the esteem rewards component were associated with sickness absences. In contrast, Lang et al. reported that turnover intentions were associated with intrinsic rewards although were unrelated to esteem or financial rewards.

The literature is still developing with respect to the relevance of the independent reward dimensions. However, the research presented above suggests that some reward transmitters may have greater relevance for particular outcomes. Further, while some forms of reward may act to buffer or compensate for greater perceived effort, other forms may have minimal influence on the demand-strain relationship in the workplace. Additional research is needed to clarify whether particular forms of reward have stronger relationships with employee health, attitudes and behaviours and whether individuals differ in their reward-sensitivity.

Research designs used in ERI research. A range of research designs can be used to investigate the ERI model hypotheses. Experimental, epidemiological, cross-sectional and prospective study designs have all been used to investigate aspects of the ERI model and important employee outcomes (for a review see van Vegchel, de Jonge, Bosma et al., 2005). There are advantages and disadvantages to all forms of research designs although some forms are more appropriate for research questions that argue directional relationships among the variables.

A small number of studies have used experimental procedures to test the ERI model hypotheses (Siegrist & Klein, 1990; Siegrist, Klein, & Voigt, 1997). There are clear advantages to such a design. Experimental research can be difficult to conduct, but when performed correctly, this approach enables direct examination of causal relationships and provides the most accurate assessment of the causal pathways between variables of interest (Mackay & Cooper, 1986). Despite the benefits of experimental studies, there are also some well-documented limitations of these designs. The validity and generalisability of experimental studies may be limited, as the strict control over experimental conditions may not represent real-life stressors and actual working environments. Additionally, experimental designs may not be feasible for some research studies as it is not always possible, or ethical, to manipulate work conditions and to assign particular participants to different experimental groups (Cooper et al., 2001).

Most of the early research based on the ERI model attempts to relate Siegrist's theory to physical health and is based on epidemiological or large-scale prospective methods. There is considerable support in the literature for the effects of chronic imbalance exposure on long-term health consequences such as cardiovascular disease (Kuper et al., 2002), myocardial infarction (Kuper et al., 2002; Siegrist,

Peter, Motz, & Strauer, 1992) and all-cause mortality (Lynch & Krause, 1997). Similarly, a high level of overcommitment is typically associated with poor health outcomes in the long-term (Siegrist & Matschinger, 1989; Siegrist et al., 1990; Siegrist et al., 1992). Studies that assess the long-term consequences of an effort-reward imbalance on psychological wellbeing have also demonstrated lagged-effects of between two months (Willis et al., 2008), one year (Laschinger & Finegan, 2008; Shimazu & de Jonge, 2008) and up to four years (Kivimaki et al., 2007). The use of prospective research designs has resulted in a strong evidence base to support the long-term effects of an effort-reward imbalance on physical and psychological health outcomes (see van Vegchel, de Jonge, Bosma et al., 2005). While large-scale research of this kind provides considerable strengths, large datasets can be costly to acquire and may not be obtainable for many researchers. Accordingly, the literature surrounding the ERI model continues to expand although most studies investigating both psychological health and more work-specific outcomes utilise wholly cross-sectional samples and self-report designs (de Jonge et al., 2000; Derycke et al., 2010; Lewig & Dollard, 2003). A number of studies have reported significant associations between the ERI model and behavioural outcomes such as absenteeism (Ala-Mursula et al., 2005; Head et al., 2007) although their measures are often retrospective (Schreuder et al., 2010) and/or self-report (Godin & Kittel, 2004; Griep et al., 2010).

The use of cross-sectional and wholly self-report data to investigate the association between the ERI model and employee work-based outcomes is open to a number of criticisms. One of the main criticisms of the use of cross-sectional data is that studies utilising this design cannot assess causality, or the issue of time in stressor-strain relationships (Zapf et al., 1996). The use of wholly cross-sectional or self-report designs precludes the assessment of causal relationships among the study variables and introduces limitations associated with the use of single-method data collection. The role of research designs in determining the causal nature of stressor-strain relationships is presented in the following section, while the issues associated with self-report methods are discussed later in Chapter 3.

Assessments of causality. The ERI model assumes a direct causal pathway between perceived effort, reward and overcommitment and subsequent levels of health and wellbeing. However, the extensive use of cross-sectional designs in previous ERI research limits the extent to which judgements can be made on the

direction of causality between the ERI model variables and employee work-related strains. Similar to the ERI model, most work stress frameworks argue for a uni-directional cause-and-effect relationship whereby the predictor variable/s (e.g., demand) precede and directly influence the criterion variable/s (e.g., psychological distress). According to this process, the change in a predictor variable (X) is responsible for, and should correspond to, a subsequent change in the outcome (Y). The conditions required to determine causality are still a matter of debate, although the vast majority of social scientists agree that at least three conditions must be met. Edwards (2008, p. 472) summarised the conditions, stating that causality requires that “the cause and effect are correlated, the cause precedes the effect in time, and alternative explanations for the presumed causal relationship (e.g., spurious correlation) can be ruled out”. According to these conditions, an adequate test of the implied causal relationship is not possible with a simple cross-sectional design where both X and Y are measured at the same time-point.

Cross-sectional designs are also inadequate to determine whether there are reverse-causal or reciprocal relationships among the study variables. There are a number of possible explanations of reverse-causality in work stress research. The first is termed the drift-hypothesis (Frese, 1982); Frese stated that employees with worse health (either mental or physical) are likely to ‘drift’ into worse positions within the organisation. For instance, poor mental health may result in greater absenteeism and lowered performance that then leads to positions with less responsibility, and by virtue of the position, greater stress (De Lange, Taris, Kompier, Houtman, & Bongers, 2005). The concentration of these employees in positions classified as high in ‘job strain’ may therefore be a consequence of poor health.

The second explanation for reverse-causality involves a true, reversed-causation effect whereby employee strain affects the subsequent reports of workplace stressors. The reversed strain-stressor explanation suggests that employees who experience greater strain (e.g., lowered satisfaction or poor mental health) are likely to engender more stressful experiences through their poor use of resources such as social support. In comparison, those employees who perform well in their positions, are healthy, happy and satisfied at work are more likely to be rewarded and receive greater support from colleagues (Zapf et al., 1996).

Recent research has explicitly tested the possibility of reversed or reciprocal directions within the ERI model. Head et al. (2007) examined reversed relationships between the ERI model and employee absenteeism although found no support for an association between sickness absence and subsequent reports of effort-reward imbalance. In contrast, Shimazu and de Jonge (2008) identified that while the stressor-strain pathway was dominant, there was also evidence for reciprocal relations between an effort-reward imbalance and employee mental health.

The relationship between personality, the ERI model, and employee strain is also potentially more complex than has previously been acknowledged. It is possible that aspects of personality such as overcommitment or Type A dimensions might be related to workplace stressors and strain according to patterns that represent reversed or reciprocal relationships. Individual differences such as personality may affect the stress process by influencing an individual's exposure to stressful conditions (a personality-exposure effect), either increasing or decreasing the frequency of their encounters. Individual differences may also influence an individual's reaction to environmental stressors and/or may affect the time it takes to recover from the effects of workplace stress and restore mental or physical resources after exposure (a personality-reactivity effect) (Williams, Smith, Gunn, & Uchino, 2011). Particular traits may also lead employees to simply report better (or worse) job conditions, or less (or more) stress regardless of the job role (e.g., the 'gloomy perception' mechanism or the 'rosy perception' mechanism) (De Lange et al., 2005). A combination of these effects, representing an exposure-reactivity model, may provide the best explanation of the relationship between personality and stress (Bolger & Zuckerman, 1995). Alternatively, a process of occupational socialisation may enhance or encourage the development of particular traits (Frese, 1982).

The ERI model is formulated according to a reactivity model, and definitions of overcommitment refer to the construct as a relatively stable and enduring trait-coping style that is resistant to change over time. Specifically, Siegrist et al. (1990, p. 1128) state that overcommitment does "not merely reflect transient subjective states related to the situational conditions under study" suggesting that overcommitment should reflect a continual underlying trait that is relatively impervious to environmental stressors. However, previous authors have questioned this description of overcommitment as a stable trait, suggesting that the inconsistent nature of

overcommitment within the literature provides evidence that the role of overcommitment may be more complex than is currently understood (van Vegchel, de Jonge, Bosma et al., 2005). More recently, Siegrist (2010) has acknowledged the influence of environmental pressures on employee overcommitment, noting that overcommitment may be triggered by external social pressures or competitive environments. Consistent with Siegrist's more recent view of overcommitment, emerging evidence indicates that overcommitment may be modifiable and responsive to situational or contextual factors. Specifically, a study conducted by Fahlen (2008) identified that under conditions of unchanged effort-reward imbalance, overcommitment remained relatively stable. In comparison, an increase in effort-reward imbalance was associated with an increase in overcommitment. The changes in overcommitment associated with effort-reward imbalance status suggest that the level of overcommitment expressed by an individual may be influenced, at least partially, by the environment. Further research is needed that examines the precise role of overcommitment within the ERI model, and in response to environmental conditions.

The Type A profile may contribute to stress and ill health through a number of pathways. Consistent with the proposed linkages between the ERI model and the Type A pattern (Matschinger et al., 1986), Type As may be more vulnerable to environmental stressors and more likely to react to situational challenges and threats with increased arousal. Alternatively, Type As may be more likely to experience stressful situations as a result of their underlying dispositions (e.g., competitiveness, achievement-orientation) (Heilburg & Friedburg, 1988; Smith & Anderson, 1986). Studies that test both the exposure and reactivity hypotheses of general personality traits typically report much stronger support for a reactivity model rather than an exposure model (e.g., Bolger & Schilling, 1991; Hahn, 2000; Kwon & Laurenceau, 2002) although the extent to which Type A dimensions lead to greater stress-exposure in the work setting has rarely been examined. There is some evidence that the Type A profile is subject to a process of adult socialisation within the workplace (Evans, Coman, & Stanley, 1992) although the vast majority of studies tend to report that Type A behaviour (Keltikangas-Jarvinen, 1989) and other personality traits (Costa & McCrae, 1986, 1988) remain relatively stable in adulthood. Nonetheless, reciprocal relationships between the ERI model and individual differences related to

a high need for control are possible, and research to date has not excluded these potential pathways.

Choice of outcome measures. Self-report instruments, observational approaches, and physiological indicators are commonly used in occupational stress research and there are benefits and limitations to all methods (Frese & Zapf, 1994; Hurrell, Nelson, & Simmons, 1998). The recommended method to operationalise the ERI model variables is a self-report questionnaire, although strain outcomes can be operationalised in a number of different ways. Most often, ERI research focuses on physical health and utilises objective measures such as myocardial infarction (Peter, Siegrist, Hallqvist, Reuterwall, & Theorell, 2002) or CHD risk symptoms such as blood pressure (Peter et al., 1998; Steptoe et al., 2004). Self-report questionnaires most often are used in ERI research when the focus is psychological health (Dragano et al., 2008; Janzen et al., 2007) or work-based strain outcomes (Calnan et al., 2000; de Jonge et al., 2000; Derycke et al., 2010).

There are considerable benefits associated with objective data and physiological measurements. Objective data such as physical health indicators, performance data, and absenteeism records are likely to provide a more accurate depiction of actual outcomes (Semmer, Grebner, & Elfering, 2003). Studies based on objective measurements may therefore provide more distinct and measurable solutions for organisational interventions (Kasl, 1998). Additional benefits of the use of objective data are that the measurements are not as confounded when compared with subjective approaches, in that there is a clear separation between independent and dependent variables (Kasl, 1998).

There are also some limitations to the objective approach to occupational stress measurement. The observational method may not necessarily represent the ‘true objective environment’ as observers may miss particular work elements particularly if stressors are infrequent (Semmer et al., 2003). Further, not all research designs permit the collection of physical or objective information. For instance, the collection of physiological data may be impractical when used in large group studies. In the workplace, collection of physiological data may be overly burdensome for employees and risk causing undue discomfort among participants so these methods are often resisted by individuals and organisations (Fried, 1988). Further, objective data such as observer ratings may actually be inappropriate in settings where the

focus is the subjective experience of employees. Lazarus (1999) argued that individual appraisals and interpretations of the environment are the most important factor in determining strain. The objective environment may therefore be less important to the stress process and the experience of strain. Accordingly, self-report methods are frequently utilised to measure strains within occupational settings.

Self-report measures may be in the form of questionnaires, interview data, diaries, or other similar measures that require substantial personal reflection. There are considerable benefits associated with self-report methods of data collection. They are convenient, relatively easy to administer to participants, can reduce the costs of research in terms of both time and money particularly when questionnaires are used, and have high face validity if the aim is to measure subjective awareness of stressors and/or strains (Kasl, 1996; Spector, 1987). There are also some constructs that are measured most appropriately with self-report methods. In particular, when employee attitudes or perceptions are the central focus of the research, objective data or supervisory reports are unlikely to capture the individual variation associated with such factors and self-reports provide great insight into internal processes (Schmitt, 1994; Spector, 1994).

There are also some limitations associated with self-report measurements. Self-reports may introduce response biases or distortions such as negativity, social desirability, acquiescence, misattribution, leniency, priming, consistency or recall biases (for a discussion see Podsakoff, et al., 2003; Frese, 1988). Further, the use of wholly self-report and subjective data cannot control for the potential effects of common-method variance. Common-method variance (CMV) refers to the process where correlations between the study variables are artificially inflated using similar methods (i.e., self-report questionnaires) to measure both the independent and dependent variables (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003). The effects of CMV are particularly problematic in self-report studies where similar formatting and wording are used to measure both the predictors and criterion variables (Podsakoff et al., 2003).

The issues associated with single-source data have been frequently discussed in the literature (Brief, Burke, George, Robinson, & Baker, 1988; Spector, 1992). Cross-sectional single-source research designs are often criticised however, single-source data does not necessarily lead to invalid study findings (Spector, 1994). Some

have suggested that while CMV may inflate the correlations among study variables, it is unlikely that CMV would influence the risk of a Type I error (Meade, Watson, & Kroustalis, 2007). That is, CMV may enhance the significance of a true relationship between two variables but would be less likely to reveal a false-positive effect. Further, CMV is unlikely to have an influence in research that investigates more complex nonlinear or interaction relationships, acting only to inflate the correlations between main effects and the outcome variables rather than changing the direction of these relationships (Michaela, Lukaszewski, & Allegrante, 1995; Siemsen & Roth, 2010).

A number of strategies have been proposed to reduce the limitations associated with self-report data. For instance, obtaining measures of the predictor and outcome variables from different sources can substantially control the cause of CMV. In cases where alternative measurements are not possible, differentiation of the predictor and criterion variables either in terms of their location in a questionnaire, wording of scale items, or response-scale formats can reduce the effect of single method data collection. Longitudinal studies that measure the predictor and criterion variables at different points in time also provide a much more appropriate test of the causal relationships between the variables and are less likely to be influenced by occasion factors (Spector, 1994; Podsakoff, et al., 2003).

In sum, self-report measures are often the most appropriate measurement choice when employee experiences and subjective perceptions are the focus of the research. However, due to the limitations associated with self-report data, sole reliance on single-source data is not recommended. Where possible studies should aim to reduce the possible biases associated with self-report research by utilising longitudinal designs and self-report studies should be supplemented with the use of objective or multi-source data (Semmer et al., 2003).

Measurement of the core ERI model constructs. The use of self-report measures also raises concerns over the construct validity of questionnaires typically utilised to operationalise the ERI model constructs. The choice of measurement tools or scales can have a substantial effect on the results of the research. There are a number of concerns regarding the way that the core constructs of the ERI model in particular have been operationalised in empirical research. A large range of measurement tools were employed in the early years of ERI research and the

literature surrounding the ERI model is lacking in measurement consistency. The adequacy of measurement tools used in many studies is doubtful particularly with regard to their ability to capture the conceptual properties of the ERI model components.

The current recommended method to measure the components of the ERI model is the ERI-Questionnaire (ERI-Q) developed by Siegrist and Peter (1996). The core meaning of the effort construct relates to perceived obligations, responsibility, time pressures, and workload, while physical demand is also included in some cases. The items contained in the ERI-Q measure diverse aspects of work such as frequency of interruptions, levels of responsibility, pressure to perform overtime work, and increasing work demands. The reward indicator refers to financial rewards as well as perceptions of job security, promotion prospects and performance-related esteem (Siegrist et al., 2009). Concerns associated with the overcommitment component have been discussed earlier in this chapter therefore this section will focus on the effort and reward aspects of the model.

The appropriateness of measurement scales used in prior research is contentious. Many studies use measures that contain few, and in some cases only one or two, items to reflect the effort and/or reward aspects of the model (Kivimaki et al., 2007; Kouvonen, Kivimaki, Elovainio et al., 2006; Kouvonen, Kivimaki, Virtanen et al., 2005) while others omit potentially critical elements of the ERI scales (Bakker et al., 2000; Calnan et al., 2004; Calnan et al., 2000; de Jonge et al., 2000). ERI research that was conducted prior to the introduction of the standardised ERI-Q utilised proxy measures out of necessity. As a result, much of the existing evidence regarding the ERI model and its applicability in workplace stress assessment is inconsistent and difficult to compare. For instance, studies that utilise data from the well-known Whitehall II study often report strong evidence for the effects of an ERI on employee health (e.g., Bosma et al., 1998; Chandola, Siegrist, & Marmot, 2005; Kuper et al., 2002; Stansfeld et al., 1999; Steptoe et al., 2004) although the standardised ERI-Q was not included in the Whitehall questionnaire until phase five in 1995-1996 (for an in-depth description of the Whitehall II study and the questionnaires see <http://www.ucl.ac.uk/whitehallII>). Subsequently, the extent to which the measurement scales included in these studies represent the current conceptualisation and measurement of the ERI model variables is questionable. Previous research has

also identified that the level of agreement between proxy measures of the effort and reward variables and the recommended scales is relatively low. For example, Hintsä et al. (2010) used proxy measures of effort and reward in one survey period of their longitudinal research and the original measures were used at the follow-up survey period. The correlation between an effort-reward indicator between T1-T2 was only .45. This suggests that employee reported ERIs might have substantially changed between measurements. However, it might also suggest that while there is some overlap between the proxy scales chosen and the original ERI questionnaire the overlap may be minimal.

Findings such as those identified by Hintsä et al. (2010) raise doubt as to whether proxy measures provide an accurate coverage of critical work environment aspects defined in the ERI model. Recent evidence indicates that proxy measures such as the demand component of the DCS model are not adequate replacements for the effort component of the ERI despite their use in previous studies (Landsbergis, Theorell, Schwartz, Greiner, & Krause, 2000). Furthermore, a joint statement produced by Karasek, Theorell, and Siegrist (1998) suggested that there are considerable distinctions between the demand component of the DCS and the effort component of the ERI model. Specifically, Karasek, Theorell and Siegrist note that while the measures appear similar, the ERI-Q also includes reference to total workload and, when relevant for the sample, physical load, while the DCS model focuses solely on specific tasks.

The original Whitehall II questionnaire and the proxy scales developed from this questionnaire (see Kuper et al., 2002) measure the status control and security aspects of the ERI using items referring to satisfaction with pay and feelings of security. However, the scales from the Whitehall II studies do not assess undesirable changes at work or employee feelings concerning adequacy of occupational level. In addition, the ERI-Q refers to perceptions of *respect* derived from colleagues and superiors, however the Whitehall II items refer to *support* and assistance, potentially confusing the construct of esteem with that of social support. Thus, studies conducted using Whitehall II samples in the decade prior to the introduction of the ERI-Q assess the ERI model using measurement scales that may not be wholly representative of the current scales.

Many other popular proxy measures may not be adequate alternatives of the effort and reward constructs within the ERI model, and may not capture critical aspects of these components (Fahlen, Peter, & Knutsson, 2004). For instance, Landsbergis et al. (2000) noted there is limited content overlap between the ERI-Q and other work stress measurement tools that are often utilised as proxy measures for the ERI model such as the Job Content Questionnaire, the Demand-Control Questionnaire and the Work Organization Matrix. Similarly, recent research has explicitly tested the equivalence of proxy measures such as the demand component of the DCS model, and the ERI components (Fahlen et al., 2004) and identified that agreement between alternative scales and the items included in the ERI-Q is considerably low.

Ultimately, the use of proxy measurements increases the risk that unique aspects of the ERI model may be lost when alternative job stress indices are used in lieu of the ERI-Q. The divergent or non-significant findings of past research may be attributable to differences in the operationalisation of the model components and make comparisons between studies difficult. Where possible, standardised and congruent measurement instruments should be used to enhance reliability and validity of the research results. Accordingly, the current research utilises the current ERI questionnaire ensuring that the findings are consistent with theoretical descriptions of the ERI and the recommended operationalisation of the ERI model components.

Associations between the ERI and different forms of employee strain. The final major area where greater clarity is required regarding the ERI model and its applicability to work stress involves the breadth of target variables that are examined in ERI research, and the extent to which the ERI model hypotheses are tested and supported among these outcomes. An extensive review of the literature was provided in Chapter 2 of this thesis although a number of studies are revisited in this section to highlight the need for further research.

Consistent with the origins of the ERI model, the focus of previous research has most often been the association between the extrinsic ERI hypothesis and physical or psychological health. The results of prior studies appear to strongly support the detrimental effects of an effort-reward imbalance on health outcomes (for reviews see Tsutsumi & Kawakami, 2004; van Vegchel, de Jonge, Bosma et al., 2005). There

is also a growing body of literature that examines the effects of an imbalance on work-related attitudinal and behavioural outcomes, although the results are relatively inconsistent. A number of studies have identified a significant effect of a combined high effort-low reward indicator on work outcomes such as job satisfaction (de Jonge et al., 2000; Li et al., 2005; Van Vegchel et al., 2001), absenteeism (Griep et al., 2010; Hanebuth et al., 2006), and performance (Wang et al., 2010) although not all studies support the extrinsic hypothesis. For instance, no evidence of an imbalance effect on work-related outcomes could be identified among studies examining work motivation (De Jonge & Hamers, 2000), employee engagement (Kinnunen et al., 2008), sickness absence (Peter & Siegrist, 1997) or work-family conflict (Willis et al., 2008).

A similar set of results are identified with respect to the intrinsic ERI model hypothesis. The evidence appears to be quite strong when employee physical or psychological health is the focal outcome (e.g., Bakker et al., 2000; Hanson et al., 2001; Kuper et al., 2002; Siegrist & Matschinger, 1989; Tsutsumi et al., 2001). In comparison, the direct effects of overcommitment on work-based strain or behavioural outcomes are rarely investigated and support is mixed. To illustrate, a high level of overcommitment was associated with increased frequency of short sickness absences within a study conducted by Griep et al. (2010), and yet Peter and Siegrist (1997) and Godin and Kittel (2004) both report no support for the intrinsic hypothesis when examining absenteeism. Overcommitment has also been related to greater work-life conflict (Kinman & Jones, 2007), less job satisfaction (Kinman & Jones, 2008) and greater absorption (Kinnunen et al., 2008), but was found to be unrelated to turnover intentions (Kinman & Jones, 2008; Kinnunen et al., 2008).

Finally, the literature review presented in Chapter 2 of this thesis identified that the interaction hypothesis of the ERI is investigated with less frequency when compared with the extrinsic hypothesis. The limited and inconsistent empirical evidence makes conclusions regarding the existence of an interaction effect difficult. Support for an interaction effect has been demonstrated most often when psychological health is the outcome although the relevance of an interaction to work-based and behavioural outcomes has received varying levels of support and contradicting findings are often reported in the literature.

The limitations addressed in the previous sections of this chapter suggest that the operationalisation of the model components and their relationships to each other may have had a significant effect on the findings of previous research. The inconsistencies in the literature may also indicate that the effects of the ERI model on employee strain are stronger for particular outcomes. Considering the medical-sociological basis of the ERI model, the consistent effect of an ERI and overcommitment with regard to health-related outcomes is unsurprising. However, the relevance of the ERI model to work-based and behavioural outcomes requires further investigation. In particular, further research is needed that extends the literature and tests the utility of the ERI model on a range of employee strain indicators including health, attitudes, and behaviour. By examining a broad range of outcomes, the ERI hypotheses can be tested in relation to different strain outcomes. Accordingly, the extent to which the ERI hypotheses relate to health- versus work-related outcomes can be assessed, and the importance of individual differences within the ERI as predictors of different strains can be determined.

The ERI model and employee psychological health, work-related attitudes and behaviour. The ERI model was originally evaluated in relation to cardiovascular health and coronary heart disease. The results of prior ERI research suggest a substantial effect of the work environment on physical health (Tsutsumi & Kawakami, 2004; van Vegchel, de Jonge, Bosma et al., 2005). However, increasingly ERI researchers have developed an interest in stress according to psychological terms and the effect that stressful working conditions can have on organisational functioning. Consistent with the shifting emphasis on psychological and organisational effects of stress, the role of the ERI model as a predictor of cognitive, affective, and behavioural outcomes is the focus of the current research.

Psychological health. Mental illness is a significant concern within the Australian population. The workplace has been identified as a substantial influencing factor in individual mental health (Cooper & Cartwright, 1994; Cooper & Judi, 1976; LaMontagne, Keegel et al., 2010) and recent estimates suggest that stress-related mental disorder costs the Australian economy up to \$730 million a year (LaMontagne, Sanderson, & Cocker, 2010). The extensive costs associated with work-related mental stress have generated considerable interest in the predictors of individual well-being. A wide range of mental health outcomes have been the focus

of previous occupational health studies. Depression (Tennant, 2001; Whitely et al., 1994), anxiety (Godin et al., 2005; Melchior et al., 2007), psychological symptoms (Afzalur & Clement, 1996; Rahim, 1997) and general psychological health (Bourbonnais, Brisson, Moisan, & Vezina, 1996; de Jonge et al., 2000) have all been linked to poor working conditions and workplace stressors. Previous research has also identified that individual differences such as personality traits (Semmer, 2003), negative and positive affectivity (Danna & Griffin, 1999), or particular demographic factors (Warr, 1999) are relevant to employee mental well-being.

The ERI model has been tested using a variety of populations and a range of psychological health outcomes. Previous studies have confirmed the utility of the ERI model using outcomes such as general mental well-being (Weyers et al., 2006), depression (Dragano et al., 2008; Griffen et al., 2007) or psychological distress (Janzen et al., 2007). Support has been reported for the extrinsic (Godin & Kittel, 2004; Sakata et al., 2008), intrinsic (Tsutsumi et al., 2001), and interaction (Weyers et al., 2006) hypotheses, suggesting that the ERI model provides an appropriate framework to study the effects of workplace stress on psychological health.

Work attitudes. The ERI model has been shown to have great utility in predicting health-related strain. Despite this, many health outcomes (e.g., cardiovascular disease) are more distal indicators of overall functioning and may be impractical as the focus for organisational interventions. Employee attitudes such as turnover intentions or job satisfaction may be more salient for managers and may be more amenable to change in the short-term. By highlighting those conditions and attributes that are closely associated with these outcomes, empirical research can provide opportunities for managers to improve employee attitudes. Two work-based strain indicators that have been used frequently in occupational stress research are job satisfaction and organisational commitment.

Job satisfaction has been used extensively as an outcome measure in occupational stress research (Warr, 1987). A popular definition views job satisfaction as “an attitude that individuals have about their jobs. It results from their perception of their jobs and the degree to which there is a good fit between the individual and the organization” (Ivancevich, Olelelns, & Matterson, 1997, p. 91). Reviews of the literature suggest that job satisfaction is an effective measure of employee job-related strain and dozens of studies have identified a significant relationship between work

stressors and job satisfaction (Judge, Parker, Colbert, & Ilies, 2001; Loher, Noe, Moeller, & Fitzgerald, 1985). Recent work suggests that dispositional factors or personality traits are also important to job satisfaction (for a review see Judge, Heller, & Mount, 2002). Ultimately, job satisfaction appears to be influenced by a combination of environmental, job, and person characteristics (Agho, Mueller, & Price, 1993).

Organisational commitment has also received a great deal of attention in the occupational stress literature over the past decades (Mathieu & Zajac, 1990; Reichers, 1985). Commitment to the organisation is particularly important to managers and human resources professionals as highly committed employees are less likely to turnover (Cohen, 1993; Jaros, 1997) leading to reduced costs of recruitment and selection and employee training. Committed employees are also more likely to perform to a higher standard (Mowday, Steers, & Porter, 1979) and are more likely to engage in positive behaviour such as voluntary organisational citizenship behaviours (Organ & Ryan, 1995). Organisational commitment is defined as “a strong belief in and acceptance of the organization’s goals and values, a willingness to exert considerable effort on behalf of the organization, and a definite desire to maintain organizational membership” (Porter, Steers, & Mowday, 1974, p. 604).

Despite the global and uni-dimensional definition of commitment, recent authors have suggested that the concept is best represented by multiple and independent, although related, dimensions (Meyer & Allen, 1991, 1997). Meyer and Allen (1991) proposed three individual components of organisational commitment, namely, normative, continuance and affective. These forms of commitment differ with respect to the source of commitment and the motivation for the commitment. As defined by Meyer and Allen, normative commitment refers to a feeling of obligation to remain with an organisation. The continuance commitment component describes the cognitive realisation that a decision to leave the organisation would forfeit any benefits gained because of accumulated investment in the organisation, or that there are limited comparable employment alternatives. Finally, affective commitment describes the emotional attachment that a person feels toward an organisation (Meyer, Allen, & Smith, 1993). Although organisational commitment has been conceptualised as a multi-dimensional construct, the affective commitment dimension has received the greatest level of interest among scholars. The affective

component has been found to have strong links with positive work attitudes and performance indicators and is positively related to job involvement, less turnover and less work-family conflict (Mathieu & Zajac, 1990; Meyer, Stanley, Herscovitch, & Topolnytsky, 2002).

Studies that have tested the capacity of the ERI model to predict job satisfaction have found varying support. van Vegchel et al. (2001) identified that a high effort-low reward indicator involving either physical or emotional demands was associated with job dissatisfaction although overcommitment was not included in the study design. de Jonge et al. (2000) also identified a significant effect of a combined effort-reward indicator on job dissatisfaction as well as a moderating effect of overcommitment. However, overcommitment was operationalised with the use of a single-item proxy representing commitment to the job. Finally, Calnan et al. (2000) identified that intrinsic effort (i.e., overcommitment), but not extrinsic effort or reward, was associated with job satisfaction but a combined effort-reward indicator was not tested. There is little research linking the ERI model to organisational or affective commitment, although the ERI appears to have relevance to cognitive withdrawal outcomes such as intentions to turnover (Kinnunen et al., 2008; Siegrist et al., 2006).

Overall, the ERI model is likely to have significant utility to predict work-related outcomes such as job satisfaction and commitment. The existing research provides some support for the effects of the ERI model on employee affective and cognitive withdrawal although further research is necessary. Expanding the ERI model to include more organisationally central outcomes will provide greater understanding of the way that stress, as depicted by ERI theory, influences important employee outcomes.

Behavioural outcomes. Behavioural measures of job strain provide valuable objective information on the effects of working conditions. A range of behavioural indicators can be used to operationalise job strain. Previous research has focused on indicators such as turnover (de Croon, Sluiter, Blonk, & Broersen, 2004), job performance (Beehr, Jex, Stacy, & Murray, 2000; Jex, 1998), and productivity (Baruch-Feldma, Brondolo, Ben-Dayana, & Schwartz, 2002). Absenteeism is particularly important to organisations with previous estimates suggesting that

employee absence from work costs Australian employers over \$7 billion annually (Wooden, 1993).

Absenteeism is viewed as a multidimensional construct that reflects both voluntary and involuntary behaviour (Bakker et al., 2003; Driver & Watson, 1989) and is related to a host of personal, organisational, and attitudinal factors (Gellatly, 1995; Shaw, Delery, Jenkins, & Gupta, 1998). Involuntary absences are uncontrollable absences from work that occur because of factors considered outside of the employee's influence such as illness or family commitments. Conversely, voluntary absences from the work role represent purposive action to avoid work (Hammer & Landau, 1981). Voluntary absences reflect withdrawal behaviour and are likely to be a reaction to poor working conditions (Chadwick-Jones, Nicholson, & Brown, 1982).

Habitual, voluntary absenteeism is of particular concern and the reduction of this action offers significant organisational benefits. Work-related factors are frequently reported as strong antecedents to voluntary absenteeism (Bakker et al., 2003; Dwyer & Ganster, 1991; Goff, Mount, & Jamison, 1990). Studies suggest that habitual absenteeism also may be related to between-person differences such as personality traits or coping styles and particular individuals may be more likely to use absenteeism for their own benefit (Martocchio & Jimeno, 2003). Recent work has also found support for a dispositional source of 'absence proneness' in addition to social or contextual sources (Harrison & Price, 2003; Iverson, Olekalns, & Erwin, 1998).

Understanding the antecedents to employee absenteeism is an important endeavour although there are a range of methodological issues that have affected previous research. The collection of absenteeism data and the construction of absenteeism indicators can have a considerable influence on the overall results (Steel, 2003). Absenteeism data has been shown to display non-normal distributions and typically utilised count indices (i.e., days off work) are often highly skewed. Frequency data tends to display the greatest level of reliability when compared with alternative measures of absenteeism such as total time lost or the duration of absences (Hammer & Landau, 1981; Muchinsky, 1977). Frequency measures of absenteeism are most often used to represent voluntary absenteeism while time lost is most often used to represent involuntary absences (Hackett & Guion, 1985).

Only a small number of studies have assessed the relationship between the ERI model and absenteeism. The extent to which the full ERI model (i.e., including tests of the extrinsic, intrinsic and interaction hypotheses) was tested varied between studies while the measurement of absenteeism differed substantially. A study performed by Peter and Siegrist (1997) measured short- (i.e., ≤ 3 days) and long-term (>3 days) sickness absence, as well as the number of absence episodes. The results indicated that low levels of reward differentiated participants who were absent from work from those who were not. In particular, short-term absences were consistently associated with perceived low reward. However, a combined effort-reward indicator was not associated with any of the absenteeism measures. A similar study conducted by Head et al. (2007) measured both short (<7 days) and long (>7 days) absences. The presence of an effort-reward imbalance was associated with increased short and long sickness absences. One further study (Godin & Kittel, 2004) utilised retrospective self-report data and focused on both frequency of absences (≥ 3 absence episodes) as well as duration of absences (>1 week and ≥ 1 long spell of 15-days or greater). The results indicated that an imbalance was associated with both measures of absence duration although was not associated with frequency of absences.

Very little research has investigated the effect of overcommitment or an ERI \times overcommitment interaction on absenteeism and results are mixed. Some authors have identified a positive relationship between overcommitment and absenteeism (e.g., Godin & Kittel, 2004; Schreuder et al., 2010) and yet others report no direct relationship between the measures (e.g., Griep et al., 2010; Hanebuth et al., 2006). The moderating effect of overcommitment is rarely tested although some support is reported in studies of sickness absence (e.g., Griep, et al., 2010; Head, et al., 2007). Further research is needed to test the ERI model components, and the ERI hypotheses, in relation to important behavioural outcomes such as absenteeism.

Police stress and the ERI. There are strong empirical and contextual reasons for testing the ERI model using a sample of operational police officers. The ERI model has been found to have broad cross-occupational validity (e.g., de Jonge et al., 2000; Joksimovic et al., 2002; van Vegchel et al., 2002). However, there have been calls for job strain research to be underpinned by models that are specific to the context in which the study is being undertaken (Sparks & Cooper, 1999). It is therefore necessary to consider the extent to which the ERI model captures working conditions

and employee attributes that are particularly relevant to operational law enforcement personnel.

In terms of the relevance of the issue (i.e., job strain), police work has been identified as a demanding and stressful occupation (Johnson et al., 2005; Liberman et al., 2002) and high levels of stress within police agencies can have negative influences on both the organisation (e.g., low levels of organisational commitment, higher absenteeism) and individual employees (e.g., reduced physical and mental health, declining job satisfaction) (Burke & Mikkelsen, 2006; Jaramillo & Sams, 2005; Kirkcaldy, Cooper, & Ruffalo, 1995; Norvell, Belles, & Hills, 1998; Tang, 1992). Police work involves a range of potential stressors including operational duties such as attending crime scenes or motor vehicle accidents, and other more general work stressors such as coping with multiple and competing demands, negotiating freedom over work schedules and managing competing deadlines. A number of studies of police stress have identified that officers often rate non-operational stressors typical of many occupations as more taxing than operational duties considered specific to law enforcement (Biggam, Power, & MacDonald, 1997; Kirkcaldy, Cooper, & Ruffalo, 1995; Kop, Euwema, & Schaufeli, 1999). Factors related to work pressure (Cooper, Davidson, & Robinson, 1982), communication and control (Collins & Gibbs, 2003) and social support (Berg, Hem, Lau, & Ekeberg, 2005) have been found to contribute significantly to reported levels of stress.

Many aspects of the ERI model are applicable to an officer's role and the potential for an effort-reward imbalance among law enforcement personnel is significant. First, the ERI model is argued to have the greatest relevance among service occupations and is thought to be common particularly among those professions that deal with person-based interactions (Marmot, Siegrist, Theorell, & Feeney, 1999). The central role of police officers is the provision of law enforcement services to the community. Despite perceptions that the majority of police work time is spent performing operational duties (e.g., attending crime scenes), a large percentage of their time is spent performing non-operational tasks (Singer, 2001). For instance, recent reports indicate that a significant proportion of time is spent handling public enquiries and complaints rather than handling more traditional police affairs such as police searches or investigations (Munro, 2010). The vast majority of office work conducted by officers involves administrative duties, supervision, and

correspondence with community members and is subject to a range of constraints such as time pressures and frequent interruptions.

The second reason why the ERI model is particularly relevant to a policing sample is that the role of an officer is very broad with a range of competing demands, varied daily responsibilities, and changing external influences. Police agencies are necessarily tied to government and bureaucratic methods of operating. As a result, the demands and general nature of policing changes according to continually shifting government objectives, social, economic, and technological changes (Deschamps, Pagnon-Badiner, Marchand, & Merle, 2003). Similarly, officers are employed across a large number of geographically dispersed regions and divisions, and their daily experiences are largely contingent on the particular station in which they are based. The availability of interpersonal and instrumental support, the demands placed on officers, and their opportunities for development are often dependent upon a particular officer's division or station leading to considerable diversity in experiences.

A small number of studies could be identified that investigated the ERI model using a policing sample (e.g., Euwema, Kop, & Bakker, 2004; von dem Knesebeck, David, & Siegrist, 2005; Willis et al., 2008). Most of these studies were cross-sectional and focused on the imbalance hypothesis, although half also included a form of intrinsic effort or overcommitment. Franke et al. (2010) studied the effects of an ERI on markers of vascular inflammation and while there were significant differences between the officer sample and the control sample in terms of reported effort and reward, there were no significant effects of any component on vascular inflammation. In contrast, von dem Knesebeck and colleagues (2005) assessed the relevance of an effort-reward imbalance for musculoskeletal injuries. Their results suggest that there was a strong relationship between an imbalance and risk of neck, back and hip pain among German law enforcement employees.

Evidence for the effects of an ERI on police strain appears to be stronger where psychological outcomes are concerned. Specifically, Euwema and colleagues (2004) and Willis et al. (2008) both examined the utility of the ERI model in predicting police officer burnout. These studies both provide substantial support for the negative effects of high effort-low reward positions, although when considered independently of an imbalance, the effort component appeared to have a greater

influence on officer outcomes than the reward or overcommitment components (Willis et al., 2008). Providing further support for the influence of the ERI on officer psychological outcomes, Janzen et al. (2007) report the results of a cross-sectional study that identified that perceptions of an effort-reward imbalance and greater overcommitment were associated with higher incidence of psychological distress.

The role of personality in police stress has also been the subject of a number of investigations. Components of the Type A behaviour profile have been shown to relate to police officer engagement and cynicism (Richardson, Burke, & Martinussen, 2006), choice of coping mechanisms (Kirmeyer & Diamond, 1985), job satisfaction and mental health (Kirkcaldy, Shephard, & Furnham, 2002), and cardiovascular health (Schaubroeck, Ganster, & Kemmerer, 1994). Suggesting that the augmented model developed for the current research is likely to have considerable relevance within a law enforcement context.

Applying an extended ERI model to the law enforcement context provides an opportunity to add to the existing literature with respect to the experience of strain within policing. Investigating how an augmented ERI-Type A model influences police strain will provide greater understanding of the critical personal and situational factors relevant in this context, and in other similar occupations (e.g., corrections officers, military personnel). In particular, the current research will clarify the extent to which officer experiences of multiple strains are influenced by either simple job characteristics and resources or the more complex exchange relationship. Understanding the key mechanisms that drive officer strain will provide valuable information that can be used to develop strategies for interventions that focus on the most critical aspects of the work environment and the person-environment interface.

The present study and research hypotheses

This section will summarise the literature reviewed in the previous chapters noting the gaps in the existing research and the ways in which the ERI model can be clarified and strengthened. The aims of the present research then will be introduced followed by the study hypotheses.

Summary. A common critique of work stress models is the failure to acknowledge the role of individual cognitions in the stress process (e.g., Daniels & Guppy, 1994). Popular frameworks such as the demand-control model are criticised

for their over-reliance on external environmental stressors, largely ignoring the cognitive processes that contribute to individual experiences of strain (Kristensen, 1995; Siegrist, 2000). Siegrist (2000) noted the interpretation of work stress without consideration of the individual processes that determine their subjective experience of stress does not, and cannot, adequately explain the complex stressor-strain process. The ERI model therefore, attempts to address some of the criticisms of other work stress models by explicitly including an assessment of individual cognitions and motivations.

Published research involving the ERI model is continuing to expand; however, there are a number of conceptual and practical issues that, if addressed, could strengthen our understanding of the relationship between the ERI model and employee strain. In particular, the contribution of individual differences to the experience of workplace stress remains a relatively under-researched area. The intrinsic hypothesis of the ERI model has been investigated far less often than the extrinsic hypothesis particularly with respect to work-related outcomes. Further, although individual differences occupy a central role within the ERI model evidence to support the moderating effect of overcommitment is mixed.

The inconsistent results of previous research may indicate that the role of overcommitment as a moderator of an ERI is limited although there are significant methodological and conceptual issues to consider. In particular, individual differences relating to a high need for control and the Type A profile are thought to have the greatest relevance in employee reactions to effort-reward conditions. Alterations to the overcommitment scale over time have however, led to the removal of many aspects of Type A from the current overcommitment scale introducing uncertainty as to the extent to which overcommitment continues to reflect the Type A construct. Expanding the ERI model with the Type A profile therefore offers considerable opportunity to investigate the influence of individual differences that are theoretically linked to the ERI model. Testing an expanded model may also provide a more comprehensive view of those individual differences that are associated with increased reactivity to demanding or threatening situations.

The research methods employed to test the ERI model may also have influenced the consistency of previous results. Firstly, the extensive use of a ratio indicator has potentially limited our knowledge of the combinations of effort and reward that are

damaging to employee health and wellbeing. Multiplicative terms or an additive, lower-order model may provide a more appropriate test of the ERI model hypotheses over the traditional ratio indicator. Secondly, the use of a composite reward indicator may have led to an over-simplification of the relationship between occupational resources and strain outcomes, while empirical research has extensively used proxy measures which may have underestimated the effects of the model components on employee strains. Finally, research investigating health outcomes has used prospective designs and objective data although the relationship between the ERI model and workplace outcomes have predominantly been tested in cross-sectional and/or self-report studies thus limiting the extent to which causal inferences can be made.

Our knowledge of work stress generally, and the ERI model specifically, may be strengthened by clarifying the ERI model according to the aforementioned shortcomings. Therefore, the focus of this thesis was to examine the role of individual differences within the ERI framework. To add to and extend the existing ERI literature this thesis also aims to address the need for greater specificity. A key goal of this thesis is to add to the existing research by investigating additional individual differences associated with reactivity to work stressors along with the reward dimensions of the ERI model and their influence both as independent predictors of employee strain and as buffers of the relationship between workplace stressors and strain outcomes. Finally, this thesis aims to add to the existing literature by examining how the model components are related to a broad range of employee outcomes, both in the short- and long-term.

Hypotheses. The overall purpose of the current research was to investigate the role of individual differences within the ERI model, and to assess the capacity of an augmented ERI-Type A model to predict the strain experienced by a sample of Australian police officers. The ERI model argues that individual characteristics are likely to influence employee reactions to distinct control-limiting conditions, represented in the ERI model as high effort and low reward in the workplace. Despite this, the full ERI model, including consideration of the moderating role of individual differences, has rarely been examined in the previous job stress research.

The overcommitment component of the ERI model was significantly based on the Type A profile with earlier versions of overcommitment (i.e., need for control)

described as a trait-like coping variable that represents those cognitive, emotional and motivational components of Type A suspected of triggering enhanced arousal to environmental stimuli (Siegrist, 1995a). The most recent version of overcommitment was described by Siegrist et al. (2004) as the ‘inability to withdraw from work obligations’, and while many authors continue to refer to overcommitment as a variable that reflects the Type A profile (Bellingrath & Kudielka, 2008; Tei-Tominaga, Akiyama, Miyake, & Sakai, 2009; van den Heuvel et al., 2007), alterations to the measurement scale have likely resulted in a conceptual divide between overcommitment and the Type A profile. Consistent with prior findings, it is hypothesised that:

Hypothesis 1: There will be no overlap, in terms of cross-loadings, between the current overcommitment scale and the Type A profile

If the findings of this research confirm that the current overcommitment measure does not overlap with the Type A profile, then this study will provide important evidence to support the conceptual divide between the Type A profile and the current overcommitment measure. The implication of this finding is that, the definition of overcommitment as a personality variable reflecting the Type A profile may be misleading and therefore may have implications for both theory and practice. In particular, the development of intervention programs based on empirical research may not adequately address those individual characteristics that are related to increased reactivity in the workplace, while the exclusive use of overcommitment in empirical studies may limit the extent to which the ERI model contributes to the prediction of employee strain and the extent to which individual differences influence the relationship between high effort and low reward and employee outcomes.

An additional aim of the current research was to build on and extend the existing literature by examining the full ERI model, and the interrelationships between the model components. The main ‘extrinsic’ hypothesis of the ERI model argues that conditions of high effort and low reward are thought to lead to reductions in employee health and wellbeing. The results of previous research have generally supported the extrinsic hypothesis, although it is possible that employee strain outcomes are also affected by feelings of under-utilisation or overpayment in the workplace. Few studies have considered the differential associations of effort and

rewards, although their combined effects are argued to be greater than their individual effects.

The extrinsic hypothesis is most commonly operationalised with the use of a ratio indicator, and while there is considerable evidence to suggest that an ERI ratio is strongly associated with physical health outcomes, more recent work suggests that the additive effects of effort and reward, or a conditional effort \times reward interaction, have greater power to detect relationships (Prekel et al., 2007; van Vegchel, De Jonge, & Landsbergis, 2005; Willis et al., 2008). Further, the majority of previous research utilises a composite reward indicator despite the multi-dimensionality of the reward component. Particular rewards may however, have stronger relationships with certain outcomes, or for certain employees. The use of a multi-dimensional reward indicator along with additive and multiplicative terms in the operationalisation of the ERI model hypotheses will provide important theoretical and practical insights in to the way that the ERI is associated with diverse strain outcomes. Based on ERI theory it was expected that:

Hypothesis 2: Effort will be positively related to employee strain

Hypothesis 3: Rewards will be negatively related to employee strain

Hypothesis 4: Rewards will be differentially related to employee strain outcomes

Hypothesis 5: The interaction between effort and rewards will explain additional variance over their main effects

The 'intrinsic' ERI hypothesis argues that a greater level of overcommitment in the work setting will result in employee strain. The role of overcommitment in the ERI model has been altered since the model's inception, although recent theoretical work explicitly establishes overcommitment as both a direct risk factor and a moderator of the stressor-strain relationship. Siegrist (2008) argued that overcommitment, as a pattern of coping with environmental demands, is likely to act as an amplifier of the stress-health association. Thus, when an overcommitted individual is employed under control-limiting conditions such as reduced upward mobility or a position with poor job security, their frustrated attempts to regain or maintain control over their environment are likely to result in greater distress and increased health concerns when compared with conditions where overcommitted employees feel in control (Siegrist & Peter, 1994). Existing research provides considerable support for the effects of overcommitment on health outcomes although

the extent to which overcommitment relates to more organisationally-based outcomes requires further investigation. The findings provided by this research will therefore expand the evidence base with respect to the role of overcommitment as an antecedent to broad strains. Based on the previous literature two hypotheses were developed regarding the role of overcommitment in the ERI model:

Hypothesis 6: Overcommitment will be positively related to employee strain

Hypothesis 7: Overcommitment will exacerbate the stressor-strain relationship

Individual differences related to a high need for control are expected to have considerable effects on employee reactions to effort and reward conditions.

Theoretically, individual characteristics representing the Type A profile are thought to have significant relevance within the ERI model although the precise role of the Type A profile within the ERI model is relatively unknown. Previous research has identified that a global Type A indicator may not be able to predict employee health or performance outcomes although the independent dimensions of Type A are likely to have significant power within occupational research. In particular, the impatience-irritability and hostility aspects of the Type A profile consistently are related to poor outcomes and greater strain amongst employees (Barling & Charbonneau, 1992; Chida & Steptoe, 2009; Spence et al., 1987; Williams et al., 1980), while the achievement striving dimension is typically associated with positive outcomes such as higher job performance (Barling & Charbonneau, 1992; Barling, Kelloway, & Cheung, 1996). Identifying those aspects of the Type A profile that are associated with increased reactivity to strain has important implications. In particular, aspects of the Type A profile that are associated with greater reactivity to effort and reward conditions may provide a useful expansion of the individual differences within the ERI model. Based on previous research, the following hypotheses were developed:

Hypothesis 8: Achievement striving, impatience-irritability and hostility will account for additional variance in employee strain after controlling for the main effect of overcommitment

Hypothesis 9: Achievement striving will be negatively related to employee strain

Hypothesis 10: Impatience-irritability will be positively related to employee strain

Hypothesis 11: Hostility will be positively related to employee strain

Hypothesis 12: Achievement striving will buffer the stressor-strain relationship

Hypothesis 13: Impatience-irritability will exacerbate the stressor-strain relationship

Hypothesis 14: Hostility will exacerbate the stressor-strain relationship

Chronic work stress is associated with increased health risks and organisational problems such as rising absenteeism (Peter & Siegrist, 1997) and depression (Tennant, 2001). Therefore, continued exposure to poor working conditions over time may produce chronic health impairment and increased employee strain. ERI theory argues that the presence of high effort and low reward conditions and a high need for control or overcommitment are likely to have long-term consequences for employees (Siegrist et al., 2004). Accordingly, it was hypothesised that:

Hypothesis 15: All of the above relationships hold when examining long-term strain

The last set of hypotheses was designed to test the assumptions of much of the previous ERI and occupational stress research. Specifically, ERI theory predicts that the effects of environmental stressors on employee strain is causally dominant, where a stressor-strain, as opposed to strain-stressor effect, best fits the data. Similarly, where personality is concerned, the ERI theory argues for a differential-reactivity model of personality and stress as opposed to a personality-exposure model. In this sense, the relationship between personality and environmental stressors is thought to be a result of individual reactivity to environmental conditions, rather than different levels of exposure to positive or negative conditions. Similarly, individual differences such as overcommitment and Type A are thought to represent personality traits that are relatively immune to environmental or occupational pressures. As such, it is expected that overcommitment and Type A will not be subject to effects such as occupational socialisation. Accordingly, two hypotheses were developed to reflect the causal pathways presumed within the ERI model:

Hypothesis 16: There will be no evidence of a strain-stressor relationship among the data

Hypothesis 17: There will be no evidence to support a personality-exposure or occupational socialisation effect among the data

The results relating to these final hypotheses will provide new evidence with respect to the causal relationships between the ERI model, the Type A profile and important employee strain outcomes. There is a relative scarcity of occupational

stress studies that test potential reverse-causal relationships (De Lange et al., 2005). However, a number of authors argue that stress research should address the issue of causality (Zapf et al., 1996). The results of this research will therefore add to a limited body of research regarding the causal relationships between the Type A profile, ERI model and strains.

In conclusion, the review provided in this chapter suggests that there are a number of limitations associated with the existing ERI research and a number of refinements that can be applied to the ERI model to strengthen future studies. This chapter has demonstrated that existing research is particularly limited with respect to the role of individual differences within the ERI model and their influence as moderators of the stressor-strain relationship. Individual differences that are related to a high need for control are theoretically associated with the ERI model and may be a worthwhile extension of the current overcommitment component. Studies assessing the ERI model also share a number of methodological shortcomings. The vast majority of studies utilise a ratio indicator to operationalise the effort-reward relationship despite recent evidence to suggest that additive and multiplicative terms are more likely to yield significant effects. Previous research also tends to utilise proxy measures of the ERI variables leading to difficulties comparing the results and potentially missing crucial aspects of the ERI model. A further limitation that is common to the majority of previous ERI research is the use of a composite reward indicator despite the multi-dimensionality of the reward component of the ERI model and potential differential relationships between occupational rewards and diverse employee strains.

Expanding the ERI model to incorporate individual differences that are expected to influence employee reactions to effort and reward conditions at work will provide a more in-depth understanding of the complex person-environment interaction. Further, applying the methodological refinements to the ERI model specified above will strengthen the existing research and add to the development of the ERI literature. Finally, the research will provide valuable practical insights in to those aspects of the work environment that are critical for the well-being of law enforcement personnel and that therefore, should be considered in future research and interventions.

CHAPTER 4: Method

The current research aimed to assess the suitability of an extended ERI-Type A model to predict the level of strain experienced by a sample of operational law enforcement officers. Three studies were designed to investigate the aims and hypotheses of the current research. The research procedure, participants, and measures are described in the sections that follow.

Procedure

A two-wave full panel design was used to test the hypotheses developed in this thesis. Specifically, the research was conducted over an 18-month period between 2006 and 2008. This timeframe was chosen based on research design considerations as well as organisational constraints. Specifically, the ERI model was designed to identify the effects of chronic stress on employee health and wellbeing. Evidence suggests that a follow-up period of between one year (Tsutsumi, Nagami, Morimoto, & Matoba, 2002) and five years (Stansfeld et al., 1999) is a suitable time lag to identify the long-term effects of work stress, as specified by the ERI model, on strain reactions.

The initial survey period (T1) was conducted in October 2006 and the follow-up questionnaire (T2) was conducted in April 2008. In both survey periods, all policing personnel were sent a copy of the study questionnaire via internal mail, along with a covering letter from the agency's highest ranking officer, the Chief Commissioner. Reminder emails were sent to employees after two weeks. Employees were requested to supply their employee number to aid tracking of participant responses across survey periods although this was voluntary. Absenteeism data was provided by the host organisation and matched to participant-provided employee numbers.

Participants

The employee population taking part in the current study consisted of sworn members from a large state-based Australian police agency. Members of this agency were organised into six separate regions, however due to time and resource constraints only two regions participated in this research. The demographic characteristics of the officers from these two regions of the agency were very similar. Anecdotal information from the agency's human resources department also indicated that there were a diverse range of physical and psychosocial working environments represented across these two regions and that this diversity would ensure there was a

high level of variation among the data. A summary of the demographic characteristics are presented below, for a full description see Appendix A.

Time 1 Sample. A total of 897 (N = 3310) employees returned completed questionnaires in T1, representing a response rate of 27%. After taking into account the number of employees on leave for two weeks or more during the survey period (N = 196) the response rate was 29%. Of the 897 participants, 717 (80%) were male. In terms of tenure, 259 (29%), 293 (33%) and 345 (39%) employees reported that they had worked with the organization for nine years or less, ten to nineteen years, or twenty years or more respectively. The majority of participants were aged 30 to 49 (N = 662; 73.9%).

Time 2 Sample. A total of 835 (N = 3250) participants completed the survey in Time 2, representing a response rate of 26%, and after taking into account employees on leave during the survey period (N=230), the response rate was 28%. Of the 835 participants, 608 (73%) were male. In terms of tenure, 241 (29%), 220 (26%) and 374 (45%) employees reported that they had worked with the organization for nine years or less, ten to nineteen years, or twenty years or more respectively. The majority of participants were aged 30 to 49 (N=587; 73.9%).

Comparison with population of police officers. To test the extent to which participants from the two regions were representative of the entire organisation, data were obtained from the host organisation on key demographic characteristics regarding the operational police they employed. There were no significant differences between the samples at T1 and T2 and the population in terms of gender, while the differences between the samples and the population with respect to age appeared to be minimal. Specifically, of the total population, 77% were male (T1: $\chi^2(1) = 0.468$, ns; T2: $\chi^2(1) = 0.293$, ns), and while a breakdown of the population by the same age categories was not possible, the majority of respondents were aged between 35 and 44 (41%). Tenure rates were not available.

Matched Sample. A total of 195 participants supplied their employee number at both survey periods enabling their responses to be matched (matched sample). The overall matched sample represented a response rate of 22%. The demographic characteristics of the matched sample were relatively representative of both the T1 and T2 samples, although a higher proportion of participants who supplied their employee numbers also reported greater tenure. Of the 195, the majority were male

(81%), aged between 40 and 49 years (51.5%) and had worked with the organisation for 20 years or more (56%). Chi-square analyses revealed no significant differences in gender between the matched sample and either the T1 ($\chi^2(1) = 0.764$, ns) or T2 samples ($\chi^2(1) = 0.068$, ns).

Absenteeism samples. Matching rates of absenteeism with employee responses to the survey required participants to provide their employee number. A total of 555 employees (62%) provided their employee number at T1 and a total of 499 participants provided their employee number at T2 (60%). Analyses were conducted to examine the differences between those participants who provided their employee number to enable tracking of survey responses over time, as compared to those who did not provide their employee number. Again, there were some significant differences between the groups with respect to the demographics and the outcome variables, although these were relatively small. T-tests and Chi-Square analyses revealed that officers who provided their employee number in 2006 reported a lower level of psychological distress (mean 18.28 versus 19.57, $t = 2.443$, $df = 895$, $p < .05$), a greater level of affective commitment (mean 25.49 versus 27.35, $t = -4.324$, $df = 895$, $p < .000$), and greater job satisfaction (mean 13.26 versus 12.40, $t = -3.150$, $df = 895$, $p < .01$) than officers who did not provide their employee number. The tenure rates were also slightly different between those who provided their employee number and those who did not ($\chi^2 = 20.219$, $df = 2$, $p < .000$). Specifically, participants who provided their employee number were more likely to have worked for the organisation for longer than those who did not provide their employee number (20 years or more: 42.4% versus 31.9%; 10-19 years: 33.9% versus 30.7%; and 9 years or less: 23.7% versus 37.4%).

The same analyses were conducted on the 2008 sample and revealed that participants providing their employee numbers ($N = 499$) were more likely to be satisfied in their positions (mean 12.53 versus 11.92, $t = -2.275$, $df = 797$, $p < .05$), committed to the organisation (mean 25.32 versus 23.24, $t = -4.540$, $df = 797$, $p < .000$), and tended to report lower levels of psychological distress (mean 18.66 versus 20.00, $t = 2.544$, $df = 797$, $p < .05$). They were also more likely to be male (75.8% versus 67.2%, $\chi^2 = 7.677$, $df = 1$, $p < .01$), older (50 years or more: 22.7% versus 20.0%; 40 to 49 years: 44.4% versus 36.4%; 30 to 39 years: 26.2% versus 32.5%; 29 years or less: 6.8%, 11.0%; $\chi^2 = 11.208$, $df = 3$, $p < .05$), and have worked for the organisation for

longer (20 years or more: 49.6% versus 38.0%; 10 to 19 years: 25.8% versus 26.4%; 9 years or less: 24.5% versus 35.6%; $\chi^2 = 14.784$, $df = 2$, $p < .01$) than those participants who did not provide their employee numbers.

Missing values and assumption-checking. Missing values within data sets and violations of statistical assumptions have the potential to severely distort results therefore the data were carefully screened for missing values and non-normality. Missing values were identified in both the T1 and T2 data sets. Exploration of these missing values indicated that they were randomly scattered throughout the dataset and did not account for more than 5% of any variable. As such, these values were treated with list-wise deletion (Tabachnick & Fidell, 2001).

Evaluation of the scales revealed that all variables met the assumptions of linearity and homoscedasticity although normality was violated in some cases. Due to the possibility that significant interaction terms can be obtained when predictor variables are highly skewed, additional analyses were conducted after transforming those variables that could be classified as skewed. These analyses indicated that there was no difference in interpretation of the results whether the transformed or untransformed variables were included in the analyses; subsequently the untransformed variables are presented in the results.

Measures

A paper based questionnaire was developed for use in this study (see Appendix B), consisting of well-validated scales along with questions relating to general demographic information. The same questionnaire was used for both time periods.

Effort-reward imbalance. The questionnaire used to measure the ERI model consisted of three parts: effort, reward, and overcommitment. This questionnaire had evolved over time, although the measure designed by Siegrist and Marmot (2004) is the most up-to-date formulation. The question relating to physical demands may be omitted in surveys of largely white-collar or service occupations hence was not included in the current research. The original questionnaire designed by Siegrist and Marmot required participants to respond in a two-stage format. Initially participants indicated whether a given work stressor exists ('agree' or 'disagree'), following that participants were then asked to rate the level of distress felt as a result of this stressor where 1 reflects minimal distress (i.e., 'not at all distressed') and 4 reflects a high

level of distress (i.e., 'very distressed'). In cases where participants reported that a stressor did not exist, their responses were coded as 1.

Recent research suggests that the original questionnaire format contains measurement error that can be avoided by changing the response categories (Tsutsumi et al. 2008). Further, participants have previously reported difficulty understanding the response requirements (Dollard & de Jonge, 2003; Smith, Roman, Dollard, Winefield, & Siegrist, 2005). As such, the ERI model was measured using a modified version of the self-report scales developed by Siegrist and Marmot (2004). Specifically, a single-stage response format that required participants to rate the extent to which they agreed (1) or disagreed (5) with an item was preferred over the original two-stage response format.

Effort was measured with five items (e.g., "I have a lot of responsibility in my job") that assessed employee perceptions of time pressures, number of interruptions, responsibilities, pressure to work overtime, and increases in their work demands. Rewards were measured with a composite scale of eleven items (e.g., "I receive the respect I deserve from my superiors"). Summed scores were created with high scores related to high effort and reward.

Overcommitment. Overcommitment was measured with the recommended six-item overcommitment scale (Siegrist & Marmot 2004). Participants were asked to rate their agreement with the statements on a five-point Likert-type scale, with responses ranging from 'strongly disagree' (1) to 'strongly agree' (5). High scores indicated high levels of overcommitment. An example item is, "I get easily overwhelmed by time pressures at work".

Type A Personality. The dimensions achievement striving and impatience-irritability were measured using two subscales that form a modified version of the Jenkins Activity Survey (Spence et al., 1987). These subscales were measured with seven and five items respectively. Participants were asked to indicate the extent to which the item statements applied to them on a five-point Likert scale. Variable response categories were given for each item (e.g., much less than others/much more than others; very hard-driving/very relaxed and easy going). An example item is, "Typically, how easily do you get irritated?".

Hostility was measured with six items adapted from the indirect hostility subscale developed by Buss and Durkee (1957). The indirect hostility scale measures

the expression, rather than the mere experience, of anger and hostility and “both roundabout and undirected aggression” (p. 343). Responses were given on a five-point Likert scale with participants asked to indicate how often they had displayed the stated behaviours in the last week (e.g., “When I am mad, I sometimes slam doors”). Responses ranged from ‘not at all’ (1) to ‘all the time’ (5).

Psychological distress. Psychological distress was defined as the presence of non-specific psychological distress symptoms such as feelings of anxiety or depression that employees had experienced in the month prior to the completion of the survey. Psychological distress was measured using the Kessler Psychological Distress Scale (K10) developed by Kessler and Mroczek (1994), which contained 10 items. Respondents rated each item on a 5-point Likert-type scale, ranging from ‘All of the time’ (1) to ‘None of the time’ (5). After reverse coding all items, the ten items were summed to form an overall psychological distress score with higher scores indicating higher levels of distress.

Job satisfaction. Job satisfaction was measured with the three positively worded items from the satisfaction scale of the Job Diagnostic Survey designed by Hackman and Oldham (1976), that is, the two items in the original scale referring to intent to quit were not used. Respondents were required to rate the items on a seven-point Likert scale, ranging from (1) ‘Extremely satisfied’ to (7) ‘Extremely dissatisfied’ (e.g., “Generally speaking, I am very satisfied with this job”). These three items were summed to create an overall job satisfaction score, with higher scores associated with higher levels of job satisfaction.

Affective commitment. The affective commitment scale of Allen and Meyer’s (1990) commitment scale was chosen to measure employee commitment to the organisation. The eight-item measure required respondents to rate each item on a five-point scale with responses ranging from ‘strongly disagree’ (1) to ‘strongly agree’ (5). An example item is “I would be very happy to spend the rest of my career with this organisation”. High scores corresponded to higher levels of commitment.

Absenteeism. Employee absenteeism rates were obtained through the Police Agency’s internal HR records. The Agency provided data corresponding to the years in which the survey periods were conducted and was matched to survey data by employee number. The records included the first and last date of all sickness absence episodes and absenteeism was measured with the number of absences over this one-

year period. Frequency of absence measures have been found to have good psychometric properties (Hammer & Landau, 1981) and have been commonly used in absenteeism research (e.g., Iverson & Pullman, 2000). The absenteeism measure utilised in this research was operationalised as the frequency of absences for the year following the survey period (in the case of the T1 survey) rather than a count of time lost. Absenteeism rates at T2 only could be obtained for the calendar year coinciding with the survey. This measure therefore represents a combination of previous and future reports of absenteeism. Absences recorded in this way may comprise both voluntary and involuntary incidences, although repeated absences are likely to represent systematic withdrawal from the work role (Bakker et al., 2003). Tests using shorter periods for the frequency count (e.g., over six months) obtained similar results to that shown below, although the frequency counts over the 12 month period more closely met the assumptions of multiple regression.

Control Variables. Age (29 years or less, 30-39 years, 40-49 years, 50 years or more), gender (males versus females) and tenure (less than 9 years, 10-19 years and 20 years or more) were included as potential confounding variables of the relationship between effort-reward imbalance, Type A behaviour and psychological distress, job satisfaction, affective commitment and absenteeism. Prior to their inclusion in the regression analyses the categorical control variables were dummy coded (0, 1).

CHAPTER 5: Results

The results of the research have been divided into sections based on the three studies. The literature review established that there were a number of limitations involving the ERI model and that this research aimed to address a number of these existing concerns. The first study investigates the construct validity of the overcommitment component of the ERI model as it relates to the Type A profile. Study 2 assesses the ERI model, augmented with the Type A profile, and its cross-sectional associations with employee strain outcomes. Finally, the main aim of the third study was to investigate the longitudinal associations between the augmented ERI-Type A model and employee strains measured 18-months later.

Study 1

Study 1 was a cross-sectional, self-report investigation using a total sample of 896 operational police officers. Using factor analytic procedures, the initial aim of Study 1 was to investigate the extent to which the overcommitment construct of the ERI model represents the Type A profile. Criteria used to determine the number of factors to be extracted and interpreted were Kaiser's rule (eigenvalues greater than 1.0), the Scree test, and the interpretability of the factor solution (Tabachnick & Fidell, 2001). A cut-off point of .30 was used to assess the factor loadings.

Prior to undertaking the analyses, data were screened for outliers and assessed for violations of the assumptions of factor analysis (Tabachnick & Fidell 2001). The results indicated that all assumptions were met. A principal axis factoring (PAF) analysis was conducted to investigate Hypothesis 1, that the overcommitment construct was conceptually distinct from the Type A profile. The data was deemed suitable for PAF after an inspection of the correlation matrix revealed many correlations above .3, a Kaiser-Meyer-Olkin value of .86 well above the recommended .6, and a significant Bartlett's Test of Sphericity (Tabachnick & Fidell, 2001). Given that there are unknown relationships between the items, an exploratory method was employed (Henson & Roberts, 2006). An examination of the eigenvalues produced during the PAF suggested a five-factor structure. Specifically, five factors with eigenvalues above 1 (Kaiser, 1974) explained 19.7 per cent, 10.9 per cent, 6.2 per cent, 3.4 per cent, and 3.0 per cent of the variance respectively. To aid interpretation, the data were subjected to Oblimin rotation. The rotated structure matrix is presented in Table 1.

Table 1. Structure matrix presenting the results of the PAF including overcommitment and the Type A profile

Items and Factors	Factor Loadings				
	I	II	III	IV	V
I. Impatience-irritability					
1. Feel like hurrying person along when taking too long to make a point	.52	.13	-.15	.16	.25
2. Easily irritated	.80	.03	-.35	.37	.39
3. Do most things in a hurry	.60	.24	-.25	.24	.24
4. Temper is hard to control	.66	-.00	-.41	.47	.35
5. Feelings waiting in line	.48	.05	-.20	.24	.21
II. Achievement striving					
1. Job stirs you into action	-.10	.44	.07	-.15	-.15
2. Generally very hard-driving	.27	.49	-.28	.09	.08
3. Your level of activity considered too fast	.07	.53	-.05	-.04	-.16
4. Take your work much more seriously than most	.03	.68	-.17	-.04	-.11
5. Set deadlines or quotas in work	.11	.65	-.13	-.04	-.10
6. Amount of effort put forth is much more compared to co-workers	.18	.63	-.16	.03	-.07
7. Approach life in general much more seriously than co-workers	.31	.49	-.30	.02	.05
III. Overcommitment					
1. Overwhelmed by time pressures at work	.29	.06	-.44	.23	.19
2. Start thinking about work problems on waking	.29	.14	-.72	.23	.13
3. Can easily relax and 'switch off' work	.36	.16	-.68	.21	.19
4. Sacrifice too much for my job	.12	.31	-.55	.18	-.01
5. Work still on my mind when I go to bed	.27	.14	-.85	.18	.16
6. Trouble sleeping if I postpone something until tomorrow	.28	.12	-.75	.16	.17
IV. Expressive hostility					
2. Sometimes slam doors when mad	.36	-.07	-.22	.66	.39
5. Can remember being so angry I picked up the nearest thing and broke it	.25	-.03	-.15	.65	.27
6. Sometimes show my anger by banging on the table	.28	-.05	-.19	.79	.33
V. Indirect hostility					
1. Sometimes spread gossip about people I don't like	.22	-.08	.01	.20	.35
3. When I am angry, I sometimes sulk	.32	-.12	-.21	.34	.81
4. I sometimes pout when I don't get my own way	.32	-.11	-.18	.37	.77

Providing support for Hypothesis 1, the results of the factor analysis indicated a clear separation between the Type A profile and the current overcommitment scale. Five items relating to impatience-irritability loaded on factor one, seven items

relating to achievement striving loaded on factor two and six items relating to overcommitment loaded on factor three. Two factors best represented the hostility measure, with three items of this scale loading on factor four and three items loading on factor five. Closer examination of the hostility factors revealed that factor four was defined by those items relating to 'expressive hostility' and factor 5 was best interpreted as 'indirect hostility'. There was some evidence for cross-loadings particularly among the Type A scales although in most cases the loadings were considered poor (i.e., $<.45$; Comrey & Lee, 1992). There were also moderate correlations between the factors although, the results clearly suggest that the overcommitment and Type A scales are independent constructs.

Study 2

Study 2 sought to test the association between the effort and reward variables, overcommitment, the Type A profile, and officer strain. The main aim of these analyses was to test the role of individual differences as predictors of strain and as moderators in the ERI model. Individual differences reflecting the Type A profile were included in Siegrist's original conceptualisation of overcommitment, but after alterations to the measurement scales over a number of decades, Type A is no longer reflected in this scale. The augmented ERI-Type A model developed in the current research was tested with the use of hierarchical multiple regression analyses using a large cross-sectional data set of 896 operational officers for analyses predicting psychological distress, job satisfaction and affective commitment and 554 for analyses predicting absenteeism behaviour. The results of these analyses are presented in the sections below.

Preliminary Analyses. An additional aim of Study Two was to examine the relative influence of the reward subcomponents of the ERI model to officer wellbeing, satisfaction, commitment, and absenteeism. A preliminary principal components analysis (PCA) was conducted to verify the existence of subcomponents within the reward dimension of the ERI model. The results indicated that a three component solution best represented the underlying structure. An examination of the Eigenvalues produced during extraction (Kaiser, 1974) identified that three components with Eigenvalues above 1 explained 24.6 per cent, 17.9 per cent, and 14.3 per cent of the variance respectively. To aid interpretation, the data were subjected to Varimax rotation. The rotated solution is presented in Table 2.

Table 2. Results of component analysis of the reward construct

Items and Factors	Factor Loadings		
	I	II	III
I. Esteem reward			
1. Receive respect I deserve from superiors	.75	.17	.15
2. Receive respect I deserve from colleagues	.74	-.09	-.11
3. Experience adequate support	.70	.24	.23
4. Treated unfairly at work	.65	.16	.37
5. Receive respect and prestige relative to achievements	.67	.29	.16
II. Status reward			
7. Position reflects education and training	.23	.77	-.06
8. Considering effort, work prospects are adequate	.28	.77	.20
9. Considering effort, salary is adequate	-.03	.69	.12
III. Security reward			
6. Job promotion prospects are poor	.28	.30	.47
10. Experienced or expect to experience undesirable change	.09	.04	.74
11. Job security is poor	.08	.03	.71

Examination of the results indicate that five items represent the esteem component (e.g., considering all my efforts and achievements, I receive the respect and prestige I deserve at work), three items represent employee perceptions of salary and current position (e.g., considering all my efforts and achievements, my salary/income is adequate), and three items represent perceptions of job security and promotion prospects (e.g., my job security is poor; my job promotion prospects are poor). These results differ slightly from those originally proposed by Siegrist and his colleagues (2004). Specifically, the item “my job promotion prospects are poor” was originally included in the dimension representing salary and promotion prospects although was associated with perceptions of security among these data. The restructuring of these scales suggests that within this sample of officers, promotion prospects were associated with personal feelings of security rather than material rewards from the organisation. Subsequently, three scales were created based on the results of the principal component analyses, which reflected, 1) esteem rewards, 2) status (i.e., salary and position) rewards, and 3) security rewards. These were then used to compute interaction variables (after mean-centring) with the effort scale of the ERI model and the individual differences included in the current research.

Following the PCA, a preliminary correlation analysis was then conducted to test the relationships between each of the independent and dependent variables. Descriptive statistics, reliabilities, and bivariate correlations are in Table 3. Statistical analyses were undertaken using SPSS 17.0 for Windows (SPSS 2008). Consistent with expectations (Hypothesis 3), all reward components were negatively associated with psychological distress and positively associated with job satisfaction and organisational commitment. Providing support for the differentiation of the reward components (Hypothesis 4), the correlation analysis revealed that esteem and status rewards were also negatively correlated with frequency of absenteeism although security rewards were not. Partial support for Hypothesis 2 was found where effort was negatively correlated with job satisfaction and absenteeism and positively associated with distress, although was not significantly associated with affective commitment. Again, providing partial support for Hypothesis 6, overcommitment was positively correlated with psychological distress and negatively associated with job satisfaction and organisational commitment. However, overcommitment was unrelated to absenteeism. The achievement striving dimension of Type A tended to have a negative relationship with strain supporting Hypothesis 9, while impatience-irritability and the hostility components were associated with greater distress and absenteeism and less job satisfaction (Hypotheses 10 and 11). Impatience-irritability was also correlated negatively with affective commitment.

Table 3. Descriptives, reliabilities and correlations among the study variables at Time 1

	Mean	SD	α	1	2	3	4	5	6	7	8	9	10	11	12
1 Psychological distress	18.76	7.6	.93												
2 Job satisfaction	12.96	3.95	.79	-.37***											
3 Affective commitment	26.68	6.2	.81	-.26***	.50***										
4 Absenteeism (frequency)	3.98	4.75	-	.15***	-.11*	-.13***									
5 Effort	18.51	3.77	.79	.28***	-.11**	.06	-.13**								
6 Esteem reward	17.00	3.69	.80	-.42***	.47***	.31***	-.17***	-.13***							
7 Status reward	8.54	2.42	.67	-.26***	.37***	.18***	-.20***	-.17***	.42***						
8 Security reward	9.77	2.34	.45	-.40***	.38***	.29***	-.07	-.20***	.43***	.32***					
9 Overcommitment	16.83	5.40	.83	.54***	-.26***	-.07*	.07	.40***	-.30***	-.23***	-.31***				
10 Achievement striving	25.01	4.28	.76	.01	.16***	.31***	-.09*	.32***	.06	-.05	.10**	.24***			
11 Impatience-irritability	15.52	3.78	.75	.46***	-.20***	-.14***	.12**	.21***	-.20***	-.15***	-.23***	.39***	.18***		
12 Indirect hostility	6.07	2.26	.66	.34***	-.12***	-.05	.09*	-.01	-.08*	-.03	-.12***	.19***	-.08*	.37***	
13 Expressive hostility	5.33	2.51	.74	.34***	-.10**	-.04	.09*	.04	-.13***	-.07*	-.16***	.24***	-.02	.40***	.39***

* $p < .05$, ** $p < .01$, *** $p < .001$

Regression Analyses. The review presented in Chapter 3 identified that a range of analytical techniques can be used to model the hypotheses of the ERI model and the associated interactions. The majority of research thus far has operationalised the key concepts with the use of a ratio or subgroup analysis although these methods are not ideal, as there is a risk that important information and statistical power is lost through these techniques (Lehr et al., 2010; MacCallum et al., 2002). Despite the potential drawbacks of utilising multiple regression (e.g., overly conservative tests of significance and potential issues of unreliability), there are sound reasons for using this method of analysis. In particular, the use of hierarchical multiple regression analyses enable an assessment of the relative contribution of independent variables, and makes it possible to determine whether an interaction is significant over and above main effects.

Following the procedure outlined by Cortina (1993), multiple hierarchical moderated regression analyses were conducted to test the proposed augmented ERI-Type A model. Blocks of independent variables were entered in the order of: (1) demographic/control variables, (2) effort and reward, (3) overcommitment, (4) Type A dimensions (achievement striving, impatience-irritability, hostility), (5) two-way interactions reflecting the ERI model hypotheses (e.g., effort \times reward esteem, effort \times reward security) and the augmented ERI-Type A model (e.g., effort \times achievement striving, reward esteem \times impatience-irritability), and (6) three-way interactions between effort-reward and the individual difference variables. The ERI and Type A variables were mean-centred before their interaction terms were calculated to minimize the influence of multicollinearity and to ease interpretation (Cohen, Cohen, West, & Aiken, 2003). The step associated with the three-way interactions was not significant for all of the regressions and subsequently was excluded from the analyses reported here.

Overall, the model tested in this study accounted for a significant percentage of the variance in the outcome variables (see Table 4). Specifically, the total model explained 53% (Adj $R^2 = .51$; $F(37, 859) = 26.136, p < .000$) of the variance in psychological distress, 35% (Adj $R^2 = .33$; $F(37, 859) = 12.648, p < .000$) of the variance in satisfaction, 27% (Adj $R^2 = .24$, $F(37, 859) = 8.512, p < .000$) of the variance in organisational commitment, and 19% (Adj $R^2 = .13$, $F(37, 517) = 3.280, p < .000$) of the variance in absenteeism. The strongest relationship was that between esteem rewards and job satisfaction ($\beta = .28, p < .000$). Other large associations were identified between

a number of the independent variables and the strain outcomes. Specifically, esteem rewards ($\beta = .20, p < .000$) and achievement striving ($\beta = .31, p < .000$) were strongly related with affective commitment, while overcommitment ($\beta = .30, p < .000$) displayed a sizeable relationship with employee psychological distress. Achievement striving was also strongly associated with satisfaction ($\beta = .17, p < .000$).

The control variables accounted for a significant, yet small, amount of variance in employee satisfaction and commitment with two per cent of the variance explained by officer age, tenure, and gender. Upon entry, gender was a significant predictor of officer job satisfaction while tenure was a significant predictor of affective commitment. The relationships indicated that males reported lower levels of job satisfaction while employees who had been with the organisation for 10 to 19 years were less likely to be committed to the organisation when compared with those employees who had been with the organisation for 20 years or more. The demographic variables were no longer significantly associated with the outcomes when the ERI and Type A variables were entered into the regressions. The control variables were also significantly associated with employee absenteeism, with five per cent of the variance attributed to the demographics. A significant effect of age on absenteeism was identified where employees aged less than 50 years reported fewer absences than those who were 50 years or older.

Table 4. Regression analyses predicting employee psychological distress, job satisfaction, affective commitment, and absenteeism at Time 1

Independent Variable	Psychological Distress				Job Satisfaction				Affective Commitment				Absenteeism			
	B	SE B	β	ΔR^2	B	SE B	β	ΔR^2	B	SE B	β	ΔR^2	B	SE B	β	ΔR^2
Gender - Male	.00	.49	.00		-.45	.30	-.05		.03	.51	.00		-1.05	.54	-.09	
Age – Less than 39	-1.84	.75	-.12*		-.52	.45	-.07		-1.13	.77	-.09		-2.62	.79	-.27**	
Age – 40 to 49	-.95	.58	-.06		-.33	.35	-.04		-.77	.60	-.06		-2.82	.61	-.29***	
Tenure – 9 years or less	1.63	.64	.10*		-.56	.39	-.06		.34	.66	.03		-.47	.70	.04	
Tenure – 10 to 19 years	.68	.57	.04	0.01	-.49	.35	-.06	.02**	-.59	.58	-.04	.02**	.09	.59	.01	.05***
Effort	.16	.06	.08**		-.02	.03	-.02		.09	.06	.05		-.22	.06	-.16***	
Esteem Rewards	-.35	.06	-.17***		.30	.04	.28***		.33	.06	.20***		-.15	.07	-.12*	
Status Rewards	-.14	.09	-.04		.29	.05	.18***		.11	.09	.04		-.31	.10	-.15**	
Security Rewards	-.40	.09	-.13***	0.27***	.23	.06	.14***	.27***	.39	.10	.15***	.13***	.02	.10	.01	.07***
Overcommitment	.43	.04	.30***	0.12***	-.08	.03	-.11**	.01**	-.01	.04	-.00	.00	.00	.05	.00	.00
Achievement striving	-.14	.05	-.08**		.16	.03	.18***		.45	.05	.31***		-.01	.05	-.01	
Impatience-irritability	.36	.06	.18***		-.09	.04	-.08**		-.28	.06	-.17***		.07	.06	.06	
Indirect hostility	.52	.09	.16***		-.05	.06	-.03		.16	.09	.06		.04	.10	.02	
Expressive hostility	.25	.09	.08**	0.10***	.06	.05	.04	.03***	.18	.09	.07*	.08***	.06	.10	.03	.00
Effort \times Esteem Rwd	.03	.02	.05		.01	.01	.03		.00	.02	.01		-.02	.02	-.07	
Effort \times Status Rwd	-.07	.02	-.08**		-.03	.02	-.08		-.01	.03	-.01		.10	.03	.19**	
Effort \times Security Rwd	.01	.02	.01		-.00	.02	-.01		.02	.03	.03		-.00	.03	-.01	
Effort \times OVC	.00	.01	.01		-.01	.01	-.03		-.01	.01	-.04		-.01	.01	-.02	
Esteem Rwd \times OVC	-.02	.01	-.06		-.00	.01	-.02		-.00	.01	-.02		.01	.01	.02	

Table 4 cont. Regression analyses predicting employee psychological distress, job satisfaction, affective commitment, and absenteeism at Time 1

	Psychological Distress			Job Satisfaction			Affective Commitment			Absenteeism		
Status Rwd × OVC	-.03	.02	-.05	.01	.01	.05	-.01	.02	-.02	-.01	.02	-.04
Security Rwd × OVC	-.02	.02	-.03	.01	.01	.03	.02	.02	.04	.00	.02	.01
Effort × AS	.00	.01	.01	.00	.01	.02	.02	.01	.06	.01	.02	.02
Effort × II	.04	.02	.07*	.02	.01	.07	.00	.02	.01	.01	.02	.03
Effort × IH	-.04	.03	-.05	-.01	.02	-.03*	-.03	.02	.06	-.03	.03	-.05
Effort × EH	.02	.02	.03	-.03	.01	-.07	.04	.03	-.05	.03	.02	.07
Esteem Rwd × AS	-.02	.01	-.05	.00	.01	.02	-.03	.01	-.08	.03	.02	.11*
Esteem Rwd × II	-.00	.02	-.01	.01	.01	.04	.02	.02	.05	.02	.02	.08
Esteem Rwd × IH	-.03	.03	-.04	.02	.02	.04	-.09	.03	-.12**	-.03	.03	-.05
Esteem Rwd × EH	-.03	.03	-.03	-.02	.02	-.05	-.03	.03	-.05	-.01	.03	-.02
Status Rwd × AS	.07	.02	.11***	.00	.01	.00	.01	.02	.01	.01	.02	.02
Status Rwd × II	.03	.03	.04	.02	.02	.04	.03	.03	.05	-.02	.03	-.04
Status Rwd × IH	-.07	.04	-.05	-.05	.03	-.06	.03	.04	.03	.00	.04	.00
Status Rwd × EH	.06	.04	.05	-.04	.03	-.06	-.02	.04	-.02	-.02	.04	-.02
Security Rwd × AS	.01	.02	.02	-.01	.01	-.03	.04	.02	.07	-.02	.02	-.05
Security Rwd × II	-.05	.03	-.07*	.00	.02	.01	-.04	.03	-.07	-.02	.03	-.03
Security Rwd × IH	.02	.04	.01	.00	.03	.01	.12	.05	.10**	-.00	.04	-.00
Security Rwd × EH	.02	.04	.02	.04***	-.00	.03	-.01	.02	.01	.04	.01	.03*

Note. Rwd= Reward, OVC = overcommitment, AS = Achievement striving, II = Impatience-irritability, IH = Indirect hostility, EH = Expressive hostility. *p<.05, **p<.01, ***p<.001.

ERI Model Variables. The majority of explained variance in employee psychological distress ($\Delta R^2 = .27, p < .000$), job satisfaction ($\Delta R^2 = .27, p < .000$), affective commitment ($\Delta R^2 = .13, p < .000$) and absenteeism ($\Delta R^2 = .07, p < .000$) was captured by the effort and reward components of the ERI model. In terms of independent predictors, after holding all other variables stable, effort was positively related to employee psychological distress ($\beta = .08, p < .01$) and negatively related to absenteeism ($\beta = -.16, p < .000$). Esteem rewards were strongly associated with distress ($\beta = -.17, p < .000$), satisfaction ($\beta = .28, p < .000$), commitment ($\beta = .20, p < .000$) and absenteeism ($\beta = -.12, p < .05$) and security rewards were negatively associated with distress ($\beta = -.13, p < .000$) and positively associated with job satisfaction ($\beta = .14, p < .000$) and affective commitment ($\beta = .15, p < .000$). Finally, status rewards were associated with both job satisfaction ($\beta = .18, p < .000$) and absenteeism ($\beta = -.15, p < .01$). The introduction of overcommitment in the third step of the model was significant only for employee reports of satisfaction and distress. The results indicated that overcommitment was negatively related to satisfaction ($\beta = -.11, p < .01$), and positively related to psychological distress ($\beta = .30, p < .000$), providing partial support for the intrinsic hypothesis.

The ERI interaction term involving the status reward component was significantly associated with both psychological distress ($\beta = -.08, p < .01$) and absenteeism ($\beta = .19, p < .000$) providing some support for the extrinsic hypothesis of the ERI. Following the procedures suggested by Cohen et al. (2003) the significant interactions were investigated visually. The two-way interactions in Figure 3 and Figure 4 indicate that under conditions of high effort, psychological distress and rates of absenteeism were at a moderate and relatively stable level regardless of perceived reward. In comparison, the combination of a *low* level of effort and a *high* level of status reward was associated with the lowest level of distress while a low effort-low status reward condition was associated with the greatest frequency of absences.

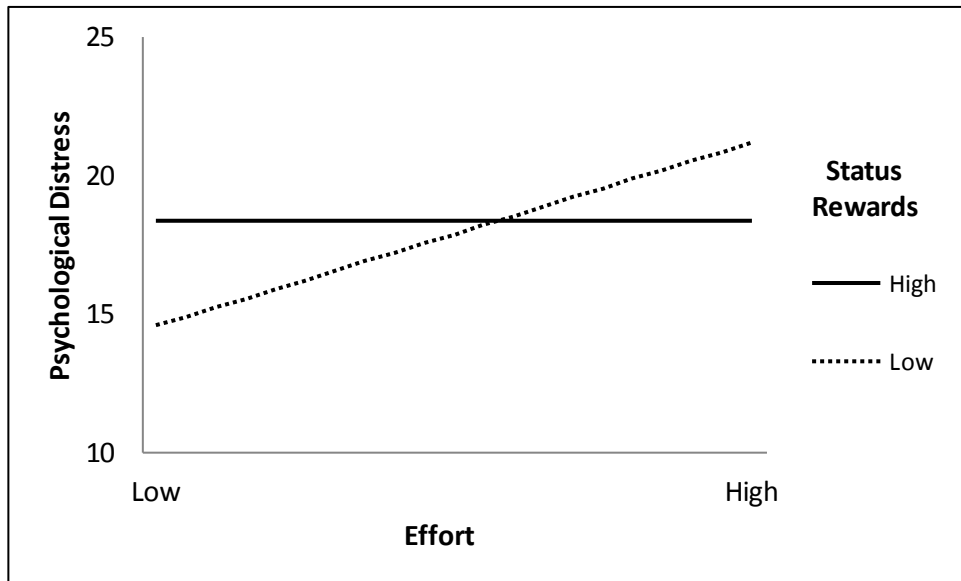


Figure 3. Interaction between effort and status rewards predicting psychological distress

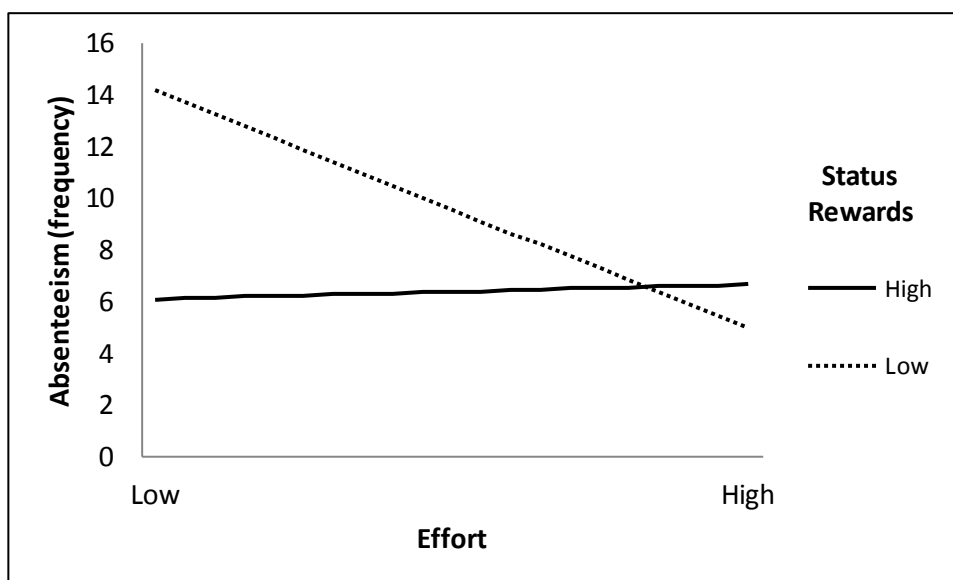


Figure 4. Interaction between effort and status rewards predicting absenteeism

Addition of Type A. The addition of the Type A items significantly improved the amount of variance predicted by approximately 10% ($p < .001$), 8% ($p < .000$), and 3% ($p < .01$) for the equations associated with psychological distress, affective commitment, and job satisfaction respectively. The strongest association was identified between the achievement striving dimension and affective commitment ($\beta = .31$, $p < .000$) although other strong relationships were identified between achievement striving and satisfaction ($\beta = .31$, $p < .000$), impatience-irritability and psychological distress ($\beta = .18$, $p < .000$), impatience-irritability and affective

commitment ($\beta=.17, p<.001$) and indirect hostility and psychological distress ($\beta=.16, p<.000$). The most consistent predictors were achievement striving and impatience-irritability. Specifically, lower levels of impatience-irritability, and higher levels of achievement striving were associated with positive effects across the outcomes, thus supporting the differential predictive capacity of the Type A personality dimensions. The two indicators of hostility were also significantly associated with employee psychological distress, and a high level of expressive hostility was associated with greater affective commitment to the organisation.

A number of two way interactions between the effort and reward variables and Type A components were significant, providing support for the conditional effects of individual differences within the ERI model. Impatience-irritability modified the associations between effort and psychological distress ($\beta=.07, p<.05$) and security rewards and psychological distress ($\beta=-.07, p<.05$). When examined more closely, it was revealed that at low effort, there was no difference in levels of psychological distress regardless of the level of impatience-irritability. Increases in perceived effort however, were met with an increase in psychological distress among highly impatient and irritable employees (see Figure 5). Similarly, under conditions of high security reward, there was relatively little difference between employees' psychological distress levels, although decreased security rewards were met with a substantial increase in distress levels among highly impatient and irritable employees (see Figure 6).

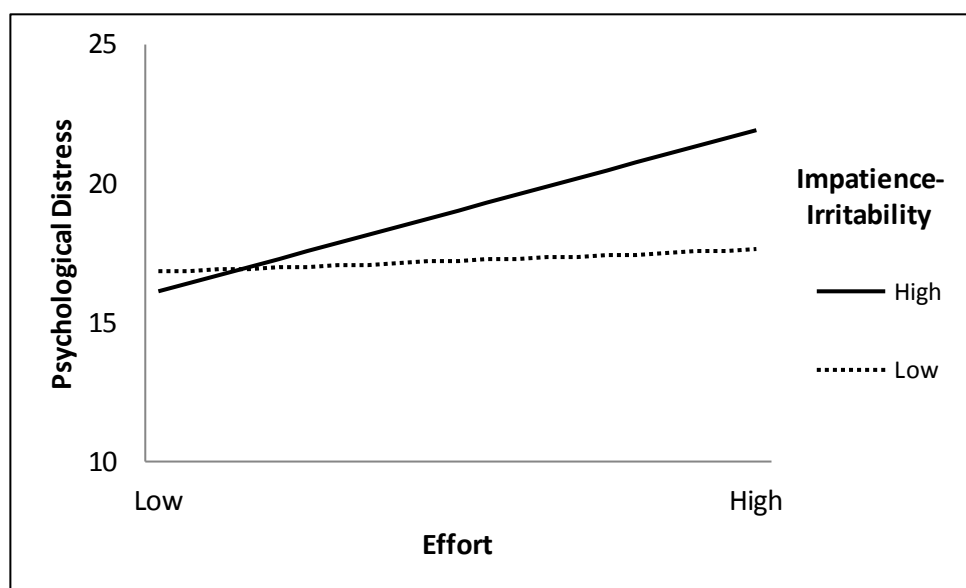


Figure 5. Interaction between effort and impatience-irritability predicting psychological distress

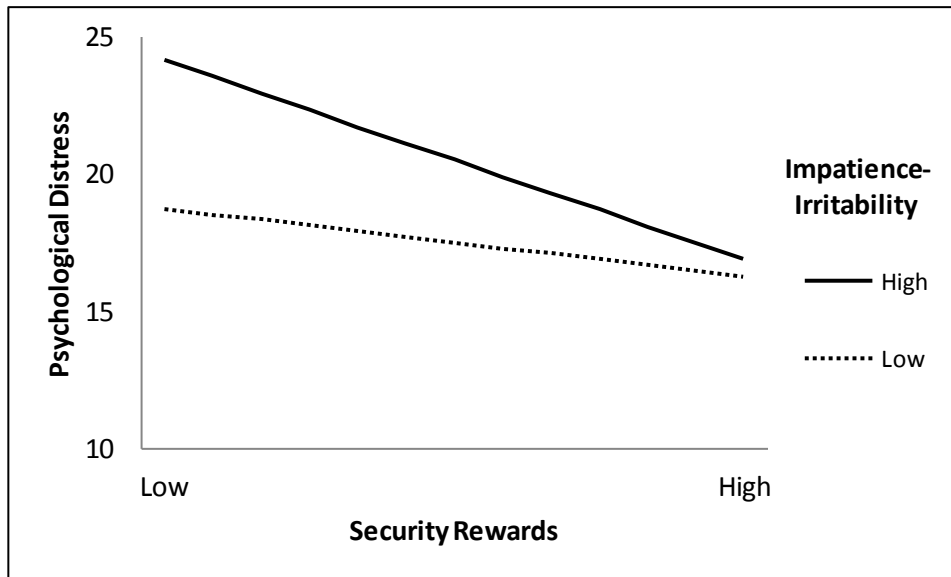


Figure 6. Interaction between security rewards and impatience-irritability predicting psychological distress

Hostility also moderated the effects of security rewards on employee organisational commitment ($\beta=.10, p<.01$). Employees high in indirect hostility were more likely to remain moderately committed to the organization despite a low level of security rewards, whereas those employees low in indirect hostility were likely to report less affective commitment when perceived security was low (Figure 7). A similar result was identified with respect to the modifying effect of indirect hostility on the relationship between esteem rewards and commitment ($\beta=-.12, p<.01$). A low level of indirect hostility was again, associated with less commitment to the organisation particularly under conditions of low esteem rewards (see Figure 8).

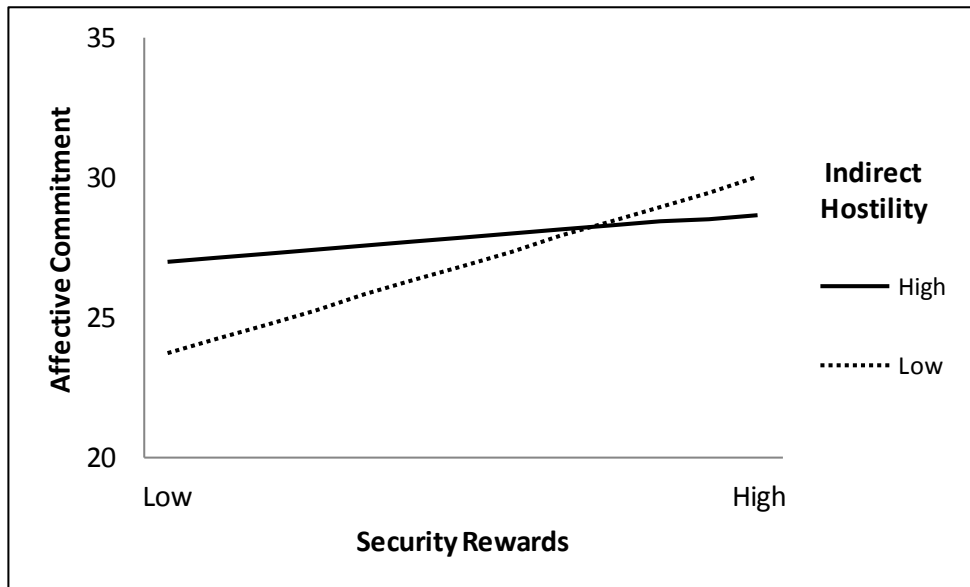


Figure 7. Interaction between security rewards and indirect hostility predicting affective commitment



Figure 8. Interaction between esteem rewards and indirect hostility predicting affective commitment

Finally, achievement striving acted to modify the effect of status reward on employee psychological distress ($\beta=.11, p<.000$) and esteem rewards on absenteeism ($\beta=.11, p<.05$). There was little difference in the absences recorded between high and low achievement striving employees whether status rewards were high or low suggesting that the interaction effect provided little additional empirical value. However, employees characterised by a high level of achievement striving reported stable, moderate levels of absenteeism whereas those low in achievement striving were likely to respond to decreased esteem rewards with greater absences. Although,

when esteem rewards were high these employees were less likely to be absent from work (see Figure 9).



Figure 9. Interaction between esteem rewards and achievement striving predicting absenteeism

Study 3

Study three investigated the concurrent and lagged effects of strain (as defined by the effort- reward imbalance model) and the contribution of individual differences within the ERI model. Hierarchical regression analyses were conducted to replicate the model developed in Study 2 and subsequently test temporal associations with employee strain among police officers. Time-lagged relationships between the ERI and Type A variables and the employee strain outcomes included in this research were examined with the use of panel data obtained at T1 and T2.

According to Zapf, Dormann, and Frese (1996), a complete two-wave panel design offers methodological benefits over an incomplete two-wave design that only measures the independent predictors at one point in time. A complete panel design in which the dependent variable at T1 is controlled and both the independent predictors at T1 and T2 are entered sequentially into the regression equation allows researchers to partial out the stabilities in the independent predictors, thus enabling a comparison of synchronous and lagged effects. It would be ideal to follow this analytical procedure, although the limited number of participants in the matched sample ($N = 195$), combined with the large number of independent predictors under investigation, would have resulted in an attenuation of power needed to identify stable effects (Cohen et al., 2003) or more concerning, a potential increase in the Type I error rate (Babyak, 2004). Power could be increased with a reduction of the number of independent variables in the model although given the involvement of all of the model components in the prediction of the outcomes identified in the cross-sectional analysis, this option was deemed unsuitable. The use of an incomplete design means that it cannot be identified whether changes in the independent variable relate to changes in the dependent variable (Zapf et al., 1996). Nonetheless, an incomplete two-wave design still offers benefits over typical cross-sectional designs and provides an opportunity to examine both short- and long-term effects of the model under investigation in this research.

Two separate regressions were conducted to test the concurrent and lagged effects of the research model. The lagged effects model utilised the matched sample ($N = 195$) while the test of cross-sectional effects was conducted using the T2 sample ($N = 798$). Absenteeism could only be tested using data provided from participants who chose to report their employee number at T2, therefore these analyses were

conducted on a smaller group of 499 officers. The variables were included in the longitudinal regression in the following order: Step 1) control variables at T1 and the dependent variable at T1, 2) T1 effort and reward dimensions, 3) T1 overcommitment, 4) Type A dimensions at T1, and finally 5) ERI interactions (e.g., effort \times esteem rewards, security rewards \times overcommitment) and Type A interactions at T1 (e.g., status rewards \times achievement striving, effort \times impatience-irritability). To test cross-sectional effects the following variables were entered in to a regression equation in this order: 1) control variables at T2, 2) effort and reward at T2, 3) T2 overcommitment, 4) Type A dimensions at T2, and 5) ERI and Type A interactions at T2.

Preliminary Analyses. Table 5 presents the correlations among the T1 predictors and outcomes, and the T2 predictors and outcomes. As expected, strong re-test correlations were identified between the measures at T1 and T2. All correlations reached over $r=.50$ except the correlation between absenteeism at T1 and absenteeism at T2 ($r=.32$, $p<.000$). Hypothesis 15 stated that the expected relationships between the ERI model and Type A variables would hold when examining long-term strain. Providing some support for the hypothesis, a number of significant lagged correlations were identified. Strong relationships were identified between overcommitment ($r=-.46$, $p<.000$), impatience-irritability ($r=.40$, $p<.000$), indirect hostility ($r=.37$, $p<.000$) and expressive hostility ($r=.36$, $p<.000$) measured at T1 and psychological distress measured at T2. Esteem rewards at T1 were significantly correlated with psychological distress ($r=-.36$, $p<.000$), job satisfaction ($r=.36$, $p<.000$) and affective commitment ($r=.32$, $p<.000$) at T2. Security rewards at T1 were also significantly correlated with psychological distress ($r=-.36$, $p<.000$), job satisfaction ($r=.40$, $p<.000$), and affective commitment ($r=.43$, $p<.000$) at T2. Status rewards measured at T1 were significantly associated with both job satisfaction ($r=.30$, $p<.000$) and commitment ($r=.30$, $p<.000$) at T2.

Analyses of the mean changes in the study variables from T1 to T2 were also conducted. The results revealed that significant mean changes were identified for measures of job satisfaction ($t(195) = 3.51$, $p<.01$, MD= 0.87), affective commitment ($t(195) = 5.98$, $p<.000$, MD= 2.40), security rewards ($t(195) = 0.82$, $p<.01$, MD = 0.82), impatience-irritability ($t(195) = 2.29$, $p<.05$, MD= 0.81), and indirect hostility ($t(195) = 3.05$, $p<.01$, MD= 0.68).

Table 5. Descriptive statistics, reliabilities, and correlations among T1 and T2 independent and dependent variables

		Mean	SD	α	1	2	3	4	5	6	7	8	9	10	11	12
1	Psychological distress (T1)	18.32	6.81	.92	-											
2	Psychological Distress (T2)	18.45	7.77	.94	.76***	-										
3	Job satisfaction (T1)	13.30	3.71	.78	-.35***	-.37***	-									
4	Job Satisfaction (T2)	12.43	3.75	.75	-.37***	-.45***	.57***	-								
5	Affective commitment (T1)	28.00	6.10	.77	-.27***	-.28***	.52***	.44***	-							
6	Affective commitment (T2)	25.60	6.49	.82	-.32***	-.35***	.38***	.54***	.60***	-						
7	Absenteeism (frequency) (T1)	4.33	5.10	-	.23**	.27***	-.13	-.14	-.22**	-.29***	-					
8	Absenteeism (frequency) (T2)	3.07	3.36	-	.21**	.11	-.11	-.25***	-.15*	-.24***	.32***	-				
9	Effort (T1)	18.86	3.65	.78	.13	.16*	-.10	-.19**	.09	.02	-.11	-.01	-			
10	Effort (T2)	19.13	3.75	.78	-.01	-.01	.07	-.09	.12	.04	-.15*	.01	.58***	-		
11	Esteem reward (T1)	17.34	3.52	.77	-.46***	-.36***	.37***	.36***	.32***	.32***	-.27***	-.10	-.11	.05	-	
12	Esteem reward (T2)	17.26	3.62	.77	-.42***	-.52***	.35***	.48***	.26***	.36***	-.18*	-.09	-.09	-.02	.55***	-
13	Status reward (T1)	8.66	2.36	.64	-.25***	-.17*	.34***	.30***	.20*	.30***	-.13	-.09	-.12	-.12	.41***	.33***

Table 5 cont. Descriptive statistics, reliabilities, and correlations among T1 and T2 independent and dependent variables

		Mean	SD	α	1	2	3	4	5	6	7	8	9	10	11	12
14	Status reward (T2)	8.74	2.39	.64	-.26***	-.28***	.36***	.46***	.18*	.33***	-.12	-.22**	-.08	-.05	.35***	.41***
15	Security reward (T1)	9.79	2.53	.62	-.39***	-.36***	.36***	.40***	.37***	.43***	-.15*	-.21**	-.08	-.00	.36***	.43***
16	Security reward (T2)	9.28	2.55	.53	-.37***	-.37***	.39***	.48***	.34***	.40***	-.14	-.15*	-.14	-.02	.38***	.50***
17	Overcommitment (T1)	17.11	5.58	.82	.58***	.46***	-.17*	-.19*	-.04	-.11	.06	.07	.38***	.27***	-.32***	-.27***
18	Overcommitment (T2)	17.19	5.31	.82	.45***	.45***	-.11	-.25***	.07	-.09	-.07	.08	.42***	.37***	-.27***	-.33***
19	Achievement striving (T1)	25.63	4.34	.77	.01	.02	.25**	.19*	.37***	.11	-.13	-.04	.29***	.16*	.08	.05
20	Achievement striving (T2)	25.51	4.49	.79	-.04	-.06	.18*	.21*	.39***	.23*	-.11	-.11	.30***	.17*	.07	.09
21	Impatience-irritability (T1)	15.55	3.84	.75	.49***	.40***	-.19*	-.18*	-.14*	-.03	.06	.17*	.22*	.01	-.24**	-.21*
22	Impatience-irritability (T2)	15.12	3.74	.71	.43***	.42***	-.23**	-.18*	-.12	-.12	.06	.13	.23*	.14*	-.24**	-.23*
23	Indirect hostility (T1)	6.34	2.23	.69	.43***	.37***	-.19*	-.14*	-.14*	-.12	.01	.02	.02	-.01	-.11	-.21*
24	Indirect hostility (T2)	5.93	2.24	.67	.40***	.40***	-.12	-.07	-.14*	-.13	.06	.02	.04	-.02	-.14*	-.22*
25	Expressive hostility (T1)	5.25	2.40	.71	.42***	.36***	-.27***	-.10	-.15*	.02	-.04	.08	.02	-.02	-.22*	-.22*
26	Expressive hostility (T2)	4.83	1.97	.59	.30***	.28***	-.16***	-.03	-.06	.00	.02	.00	.03	-.01	-.15*	-.13

		13	14	15	16	17	18	19	20	21	22	23	24	25
13	Status reward (T1)	-												
14	Status reward (T2)	.56***	-											
15	Security reward (T1)	.18*	.32***	-										
16	Security reward (T2)	.26***	.33***	.61***	-									
17	Overcommitment (T1)	-.21**	-.16*	-.30***	-.28***	-								
18	Overcommitment (T2)	-.13	-.20**	-.18*	-.18***	.70***	-							
19	Achievement striving (T1)	-.07	-.05	.19**	.19**	.28***	.35***	-						
20	Achievement striving (T2)	-.05	-.00	.15*	.15*	.29***	.32***	.77***	-					
21	Impatience-irritability (T1)	-.10	-.09	-.21**	-.21**	.41***	.30***	.18*	.17*	-				
22	Impatience-Irritability (T2)	-.11	-.19**	-.26***	-.26***	.38***	.37***	.25***	.20**	.76***	-			
23	Indirect hostility (T1)	-.08	-.04	-.18*	-.18*	.26***	.19**	-.12	-.16*	.38***	.28***	-		
24	Indirect hostility (T2)	-.16*	-.04	-.19**	-.19**	.26***	.20**	.01	-.06	.40***	.39***	.64***	-	
25	Expressive hostility (T1)	-.10	-.13	-.16*	-.16*	.32***	.18*	.01	-.02	.43***	.38***	.33***	.32***	-
26	Expressive hostility (T2)	-.10	.00	-.22**	-.22**	.26***	.16*	.05	-.01	.30***	.38***	.22**	.37***	.63***

*p<.05, **p<.01, ***p<.001.

Descriptive statistics, reliabilities, and bivariate correlations utilising the cross-sectional data collected in T2 are presented in Table 6. Correlations between the T2 independent and dependent predictors revealed a number of significant relationships. Consistent with Hypothesis 3 and the results of Study 2, the three reward dimensions were all negatively associated with psychological distress and positively associated with job satisfaction and affective commitment. However, rewards were not associated with absenteeism. Supporting the differentiation of the reward components (Hypothesis 4), the correlation analysis revealed that esteem rewards were strongly related to distress ($r = -.41, p < .000$), satisfaction ($r = .49, p < .000$) and commitment ($r = .42, p < .000$). Partial support for Hypothesis 2 was found where effort was positively associated with distress ($r = .19, p < .000$) and negatively correlated with job satisfaction ($r = -.19, p < .000$), although effort was not associated with commitment or absenteeism. Consistent with the results of Study 2 and providing support for Hypothesis 6, overcommitment was strongly associated with psychological distress ($r = .53, p < .000$) and negatively associated with job satisfaction ($r = -.31, p < .000$) and affective commitment ($r = -.09, p < .05$). The Type A dimensions were also significantly associated with a number of the strain outcomes supporting Hypothesis 9, 10 and 11. The impatience-irritability component of Type A displayed a positive correlation with psychological distress ($r = .42, p < .000$) and a negative correlation with job satisfaction ($r = -.23, p < .000$) and commitment ($r = -.14, p < .000$). Achievement striving was positively associated with both job satisfaction ($r = .16, p < .000$) and affective commitment ($r = .23, p < .000$). Indirect hostility ($r = .33, p < .000$; $r = -.08, p < .05$) and expressive hostility ($r = .34, p < .000$; $r = -.10, p < .01$) were positively associated with psychological distress and negatively associated with job satisfaction.

Table 6. Descriptive statistics, reliabilities, and correlations among the study variables at T2

		Mean	SD	α	1	2	3	4	5	6	7	8	9	10	11	12
1	Psychological distress	19.17	7.58	.93	—											
2	Job satisfaction	12.30	3.87	.92	-.40***	—										
3	Affective commitment	24.53	6.67	.83	-.27***	.57***	—									
4	Absenteeism (frequency)	1.32	1.23	—	.14*	-.19**	-.11	—								
5	Effort	18.87	3.82	.80	.19***	-.19***	-.03	-.02	—							
6	Esteem reward	17.26	3.80	.80	-.41***	.49***	.42***	-.14	-.13***	—						
7	Status reward	8.60	2.39	.64	-.26***	.43***	.30***	-.10	-.21***	.41***	—					
8	Security reward	9.24	2.51	.53	-.36***	.41***	.38***	-.14	-.20***	.43***	.30***	—				
9	Overcommitment	17.18	5.44	.83	.53***	-.31***	-.09*	.09	.43***	-.28***	-.20***	-.30***	—			
10	Achievement striving	23.27	3.39	.69	.05	.16***	.23***	-.10	.26***	.09*	-.04	.04	.28***	—		
11	Impatience-irritability	15.34	3.76	.72	.42***	-.23***	-.14***	.07	.22***	-.23***	-.16***	-.25***	.40***	.19***	—	
12	Indirect hostility	5.77	2.20	.65	.33***	-.08*	-.04	.13	-.05	-.12**	.01	-.10**	.17***	-.06	.29***	—
13	Expressive hostility	5.26	2.51	.75	.34***	-.10**	-.06	.05	.05	-.15***	-.09**	-.18***	.23***	.02	.40***	.38***

Note. *p<.05, **p<.01, ***p<.001. N (total) = 798. N (absenteeism) = 499

Testing a Lagged-Effects Model. The results of the multiple regression analyses indicated that the final model explained 58% of the variance in employee psychological distress (R^2 Adj. = .58, F [38, 157] = 8.310, $p < .000$), 42% of the variance in job satisfaction (R^2 Adj. = .42, F [38, 157] = 4.691, $p < .000$), 42% of the variance in affective commitment (R^2 Adj. = .42, F [38, 157] = 4.735, $p < .000$), and 13% of the variance in absenteeism (R^2 Adj. = .13, F (38, 157) = 1.743, $p < .01$). The step associated with the three-way interactions was non-significant in all regressions hence was removed from the analyses. In the final step of the model, previous reports of psychological distress ($\beta = .70$, $p < .000$), satisfaction ($\beta = .40$, $p < .000$), commitment ($\beta = .58$, $p < .000$), and absenteeism ($\beta = .22$, $p < .01$) at T1 were significantly related to future reports at T2, while tenure was significantly associated with job satisfaction ($\beta = .16$, $p < .05$), age was associated with psychological distress ($\beta = .22$, $p < .05$), and gender was a significant predictor of absenteeism behaviour ($B = -1.49$, $p < .05$). Specifically, employees who had been with the organisation for 10 to 19 years reported higher job satisfaction than those who had been with the organisation for 20 years or more, while employees aged 39 years or less reported higher levels of psychological distress when compared to employees who were aged 50 years or more. Males reported fewer absences than their female counterparts did.

In the final step of the regression, security rewards were related to changes in affective commitment ($\beta = .23$, $p < .01$) and job satisfaction ($\beta = .20$, $p < .01$), while effort was also significantly related to future reports of job satisfaction ($\beta = -.16$, $p < .05$). Status rewards ($\beta = .16$, $p < .05$), achievement striving ($\beta = -.17$, $p < .01$) and impatience-irritability ($\beta = .15$, $p < .05$), were also significantly associated with future reports of affective commitment at T2. Detailed regression results are available in Appendix C.

Testing a repeated cross-sectional model. The results of the Time 2 cross-sectional regression analyses indicates that the overall model explained 51% (Adj. $R^2 = .488$, F (37, 761) = 21.587, $p < .000$) of the variance in psychological distress, 46% (Adj. $R^2 = .430$, F (37, 761) = 17.306, $p < .000$) of the variance in job satisfaction, 35% (Adj. $R^2 = .314$, F (37, 761) = 10.852, $p < .000$), of the variance in affective commitment and 11% (Adj. $R^2 = .039$, F (37, 462) = 1.541, $p < .05$) of the variance in absenteeism. The strongest relationship was that between overcommitment and psychological distress ($\beta = .34$, $p < .000$). Other strong relationships were identified between a number of the independent variables and the strain outcomes. Specifically,

esteem rewards were strongly associated with job satisfaction ($\beta=.26, p<.000$) and affective commitment ($\beta=.25, p<.000$), while security rewards were also strongly associated with reported affective commitment ($\beta=.26, p<.000$). The control variables contributed little explained variance. Participants aged less than 50 reported lower levels of job satisfaction than those aged 50 and older while participants aged 40 to 49 also reported less affective commitment than those aged 50 and over. The regression results are presented in Table 7.

Table 7. Regression analyses predicting psychological distress, job satisfaction, affective commitment, and absenteeism at Time 2

Independent Variable	Psychological Distress				Job Satisfaction				Affective Commitment				Absenteeism			
	B	SE B	β	ΔR^2	B	SE B	β	ΔR^2	B	SE B	β	ΔR^2	B	SE B	β	ΔR^2
Gender - Male	.15	.49	.01		-.35	.26	-.04		-.23	.50	.02		-.23	.33	-.03	
Age – Less than 39	1.30	.73	.08		-.89	.39	-.11*		-.88	.74	-.06		-.12	.47	-.02	
Age – 40 to 49	.84	.55	.05		-.79	.29	-.10**		-1.40	.56	-.10*		-.76	.35	-.13	
Tenure – 9 years or less	-.42	.67	-.03		.20	.36	.02		-.19	.638	-.01		-.49	.44	-.07	
Tenure – 10 to 19 years	-.28	.61	-.02	.01	.12	.32	.01	.03**	-.87	.62	-.06	.03**	-.53	.40	-.08	.02
Effort	-.04	.06	-.02		-.07	.03	-.07*		.02	.06	.01		-.06	.04	-.08	
Esteem Rewards	-.42	.06	-.21***		.26	.03	.26***		.45	.06	.25***		-.05	.05	-.06	
Status Rewards	-.18	.09	-.06		.40	.05	.25***		.41	.10	.15***		-.09	.06	-.07	
Security Rewards	-.34	.09	-.11***	.23***	.27	.05	.18***	.34***	.70	.10	.26***	.25***	-.13	.06	-.11*	.05***
Overcommitment	.48	.05	.34***	.15***	-.10	.03	-.14***	.01***	.08	.05	.06	.00	.01	.03	.02	.00
Achievement striving	-.11	.06	-.06*		.23	.03	.22***		.33	.06	.19***		-.08	.04	-.12	
Impatience-irritability	.22	.06	.11**		-.07	.03	-.07*		-.11	.06	-.06		.07	.04	.09	
Indirect hostility	.60	.10	.17***		-.01	.06	.01		.04	.11	.01		-.03	.07	-.02	
Expressive hostility	.29	.10	.09**	.07***	.07	.05	.05	.04***	.13	.10	.05	.03***	.02	.07	.01	.01
Effort × Esteem Rwd	.02	.02	.04		-.01	.01	-.04		-.00	.02	-.01		-.00	.01	-.01	
Effort × Status Rwd	.05	.02	.07*		-.00	.01	-.01		.01	.02	.02		-.01	.02	-.03	
Effort × Security Rwd	-.02	.02	-.03		.01	.01	.03		.00	.02	.00		.04	.02	.13	
Effort × OVC	.03	.01	.08*		-.03	.01	-.15***		-.03	.01	-.08*		-.01	.01	-.01	
Esteem Rwd × OVC	-.03	.01	-.07*		-.01	.01	-.07		-.02	.01	-.07		-.01	.01	-.05	

Table 7 cont. Regression analyses predicting psychological distress, job satisfaction, affective commitment, and absenteeism at Time 2

	Psychological Distress			Job Satisfaction			Affective Commitment			Absenteeism						
Status Rwd × OVC	.02	.02	.04	.01	.01	.03	.04	.02	.08	-.00	.01	-.02				
Security Rwd × OVC	-.02	.02	-.03	.01	.01	.02	.04	.02	.09*	-.01	.01	-.04				
Effort × AS	-.02	.02	-.04	.03	.01	.12***	.01	.02	.03	.00	.01	.00				
Effort × II	.02	.02	.04	-.02	.01	-.08*	-.01	.02	-.03	.01	.01	.08				
Effort × IH	.02	.03	.02	-.02	.01	-.05	.04	.03	.05	-.03	.02	-.08				
Effort × EH	-.02	.03	-.03	.01	.02	.02	-.02	.03	-.02	.00	.02	.01				
Esteem Rwd × AS	-.04	.02	-.08*	.00	.01	.01	-.02	.02	-.05	.00	.01	.01				
Esteem Rwd × II	-.01	.02	-.02	.01	.01	.04	.03	.02	.07	-.02	.01	-.08				
Esteem Rwd × IH	-.06	.03	-.06	.03	.02	.06	.01	.03	.01	.03	.02	.09				
Esteem Rwd × EH	-.03	.03	-.03	.02	.02	.04	-.05	.03	-.07	.00	.02	.01				
Status Rwd × AS	.03	.03	.04	.01	.01	.01	.02	.03	.02	-.01	.02	-.03				
Status Rwd × II	-.00	.03	-.00	-.02	.02	-.04	-.04	.03	-.05	.02	.02	.08				
Status Rwd × IH	.02	.05	.01	.00	.03	.00	.07	.05	.05	.00	.03	.00				
Status Rwd × EH	-.12	.04	-.10**	-.01	.02	-.01	-.04	.04	-.04	-.01	.03	-.02				
Security Rwd × AS	.04	.03	.06	-.00	.01	-.00	.01	.03	.01	.01	.02	.03				
Security Rwd × II	-.02	.03	-.03	-.02	.01	-.05	-.06	.03	-.08*	.01	.02	.03				
Security Rwd × IH	-.02	.05	-.01	.05***	-.04	.03	-.05	.04***	-.07	.05	-.06	.04***	-.02	.03	-.04	.03

*p<.05, **p<.01, ***p<.001

ERI model variables. The majority of explained variance in employee reports of psychological distress ($R^2\Delta = .23$, $p < .000$), satisfaction ($R^2\Delta = .34$, $p < .000$), commitment ($R^2\Delta = .25$, $p < .000$) and absenteeism ($R^2\Delta = .05$, $p < .000$) were attributed to the ERI variables when these were entered in the second step of the analysis. Esteem reward was a prominent predictor of the outcomes included in the current study. That is, esteem rewards were negatively associated with psychological distress ($\beta = -.21$, $p < .000$), and positively associated with job satisfaction ($\beta = .26$, $p < .000$) and commitment ($\beta = .25$, $p < .000$). Security rewards were also a consistent predictor of the outcomes displaying a positive association with satisfaction ($\beta = .18$, $p < .000$) and commitment ($\beta = .26$, $p < .000$) and a negative association with distress ($\beta = -.11$, $p < .000$), and absenteeism ($\beta = -.11$, $p < .05$). Status rewards were positively related to both satisfaction ($\beta = .25$, $p < .000$) and commitment ($\beta = .15$, $p < .000$) although were not directly associated with distress nor absenteeism. Effort was weakly related to job satisfaction ($\beta = -.07$, $p < .05$) and was also involved in a number of two-way interactions.

Consistent with the predictions of ERI theory, the effects of effort on psychological distress were modified by employee perceived status rewards ($\beta = .07$, $p < .05$). When modelled according to the procedures outlined by Cohen et al. (2003), the interaction (see Figure 10) revealed that a combined low effort-low reward condition was associated with the greatest level of distress among officers, while psychological distress remained at a moderate level when status rewards were high regardless of the level of perceived effort.

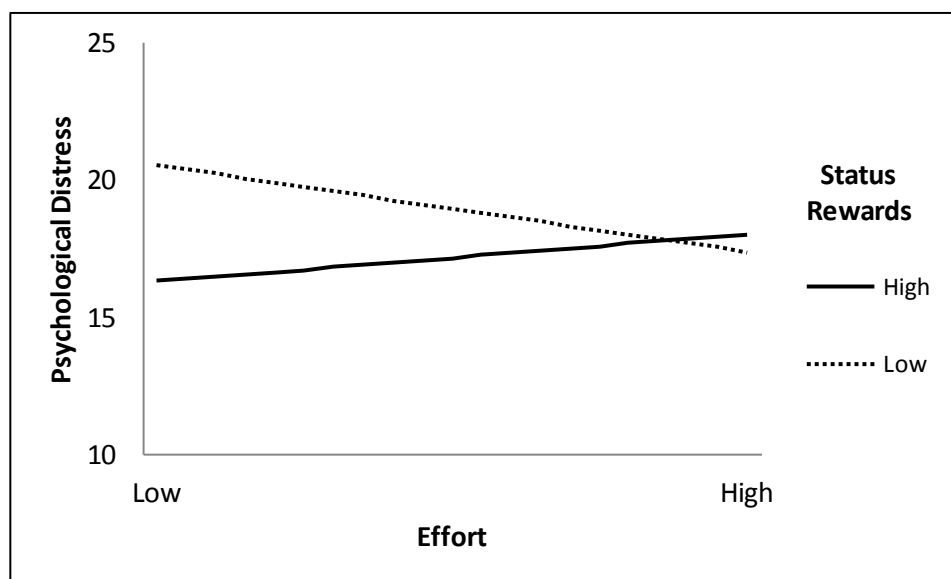


Figure 10. Interaction between effort and status rewards predicting psychological distress

Overcommitment was directly associated with psychological distress ($\beta=.34$, $p<.000$) and job satisfaction ($\beta=-.14$, $p<.000$) although, consistent with the results at T1, was not directly associated with commitment or absenteeism in the final step of the regression. Overcommitment was also involved in a number of interactions, where the association between effort and psychological distress ($\beta=.08$, $p<.05$), job satisfaction ($\beta=-.15$, $p<.000$), and affective commitment ($\beta=-.08$, $p<.05$) was moderated by employee overcommitment. Further, the association between esteem rewards and psychological distress ($\beta=-.07$, $p<.05$), and security rewards and affective commitment ($\beta=.09$, $p<.05$) was also moderated by overcommitment.

The interactions involving overcommitment were investigated and revealed that highly overcommitted employees were more likely to respond to perceived high effort with increased levels of distress (see Figure 11) and reductions in satisfaction (see Figure 12). Overcommitted employees were also likely to respond to low effort conditions favourably, reporting the highest level of job satisfaction and affective commitment (see Figure 13) under this condition.

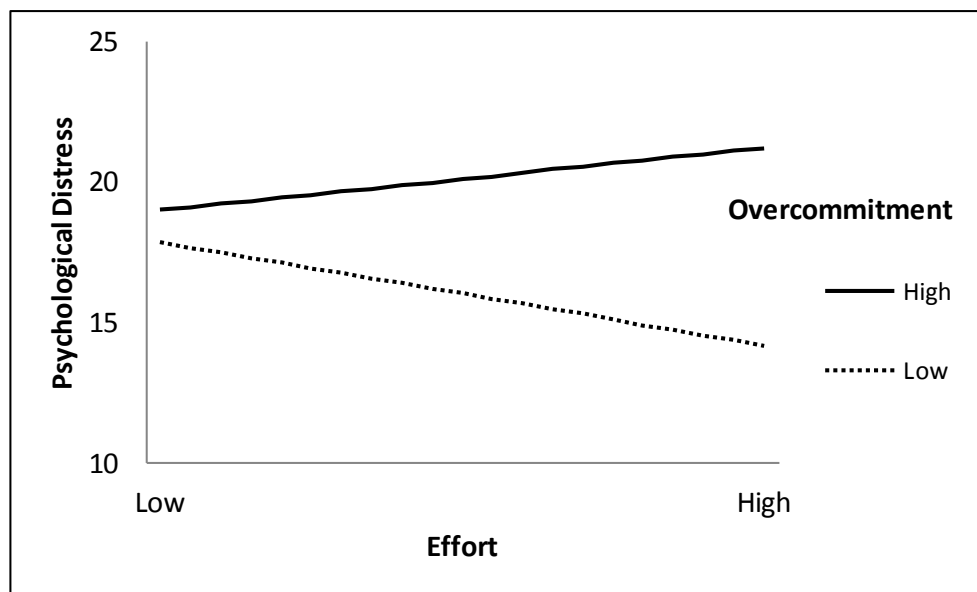


Figure 11. Interaction between overcommitment and effort predicting psychological distress

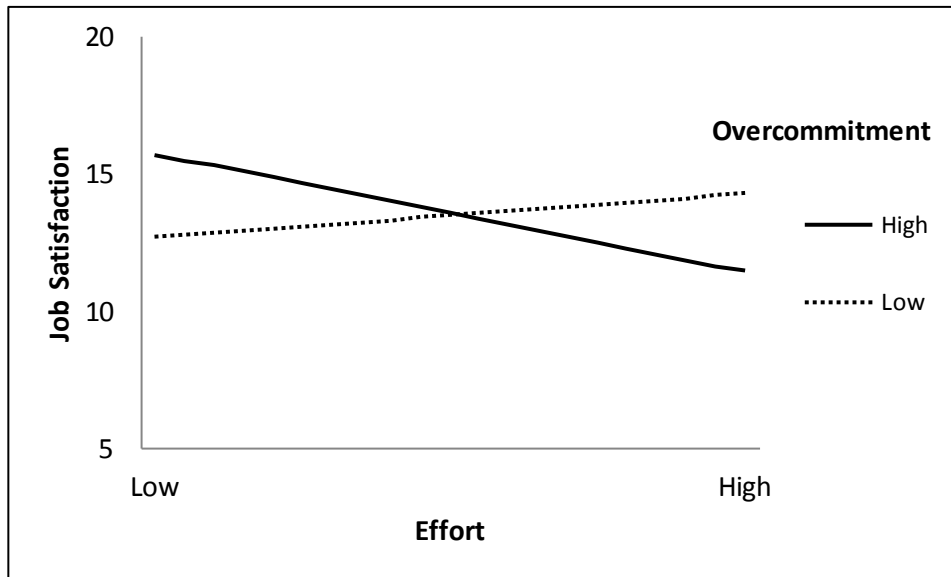


Figure 12. Interaction between overcommitment and effort predicting job satisfaction

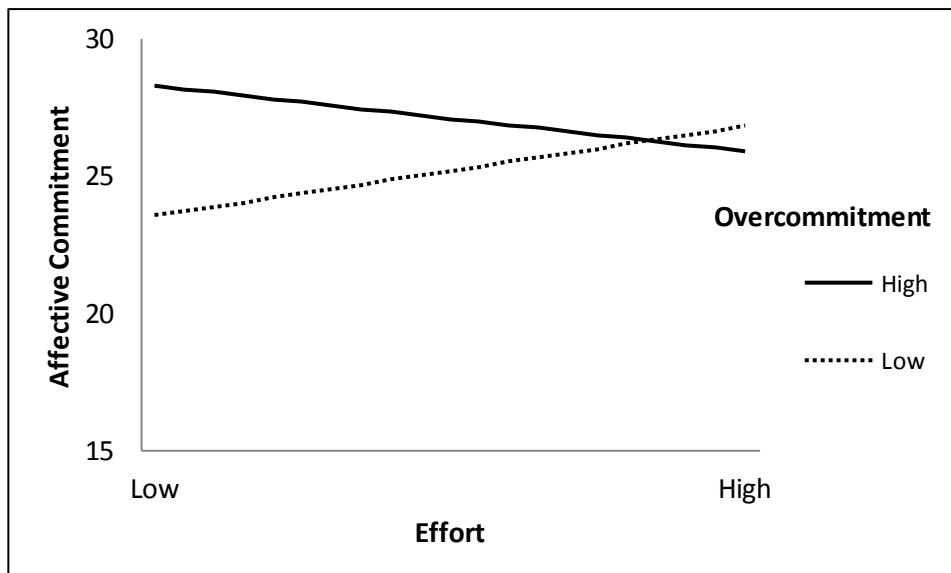


Figure 13. Interaction between overcommitment and effort predicting affective commitment

A high level of esteem rewards was associated with the most positive outcomes for all employees, however highly overcommitted employees reported a greater level of distress under conditions of low esteem reward (see Figure 14). A similar result was identified when the interaction between security reward and overcommitment on affective commitment was examined. Specifically, a greater level of security was related to increases in organisational commitment although among overcommitted employees this effect was more pronounced (see Figure 15).

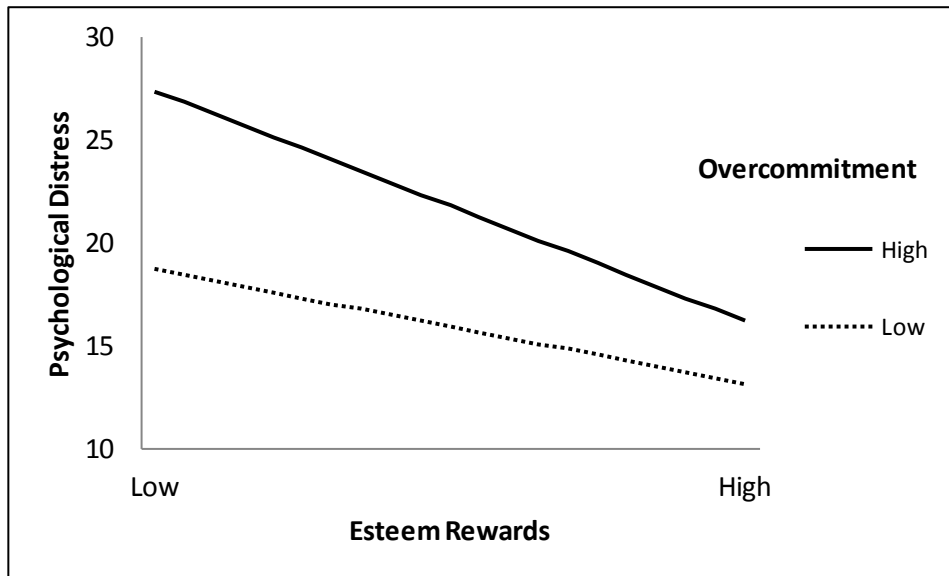


Figure 14. Interaction between overcommitment and esteem rewards predicting psychological distress

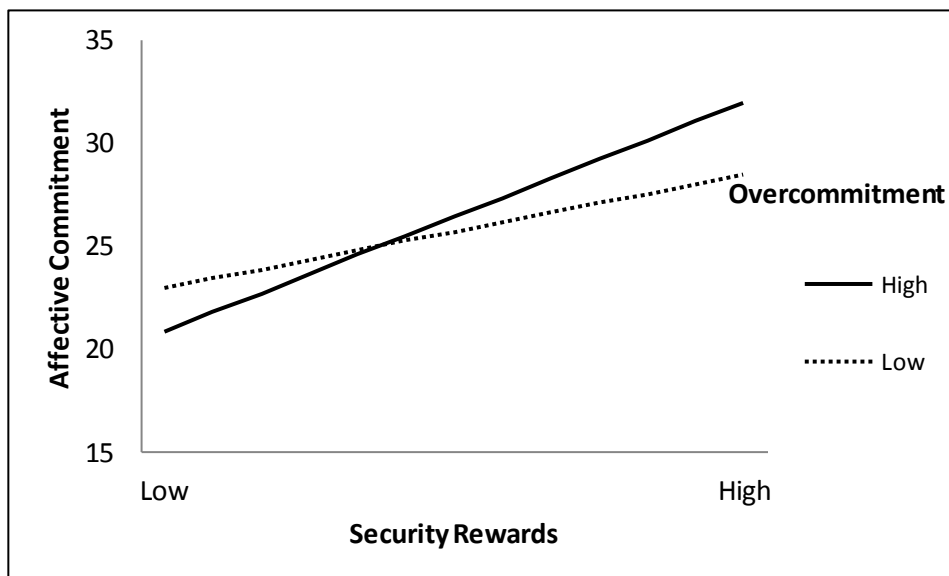


Figure 15. Interaction between overcommitment and security reward predicting affective commitment

The Addition of Type A Personality. The addition of the Type A subscales in step four significantly improved prediction by 7% ($p<.000$), 4 % ($p<.000$), and 3% ($p<.000$) for each of the outcomes of psychological distress, satisfaction and commitment respectively. The achievement striving dimension of Type A was significantly related to distress ($\beta=-.06$, $p<.05$), satisfaction ($\beta=.22$ $p<.000$) and commitment ($\beta=.19$ $p<.000$), while impatience-irritability was also associated with employee distress ($\beta=.11$, $p<.001$) and job satisfaction ($\beta=-.07$, $p<.05$). Indirect hostility ($\beta=.17$ $p<.000$) and expressive hostility ($\beta=.09$ $p<.01$) were also associated

with reports of psychological distress. The Type A dimensions failed to improve prediction of absenteeism behaviour ($R^2\Delta = .03$, $p > .05$).

A number of Type A dimensions also acted to modify the effects of effort and reward. Achievement striving modified the relationship between effort and job satisfaction ($\beta = .12$, $p < .000$), as well as the effect of esteem reward on psychological distress ($\beta = -.08$, $p < .05$). Impatience-irritability moderated the effects of security reward on affective commitment ($\beta = .07$, $p < .05$), and the relationship between effort and job satisfaction ($\beta = -.08$, $p < .05$). Finally, expressive hostility moderated the effects of status rewards on employee reports of psychological distress ($\beta = -.10$, $p < .01$).

Results involving the Type A interactions were modelled and revealed that employees characterised by a high level of achievement striving remained satisfied with their job regardless of the level of perceived effort. In comparison, employees low in achievement striving were more likely to report reduced satisfaction under conditions of high effort (see Figure 16). Esteem rewards had a positive effect on employee psychological distress, with all employees reporting a reduction in distress levels when perceived esteem rewards were high. Employees who reported a high level of achievement striving were however, more likely to respond negatively to low esteem rewards (see Figure 17).

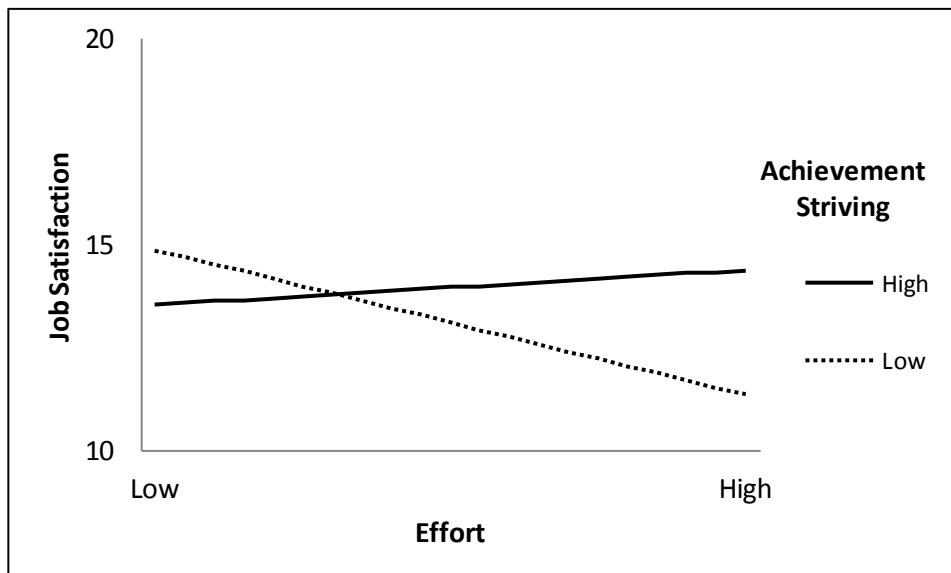


Figure 16. Interaction between achievement striving and effort predicting job satisfaction

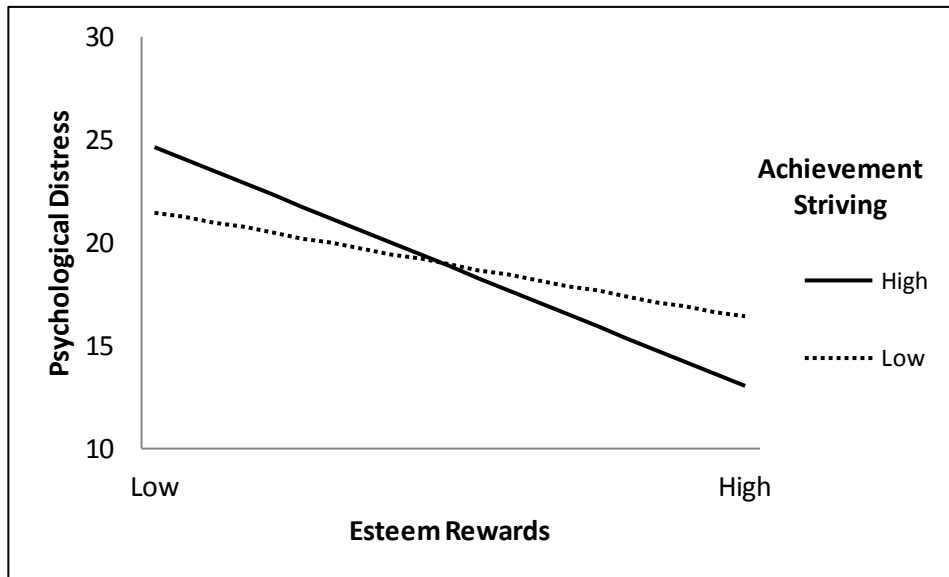


Figure 17. Interaction between achievement striving and esteem rewards predicting psychological distress

Employees reporting higher levels of impatience and irritability were more responsive to levels of perceived effort. Under conditions of high effort, employees characterised by a high level of impatience-irritability tended to report the lowest levels of satisfaction with their job. Conversely, under conditions of low effort highly impatient and irritable employees reported the greatest level of satisfaction (see Figure 18). Commitment to the organisation was also adversely affected by a low level of perceived security. However, under conditions of high security commitment to the organisation was improved. Employees who reported a high level of impatience-irritability did not respond as favourably to increased security when compared to their less impatient and irritable counterparts (see Figure 19). Finally, the level of expressive hostility exhibited by employees was associated with their responses to status rewards. Employees high in expressive hostility were more likely to report a high level of psychological distress when status rewards were low. However, reported distress levels reduced dramatically when perceived status rewards increased (see Figure 20).

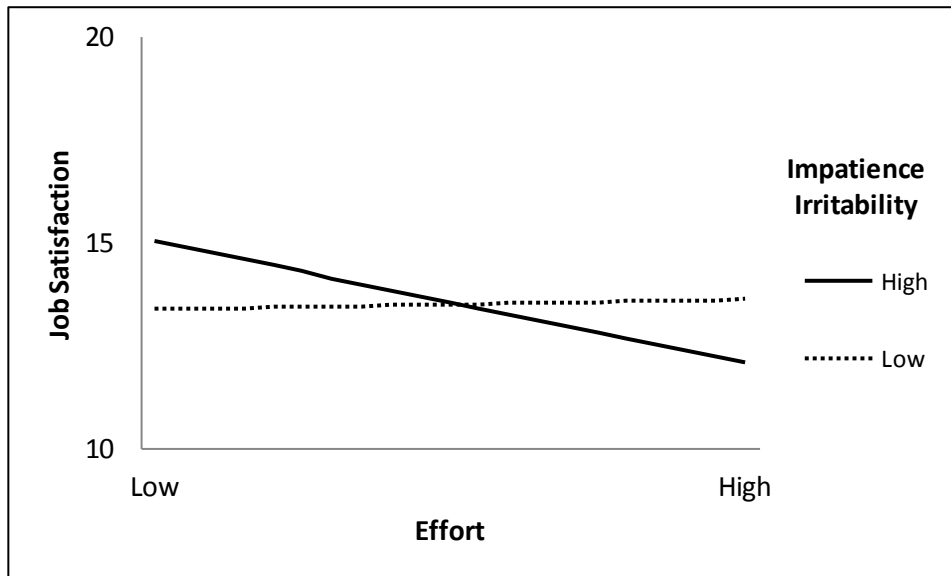


Figure 18. Interaction between impatience-irritability and effort predicting job satisfaction

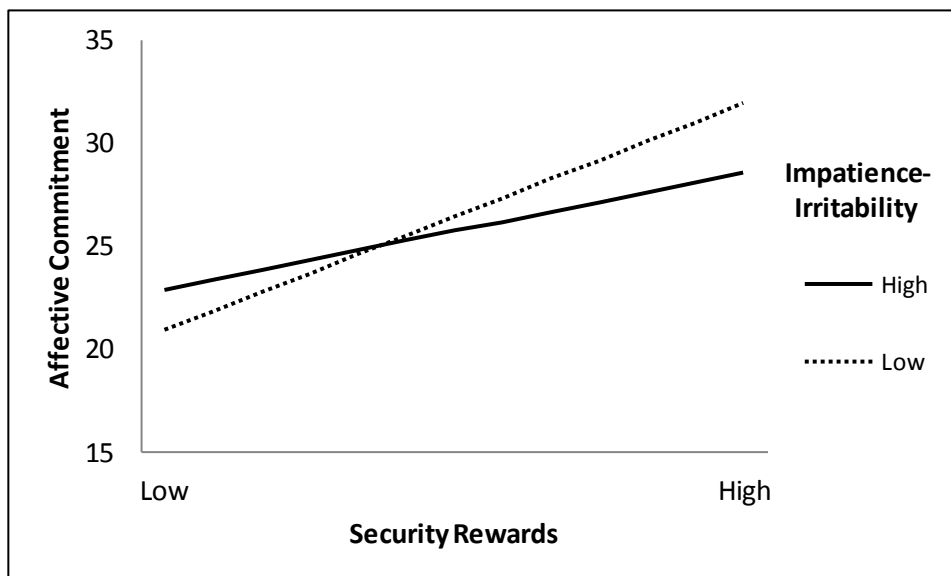


Figure 19. Interaction between impatience-irritability and security rewards predicting affective commitment

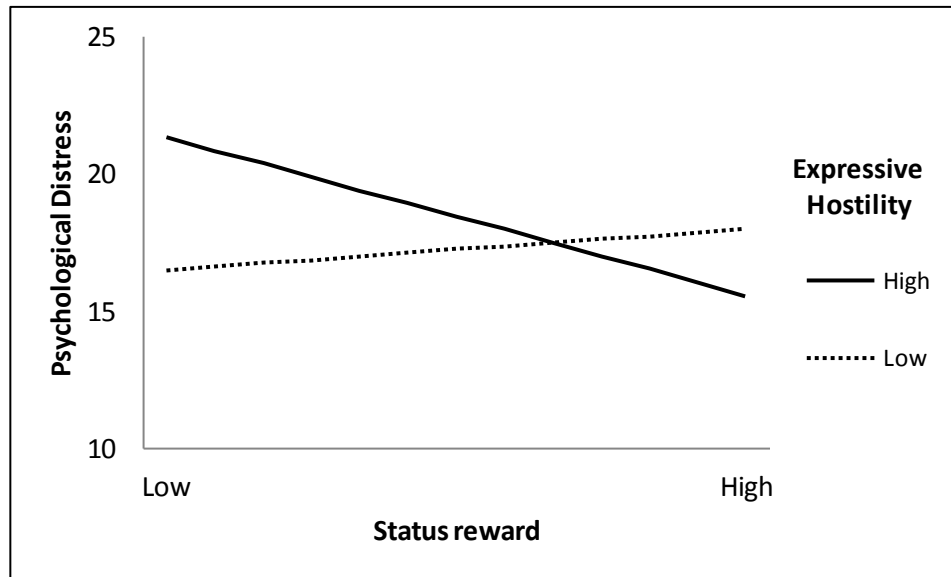


Figure 20. Interaction between expressive hostility and status rewards predicting psychological distress

Reverse-causality. Additional analyses were conducted to test potential reverse-causation effects. Reverse-causal models were examined to establish whether potential effects such as the drift hypothesis or the personality-exposure (compared to reactivity) hypothesis provided additional fit to the data. The drift hypothesis (Frese, 1982) suggests that unhealthy or unhappy employees may experience greater job stress as a direct result of their initial levels of strain. Accordingly, a high level of distress at T1, for example, would be associated with fewer rewards at T2. Similarly, the personality-exposure model (Bolger & Zuckerman, 1995) proposes that particular personality traits can influence the level of reported work stress either by leading employees to self-select into positions that are more challenging and more stressful, or by influencing the reporting of work stressors in a more positive or negative way. The personality-exposure hypothesis would result in personality traits at T1 predicting changes in reported stressors at T2. To test strain-stressor associations, the procedure described by Zapf and colleagues (1996) was followed and after controlling for the effects of potential confounding variables as well as stressors at T1 in the first step, employee strain at T1 was regressed onto employee stressors at T2. These results indicate that there was some evidence for reverse-causality. Specifically, greater psychological distress at T1 was associated with lower esteem rewards at T2 ($\beta = -.18, p < .05$), and greater job satisfaction at T1 was significantly associated with future reports of security ($\beta = .17, p < .05$) and status ($\beta = .18, p < .05$)

rewards. The results are presented in Tables 8-10. Prior strain was not however, associated with perceptions of effort. No reverse-causal relationships were identified between stressors and absenteeism.

Table 8. Reverse-causal relationship between strains at T1 and esteem reward at T2

Independent variable	B	SE B	B	ΔR^2
Step 1				
Esteem reward T1	.42	.07	.40***	
Gender – Male T1	-.01	.58	-.00	
Tenure – 9 years or less T1	.54	.73	.06	
Tenure – 10 to 19 years T1	.41	.63	.05	
Age – 39 years or less T1	-.52	.91	-.07	
Age – 40 to 49 years T1	-.68	.73	-.09	.30***
Step 2				
Psychological distress T1	-.09	.04	-.17*	
Job satisfaction T1	.14	.07	.14	
Affective commitment T1	-.00	.04	-.01	
Absenteeism T1	-.02	.05	-.03	.01

* $p < .05$, ** $p < .01$, *** $p < .001$

Table 9. Reverse-causal relationship between strains at T1 and status reward at T2

Independent variable	B	SE B	β	ΔR^2
Step 1				
Status reward T1	.50	.07	.49***	
Gender – Male T1	.59	.38	.10	
Tenure – 9 years or less T1	-.42	.48	-.07	
Tenure – 10 to 19 years T1	-.23	.41	-.05	
Age – 39 years or less T1	.06	.59	.01	
Age – 40 to 49 years T1	-.22	.48	-.05	.33***
Step 2				
Psychological distress T1	-.03	.02	-.08	
Job satisfaction T1	.12	.05	.18*	
Affective commitment T1	-.01	.03	-.02	
Absenteeism T1	-.02	.03	-.05	.04*

* $p < .05$, ** $p < .01$, *** $p < .001$

Table 10. Reverse-causal relationship between strains at T1 and security reward at T2

Independent variable	B	SE B	β	ΔR^2
Step 1				
Security reward T1	.48	.06	.48***	
Gender – Male T1	-.17	.38	-.03	
Tenure – 9 years or less T1	.12	.48	.02	
Tenure – 10 to 19 years T1	.07	.41	.01	
Age – 39 years or less T1	.53	.58	.10	
Age – 40 to 49 years T1	-.42	.47	-.08	.41***
Step 2				
Psychological distress T1	-.03	.02	-.08	
Job satisfaction T1	.12	.05	.18*	
Affective commitment T1	.02	.03	.04	
Absenteeism T1	-.02	.03	-.05	.05**

* $p < .05$, ** $p < .01$, *** $p < .001$

Further analyses were conducted to assess the possibility of reverse-causality between the individual differences included in this research (i.e., overcommitment and Type A profile), and work stressors. To test these associations, the overcommitment and Type A variables were regressed on the effort and reward variables. All analyses controlled for previous reports of the dependent variable as well as demographic variables. There was little evidence to support the personality-exposure hypothesis or a process of occupational socialisation. Overcommitment was the only individual difference that was influenced by previous reports of job stressors. Specifically, those employees who reported a higher level of effort at T1 were also more likely to report a high level of overcommitment at T2. The results of this regression analysis are presented in Table 11.

Table 11. Reverse-causal relationship between stressors at T1 and overcommitment at T2

Independent variable	B	SE B	β	ΔR^2
Step 1				
Overcommitment T1	.58	.06	.61***	
Gender – Male T1	-1.38	.71	-.10	
Tenure – 9 years or less T1	-.04	.92	-.00	
Tenure – 10 to 19 years T1	-.73	.78	-.06	
Age – 39 years or less T1	.97	1.12	.09	
Age – 40 to 49 years T1	.53	.86	.05	.51***
Step 2				
Effort T1	.29	.08	.20***	
Esteem reward T1	-.16	.09	-.10	
Status reward T1	.12	.13	.05	
Security reward T1	.02	.12	.01	.04**

*p<.05, **p<.01, ***p<.001

Overall, the findings were generally supportive of a personality-reactivity model as opposed to a personality-exposure model, in that none of the Type A variables were associated with future reports of job stressors. The results also indicated that there was only modest support for a strain-stressor association. The findings suggest that a reciprocal relationship exists between occupational rewards, job satisfaction, and psychological distress although a stressor-strain relationship appears to provide the greatest predictive utility.

CHAPTER 6: Discussion

The purpose of this chapter is to summarise and evaluate the research findings and to clarify the contributions made by the current study in relation to the aims and hypotheses developed in Chapter 3. The literature review identified that there were significant theoretical and methodological issues involving the ERI model and the existing empirical research. In particular, individual differences related to a high need for control and reflecting many aspects of the Type A profile were argued to have a central role within the ERI model (Siegrist et al., 1986). However, because of the gradual evolution of the overcommitment construct the extent to which Type A continues to be represented in the ERI model required clarification. Further, few studies adequately tested the influence of individual differences within the ERI model, instead focusing on the more situational and environmental aspects of effort and reward. Our knowledge of the effects of additional individual differences related to a need for control in employee reactions to effort and reward conditions at work was therefore limited.

The literature review in Chapter 3 summarised how a number of methodological refinements could be applied to the ERI model to advance the ERI literature and improve the applicability of the ERI model to workplace stress. First, the majority of previous ERI research utilised a composite reward indicator despite the multi-dimensional nature of rewards specified in the ERI model. Limiting analyses to a composite reward factor potentially dilutes the differential effects of sources of reward on employee strain outcomes. Empirical research was also often limited to physical or psychological health outcomes, rather than more work-based attitudinal or behavioural end-points. The assessment of an augmented ERI-Type A model in relation to psychological, attitudinal, and behavioural strain in both the short- and long-term therefore adds important evidence regarding the ERI model's applicability to a wide variety of outcomes. Finally, previous research tended to utilise a ratio indicator to represent an imbalance and did not consider the additive independent effects of the model components, potentially camouflaging highly significant lower-order relationships (e.g., main effects or lower-order interactions).

In view of the limitations of previous ERI research, the current investigation aimed to examine the role of individual differences theoretically related to the ERI model as moderators of employee reactions to effort and reward conditions at work.

Further, the current research aimed to address some of the limitations of previous studies by using a multi-dimensional indicator of the reward component of the ERI model, along with additive and multiplicative terms, a longitudinal design, and a diverse range of employee outcomes. The sections that follow discuss each study's findings before considering the research program in its entirety and the implications and conclusions that can be drawn from the research.

Discussion and Conclusions from Study 1

The primary aim of Study 1 was to clarify whether there was a conceptual overlap between the current recommended measure of overcommitment and the Type A behaviour subscales, achievement striving, impatience-irritability and hostility. Based on the existing literature, it was expected that there would be minimal overlap between overcommitment and the Type A profile (Hypothesis 1). This proposition was tested with factor analysis, and an investigation of factor loadings and the presence or absence of cross-loadings. The results of Study 1 provide support for the prior predictions. Consistent with expectations, the results of the factor analysis overwhelmingly suggest that overcommitment does not represent the components of the Type A personality profile represented by the achievement striving and impatience-irritability components of the Jenkins Type A scale, and a behavioural measure of hostility.

The results of the factor analysis identified a five-factor solution. Investigation of the results revealed that a single factor best represented the overcommitment construct, while the Type A subscales achievement striving and impatience-irritability also formed independent factors. The hostility subscale formed a two-factor solution where the first, labelled expressive hostility, represented more covert forms of hostility (e.g., spreading gossip), and the second, labelled indirect hostility, represented the overt aspects of hostility (e.g., slamming doors). The overcommitment construct displayed a high level of internal consistency, confirming the results of previous studies that suggest the current overcommitment scale is a reliable measure (e.g., Siegrist et al., 2004; Siegrist et al., 2009).

A review of the ERI literature revealed that the conceptual properties of overcommitment, particularly as they relate to the Type A personality profile, required clarification. Originally based on the concept of a high need for control and developed significantly from the Type A personality profile (Siegrist et al., 1986),

the overcommitment construct has significant theoretical and historical links with the Type A construct. Siegrist (1996) argued that many aspects of the Type A profile were integral to the ERI model and could determine employee responses to demanding workplace conditions such as perceived high effort and low reward. Nonetheless, the role of overcommitment in the ERI model as well as the indicators used to measure the construct evolved throughout the life span of the ERI model. This gradual evolution resulted in a lack of clarity regarding the precise nature of overcommitment and the extent to which the ERI model continues to measure aspects of the Type A profile.

Much of the previous research identifies a significant and consistent relationship between overcommitment and employee health (Appels et al., 1997; Bakker et al., 2000; Calnan et al., 2000; Vrijkotte et al., 1999) and yet the measures used to operationalise the overcommitment component of the ERI model were often proxies, typically incorporating many facets of the Type A profile (Bosma et al., 1998; Kuper et al., 2002; Siegrist & Marmot, 2004). Previous research has identified a strong correlation between the original need for control scale and the current overcommitment measure (Fahlen, 2008), although this was mostly associated with the ‘inability to withdraw from work obligations’. The current overcommitment scale was therefore, thought to share little conceptual overlap with aspects of Type A such as disproportionate irritability or an achievement-orientation. The results of Study 1 confirmed expectations that there was little remaining overlap between the current overcommitment measurement and the Type A profile.

Recent research continues to argue that overcommitment shows a strong theoretical overlap with the Type A behaviour pattern (e.g., Smith et al., 2005; Van Vegchel et al., 2001; Vrijkotte et al., 2004). In particular, components of Type A relating to a need to be approved and esteemed at work and an impatience and competitiveness with others are thought to underlie the overcommitted employees’ inability to ‘let go’ (Vrijkotte et al., 1999). The results of the current study challenge the theoretical underpinnings of the current measure and suggest that alterations to the overcommitment scale over time have resulted in a conceptual separation between ‘Type A’ and ‘overcommitment’.

The current overcommitment measure is a strong predictor of health outcomes particularly with respect to psychological outcomes (Prekel et al., 2007; Watanabe et

al., 2008) and physical health outcomes such as CHD and CHD risk factors (Hanson et al., 2001). However, studies that are based on a broad interpretation of overcommitment that include reference to the Type A profile, may not provide an adequate explanation of the association between this critical individual difference variable and important employee outcomes. A lack of conceptual clarity and precision does not necessarily imply that the current overcommitment construct lacks value, although the results do suggest that additional empirical research and theory building are needed. In particular, additional research is needed to investigate the precise role of the current overcommitment measure in the ERI model.

The results of the current investigation suggest that overcommitment may not represent the theoretically linked ‘cognitive, emotional, and behavioural’ aspects of the Type A profile. Consistent with recent descriptions of overcommitment as the ‘inability to withdraw from work obligations’ (Siegrist et al., 2004), the scale items from the current overcommitment measure (see Siegrist et al., 2004) appear to be more closely linked with a psychological preoccupation with work-related concerns rather than a Type A trait or coping method. In particular, there appears to be little overlap with the competitiveness and hostility elements of Type A despite reference to these aspects in previous studies (Stansfield, 2002; Tei-Tominaga et al., 2009; Vrijkotte et al., 2004).

The overcommitment construct was based on the notion of a Type A person’s need for control, and their subsequent hyper-reactivity to control-limiting conditions (Siegrist, 1996). However, previous research that includes a test of the moderating effects of overcommitment has found highly inconsistent results. According to ERI theory, overcommitment is considered a stable, trait-like construct based on Type A, proposed to influence employee motivation at work as well as individual reactions to workplace inequity (Siegrist et al., 2004). van Vegchel et al. (2005) have previously questioned the nature of overcommitment in the ERI model. They cite the inconsistent results of empirical research with respect to the moderating effects of overcommitment as evidence that this variable may have an influence on any number of points within the stress process. For instance, in addition to being a mechanism for coping with control-limiting situations, overcommitment may be a consequence of greater work stress and increasing demands. Overcommitment may also lead to greater exposure to negative workplace conditions. Further research is necessary to

identify whether overcommitment should be viewed as a variable that consistently enhances reactions to stressors in the work environment or whether it has effects on different aspects of the stress process. Further research should also attempt to identify how individual overcommitment interacts with the environment and whether exposure to work stressors acts to enhance overcommitment over time. The extent to which additional individual differences related to a high need for control (i.e., the Type A personality) may lead to hyper-reactivity to control-limiting conditions specified within the ERI model should also be examined in detail.

Overall, the results of Study 1 suggest that overcommitment and Type A should be viewed as related although conceptually separate variables. This conceptual divide between Type A and overcommitment has a number of important implications. One of the key consequences of the separation between overcommitment and Type A is that the interpretation of overcommitment as a personality trait that reflects the Type A pattern may be misleading. Thus, there is a risk that studies utilising the current measure of overcommitment may assume that this scale includes the Type A components, particularly in cases where researchers have focused on early ERI theory and yet utilised the later-developed measure. In such cases, researchers need to be aware of how overcommitment is operationalised in their results and should ensure that their interpretations of the data match this definition. Similarly, researchers should be aware of the implications of their research as they relate to making recommendations for practice and potential interventions, clearly emphasising overcommitment as the ‘inability to withdraw from work’ as opposed to the Type A profile.

The results of the factor analysis also suggest that studies assessing the role of the Type A profile need to look beyond the more parsimonious overcommitment measure as a way of measuring Type A components such as achievement striving, impatience–irritability or hostility. In relation to ERI research, there is little evidence regarding the comparative importance of overcommitment in relation to Type A variables, hence there is the possibility that the Type A components may provide explanatory power over or above that attributed to overcommitment. Testing the utility of an expanded ERI model that includes both the overcommitment scale and the Type A profile should therefore be undertaken as a way of assessing the relative contribution of these variables. Ultimately, this latter research could help clarify

which of these individual difference variables should be the focus of future ERI research.

Another important implication of Study 1 relates to the use of the overcommitment measure in empirical research. Evidence regarding the role of the shortened overcommitment measure in the stress process and how this variable interacts with control-limiting conditions within the ERI model is still developing. However, using the current overcommitment measure alone may lead to an underestimation of the effects of critical individual differences within the ERI model. For instance, the inconsistent findings reported in previous research with respect to the interaction hypothesis of the ERI model (e.g., van Vegchel, de Jonge, Bosma et al., 2005), may be a result of an incomplete view of those aspects of personality that determine reactions to demanding and stress-inducing conditions (i.e., high effort, low reward conditions). Overcommitment may influence both the onset and severity of job stress, independent of an effort-reward imbalance. Broader job stress research involving overcommitment may therefore enhance our understanding of the conceptual properties of this construct by focusing on the psychological correlates of overcommitment, and the specific role of overcommitment as an antecedent or consequence of workplace stress.

Discussion and Conclusions from Study 2

The focus of Study 2 was to examine the influence of individual differences within the ERI model and to test an augmented ERI-Type A model in relation to police officer strains. The main ‘extrinsic’ hypothesis of the ERI model focuses on employee perceptions of the fairness of exchange between the individual and the organisation or the organisation’s representatives (Siegrist, 2008). A perceived imbalance between high effort and low reward is proposed by the ERI model to result in employee distress, strain and increased physiological activity leading to physical health concerns. The ‘intrinsic’ hypothesis concerns the role of individual differences in the experience of strain and states that a greater level of overcommitment will be associated with poor employee outcomes, independent of the effects of an effort-reward imbalance. Finally, the interaction hypothesis argues that the combination of both a high effort-low reward condition and a high level of overcommitment will produce the increasingly detrimental outcomes for employees (Siegrist, 1999).

The review of the ERI literature in Chapter 3 identified a number of theoretical and methodological gaps associated with the previous ERI research. Refinement of the ERI model according to the identified limitations would therefore strengthen our understanding of this model and its relationship to workplace strain reactions. First, the ERI model places significant emphasis on the role of individual difference variables in the stress process and posits that a greater ‘need for control’ or overcommitment in the work setting is likely to lead to detrimental outcomes for employees. Despite the clear emphasis on the role of individual differences in the ERI, not all studies include the overcommitment component in their study design and the specific contribution of individual differences related to a high need for control are rarely the focus of empirical research. Further, despite continued reference to the Type A profile in ERI theory, the current recommended measurement scales do not adequately represent the Type A profile. Subsequently, little is known regarding the influence of historically and theoretically related critical individual differences within the ERI model. Individual differences that currently are not represented in the model may therefore add significantly to the predictive capacity of the ERI framework.

Existing research has also identified a need for refinement of the ERI model and greater specificity with respect to the relationship between the model components. In particular, papers have acknowledged that there are substantial issues with the ERI-ratio indicator, and emerging evidence suggests that additive models and multiplication terms have greater power to detect significant effects (Prekel et al., 2007; van Vegchel, De Jonge, & Landsbergis, 2005). Another gap identified in the literature was that the reward component within the ERI model is a multi-dimensional construct and the independent components are likely to have differential effects on employee strain, although reward is rarely examined outside of its composite indicator. The relevance of an effort-reward imbalance on physical and psychological health has been demonstrated throughout the literature. However, existing research provides inconclusive support for the ERI model hypotheses with respect to more organisationally based attitudinal or behavioural outcomes. Considering these issues, the current study aimed to expand the literature by addressing the concerns surrounding the role of individual differences in the ERI model and the conceptual and methodological refinements suggested in the previous

literature. The major focus of Study 2 was therefore, on the additive and interaction relationships between the ERI model, Type A profile, and both health-related and organisationally centred employee strain outcomes.

The role of overcommitment. Support for the relationship between the current overcommitment scale and employee physical health is relatively strong and the majority of studies that include this component in their research design report a significant association between a high level of overcommitment and poor health outcomes (for a review see van Vegchel, de Jonge, Bosma et al., 2005). In comparison, evidence regarding the correlates of overcommitment, especially as it relates to job- or organisationally-specific attitudes and behaviours is under-developed. Further, in spite of the hypothesised moderating effects of overcommitment, few studies adequately test the interaction hypothesis and results are often inconsistent. The limited use of overcommitment in empirical research has ultimately restricted our knowledge of the role that this variable may have in employee strain reactions and potential reactivity to environmental stressors.

The results of Study 2 provide new information on the role of overcommitment in the ERI model and its relationship with a broad range of health, attitudinal and behavioural outcomes. Providing some support for the intrinsic ERI hypothesis (i.e., Hypothesis 6) the findings of this research indicated that overcommitment was associated with reduced job satisfaction and greater psychological distress although overcommitment was not related to affective commitment or absenteeism. Consistent with previous studies, the strongest relationship was identified between overcommitment and psychological distress (Calnan et al., 2000; Kuper et al., 2002; Niedhammer et al., 2006). This pattern of results also provides specific information with respect to the conceptual properties of overcommitment. In particular, the finding that highly overcommitted employees do not tend to report satisfaction with their job, suggests that while overcommitment may represent the ‘inability to withdraw from work’, this likely reflects a psychological preoccupation or addiction to work rather than a personal desire to work or the enjoyment of work time.

Study 2 also revealed that there was little evidence for a moderating role of overcommitment. Previous research has tended to find inconsistent support for the conditional effects of overcommitment (see van Vegchel, de Jonge, Bosma et al., 2005). The finding that overcommitment had little influence on the relationship

between effort or reward and diverse employee strains suggests that overcommitment may not be associated with increased reactivity to control-limiting conditions. Despite the use of multiplicative terms and the assessment of lower-order relationships (e.g., overcommitment \times esteem rewards), the findings of the current study appear to suggest that role of overcommitment as a moderator in the ERI model is limited. The results of the current study combined with the inconsistent findings of previous research may therefore indicate a limitation associated with the operationalisation of the individual difference component of the ERI model. In particular, the extent to which overcommitment captures individual differences that are relevant to employee reactions to effort and reward conditions at work may be limited.

Examining an augmented model. The addition of the Type A profile to the ERI model was a unique feature of the current study. The Type A personality construct has strong historical links with the ERI model through the emphasis on their ‘need for control’ at work (Siegrist, 1996) although Study 1 identified that alterations to the recommended overcommitment scale over time have resulted in a separation of the two constructs. To test Hypothesis 8 and examine the additional explanatory power of the Type A profile within the ERI model, overcommitment was entered prior to the introduction of the Type A subscales ensuring that any shared variance was captured by the overcommitment component.

The results of Study 2 clearly indicate that the individual components of the Type A profile have differential influences on employee strain outcomes. The Type A dimensions make significant contributions to the predictive capacity of the ERI model, over and above the influence of overcommitment, thus providing support for Hypothesis 8. The results of the current study confirm the utility of separating the Type A profile into components and provide further evidence that a global Type A indicator is likely to have less utility within stress and health research. Supporting Hypotheses 9 and 10, the results indicated that a high level of impatience-irritability appeared to be detrimental to employee health and attitudes toward the organisation while a high level of achievement striving had a positive influence both at an individual and organisational level. Further, achievement striving acted as a buffer of particular workplace conditions such as high work demands or limited status and esteem rewards, thus supporting Hypothesis 12. In contrast, a high level of

impatience-irritability appears to exacerbate the negative effects of poor job security or limited occupational mobility, supporting Hypothesis 13.

Interestingly, the results indicated that a low level of esteem rewards were more distressing for those employees characterised by a high level of achievement striving, suggesting that particular rewards such as recognition and respect hold greater importance for achievement strivers than aspects of reward such as salary and opportunities for promotion. The results presented here are consistent with Price's (1982) understanding of the underlying beliefs and fears about the external environment that motivate Type As. In particular, beliefs that individual self-worth is linked to accomplishments is thought to drive achievement striving behaviour. An intense fear that there are no universal moral principles and that resources are scarce, therefore may not be distributed equally, are also thought to underlie the time urgency and impatient behaviour of Type As (Burke, 1985; Lee, Jamieson, & Earley, 1996b). Accordingly, employees high in achievement striving are likely to view the workplace as a key source of self-worth, where the receipt of feedback and recognition at work is likely to serve as a form of reassurance among these employees. Low esteem reward may therefore be a particular resource-related stressor for achievement-oriented employees.

The link between job insecurity, health, and organisational withdrawal is well established (e.g., Dekker & Schaufeli, 1995; Ferrie, Shipley, Stansfeld, & Marmot, 2002; Sverke & Hellgren, 2002). The results of the current research further support these associations and add to the existing knowledge by identifying that the effects of job insecurity on employee strain were moderated by Type A components. Most notably, employees who were high in impatience-irritability were more likely to react to perceived job insecurity with greater psychological disturbance, and were more frequently absent from work. In comparison, employees who were low on impatience-irritability were relatively unaffected in this regard. Previous work has identified that individual characteristics can have both a positive and negative effect on the relationship between job insecurity and strain outcomes although investigations tend to focus on factors such as occupational status (De Witte, 1999; Sverke, Hellgren, & Naswall, 2002), gender (Kinnunen & Mauno, 1998), or mood states (e.g. Roskies, Lois-Guerin, & Fournier, 1993) rather than dispositional traits. The finding that stable traits can significantly influence emotional and behavioural

reactions to job insecurity indicates that personality should be included in future studies of the consequences of insecurity in the workplace.

Interest in the Type A profile has often focused on hostility as the potential ‘pathogenic’ component (Myrtek, 2006). Accordingly, it was expected that a higher level of hostility would be associated with increased strain (Hypothesis 11). The results of the current research provide moderate support for the effects of hostility on employee wellbeing. The results indicated that hostility was strongly associated with the health-based outcome psychological distress. Indirect hostility and expressive hostility were both positively related to psychological distress where greater hostility was associated with increased distress. In contrast to prior predictions, expressive hostility was also associated with affective commitment where greater hostility was associated with a higher level of commitment to the organisation.

Hostility also acted as a moderator of a number of relationships between the ERI variables and occupational strain, although the direction of the relationship was in contrast to that predicted by Hypothesis 14. Specifically, the results indicated that a conditional effect was present where low levels of hostility combined with low esteem or security rewards produced a lower level of commitment. In comparison, employees high in indirect hostility were relatively unaffected by perceived rewards. Employees low in expressive hostility were more likely to be absent from work when job security was low, although employees high in expressive hostility were relatively unaffected by perceived security. These results were unexpected and suggest that a greater level of interpersonal hostility can protect against the negative effects of low occupational rewards.

Recent research provides some support for a positive association between negative work-related attitudes or behaviour and beneficial employee outcomes. For instance, previous authors have suggested that a greater level of cynicism is exhibited by many police officers and negative traits such as cynicism may reflect a necessary “survival skill” within policing (Caplan, 2003, p. 304). Recent research has also identified that counter-productive workplace behaviour may represent a form of emotional coping and a protective mechanism at work (e.g., Krischer, Penney & Hunter, 2010). A greater level of expressive hostility may be a practical method used by officers to deal with the demands of the organisation or the job role. Police officers work in a relatively hostile environment and often are exposed to

interpersonal conflict simply due to the nature of their roles. As such, it may be the case that a higher level of behavioural hostility may act as a protective factor for dealing with these challenges, and may provide officers with a source of personal emotional regulation when faced with operational or organisational concerns.

Some authors have suggested that police work engenders greater hostility because of their daily dealings with criminals and difficult interpersonal situations (Gould, 2000). The suggestion that police work can create greater hostility implies an occupational socialisation effect whereby police develop greater hostility because of their role requirements. Prior research has provided conflicting evidence for a socialisation effect amongst police, with some studies suggesting a clear exposure effect (e.g., Evans et al., 1992), while others suggest that persistent officer characteristics and attitudes are likely formed prior to joining the police agency rather than after (Haarr, 2001). Nonetheless, a greater level of hostility is more strongly associated with poor health outcomes, suggesting that the positive association between commitment and hostility is outweighed by the detrimental effects of this characteristic. The cross-sectional nature of this study precludes the assessment of causal pathways, although future research should examine the relationship between police personality, hostility, and stress in detail.

The ERI Model hypotheses. The results of Study 2 provided little support for the extrinsic hypothesis of the ERI model (Hypothesis 5), in that there were only two significant interactions between perceived effort and reward. The results did however provide strong support for an additive model, particularly with respect to perceived esteem and security rewards. A low level of reward was associated with greater psychological disturbance as well as an increase in cognitive and behavioural withdrawal from the organisation, providing some support for Hypothesis 3. Greater perceived effort was also associated with increased psychological distress and less absences providing partial support for Hypothesis 2.

The results of the current study provide new findings with respect to the relationship between the ERI model components and health- and work-based outcomes. Research has rarely assessed the differential effects of effort and reward conditions, or the relative importance of the reward dimensions to strain outcomes. However, the findings of Study 2 confirm the differential importance of sources of occupational reward to employee outcomes, therefore supporting Hypothesis 4. The

results suggest that the esteem dimension of the reward component has a strong, direct influence on emotion-related employee outcomes such as mental well-being, job satisfaction, and affective commitment. Behavioural withdrawal from the workplace however, appears to be affected most by employee perceptions of status rewards, as represented by salary and adequacy of position in relation to skills and education.

The finding that the esteem component of rewards was most strongly associated with employee strain was unsurprising and underscores the value of respect in the workplace. The importance of socio-emotional support is emphasised within ERI theory (Siegrist et al., 1986), and the availability of social resources is thought to protect individuals from potentially damaging conditions in their environments (Cohen, Clark, & Sherrod, 1986; Reblin & Uchino, 2008). In comparison, there are generally only modest relationships between material or financial rewards and individual health or happiness, particularly when compared with more intangible, non-financial aspects of the workplace such as recognition and respect from colleagues (e.g., Csikszentmihalyi, 1999). Consistent with prior research (van Vegchel et al., 2002) financial or material rewards were not directly associated with employee psychological health, although they were involved in an interaction effect.

A conditional high effort-low reward condition was associated with employee reports of psychological distress although this effect was only significant when status rewards were included as the reward component providing weak support for the extrinsic ERI model hypothesis (Hypothesis 5). The presence of a conditional effect of status rewards, in the absence of a direct effect, suggests that extrinsic rewards are likely to influence employee mental health under certain conditions. In particular, the experience of a high level of workplace demand coupled with limited potential for growth or adequate payment for current skills and training is associated with impaired mental health. The finding confirms Siegrist's assertion that 'active distress' results from continued, unsuccessful efforts at self-regulation (Siegrist, 2002a). This finding is also consistent with theoretical perspectives based on the norm of reciprocity such as distributive justice (Greenberg, 1990) and equity theory (Adams, 1965) and suggests that overt contractual forms of reward are more likely to be subject to the principles of equity and reciprocity, while more discretionary

rewards such as social support may not be subject to the same exchange expectations.

The findings from Study 2 also revealed that a conditional low effort-low status reward effect predicted levels of absenteeism. The result suggests that employees are more likely to withdraw from the organisation in circumstances where their financial and tangible rewards outweigh work demands. This finding is consistent with the notion of underutilisation or underload as a stressor (Frankenhaeuser & Gardell, 1976; Noblet, Rodwell, & Allisey, 2009). The measure of absenteeism used in this research was based on the frequency of absences, and may represent both voluntary and involuntary absences. It is possible that employees who are chronically ill are more likely to hold lower positions in the organisation, and are likely to receive less reward, however habitual absences from work because of a perceived reward deficiency may also represent a purposeful decision to avoid the workplace. Consistent with the conceptualisation that frequent absences represent a voluntary, conscious decision (McShane, 1984), the findings also indicate that a high level of perceived effort is related to fewer absences suggesting that employees with significant workplace demands cannot afford unnecessary time away from work. Similarly, absenteeism rates increased where workplace demands were low and status rewards were high, suggesting that where employees feel under-utilised, they are more likely to engage in behavioural withdrawal. Considering the nature of the absenteeism measure of the current research, the findings suggest that employees may take advantage of positions that are financially rewarding and yet low in effort, voluntarily withdrawing from the job where their work demand allows. Maintaining adequate workloads and job complexity should therefore be a fundamental concern for management.

Discussion and Conclusions from Study 3

The primary aim of Study 3 was to investigate the long-term effects of an augmented ERI model that extends the view of individual differences as moderators of effort and reward conditions at work. In particular, the aim was to examine whether variance in the strain experienced by officers during an 18-month period could be attributed to the proposed ERI-Type A model. Due to restrictions associated with the study sample, a secondary aim was to assess a repeated cross-sectional model to validate previous findings.

The longitudinal nature of the data provided an opportunity to examine the contribution of the ERI model to future job strain. However, the results of Study 3 provided little support for Hypothesis 15, which stated that the cross-sectional findings would hold in a lagged-effects model. Specifically, the results indicated that reports of work stressors and individual differences were not related to changes in reported distress levels or rates of absenteeism 18-months later. The analyses also found no significant lagged-interaction effects for any of the outcome variables. Perceived security rewards at T1 were however, associated with employee reports of changes in job satisfaction and commitment levels from T1 to T2. Effort at T1 was also related to changes in job satisfaction, while status rewards also predicted future commitment to the organisation. Only the achievement striving dimension of Type A at T1 was associated with changes in job strain. Greater achievement striving was negatively associated with later reports of affective commitment.

In contrast to the lagged-effects model, the results of the cross-sectional analyses at T2 identified a number of significant relationships between the ERI and Type A variables, and the measures of strain included in this research. These results suggest that the effects of the ERI-Type A model tested in the current study had a greater influence on short-term rather than long-term strain outcomes. The repeated cross-sectional results identified that esteem and security rewards in particular were strongly associated with beneficial outcomes among officers. The cross-sectional findings also identified that, in accordance with the findings of Study 2, the addition of the Type A variables provided considerable additional predictive utility. Similarly, numerous conditional effects were identified further supporting the role of an expanded set of individual differences within the ERI model. These findings are discussed in detail in the sections that follow.

Lagged model findings. There is a substantial body of research to support the detrimental effects of an effort-reward imbalance on future reports of physical health or mental wellbeing (for a review see van Vegchel, de Jonge, Bosma et al., 2005). Despite this support, evidence regarding the relationship of the full ERI model to more long-term and organisationally-based outcomes such as employee affective commitment remains sparse. Similarly, the majority of previous research tends to utilise a composite measure of rewards, or focus only on a combined effort-reward

indicator, limiting our knowledge of the role of the independent effort, reward, and overcommitment variables in chronic strain.

The findings from Study 3 revealed that both status rewards and security rewards were associated with changes in affective commitment from T1 to T2, such that greater rewards were associated with increased commitment. Similarly, security rewards were positively associated with changes in job satisfaction at T2. The finding that esteem rewards did not have a lagged-effect on employee strain over the 18-month period was unexpected. Esteem rewards featured prominently across both cross-sectional studies, yet their effects appear to be relatively transitory.

The most significant predictors of both the cross-sectional studies at T1 and T2 were the ERI model components. The finding that the ERI variables were not related to changes in employee distress and absenteeism in the long-term was therefore not consistent with the cross-sectional findings. The vast majority of previous ERI model research that examines work-based strains is cross-sectional in nature, although prospective studies have found an association between the ERI and mental health (e.g., Shimazu & de Jonge, 2008), or burnout (e.g., Laschinger & Finegan, 2008) using time-lags of up to 1 year, suggesting that the effects of the ERI model can have a long-term influence on employee affective responses. Despite this, none of the ERI components were related to changes in distress or absenteeism after an 18-month interval.

There is little research that tests the relevance of the ERI model to long-term work-based outcomes although similar results to the current study have been reported in the literature with respect to long-term employee health outcomes. Specifically, a study conducted by Niedhammer et al. (2004) investigated both cross-sectional and prospective relationships between the ERI model and employee self-reported health. Their results indicated strong support for an effort-reward indicator within their cross-sectional analyses although not for health measured one-year later. Reward was however an independent predictive factor for long-term health outcomes. The finding that the ERI model was more strongly associated with short-term, rather than long-term strain, suggests that the effects of effort, reward and their interaction on employee strain may be more immediate and relatively transient in nature. The strong cross-sectional findings also suggest that employee psychological

and behavioural strain may be strongly linked to current HR or management practices and daily events rather than more stable employment conditions.

The results of Study 3 suggest that only some components of the ERI model are relevant to long-term job-related attitudes. In particular, employee perceptions of job security are likely to have a long-lasting influence on employee outcomes. Reductions in organisational commitment and job satisfaction represent a cognitive withdrawal response and the results of Study 3 suggest that changes to these employee attitudes can be influenced by distal factors such as perceptions of job security. A considerable body of research has considered the role of job security in employee stress. Specifically, job insecurity refers to a prolonged uncertainty about the future (Hartley, Jacobson, Klandermans, & van Vuuren, 1991) and a perceived threat of possible unemployment (De Witte, 2005). A lack of security then, by its very nature, is likely to have long-term effects for employees particularly when alternative employment options are unavailable or undesirable. A number of cross-sectional studies have demonstrated a strong and consistent influence of job insecurity on employee job satisfaction and commitment (e.g., Silla et al., 2010; de Witte, 2005; Sverke & Hellegren, 2002). However, few longitudinal studies involving job insecurity have been undertaken (for a review see Sverke & Hellegren, 2002). Thus, the findings of Study 3 contribute to the literature by providing strong evidence that perceived job insecurity has both immediate and lagged effects on employee job satisfaction and commitment to the organisation.

The Type A dimensions were also associated with future reports of job strain. Specifically, achievement striving and expressive hostility were both associated with changes in affective commitment. Employees reporting a high level of expressive hostility were more likely to report increases in affective commitment. This finding is consistent with the results at T1, suggesting that a greater level of hostility may be a beneficial trait within a policing context. In comparison, achievement-oriented individuals were more likely to withdraw from the organisation, reporting greater levels of commitment initially although in the long-term their commitment to the organisation reduced.

The finding that a greater level of expressive hostility was associated with increases in affective commitment over time was unexpected. The positive influence of hostility on affective commitment indicates that officers who report greater

interpersonal hostility are more likely to feel a sense of belonging and connectedness to the organisation. Reverse-causal analyses found no support for reversed or reciprocal effect between hostility and the ERI model variables. A post-hoc ANOVA was also conducted to test whether levels of commitment expressed by hostile employees varied based on tenure. Participants were divided into groups by selecting those employees one standard deviation above and below the mean on the indirect hostility scale. The results of the ANOVA found no evidence to suggest an interaction effect between hostility and tenure on employee affective commitment ($F(2, 51) = .161, p > .05$). Thus, it appears that there is little evidence to support an occupational socialisation effect within the data. Organisational commitment can be considered a function of perceived fit between an individual and the organisation (Vandenberg & Scarpello, 1994). The positive result between hostility and commitment may therefore suggest a self-selection effect whereby individuals characterised by a higher level of hostility are attracted to the police agency and subsequently perceive greater fit between their personal characteristics and the organisation. In comparison, employees who display less hostility may be less likely to feel the same level of attraction or dedication to the organisation.

Participants who reported a high level of achievement striving at T1 were also likely to report reductions in organisational commitment at T2. This result was in contrast to the cross-sectional results at T1 and T2, in which achievement striving was positively related to affective commitment. The finding that achievement striving was associated with lowered commitment in the long term was an unexpected finding although highlights the complex relationship between individual differences and attitudes. The combined results of Study 2 and Study 3 suggest that organisational commitment is higher among achievement-oriented employees although this attitudinal variable is also subject to change and may be more flexible over time. Supporting this view, simple post-hoc comparisons between high (+1SD) and low (-1SD) achievement striving employees between T1 to T2 identified significant differences in commitment levels, although only among highly achievement-oriented employees ($t(75) = 5.72, p < .000$). Specifically, commitment levels at T2 were higher among more achievement-oriented employees (Mean = 28.95) when compared to those low in achievement striving (Mean = 23.36). However, employees characterised by a high level of achievement striving also

recorded significant decreases in commitment over time ($t(37) = 2.87, p < .01$; $T1 = 32.18, T2 = 28.95$) whereas employees low in achievement striving recorded no significant change in commitment levels between $T1$ to $T2$ ($t(38) = 1.638, p > .05$).

The cross-sectional findings at both $T1$ and $T2$ identified that a high level of achievement striving was associated with greater job satisfaction and less psychological distress. Thus, there are considerable benefits for organisations that employ achievement-oriented individuals. Nonetheless, the implication of the contrasting findings is that organisations need to be aware of both the benefits and the potential limitations to encouraging achievement-oriented behaviour among employees. An achievement-orientation is associated with a higher level of job involvement (Hirschfeld, 2002; T. W. Smith & Brehm, 1981), and this is likely to be the pathway through which achievement striving employees derive a greater sense of commitment to the organisation. Greater job involvement has a range of benefits such as enhanced productivity and profitability (Emery & Barker, 2007), less turnover and lowered absenteeism (Blau & Boal, 1987). However, there are also potential drawbacks to a high-level job involvement. In particular, the potential for fatigue or frustration with the work role that may be experienced by highly involved employees in the longer term may lead to a gradual withdrawal from the organisation (Macky & Boxall, 2008). Managing discretionary effort levels and encouraging a clear work-life balance may assist highly invested employees and improve both individual and organisational outcomes.

The findings of the lagged analyses indicated that the F -statistic associated with the interactions was non-significant for all outcomes. The results of Study 3 may indicate that the complex relationships between effort, reward, and individual differences included in the current research are not related to long-term strains. The results may suggest that complex person \times situation interactions are stronger determinants of short-term reactions to strain while more stable effects can be attributed to particular workplace conditions and individual characteristics. However, the results also may be related to the methods employed within this research. For instance, it is possible that this finding is the result of reduced power to detect more complex relationships within longitudinal data. Specifically, moderated multiple regression analysis is known to be a conservative analysis technique leading to an increased risk of failing to identify significant effects, namely Type II errors

(Aguinas, 2004; Aguinas & Gottfredson, 2010). Longitudinal designs are likely to further increase the Type II error rate associated with moderation tests as strain measures are fairly stable over time thus, the majority of the variance in strain at T2 is already accounted for by the inclusion of strain at T1 (Aiken & West, 1991).

An incentive program was used to generate interest in the current research program and encourage the return of surveys, although the return-rate was lower than might be anticipated. A response rate of 22% across an 18-month time period was disappointing and the sample size may have limited the power of the analyses to identify significant interaction effects. According to a power analysis conducted using the tables provided by Cohen (1988), after accounting for the number of independent predictors, this study had the power to detect medium or large effect sizes (at a power of .80), but not small effects. Thus, the findings reported in the current study may reflect a limitation associated with power.

Cross-sectional findings. The small number of participants whose responses could be matched between T1 to T2 limited the longitudinal analyses to a simple lagged effects model, although the larger cross-sectional sample at T2 enabled a repeated concurrent analysis of the ERI-Type A model developed in the current research. The use of repeated cross-sectional data is common within organisational research (Josephson, Lagerstrom, Hagberg, & Hjelm, 1997; Paulsen et al., 2005) and provides benefits over single cross-sectional studies. In particular, repeated cross-sectional studies follow identical research designs, thus limiting potential biases resulting from differences in designs and periods and can provide important additional information on the robustness of stressor-strain relationships. A number of study findings, particularly the main effects, were consistent across both periods in the current research providing evidence that these effects are relatively stable. In comparison, the interactions between the effort and reward variables and the Type A variables tended to vary across both study phases suggesting that these relationships may be stronger determinants of short-term strain and subject to varying management or HR practices and organisational contexts.

Examining the role of overcommitment in the ERI model. The focus of this thesis was the role of individual differences as moderators within the ERI model, specifically overcommitment and the Type A profile. Consistent with the analyses at T1 and Hypothesis 6, overcommitment was positively associated with psychological

distress and negatively related to job satisfaction. Overcommitment also moderated the relationship between esteem rewards and psychological distress providing some support for Hypothesis 7. Specifically, overcommitted employees reported the greatest level of distress overall when compared to their counterparts, reinforcing the pathogenic nature of overcommitment and providing support for the moderating effect of an overcommitment within the ERI model. The interaction with rewards also revealed that overcommitted employees appeared to place greater emphasis on the availability of recognition within the workplace when compared to employees who reported lower levels of overcommitment. Specifically, highly overcommitted employees tended to report considerable increases in distress when they perceived that esteem rewards were low.

The current investigation joins a small group of studies that have examined the moderating effects of overcommitment on the relationship between effort, reward, and employee workplace strain indicators. Much of the previous research has failed to find support for a conditional effect of overcommitment within the ERI model (e.g., Kinman & Jones, 2008; Prekel et al., 2007; von Kanel & Kudielka, 2009; Willis et al., 2008). However, few studies have considered the independent effort and reward components outside of an interaction, neither has previous research examined the relationship between overcommitment and the independent reward dimensions. The results of Study 2 failed to identify any interactions between overcommitment and effort or reward, although the results of Study 3 indicated that overcommitment moderated the relationship between effort and employee distress, satisfaction and commitment, partially supporting Hypothesis 7.

Siegrist (2005) noted that overcommitted employees are thought to experience a greater level of stress because of their constant involvement in work. Their higher need for control and their emphasis on approval and esteem also causes them to be sensitive to the distribution of social rewards and leads to maintenance of conditions that are potentially harmful (i.e., high effort). The finding that overcommitted employees were more susceptible to reductions in esteem rewards was not surprising given the description of overcommitment as a variable that reflects a need for approval and esteem (Siegrist, 2005). Nonetheless, while there is a general understanding that overcommitment is motivated by a need for approval and esteem, there is little empirical evidence that tests these conceptual properties or the

relationship between overcommitment, social rewards, and work-based strain. These results therefore, provide new evidence to support the proposition that an overcommitment and an inability to withdraw from work obligations likely are driven by desire for approval and esteem. Overcommitment also acted as a moderator of security rewards, although provided little additional contribution to understanding the effect that security rewards have on employee commitment. Specifically, the pattern of results tended to follow a positive linear trend whereby increases in security were associated with increases in commitment. However, overcommitted employees tended to report stronger increases in commitment where perceived security was high.

The results of Study 3 suggest that among highly overcommitted employees a low level of effort was associated with less distress and greater satisfaction and commitment. In comparison, employees who were characterised by a low level of overcommitment tended to experience greater strain under conditions of low effort. These results are in contrast to expectations and suggest that overcommitted employees appeared to view low effort as a desirable quality of the work environment while perceived under-utilisation was a stressor for employees who were characterised by a low level of overcommitment. There are a number of possible conclusions that can be drawn from these results. The generally high level of psychological involvement in the work role may lead to exhaustion and burnout among highly overcommitted employees (Siegrist, 2005) and, as identified in the current research, may result in greater distress and less satisfaction with the work role. Overcommitted employees are thought to expend more energy on work-related concerns because of their desire for control and their psychological preoccupation with work and inability to let go (Vrijkotte et al., 2004). Low effort positions may therefore provide greater opportunity for control in the workplace and subsequently be viewed as desirable for overcommitted employees. A low level of external effort may therefore act to mitigate the high level of internal effort that typically characterise highly overcommitted employees.

The finding that overcommitment was a moderator of effort and reward, but not a combined effort-reward indicator suggests that previous ERI research may be limited using a composite measure or an ERI ratio. The current research reinforces the division of reward into its component parts, and suggests that overcommitment may

interact with employee perceptions of effort and reward independent of an imbalance. The finding that overcommitment was relevant only when esteem rewards were included in the interaction term also suggests that overcommitted employees are highly sensitive to interpersonal interactions in comparison to their co-workers. In particular, overcommitted employees appear to be more sensitive to opportunities for recognition and perceptions of respect. The association between overcommitment and rewards should be explored further, although future research attempting to identify moderating effects within the ERI model may have greater success when the specific relationship between the esteem reward dimension and overcommitment is considered, as opposed to a composite indicator.

The addition of Type A personality to the ERI model. In support of Hypothesis 8, the Type A variables significantly contributed to the predictive validity of the study model when examining psychological distress, job satisfaction, and commitment to the organisation. However, the Type A components did not improve prediction of absenteeism. Supporting Hypothesis 9 and consistent with the results of Study 2, achievement striving was negatively related to distress but positively related to satisfaction and commitment, further supporting the proposal that this personality trait plays a protective role in the workplace (Day & Jreige, 2002; Spence et al., 1987). Impatience-irritability was also related negatively to job satisfaction and positively related to psychological distress, supporting Hypothesis 10. Hostility was positively associated with reports of psychological distress, providing some support for Hypothesis 11. The results of the T2 cross-sectional analyses also identified a number of conditional relationships between the ERI and Type A variables, and the measures of employee strain included in this research, thus providing some support for Hypotheses 12-14.

Some authors have suggested that the Type A construct has little effect on employee outcomes (Myrtek, 1995) although this previous lack of results may be due to the use of a global indicator in prior studies (Barling & Charbonneau, 1992; Spence et al., 1987). The finding that the Type A components of the Jenkins Activity Survey had differential and in fact opposite effects on the stressor-strain relationship strongly supports the separation of Type A into its component parts. Impatience-irritability and achievement striving both acted to modify the relationship between effort and job satisfaction. According to these findings, employees characterised by a

high level of achievement striving or a low level of impatience-irritability were less likely to react to perceived levels of effort, whether high or low. Thus, a high level of achievement striving and a low level of impatience-irritability acted to buffer the negative effects of high effort. In comparison, those employees who reported a low level of achievement striving or a high level of impatience-irritability were more likely to feel less satisfaction with their job when perceived effort was high.

Achievement striving and impatience-irritability were only modestly correlated among these data ($r=.17$, $p<.01$), and it is not yet clear whether a high level of impatience-irritability necessarily follows from a high level of achievement striving (or vice versa), although the pattern of results identified in this research does not appear to support this view. It is more likely that these two components of Type A are independent and represent two separate aspects of personality that may, or may not, co-occur. The successful 'Type A' individual may therefore display a high level of achievement striving, and yet a low level of impatience-irritability. Accordingly, recruitment processes could successfully identify those with desirable, achievement-oriented qualities who display little of the potentially damaging impatience and irritability behavioural patterns. Further, the extent to which aspects of impatience-irritability are amenable to change has rarely been the subject of empirical research although there are considerable opportunities for future research to investigate methods to reduce impatience-irritability in the work setting.

Achievement striving was also involved in an interaction with the esteem rewards dimension. Interestingly, despite the generally positive effects of achievement striving across the measures included in this research, when esteem rewards were low, high achievement strivers tended to report a greater level of distress than other employees. This finding is consistent with the view that achievement strivers are generally high-performing (Bluen et al., 1990) and are motivated by a desire for recognition (Siegel & Leitch, 1981). The finding also substantiates the need for practical and clear outcome- and performance-based reward structures within organisations that emphasise the acknowledgement of individual as well as group inputs.

Only one hostility component was involved in an interaction, such that expressive hostility modified the relationship between status rewards and psychological distress. This is an important finding with respect to the proposed

pathogenic nature of hostility. Previous studies have found a significant, although modest, association between hostility and psychological distress or poor health (Myrtek, 2006). However, the association between personality, stress, and health is likely to be more complex than simple linear models can identify (Hagger, 2009). A greater level of expressive hostility was associated with increased distress, but only under conditions of low status rewards. Employees who perceived high status rewards, reported minimal differences in levels of psychological distress regardless of their level of hostility. The finding that hostility can moderate the effects of financial rewards in the workplace suggests that hostility should be considered an independent risk factor for mental ill health although environmental conditions that limit the availability of financial resources are likely to increase the probability of highly hostile individuals experiencing mental distress. Therefore, while both the current study and the previous research typically finds moderate to small main effects of hostility on health, the findings reported in the current study suggest that the interactions of hostile individuals with their environments should be considered to determine their relative risk.

The *F* statistic associated with the Type A personality components and the interaction effects were not significant when predicting absenteeism recorded during the T2 survey phase. The results were unexpected and were not consistent with the results of Study 2. The nonsignificant findings may reflect the difficulties associated with the prediction of behaviour from specific traits. The search for consistency in trait-behaviour relations spans a number of decades (see Weiss & Adler, 1984; Ajzen & Fishbein, 1977), and yet there is little consensus on whether we should expect a direct causal link between traits and actions. Some authors suggest that measurement error may be responsible for the attenuation of relationships between traits and behaviours (Kirkpatrick, 1997; Lastovicka & Joachimsthaler, 1988). The extent to which attitudes, traits, and behaviours can be measured reliably is therefore a major concern in studies of occupational behaviour. Absenteeism data was available the year directly following the survey in October of 2006 (T1 survey period), however the T2 measure of absenteeism was based on data for the year coinciding with the survey period in April of 2008 (T2 survey period). Subsequently, the measure of absenteeism in T1 reflected future reports of absenteeism, whereas the T2 measure represented both previous and future reports of absenteeism. The objective nature of

the data reduces some of the complications associated with postdictive absenteeism studies (see Harrison & Martocchio, 1998), however this design limitation may have influenced the findings.

The findings identified in Study 3 may also reflect the research context. In particular, the allowances for leave within the organisation participating in this research were above traditional allowances in many public and private organisations. Traditionally, Australian employees are granted four weeks, or 20 days, of personal and recreational leave per year. In comparison, operational officers within the focal police agency receive nine weeks of personal and recreational leave per calendar year in addition to their sick leave allowances. Consequently, the high level of formally permissible leave may have weakened the link between occupational strain and absence. Research design issues are discussed in detail within the limitations section of this thesis.

The ERI model hypotheses. Consistent with the cross-sectional results of Study 2 and the proposition of Hypothesis 3, occupational rewards were prominent predictors of the strain outcomes included in the current research. Further, supporting the differential effects of the various reward dimensions (Hypothesis 4), security and esteem rewards were the most consistent predictors within Study 3 although status rewards were related only to satisfaction and commitment. Specifically, greater support and recognition from colleagues and perceptions of greater job security were associated with lower levels of psychological distress and greater commitment and satisfaction. A higher level of security reward was also associated with lowered absenteeism, while high status rewards were positively related to job satisfaction and affective commitment. Effort was related to only one outcome, where a higher level of effort was associated with less job satisfaction, providing limited support for Hypothesis 2.

The results of Study 3 corroborate the notion that health- and organisationally-related employee strain outcomes are likely to be influenced differentially by job conditions represented in the ERI model. In particular, esteem rewards appeared to display the strongest association with distress and satisfaction at T2, although security rewards were of greater relevance when predicting employee commitment and absenteeism. Supporting the results of Study 2, and the main hypothesis of the ERI model (Hypothesis 5), a conditional effort-reward relationship was significant

although only for employee reports of psychological distress and only when status rewards were included in the interaction term. Again, similar to the results revealed in Study 2, status rewards were not independently associated with distress despite the relevance of this dimension in the interaction term, thus reinforcing the notion that extrinsic employee benefits such as financial rewards are only influential under particular conditions. Interestingly, the results indicated that a *low* level of effort, when combined with low rewards, was the most detrimental condition among officers at T2 whereas a condition of high effort and low reward was most distressing at T1. There are considerable known difficulties in replicating interaction effects in occupational stress research (de Rijk, Le Blanc, & Schaufeli, 1998; Ganster, Fusilier, & Mayes, 1986; Spector, 1987); although the consistent interaction identified in the current research may suggest that both effects could exist. That is, conditions that are associated with both under-utilisation and under-payment may both produce distress.

Because of limitations in the study design and sampling mentioned previously, the causal pathway of all of the possible results could not be determined thus, it cannot be stated whether under-utilisation occurs as a function of organisational constraints, or whether this finding represents the ‘drifting’ of employees who suffer from poor health into less demanding and less rewarding positions (Frese, 1982; Kohn & Schooler, 1983). Nonetheless, the finding that under-utilisation can produce equally distressing outcomes as the traditional imbalance hypothesis, suggests that the association between working conditions and strain may be more complex than the existing ERI literature has acknowledged.

Reverse-Causation. Additional analyses were conducted to investigate the possible reverse-causal pathways between work stressors, personality and strain (see Appendix D). In particular, the possibility that a personality-exposure (versus reactivity) model (Bolger & Zuckerman, 1995), an occupational socialisation effect, or a strain-stressor/drifting effect (Frese, 1982; Zapf et al., 1996), provided additional predictive value to the model developed in this thesis. The limited available data did not allow a rigorous test of reverse causation, simply because only two-waves of data were collected and the sample size was relatively small. Nonetheless, the limited tests possible with the present data showed little evidence for alternative perspectives on the relationship between personality, stressors, and strains.

The exposure hypothesis of personality argues that personality traits may predispose an individual to enter more demanding and challenging situations, or alternatively, to report greater strain simply because of individual differences (Bolger & Zuckerman, 1995). For instance, previous research has examined personality as an antecedent to reported job insecurity arguing that the variability in job insecurity is at least partially a result of differences in perceptions rather than actual employment conditions (Sverke et al., 2002). Supporting Hypothesis 17, the tests for reverse-causality indicated that there was little evidence for a personality-exposure effect in that none of the individual differences at T1 were associated significantly with changes in perceived work stressors at T2. A personality-exposure effect cannot be ruled out completely as employee work perceptions were not measured prior to their commencement with the organisation. Therefore, it is possible that the effects of personality on exposure to stressors occurred prior to the commencement of the current research. Nonetheless, the results do indicate that personality traits were not associated with an intensification of negative work conditions.

The drift hypothesis argues that employees who are previously affected by strain such as greater incidence of mental distress, frequent absences from work or dissatisfaction with their position may be more likely to be moved into roles that can be classified as higher strain (e.g., less rewarding positions) (Frese, 1985). Alternatively, these employees may be looked over for promotions to jobs with better conditions, or given worse jobs with worse conditions because they were less healthy or more unhappy with their organisation (De Lange et al., 2005). This effect would therefore lead highly distressed employees, less satisfied and less committed employees to report greater imbalance at work. Very few occupational stress studies test for reverse-casual effects, often dismissing potential alternative pathways *a priori*. Hypothesis 16 stated that a reversed strain-stressor relationship would not fit the data although in contrast to these expectations there was some evidence for a strain-stressor association among the data. Specifically, job satisfaction was positively associated with future reports of status and security rewards, while psychological distress was associated with future reports of esteem rewards in the workplace (see Appendix D). The results presented in Study 3 add to the existing literature and suggest that particular forms of reward may have reciprocal relationships with employee strain.

The finding that a greater level of psychological distress was associated with the subsequent perception of lower levels of esteem rewards is consistent with the dynamic connections between social support and stress (Gore, 1981; House, 1981; Thoits, 1982). Existing research that focuses on depression and psychological distress within the workplace has suggested a reciprocal relationship may exist where a higher level of psychological disturbance is associated with poor working conditions, although greater distress is also associated with less favourable evaluations of the workplace (e.g., Daniels & Guppy, 1994; De Lange, Taris, Kompier, Houtman, & Bongers, 2004; Prosser, Johnson, & Kuipers, 1997; Tennant, 2001). Similarly, the finding that a higher level of satisfaction was associated with greater status and security rewards is unsurprising. More satisfied employees may receive greater rewards because of positive-selection effects where managers identify these employees for promotions and more interesting tasks (De Lange et al., 2005). Additionally, more satisfied employees may evaluate working conditions as more rewarding, and view the workplace in a positive light, according to a ‘rosy’ perception mechanism (Fletcher, 2003).

Finally, despite the suggestion that a process of adult socialisation may occur within a work context (Frese, 1982), there was little evidence of a socialisation effect among these data (see Appendix D). There were no significant associations between work stressors at T1 and personality at T2, which suggests that the Type A profile represents a relatively stable and enduring constellation of traits rather than a reaction to situational conditions. The results of the reverse-causal analyses identified that overcommitment was however, influenced by working conditions. Specifically, employee perceptions of high effort at T1 were associated with greater levels of overcommitment at T2. Few studies have considered the potential effects of work stressors on overcommitment. Shimazu and de Jonge (2008) tested alternative causal pathways of the ERI model and while their results found evidence for reciprocal relations, their study did not include the overcommitment component. Similarly, a recent study examining the influence of an ERI on sickness absence found no evidence of reverse-causality although their study design also excluded the overcommitment component (Head et al., 2007). Thus, the results of Study 3 provide new evidence on the causal relationship between the overcommitment construct and stressors within the ERI model. In particular, the findings suggest that

overcommitment may represent both a risk factor for, and a consequence of, workplace stress. Future research should endeavour to investigate the causal pathways between job conditions and overcommitment further.

General discussion and conclusions

Overall, this thesis aimed to address some of the major concerns surrounding the ERI model and its applicability to job strain. The purpose of this final section is to provide a summary of the key findings resulting from the current research in relation to the study aims. A brief overview of each study is provided, followed by a section detailing the specific contributions of the thesis.

Summary of study findings. The first study undertaken as part of this thesis examined the construct validity of the overcommitment component within the ERI model. A review of the ERI model literature identified that while previous research has reported a strong effect of overcommitment on a variety of outcomes (for reviews see Tsutsumi & Kawakami, 2004; van Vegchel, de Jonge, Bosma et al., 2005), changes to the recommended measure and the widespread use of proxy items led to uncertainty regarding the extent to which the current overcommitment measure continues to reflect the theoretically- and historically-related Type A construct. Therefore, the major aim of Study 1 was to investigate the degree to which the current overcommitment component of the ERI model was related to the achievement striving, impatience-irritability and hostility components of the Type A profile.

The results of Study 1 provide valuable information on the construct validity of overcommitment. Specifically, Study 1 identified that although there remains a conceptual relationship between the Type A profile and overcommitment, the current measure does not appear to represent 'Type A'. The findings revealed that the Type A measures included in this study were correlated with overcommitment, however Type A and overcommitment could be considered conceptually distinct. This finding suggests that these constructs should be viewed as independent rather than interchangeable variables. Thus, the expansion of the ERI model with the Type A profile may provide additional predictive utility when considering individual reactivity to effort and reward conditions at work.

Given the differentiation between overcommitment and Type A, the focus of Study 2 was to examine an augmented ERI-Type A model in relation to officer

strain. Another important aim of Study 2 was to address some of the major methodological shortcomings identified within the ERI literature. Specifically, a review of the ERI research revealed that the relative importance of the ERI reward dimensions to a more diverse range of employee outcomes had been under researched despite recent evidence to suggest that the individual components are likely to have differential effects on employee outcomes (Lang et al., 2010; van Vegchel et al., 2002). Recent authors have also advocated the use of additive and multiplicative terms rather than a ratio to operationalise an effort-reward interaction (Prekel et al., 2007; van Vegchel, De Jonge, & Landsbergis, 2005). A key contribution of the current research therefore was to expand of the ERI literature and incorporate a multi-dimensional indicator to represent the reward component. Additionally, the current study aimed to expand the research involving the ERI model by including lower-order terms (i.e., additive terms and two-way interactions) prior to the $ERI \times$ overcommitment interaction effect.

Providing support for the expansion of the individual difference component of the ERI model, the findings of Study 2 identified a number of significant interactions between the effort and reward variables and Type A components. The achievement striving dimension had a generally protective effect, providing a buffer against negative conditions such as high effort. In comparison, impatience-irritability acted to exacerbate the negative effects of high effort or low reward, effectively increasing employee reactivity to workplace stressors. In addition to its role as a modifier of work conditions, the Type A profile was also more strongly associated with the work- or job-related outcomes than the overcommitment component of the ERI model further supporting the augmentation of the ERI with the Type A profile.

The separation of reward into its component parts provided insights into the sources of occupational rewards that are most relevant to the strain outcomes. Employee perceptions that work provided satisfactory opportunities for recognition and support, along with adequate job security were consistently associated with positive outcomes across the strain measures. The findings of Study 2 also identified that an imbalance effect was significant, although only when status rewards were included as the reward component and psychological distress as the outcome. This finding appears to confirm the detrimental effects of a combined high effort and low

reward condition, consistent with the imbalance hypothesis of the ERI model (Siegrist, 1996).

The focus of Study 3 was the repeated analysis of the study model along with an assessment of the potential long-term effects of the ERI-Type A model. There was only modest support for the lagged-effects of the augmented model developed in this research. Security reward was the strongest predictor of long-term strain and was associated with changes in affective commitment and job satisfaction. Status reward was also associated with future reports of affective commitment while lower levels of effort were associated with increases in job satisfaction. Higher levels of achievement striving and lower levels of impatience-irritability were also associated with increases in affective commitment at T2. The repeated cross-sectional analyses identified similar results to the T1 analyses, particularly with respect to the main effects, suggesting that the influence of both the ERI and Type A variables on employee job strain are mostly replicable although may be more transitory in nature, having a primarily short-term effect. In particular, esteem and security rewards and the achievement striving and impatience-irritability components of Type A were consistent predictors across both T1 and T2. The finding that a conditional effect of status rewards on the relationship between effort and distress was also significant at T2 provided some support for an effort-reward interaction, although distress was associated with a combined effect of low effort and low reward more so than the traditional high effort-low reward interaction. Finally, the numerous moderating effects of the Type A components on the relationship between effort and reward and employee strains provides support for the concurrent effects of the augmented research model utilised in the current research.

Overall study contributions. The results of this thesis add to the literature in at least six ways. The specific contributions are summarised in the following section. The limitations and implications for both research and practice are then discussed in the sections that follow.

The role of overcommitment in the ERI model. One of the major contributions made by this thesis is that the research helped to clarify the overcommitment construct as it relates to the Type A profile and broader measures of employee strain. The findings of Study 1 confirmed that, despite the theoretical relationship between Type A and the overcommitment component of the ERI model, the current

overcommitment measure cannot be considered a proxy for the Type A profile. Therefore, while overcommitment is an internally sound construct that continues to have a significant influence on employee experiences in relation to physical and psychological health, references to Type A when describing the effects of an overcommitment on stress and health may be inaccurate.

The findings presented in this thesis indicate that overcommitment was the strongest predictor of employee psychological distress, confirming the role of overcommitment with respect to employee health outcomes (e.g., Calnan et al., 2000; Dragano et al., 2008; Janzen et al., 2007; Tsutsumi et al., 2001). In comparison, overcommitment appears to have only a modest effect on more work-based and behavioural strains and offers little in terms of additional explained variance. The current research also contributed to knowledge of the role of overcommitment as a moderator of the relationship between work stressors and strains. Previous research provides inconsistent support for the effects of an $ERI \times$ overcommitment interaction (van Vegchel, de Jonge, Bosma et al., 2005). The results of this study also found little support for a moderated $ERI \times$ overcommitment effect. However, overcommitment did act to modify the relationship between effort and reward and employee strains outside of a combined effort-reward imbalance indicator.

Siegrist and Marmot (2004) suggest that overcommitment represents a pattern of coping with work demands. Consistent with this view, the results of the current research identified that overcommitted employees were highly reactive to perceived work demands. Overcommitted employees appeared to respond negatively to high effort and positively to low effort positions. Overcommitted employees may therefore be particularly sensitive to external pressures, fearing that excessive workplace demands will limit their control. Further, consistent with Siegrist's (2010) description of the internal motivations and beliefs of overcommitted employees', the results of the current research confirmed the importance of esteem and approval to individuals reporting a high level of overcommitment. Previous research has rarely examined the reactions of overcommitted employees to particular reward transmitters in the workplace. However, the results identified in the current research suggest that the pathogenic nature of overcommitment may be limited to the esteem component of rewards.

The value of individual differences within the ERI. Another important contribution of the current investigation was the identification of individual differences that significantly improved the predictive capacity of the ERI model. The addition of the Type A profile to the ERI model improved fit in all cases and a number of moderating effects were identified. Despite the mixed results obtained across survey periods, the value of the Type A subscales within the ERI model was evident particularly as they related to the more work-based strain outcomes (i.e., satisfaction and commitment). The achievement striving and impatience-irritability dimensions of Type A in particular, were significantly associated with strain across both survey periods.

The Type A profile itself has a long-standing history within occupational stress and epidemiological research (Helmreich, Spence, & Pred, 1988; Jenkins, 1975; Myrtek, 2001). However, investigation of the role of Type A as a moderator of the relationship between work stressors and health or wellbeing has been the subject of only a small number of studies (Day & Jreige, 2002; Hallberg et al., 2007; Hintsa et al., 2010; Jex et al., 2002). Further, the independent dimensions of the Type A profile are rarely investigated, despite evidence demonstrating that a global Type A indicator often has less utility (Spence et al., 1987). The results of this thesis provide further support for the differential effects of the Type A dimensions, and strongly suggest that future research should operationalise the Type A profile as a multi-dimensional construct.

Previous work has rarely considered the extent to which the Type A profile acts to either buffer or exacerbate conditions of effort and reward at work. Overall, the results presented in this thesis were supportive of a differential-reactivity model over a personality-exposure effect, in that none of the Type A components were associated with future reports of work stressors. Further, consistent with the interactionist perspective within occupational stress and health research (Hagger, 2009; Schmitt, 2009), the findings also suggest that employee strain resides not only with the environment or the individual but can be attributed to the combination of both person and situation.

The anticipated negative effects of hostility were only partially supported within this research. A greater level of hostility was associated with greater distress and yet in some cases acted to reduce employee reactivity to workplace stressors. This result

appears to contradict much of the existing evidence with respect to the influence of hostility in individual stress-reactivity (Dwyer & Fox, 2000; Elovainio, Kivimäki, Vahtera, Virtanen, & Keltikangas-Järvinen, 2003; Hardy & Smith, 1988; Weidner, Friend, Ficarrotto, & Mendell, 1989), although may reflect the policing context of the current research. Further research regarding the role of hostility as a moderator of stressor-strain relations should be conducted to establish whether hostility might be protective in particular circumstances.

Achievement striving and impatience-irritability had a substantial influence on employee reactions to perceived environmental stressors. This moderation was particularly evident for more affective responses such as psychological distress or job satisfaction. The pattern of results indicated that employees high in impatience-irritability were more reactive to work stressors such as high effort and low job security. Highly demanding positions therefore may be viewed as less desirable and more distressing for impatient and irritable employees, and positions that offer little stability may result in withdrawal from the workplace. In contrast, a high level of achievement striving buffered the negative effects of high effort and low rewards, except in the case of low esteem rewards. The level of psychological distress experienced by high achievement strivers was generally lower when compared to employees low in achievement striving. However, distress levels of individuals high in achievement striving significantly increased when esteem rewards were low, suggesting that although achievement-oriented employees are resilient to most work stressors, recognition and respect in the workplace holds significant importance for these employees. Achievement-oriented employees also appeared to be less reactive to perceived effort or status rewards at work, reporting relatively stable levels of satisfaction, absenteeism, and distress regardless of the level of effort or reward.

Overcommitment as a consequence of workplace pressure. A further contribution of this research to the ERI literature was the investigation of reverse-causality within the augmented ERI-Type A model. Few studies have considered the reverse-causal effects of environmental factors on overcommitment. However, recent theoretical work suggests that overcommitment may be influenced by particular situational pressures such as a competitive workplace (Siegrist, 2010). The assessment of potential alternative causal pathways was not the major focus of the

current study, although the findings of this research provide a basis for understanding the relationship between overcommitment and environmental conditions.

The findings of the current research provide evidence to suggest that overcommitment not only influences reactions to work stressors but may also be elicited in response to perceived work pressure. Specifically, the results of the current research identified that high work demands can lead to increases in overcommitment over time indicating a potential bi-directional relationship between overcommitment and the work environment. Accordingly, the results provide some support for the view that overcommitment may be heightened in particular circumstances (Peter & Siegrist, 1999) and may suggest that overcommitment represents an adaptation to repeated environmental pressures. The finding that overcommitment increases in response to work pressure also suggests that overcommitment may be malleable and open to modification although intervention research with respect to the ERI model is limited. Previous studies have attempted to address a high need for control in the workplace and report successfully inducing and maintaining reductions in the individual levels of need for control over time (Aust, Peter, & Siegrist, 1997; Irie, Tsutsumi, & Kobayashi, 2003). However, this research was based on the original need for control concept and focused on the Type A profile, therefore the extent to which these results are applicable to an ‘inability to withdraw from work’ is questionable. Further research is needed to assess the effectiveness of interventions targeted at overcommitment in the work setting.

A simple versus complex ERI model. The results of the current research indicate that the ERI framework provides an adequate predictive model of work stress, although the effects of the ERI model on work-based strain outcomes are more likely the result of an additive effect of occupational rewards, as opposed to an imbalance. Specifically, Siegrist’s (1996) main argument – that strain is influenced by the simultaneous effects of effort and reward – was only partially supported in the current research. In comparison, occupational rewards were strong predictors of all the outcomes included in the present study. The majority of previous empirical research focuses on physical health outcomes and typically tests the effects of an ERI-ratio or subgroup comparisons including a high effort-low reward condition (van Vegchel, de Jonge, Bosma et al., 2005). Results of previous ERI research that are based on more organisationally-oriented outcomes provide varying degrees of

support for the effects of an imbalance. However, the conditions that lead to poor health outcomes may be different to those that lead to employee withdrawal from the workplace and may not necessarily be associated with the traditional high effort-low reward indicator (Peter & Siegrist, 1997; Siegrist, 1996).

Encompassing broad aspects of the work environment, along with consideration of the wider social context, the ERI model offers an expanded view of occupational stress relative to alternative frameworks such as the Demand-Control model (Karasek, 1979). However, the results of the current study add to evidence that suggests that the hypothesised interaction relationships within the ERI model may be unnecessarily complicated (Prekel et al., 2007). There was no support for a three-way $\text{ERI} \times \text{overcommitment}$ interaction for any of the outcomes investigated in the current research. This finding adds to the growing list of studies that have identified that the higher-order relationships (i.e., three-way interactions) within the ERI model may offer little contribution over a lower-order model (Prekel et al., 2007; Van Vegchel et al., 2001; Willis et al., 2008).

The primary focus of the present study was on more proximal and non-physical indicators of strain rather than traditional outcomes such as cardiovascular disease, therefore the results may not represent the ERI model in the physical health domain. Nonetheless, the findings of the current research suggest that the social exchange framework may have greater relevance for more health-related outcomes, while additive effects may be more prevalent and substantive than interaction effects where work-based attitudes are concerned. Previous research that has found support for a conditional relationship between effort and reward and employee affective responses (e.g., mental wellbeing or job satisfaction) has often utilised either incomplete or wholly proxy measures (e.g., Bakker et al., 2000; Kivimaki et al., 2007; Kuper et al., 2002; Peter et al., 1998; Pikhart et al., 2001; Stansfeld et al., 1999) and has not statistically controlled for lower-order terms prior to the introduction of an interaction or ratio term (e.g., Dragano et al., 2008; Kivimaki et al., 2007; Peter et al., 1998; Pikhart et al., 2001; Tsutsumi et al., 2001). This practice of omitting the component additive effects could potentially bias the results toward conditional effects (Cohen, 1978) and leads to difficulties assessing the precise contribution of specific work conditions. Studies that have not, or do not, partial the main effects of effort and reward prior to testing an interaction effect may therefore find

disproportionate support for a conditional or synergistic relationship. Given the frequency with which previous studies have utilised a ratio or subgroups approach to test the ERI hypothesis without allowing for main effects, the results of this thesis have significant implications for the validity of those prior studies' findings.

The relevance of an interaction effect within ERI research may be overestimated and an additive model may provide improved explanatory power when investigating employee attitudes and behaviours such as those included in the present study. The limited number of effort-reward interactions may also indicate that a wider range of work characteristics than those covered by the ERI model are relevant to the social exchange process. Future research that applies the ERI framework in an organisational context should therefore consider the independent effects of effort and reward and the different combinations of effort and reward in addition to the more traditional interaction term. The use of broader indicators to represent the effort and/or reward components may also lead to a greater likelihood of detecting an interaction effect.

Consistent with the refinements suggested by previous authors (van Vegchel, De Jonge, & Landsbergis, 2005) the current study used multiplicative terms to operationalise the interaction hypothesis. Despite this, the only effort-reward interaction that was significant was that involving the status aspect of rewards, reflecting remuneration, and perceived adequacy of occupational position. A recent study by Kikuchi et al. (2010) also identified that the interaction between the monetary aspect of rewards and effort was associated with an increase in depression among a sample of nurses. These findings suggest that, although theoretically a multitude of organisational outcomes may influence the exchange relationship, where more contractual rewards such as salary are concerned the investment-to-return relationship is paramount. In contrast, more intangible aspects of rewards such as support may influence employee health and wellbeing according to a content-based approach to work stress, rather than the process of reciprocity at work. Thus, the fairness of the investment-return relationship involving respect and recognition may be less important than the mere presence or absence of these factors at work.

Evidence to support the detrimental effects of under-utilisation within the occupational stress literature is considerable (e.g., Frankenhaeuser & Gardell, 1976; Ganster et al., 1986; Frankenhaeuser, 1991; Coburn, 1975) and prior work on police

stress in particular has identified that both underload and overload are significant sources of strain amongst operational staff (Kroes, 1976; Noblet et al., 2009). The finding that both a high effort-low reward and low effort-low reward condition was distressing for employees suggests that restriction of analyses to a ratio term may limit the extent to which potentially damaging work situations are identified. Similar to the results of previous research that has assessed the contribution of alternative effort-reward relationships (e.g., Tobiasz-Adamczyk & Brzyski, 2005), the findings reported in this research identify that conditions that represent under-utilisation may also produce negative outcomes for employees. Thus, the results of the current research suggest that underpayment as well as underutilisation may be associated with poor outcomes and should be considered in future studies involving the ERI model.

The importance of the reward dimensions. Rewards were the most consistent predictors of the outcomes included in the current study, supporting both the additive effects of the ERI variables and the separation of reward into its individual elements. Very few studies have considered the influence of the independent reward dimensions outside of an aggregate reward measure, and no studies could be identified that considered the interaction between key individual differences (i.e., overcommitment and Type A) with the independent reward dimensions. As such, this study provides crucial new information with respect to the associations between the ERI components and employee strain, and adds to our understanding of the differential relationships between reward transmitters and employee outcomes. Overall, the findings presented in this thesis suggest that particular forms of reward may have a greater influence on different outcomes, and may hold more relevance for certain employees. Specifically, the reward dimensions that were particularly important within this research were esteem and security rewards, while status rewards had only a minimal effect on employee strain responses.

The security dimension of rewards was strongly associated with long-term strain within the current research. The findings indicate that job security at T1 was positively associated with both satisfaction and commitment to the organisation at T2. This result provides further support that threats to employment security can have substantial and lasting effects on employee attitudes and wellbeing (Ferrie et al., 2002; Heaney, et al., 1994; Kinnunen, et al., 1999). The finding suggests that job

security may have a similar (i.e., long-term) time horizon, implying that the effects of reduced security are likely to be persistent. The results need to be interpreted in relation to the context of the current study. Employment conditions within Australian public sector organisations generally well protected by legislation and are therefore more stable than in the private sector. Thus, the finding that job security was a concern within the policing sample used in this research suggests that even in relatively stable work settings, the maintenance of job conditions has a considerable effect on employee perceptions of their position and their organisation.

The reward subcomponents were also involved in a number of interactions allowing for a deeper understanding of the way that job resources interact with individual differences to produce employee strain. In a similar manner to a person-job fit perspective (French, Caplan, & Harrison, 1982), the match between an individual's reward preferences and the opportunities provided by the organisation is likely to affect employee satisfaction and success within the work role (Schneider, 1975). Accordingly, it was expected that individual differences would influence sensitivity to particular reward transmitters, dependent upon the underlying beliefs and fears associated with the individual differences included in the current research. The results of the present study demonstrate that individuals are likely to be sensitive to different types of rewards depending upon their personal characteristics. For instance, security rewards held greater importance among more impatient and irritable respondents, where feelings of insecurity were associated with substantial increases in distress and greater withdrawal from the workplace. Esteem rewards also appeared to have great importance to both overcommitted and achievement-oriented employees, where low esteem rewards resulted in increased distress.

Despite the significance of the interactions between rewards and individual differences in the current research, there was little consistency across the two periods, suggesting that the strength of the associations was limited. Nonetheless, the directions of the relationships were mostly consistent with prior expectations. Specifically, the negative effects of reward frustration were exacerbated among highly impatient, irritable, hostile, or overcommitted employees while the negative effects were generally reduced among highly achievement striving employees. These results suggest that positions that offer rewards desired by employees, and those that

tap into the reward preferences for particular types of employees, are more likely to create successful and satisfying positions.

Overall, the measurement of specific rewards provides a greater understanding of the way that workplace conditions can influence employee outcomes. The findings presented in this thesis were more supportive of the intangible aspects of reward such as support from colleagues and feelings of security, rather than resources such as monetary benefits and promotions. The results also suggest that for some employees, particular forms of reward are likely to have greater relevance when considering work-based strain. The findings have a number of implications for managers. Most notably, the results suggest that the most effective solutions to employee strain will involve an appreciation of interpersonal factors and recognition systems, as well as methods of managing under conditions of employment instability. A more detailed discussion of the implications for organisations and management professionals is presented in the final section of this thesis.

Long-term associations between the ERI, Type A and employee strain. Previous research has identified that the ERI has a long-term effect on employee health outcomes such as cardiovascular disease and overall mortality (e.g., Kivimaki et al., 2007; Siegrist et al., 1990). These studies have identified that an effort-reward imbalance can have an influence on rates of disease and death up to eleven years later (Kuper et al., 2002). In comparison, studies that focus on more work-related outcomes tend to rely on cross-sectional data, assessing only the transient or short-term effects of the ERI model (for reviews see Tsutsumi & Kawakami, 2004; van Vegchel, de Jonge, Bosma et al., 2005). The current research therefore makes a significant contribution to the literature by investigating both the short- and long-term effects of the ERI model on psychological health and work-oriented attitudes and behaviour.

The investigation of lagged effects identified few significant findings. There are several possible reasons why the results of the current research identified few lagged main effects or interactions among the data. The findings may reflect the relatively transient nature of the stressors included in this research, or may indicate that responses to work conditions such as a lack of respect from co-workers naturally occur within a shorter time-span than 18-months. Sonnentag and Frese's (2003, p. 461) review of longitudinal job stress studies concluded that "individuals develop

distress reactions to stressful situations rather quickly; this implies that having experienced stressful work situations in the past may have little effect on one's psychological well-being unless the stressful situation continues into the present". That is, stress exposure may have a cumulative effect on employee strain (Landsbergis et al., 2000) rather than a simple lagged-effect.

Due to the limited matched sample across T1 and T2, a combined lagged- and synchronous-effect model could not be tested adequately in the current study. Thus, while it was possible to assess the effects of the predictors on changes in the criterion variable from T1 to T2, it was not possible to assess the relationship between changes in the predictors to changes in the criterion. Nonetheless, the consistent findings across both the cross-sectional Time 1 and Time 2 studies, particularly with respect to the main effects of the Type A and reward components, suggest that these results are relatively robust.

Reciprocity in relationships is the central concern of the ERI model and yet the results presented in the current research found only modest support for an exchange effect. The finding that few of the ERI variables were significant predictors of long-term strain was in contrast to prior expectations although may reflect temporal effects of the stressor-strain relationship. Evidence to support the lagged effects of an effort-reward imbalance on psychological and behavioural outcomes is still developing. Previous studies have identified a lagged effect of an effort-reward imbalance on mental wellbeing of up to four years (Kivimaki et al., 2007), although some authors suggest that the effects of the ERI model on employee outcomes takes place within a 1-year time-lag rather than longer time-frames (Shimazu & de Jonge, 2008). The findings of the present study also suggest that the effects of an effort-reward imbalance on affective responses and withdrawal behaviours may be more short-term in nature, taking place within a shorter time-span than 18-months. The findings of the present study therefore suggest that the social exchange mechanisms underlying the ERI model may be more relevant to the experience of short-term distress and withdrawal rather than longer-term strains.

The lack of significant results for the ERI model variables in relation to long-term work strain is an important finding in itself. There is little research available on the variance in time lags that might affect the relationship between the ERI model variables and more organisationally based outcomes such as job satisfaction or

affective commitment. Zapf and colleagues (1996) note that, in cases where the true cause-effect relationship is shorter than the chosen prospective measurement period, a synchronous effects model will best represent the stressor-strain relationship. The finding that the components of the ERI model were generally unrelated to the outcomes included in this research when measured 18-months later, implies that the interval chosen for this research may have been too long to measure the applicable causal time-lag.

The finding that the lagged interactions between the ERI variables and individual differences were not significant predictors of the outcomes could indicate that, in the long term the relationship between effort or reward at one point in time, and strain at a later point in time, may not be influenced by any persistent moderating effects of personality on the stressor-strain relationship. This proposal is supported by the lack of direct consistent relationships between effort and reward at T1 and the study outcomes at T2. Statistical issues also make it difficult to identify interaction effects in regression analyses. Individual strain measures are relatively stable over time (Sonnentag & Frese, 2003) and the use of longitudinal data is likely to affect further the power to detect effects because a substantial proportion of the variance is explained already with the inclusion of initial strain levels (Aiken & West, 1991). Future research will need to consider the ERI model's relevance to long-term outcomes, the potential moderating role of personality in the ERI, and whether these effects can be identified with shorter time lags.

Limitations

This thesis has made a number of important contributions to the ERI literature as well as the broader occupational stress and health literature. However, some limitations need to be kept in mind when interpreting the results of the current investigation. The following section will detail the limitations associated with both the research design and the theoretical assumptions of the model. The limitations will then be followed by suggestions for further research, along with some of the ways that these limitations can be overcome in future work.

Study sample. The context of this research was highly specialised with the sample comprising operational law enforcement officers, therefore the results should be interpreted with this in mind. Similarly, the participants in this sample were

mostly male and middle-aged, potentially limiting the extent to which the results can be generalised to women and other types of organisational or demographic groups. Previous work based on more female-oriented workforces such as nursing and teaching find comparable results in terms of the main ERI model hypotheses (Bakker et al., 2000; Schreuder et al., 2010; Unterbrink et al., 2007) although the role of overcommitment and other personality traits within the ERI model has not been established with regard to female-dominated samples. Further research is needed to investigate whether the same pattern of results identified in this research, might be observed within a female-oriented sample.

Similarly, the policing context of the current research may have influenced the results. In Australia, employee conditions within law enforcement agencies and the public sector are highly regulated where aspects of the job such as salary and leave allowances are covered by 'Award' regulations. Thus, the extent to which fairness associated with monetary rewards affects police agency employees, or other public sector employees under similar Award conditions, may be limited. The results identified in this research are consistent with prior research, which suggests that financial rewards may be less important than more intangible occupational resources (Mottaz, 1985). Nonetheless, future research is required to examine the extent to which rewards hold particular importance for a wider range of occupational groups.

An additional limitation associated with the study sample utilised within this research was the relatively low response rate. The response rate of the survey was restricted to only 29% and 28% of operational officers who returned their surveys in 2006 and 2008, respectively. Although this rate is within the expected range with occupational research studies (mean response rate = 52.7%, SD = 20.4 Baruch & Holtom, 2008), the relatively low response rate was below expectations, and may reflect the research-intensity and unionisation of the host organisation. One of the major concerns with lower response rates is that systemic non-response can introduce bias and influence the results of the research. For instance, it is possible that non-responders were more distressed, or were facing more work demands and subsequently did not, or could not, respond to the survey. Unfortunately, it is not possible to assess the differences between non-respondents and respondents on key outcomes although comparisons based on available demographic data indicated that

the differences between the specific population of officers in this organisation and the sample were minimal (see Chapter 3).

Research design. There are a number of limitations relevant to the design of the current study, which may have influenced the results of this research. First, the non-experimental design limits the extent to which causal relationships can be determined, and the use of cross-sectional data in Studies 2 and 3 did not enable a conclusion regarding the direction of relationships among the study variables. However, the use of a two-wave panel design did permit the examination of lagged-effects and reverse-causality, overcoming this limitation to a certain extent.

The collection of data at two points in time was a strength of the current study although multiple-wave data would have provided even greater methodological and practical benefits (Zapf et al., 1996). Further, the design of the research could not account for the effects of the job stressors on strain prior to data collection at T1. In this sense, the effects of initial exposure to stressful workplace conditions and to the policing context could not be determined. Future research is needed to determine the extent to which pre-exposure strain levels are altered as a result of experiences in the work domain. The measurement of pre-existing loads of strain may be achieved through the assessment of new recruits' experiences of effort-reward imbalance or with the use of experimental studies that manipulate levels of effort and/or reward.

The use of a non-experimental design also limited the extent to which extraneous factors could be controlled. A two-wave design allowed for some control over occasion factors, however the mechanisms that underlie an imbalance at work may be affected by outside influences not identified in the current model. Specifically, during the 18-months between survey periods, a number of structural changes occurred within the organisation along with broader economic concerns and changes to government occurring during this time that may also have had an effect on the outcomes of this research. End-points such as psychological distress that are considered more general indicators of employee wellbeing and health may be affected by external factors more than job- or organisationally-specific outcomes such as satisfaction and commitment. Nonetheless, the significance of the main effects over both periods suggests that occupational sources of strain are important to the health and wellbeing of employees.

Self-report data. The research presented in this thesis was based mostly on self-report measures of stressors and strain. The use of wholly self-report data can be problematic in occupational stress research and many authors acknowledge the issues inherent in single-method studies (Brief et al., 1988; Spector, 1992). In particular, the use of self-report data may inflate correlations between the study variables, a phenomenon known as common-method variance (CMV). Despite the known limitations, self-report data is recommended where individual characteristics and attitudes or emotions are the focus of the research (Howard, 1994). Similarly, some constructs such as values, attitudes and affective responses to the workplace are measured more appropriately with self-reports (Schmitt, 1994; Spector, 1994). Many authors recommend that a multi-method approach is taken where if possible objective data is included in the research design to supplement rather than replace the results obtained with subjective data (Semmer et al., 2003; Spector, Dwyer, & Jex, 1988). Accordingly, objective absenteeism data was included in the current research and provided additional evidence to support the relationships identified using the subjective self-report measures. Additional strategies also were used to limit the potential for CMV in this study. The survey instrument separated the predictors and the outcomes in terms of their locations within the survey and the response categories varied between scales, thus limiting the extent to which the results may be influenced by response similarities.

Previous studies have reported that common method variance has little effect on the relationship between the ERI model and affective outcomes such as depression (Griffen et al., 2007). Further, the complex moderated relationships under examination within this research are likely to limit the extent to which CMV would have an influence on these findings (Michaela et al., 1995). In fact, recent authors suggest that complex terms such as quadratic and interaction effects cannot be artefacts of CMV. Rather, their effects are more likely to be subject to deflation because of CMV making significant interactions more difficult to detect (Siemsen & Roth, 2010).

Third variables may also influence the association between the ERI variables and employee health and attitudes. Some authors suggest that negative affectivity in particular is likely to inflate correlations among self-report variables (Spector, 1994). Previous studies that have considered the role of negative affectivity within the ERI

model suggest that the interpretation of results is not influenced by the level of employee affectivity (Joksimovic et al., 2002; Stansfeld et al., 1999) although future research may wish to consider third variables such as negative and positive affectivity.

Statistical analyses. A strength of the current research was the use of multiplicative terms to operationalise the interactions between the ERI model and Type A variables. Multiple regression is recommended by a number of authors to analyse interaction effects among continuous data (Aiken & West, 1991; Cohen et al., 2003; Jaccard, 2001), however there are still some limitations associated with this technique. First, multiple regression is a conservative analysis that is likely to restrict the power to detect higher-order relationships such as the interactions examined in the current research. Effect sizes in studies of work stress and organisational behaviour are commonly small (Aguinis, Beaty, Boik, & Pierce, 2005), and given the apparent upper limit of explained variance of 10 to 15% associated with typical stressor-strain relationships (van Veldhoven, De Jonge, Broersen, Kompier, & Meijman, 2002), interaction effects may be somewhat difficult to identify within regression analyses. Moderation is also particularly difficult to identify in field studies as a result of typically non-optimal distribution of independent variables, where scores tend toward the mean rather than providing an adequate sampling population of extreme observations, which creates a reduction in statistical power (McClelland & Judd, 1993).

A further limitation of the statistical analyses conducted in this thesis concerns the number of tests performed on the data set. The large number of variables included in the regression may have warranted a more conservative p -value (e.g., $p < .001$) to guard against Type I error. However, the inclusion of all of the interactions in a single model is more likely to lead to an attenuation of power within the analyses rather than spurious significant effects (Aguinas & Gottfredson, 2010). Therefore, in light of the conservative nature of the statistical analyses the alpha level was set at $p < .05$. A number of moderating effects were identified in this research suggesting that the interactions provided a useful addition to the study model; however, none of the three-way interactions were significant which may have been a result of the inclusion of all lower-order terms and their interactions prior to the three-way interactions.

Reversed and reciprocal relationships between stressors and strains often are investigated with the use of regression analysis (Tucker et al., 2008) although there are some limitations associated with this approach. The use of regression analysis requires separate tests of competing models and cannot provide an overall test of model fit. Regression analysis also makes several assumptions such as the requirement that all variables are measured without error (Farrell, 1994). Research that is more recent tends to utilise Structural Equation Modelling (SEM) to determine the fit of alternative models to datasets (e.g., de Jonge et al., 2001; MacCallum & Austin, 2000; van Dick & Wagner, 2001). Farrell (1994) and Zapf (1996) discussed the benefits of SEM for longitudinal analyses in detail, in particular SEM has the ability to determine the fit of alternative models and the ability to statistically control for occasion factors and unmeasured third variables. Despite the potential benefits of SEM, the assessment of alternative causal pathways was not a major emphasis of the current research and regression analysis was deemed appropriate for the current study after considering the limited matched sample size.

Study measures. The use of proxy measurements is common within ERI research. However, this practice is not recommended because the extent to which an alternative measurement maintains its relationship with the original construct may be affected, particularly when single-item or ad-hoc scales are utilised. All the measures chosen for inclusion in this research were frequently-used scales that had acceptable psychometric properties and, given the problems identified with respect to proxy ERI measurements, where a standardised scale was available (i.e., as is the case with the ERI model) the recommended measure was used. Nonetheless, some limitations need to be addressed with respect to the choice of some of the study measures. In particular, the operationalisation of Type A with the use of the Jenkins Type A Scale may have influenced the results reported here. Specifically, the Jenkins Type A Scale measures the components of the Type A profile using a self-report survey, however much of the earlier work investigating the Type A profile and its associations with health have utilised the Structured Interview.

Previous research has identified that there is an acceptable level of overlap between the Structured Interview and the Jenkins Type A Scale (Dimsdale, Hackett, Catanzano, & White, 1979). Nonetheless, the extent to which previous findings are compatible with the current research results may be affected by the differences in

measurements. Further, as was demonstrated in Study 1, although the Type A profile theoretically reflects aspects of interpersonal hostility, the extent to which hostility is captured by the Jenkins Type A Scale is minimal. To overcome this limitation, a supplementary hostility scale was included in addition to the Jenkins Type A measure.

The findings with respect to employee absenteeism were highly inconsistent and may reflect the difficulties associated with the prediction of behaviour across different settings or periods (Epstein, 1980). However, the differential findings across T1 and T2 with respect to absenteeism may also reflect limitations associated with the operationalisation of absenteeism in the current research. Specifically, the timing of the survey periods and the availability of absenteeism data was largely determined by the host organisation. The survey distribution occurred in October of 2006 and subsequently in April of 2008. Absenteeism data used in this study reflected the frequency of absences taken annually in both 2007 and 2008. Therefore, while the measure of absenteeism at T1 represented a wholly predictive measure, the absenteeism measure at T2 reflected both previous and future reports of absenteeism. The findings of Study 2 provided strong support for the effects of the augmented ERI-Type A model and employee absenteeism. In contrast, the findings of Study 3 identified only one significant relationship between the ERI-Type A model and absenteeism, suggesting that the difference in absenteeism measures had a substantial influence on the study findings. The differential findings presented in the current research are therefore a strong indication that work conditions contribute to future absenteeism rather than a reverse relationship, supporting the use of wholly predictive study models in future absenteeism research (Harrison & Martocchio, 1998).

Implications

Considering the aforementioned strengths and limitations of the research, a number of conclusions and implications that can be made based on the current research program. These conclusions and implications are presented in the sections that follow.

Broadening the view of individual differences as moderators in the ERI model. Overall, the findings of the current research suggest that a broader view of

the individual differences relevant within the ERI model is warranted. Overcommitment was only weakly associated with the more work-related strain outcomes of the current research. In comparison, the Type A profile explained significant additional variance in almost all cases. Individual differences are a fundamental aspect of the ERI model and yet little research has addressed whether additional personality traits or coping styles provide further insights in to the associations between effort, reward, and employee strains. Aspects of Type A (e.g., hostility) are recognised as potentially pathogenic individual differences that are likely to have significant effects on employee health outcomes such as cardiovascular disease (Dembroski, MacDougall, Williams, Haney, & Blumenthal, 1985; Diamond et al., 1984; Donker, Breteler, & van der Staak, 2000; Everson et al., 1997). The addition of the Type A profile to the ERI model significantly improved prediction of officer strain while also acting to moderate the relationship between effort and reward and employee outcomes. Thus, the findings of the present research suggest that the expansion of the ERI model with additional personality traits such as hostility or impatience-irritability may provide substantial increases in the predictive utility of the ERI model.

Supporting a broader view of the key individual differences within the ERI, the findings of the current research identified that the Type A subcomponents acted as moderators of the relationship between effort and reward and diverse employee strains across both periods. There was little consistency over time although the findings do suggest that individual differences such as impatience-irritability are likely to provide additional explanatory power to the ERI model even after controlling for the influence of overcommitment. The findings therefore strongly suggest that when the ERI model is used to measure work-based attitudinal and behavioural outcomes, an extended view of the individual differences relevant to employee strain is justified.

Applying methodological refinements to the ERI model. The findings reported in this thesis suggest that by applying a number of refinements to the ERI model, empirical research can improve our understanding of the way that the ERI model and its components relate to diverse measures of employee strain. Consistent with the views of several authors (Niedhammer, Tek, Starke, & Siegrist, 2004; Willis et al., 2008), the findings of the current research suggest that the more complex

relationships within the ERI model may have only minimal utility over simple main effects, particularly when more work-based outcomes are the focus of the research. Similarly, the finding that a low effort-low reward indicator was associated with greater employee distress suggests that utilising a ratio to operationalise the extrinsic hypothesis of the ERI model may miss potentially distressing conditions. Therefore, the findings of this thesis strongly suggest that studies examining both health and work-based outcomes should investigate the effects of an additive ERI model in addition to the interaction hypothesis. Future ERI research should also consider using multiplicative terms rather than a ratio term to ensure that different combinations of effort and reward that are potentially damaging to employee health are identified.

The inclusion of lower-order terms (e.g., two-way interactions) was a further refinement of the ERI model applied in the current research. Few studies have considered lower-order relationships between overcommitment and effort or reward although the results of this thesis suggest that overcommitment is likely to influence reactions to both effort and reward outside of a combined effort-reward relationship. Previous ERI research that has failed to find a significant three-way interaction between effort, reward, and overcommitment may have found support for lower order relationships. Thus, while a number of authors (Prekel et al., 2007; Van Vegchel et al., 2001; von Kanel & Kudielka, 2009; Willis et al., 2008) have concluded that the theoretically-proposed moderating effects of overcommitment could not be confirmed, the limitation of analyses to a three-way relationship may have concealed possible significant effects. Therefore, empirical research may be strengthened if two-way interactions testing the moderating effects of overcommitment or other individual differences on the independent effort and reward dimensions are investigated.

Reward practices and job design. The current research contributed to the literature by further clarifying the role of reward systems identified in the ERI model and their relationships with differential employee outcomes. The results suggest managers and human resource practitioners need to be aware that perceived reward deficiencies as well as unrealised reward expectancies are likely to result in poor outcomes for employees. The implications for organisations are varied and a number of key points are discussed below.

Esteem rewards. The importance of esteem rewards in this research suggests that HR strategies aimed at enhancing perceptions of respect and recognition are likely to have benefits for employee mental health as well as organisational functioning. Employee recognition can be achieved through both formal and informal means and managers should be aware of the potential avenues for improvement (Cacioppe, 1999; Luthans, 2000). Formal methods may be a part of organisational policies such as structured performance and planning processes, quarterly or annual reviews or employee of the month programs (Luthans & Stajkovic, 2009). The success of formal recognition programs are contingent on a range of factors such as the perceived fairness associated with the distribution process and the willingness of managers to comply with organisational requirements (Meyer, 1991). Ensuring that formal reward and recognition programs are accessible to all employees and administered according to well-defined and transparent processes will therefore promote a sense of fairness and equality and increase overall organisational wellbeing. Informal support such as frequent feedback from immediate supervisors can also markedly improve employee performance, and has the added benefit of continuous reinforcement of organisational expectations and cultural norms (Kunich & Lester, 1996). Thus, improving the communication skills of managers and their ability to deliver constructive feedback should be a primary aim of HR strategies.

Job security. The finding that job security was the only reward dimension to influence employee outcomes both cross-sectionally and longitudinally, suggests that among these participants the perceived availability of long-term employment had a significant effect on their overall wellbeing. Job insecurity is increasingly recognised as a source of stress for employees (Sparks et al., 2001). Undesirable changes to working conditions are not always preventable and are often essential to help the organisation cope with wider economic or technological pressures. As such, it is necessary for organisations to have clear plans to assist employees in coping with unstable or changing employment conditions. The value of communication in reducing the effects of organisational change or threats to occupational stability is well documented (Jimmieson, Terry, & Callan, 2004; Nelissen & van Selm, 2008; Proctor & Doukakis, 2003). The literature on change management suggests that organisation-level efforts to reduce the effect of impending changes on employees should focus on employee participation in decision-making, early, and frequent

communication and transparency of procedures (Sverke, Hellgren, & Naswall, 2006). Thus, organisation-based strategies to reduce the effects of job insecurity are likely to involve a strong communications plan and seek the input of employees wherever feasible.

Recent research suggests that feelings of employability are also associated with less reactivity to job insecurity (Fugate, Kinicki, & Asforth, 2004; Kalyal, Berntson, Baraldi, Naswall, & Sverke, 2010). Thus, investing in the development of employee skills and abilities may also reduce the level of anxiety associated with organisational change and potential job loss. Individual-level interventions might focus on improving methods of coping with instability such as increasing tolerance for ambiguity (Judge, Thoresen, Pucik, & Welbourne, 1999). These strategies are even more relevant among highly impatient and irritable employees who tended to react to perceived instability with greater distress.

Status rewards. Status rewards were related directly to a number of outcomes included in the current research, albeit to a lesser extent than the more intangible aspects of reward. The status dimension of rewards was also involved in an interaction with effort suggesting that the exchange relationship is significant where financial and tangible resources are concerned. Practically, the findings of this research suggest that status rewards are likely to be an effective motivational tool to drive performance and reduce employee withdrawal from the organisation. Occupational rewards such as salary and promotion prospects may also help to minimise the negative influence of particular traits such as interpersonal hostility.

Growing pressure to improve competitiveness, efficiency, and accountability within organisations is likely to restrict the extent to which financial rewards are used as a means to reduce strain in the workplace. Nonetheless, managers should be aware of the potential for status rewards to influence important outcomes. The justice literature suggests that changing how rewards are distributed, as well as what rewards are distributed, may be an effective avenue for improvement of organisational outcomes (McFarlin & Sweeney, 1992). Clearly linking rewards to desired targets and goals, and encouraging open discussions with management surrounding the distribution of status rewards may therefore enhance employee outcomes.

The influence of individual differences in workplace strain. The results of this research clearly implicate the role of personality and key individual differences in the stress process. These findings offer considerable opportunity for organisations to address workplace concerns and to help employees to enhance their overall well-being. The subcomponents of the Type A construct appear to be only minimally correlated with each other, thus it may not be the case that a high level of achievement striving is necessarily linked to greater impatience-irritability or hostility. This suggests that there are considerable opportunities for HR practices aimed at increasing individual and organisational health and wellbeing. Firstly, utilising the recruitment stage to identify employees who are low in impatience-irritability and hostility and yet high on achievement striving can help to reduce potential problems typically faced with respect to employee satisfaction, commitment and mental wellbeing. Secondly, while personality is typically considered stable (Costa & McCrae, 1994; McCrae & Costa, 1994), behaviours, and attitudes can be modified and effective working methods can be developed. Therefore, encouraging the behaviours that are typical of achievement strivers, and minimising the attitudes and behaviours expressed by impatient and irritable, hostile or overcommitted individuals, can help others to attain the same level of satisfaction and accomplishment in their roles.

Previous authors have suggested that the Type A dimensions are associated with different methods of coping with environmental stressors. Achievement striving appears to be associated with greater use of problem-focused coping while impatience-irritability is negatively related to problem-focused coping strategy (Lee, Ashford, & Jamieson, 1993). Accordingly, the achievement striving dimension of Type A may be associated with a greater internal motivation, more successful coping methods, and accurate judgements of work goals and personal achievement. Therefore achievement striving may represent a positive engagement with work that is motivated by a desire to achieve desirable goals. In this sense, achievement strivers may be intrinsically motivated and may be more focused on personal feelings of accomplishment. Encouraging these achievement-oriented behaviours among employees may therefore improve outcomes. For instance, helping employees to develop useful work strategies such as setting realistic, and yet challenging, goals may develop greater enjoyment of work and improve performance (Lee, Sheldon, &

Turban, 2003). Further, supporting employees to develop the ability to make accurate judgements and decisions with respect to work timelines and daily scheduling may help to minimise levels of irritability and feelings of time urgency.

Finally, the research presented in this thesis suggests that interventions that aim to reduce the negative influence of overcommitment may be most successful if focus is given to aspects related to approval and esteem and coping with workplace demands. For instance, cognitive-behaviour therapy that focuses on realistic assessments of expectations and the opinions of others may be an effective solution. Further, developing the capacity to accurately judge workplace demands and available personal resources may also assist overcommitted employees when dealing with organisational and personal expectations for performance.

The relevance of an augmented ERI model to police stress. Previous research has identified policing as a particularly stressful occupation (Johnson et al., 2005; Liberman et al., 2002) although more routine aspects of police work (e.g., managing deadlines) rather than operational duties (e.g., attending motor vehicle accidents) are typically cited as key sources of strain (Kircaldy et al., 1995; Kop et al., 1999). The augmented ERI-Type A model developed for this research proved to be a strong predictor of a range of officer outcomes indicating that an extended ERI model can successfully predict the strain among law enforcement professionals. The results suggest that officer behaviour and attitudes can be greatly affected by organisational rewards as well as individual personality traits. In particular, the results of the current research underscore the importance of social support and recognition in police agencies.

The context of policing provides unique challenges and opportunities when applying the results of this research. Historically, policing organisations have conformed to a command and control structure although the emergence of the New Public Management paradigm has seen a shift to corporate strategies and management approaches (Hoque, Arends, & Alexander, 2004; Moore & Stephens, 1991). Continuing the transition to more participatory management is likely to provide benefits in terms of officer wellbeing and performance (Kim, 2002; Lee, Joo, & Johnson, 2009).

The detrimental effects of hostility with respect to employee psychological distress, combined with the positive association between hostility and commitment,

presents a note-worthy challenge for police agencies and may be generalisable to groups who work in similar environments (e.g., corrections officers, military personnel). A high level of hostility may generate greater commitment to the organisation, although officers who demonstrate this behaviour are also likely to suffer psychologically. Therefore, it is necessary to identify methods to engage employees with the organisation that also reduce interpersonal hostility. For instance, implementing team-based project work may encourage co-operation rather than competitiveness between employees (Tjosvold, 1991). Developing a coaching culture within the organisation is also likely to decrease hostility among employees and can have considerable benefits across the whole organisation (for an in-depth discussion on coaching cultures (Clutterbuck & Megginson, 2005). Providing managers with training on how to provide constructive and supportive feedback, and enhancing employees' capacity to cope with negative feedback in an objective manner may help to reduce the influence of interpersonal competitiveness and improve outcomes in the workplace (Raver, Jensen, Lee, & O'Reilly, in press).

Further Research. A number of recommendations for future research have already been presented in the discussion of this thesis. This section will reiterate these recommendations while also detailing additional possibilities that have resulted from the overall research program.

There are several ways in which future studies can build on the methodology of the current work. Firstly, future research may wish to examine the model developed in the current study with broader working populations and contexts. The importance of the ERI and Type A variables to officer strain was clear, however identifying the extent to which these results are generalisable to other samples and research contexts is an important next step. Secondly, the focus of this research was to examine the utility of an augmented ERI-Type A model on psychological and behavioural outcomes rather than physical health. Nonetheless, the medical origins of the ERI model warrant further analysis of the model developed in the current study according to its utility to predict physical outcomes such as cardiovascular health indicators. Finally, the time lag chosen for this research was largely determined by the host organisation and their constraints and may have influenced the results. Future research may wish to examine shorter time lags, or alternatively may incorporate

multiple time lags that can predict short- to long-term strain outcomes associated with the augmented ERI-Type A model.

The findings of the current study also raise the need to address additional research topics. The central focus of this research was on the role of individual differences within the ERI model. Based on the theoretical underpinnings of the ERI model, the Type A profile was thought to have the greatest relevance in control-limiting conditions such as the experience of high effort and low reward. The findings support an augmented model although additional individual differences are also likely to influence reactions to effort-reward imbalance. Previous research has investigated the role of the Big Five personality dimensions in employee strain and suggests that the addition of the Big Five traits can explain additional variance over the ERI model components, although the extent to which the Big Five moderated effort-reward relationships was not tested (Vearing & Mak, 2007). Future research may wish to examine further how broad dimensions such as the Big Five, or specific traits such as negative affectivity, influence employee reactions within the ERI framework.

The results of this research have provided some clarification on the construct validity of overcommitment, although evidence regarding the role and precise nature of the overcommitment component is still evolving. Further clarification of the conceptual properties of overcommitment is a necessary next-step should empirical research wish to contribute to intervention programs that can reduce overcommitment and workplace strain. For example, future research may address the extent to which the environment creates an unhealthy level of overcommitment. Overcommitment may result from a gradual process of occupational socialisation and may be more prevalent within certain occupations. There also appears to be considerable conceptual overlap between the current overcommitment scale and the concept of workaholism (Burke, 2000b). Therefore, the extent to which overcommitment can be considered a psychological addiction to work that is treatable according to similar processes (Burke, 2000a; Seybold & Salomone, 1994) should also be examined.

Conclusions

Chronic job stress can result in far-reaching costs for both employees and organisations (Cooper & Cartwright, 1994). Interventions aimed at reducing these

costs need to focus on those elements of working life that are most critical to the experience of strain. The ERI model (Siegrist, 1996) of work stress is currently one of the most recognised approaches to occupational strain and offers a credible and well-researched framework for the study of stress and health. Originally introduced as a medical sociological model of work stress, the vast majority of empirical work surrounding the ERI has focused on physical health outcomes with many large-scale prospective studies confirming the association between a high effort-low reward condition and physical health complaints (van Vegchel, de Jonge, Bosma et al., 2005). Despite the significance of an ERI to employee health, a number of theoretical and methodological issues can be identified in the existing ERI research. Therefore, this thesis contributed to the literature by addressing a number of these concerns, and providing a basis for future research to build on the study findings.

The ERI model emphasises individual differences that are hypothesised to exacerbate the negative effects of high effort and low reward (Siegrist, 2008). In particular, the Type A profile was thought to have the greatest relevance within a work setting as Type As strive to gain and maintain a high level of control over their environments (Glass, 1977; Glass & Carver, 1980). Accordingly, the overcommitment component of the ERI was developed to reflect those cognitive, emotional and motivational aspects of the Type A behaviour that were thought to lead to a heightened arousal under demanding and threatening conditions (Siegrist, 1996). Despite this, the results of previous research suggested that there remained little overlap between the Type A pattern and the current overcommitment measure (Fahlen, 2008). The major focus of this thesis was to examine the ERI model, augmented with the Type A profile, and to assess the extent to which this extended model explained variance in employee distress, satisfaction, commitment, and absenteeism among a sample of Australian police officers.

The findings of the current research confirmed that despite the crucial theoretical role of the Type A profile to the ERI model, the current overcommitment measure could not be considered a proxy for Type A. Thus, while overcommitment maintains its association with employee health outcomes, the Type A profile and overcommitment should be considered conceptually distinct constructs. The addition of the Type A profile to the ERI model therefore extended the current ERI framework and enabled a test of the contribution of individual differences that are

related theoretically, although not currently represented, within the model. The Type A dimensions were added to the overall regression equation only after controlling for the effects of overcommitment, yet these dimensions explained a greater amount of variance in most cases. The results of this thesis therefore support a broader view of those individual differences within the ERI model that are associated with increased reactivity to workplace stressors. Therefore, restricting the individual difference component of the ERI model to the ‘inability to withdraw from work obligations’ scale may not provide a complete view of the role of individual differences in reactions to effort, reward and an effort-reward imbalance.

The results also support the refinement of the ERI model in a number of ways. Previous research has tended to utilise a composite reward indicator and has rarely considered an additive ERI model or lower-order interactions among the ERI model components. There was little support for the extrinsic hypothesis of the ERI model, nor the longitudinal effects of the ERI, despite the strong findings of previous research with respect to physical health and cardiovascular disease. These results were unexpected and suggest that the more complex mechanisms of the ERI model may have less relevance to employee strain outcomes that are more job-oriented. The results of this thesis also reinforce the utility of separating reward into its component parts, along with the consideration of lower order terms in the ERI model. In particular, the results suggest that where the outcomes of the research are non-health related studies utilising the ERI model should consider the additive effects of effort and reward, as well as the interactions between differential rewards and individual differences.

Overall, the results suggest that interventions to reduce workplace strains should focus on the reward structure at work rather than the effort-reward relationship. Security rewards in particular were associated with changes in satisfaction and commitment over an 18-month period suggesting that the stability of work conditions is a key determinant of long-term strains among police officers. The esteem component of reward was also a prominent predictor of employee outcomes in the current research indicating that efforts to reduce occupational stress should take into account the support networks and processes associated with employee recognition. Finally, the results of the current research suggest that individual differences are highly relevant in employee reactions to effort and reward at work.

Certain positions and work conditions may be especially stress inducing for employees who display 'Type A' qualities. Appreciating the preferences of individual employees should therefore be a fundamental consideration for management.

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APPENDICES

Appendix A – Sample characteristics

Police Characteristic	Time 1	Absenteeism Time 1	Time 2	Absenteeism Time 2	Matched
Gender					
Male	79.9%	81.6%	72.5%	75.8%	81.1%
Female	20.1%	18.4%	27.4%	24.2%	18.9%
Tenure					
9 years or less	28.9%	23.6%	29%	24.5%	18.4%
10 to 19 years	32.7%	34.6%	26%	25.8%	25.5%
20 years or more	38.5%	41.8%	45%	49.6%	56.1%
Age					
29 years or less	9.9%	7.7%	8.4%	6.8%	2.6%
30 to 39 years	35.2%	35.7%	28.5%	26.2%	29.1%
40 to 49 years	38.7%	39.8%	41.2%	44.4%	51.5%
50 years or more	16.1%	16.8%	21.5%	22.7%	16.8%

Appendix B – Research questionnaire

EMPLOYEE HEALTH AND WELLBEING SURVEY

Your contribution counts!

This is the final survey in the 'Organisational Behaviour in [REDACTED] study and will be crucial in providing further information that will enable [REDACTED] to develop strategies that benefit its members.

We would like to thank all those employees who have participated in the previous surveys and encourage you to once again complete this survey. This survey is supported by [REDACTED] and is being undertaken in conjunction with Deakin University.

This survey will take approximately 30 minutes to complete and can be undertaken in work time. Once you have completed this survey, please seal it in the attached pre-paid envelope and return to the address provided.

For all enquires about this survey please contact:

Amanda Allisey (Research Assistant), Deakin University, on Ph: 9244 5021, or email: amanda.allisey@deakin.edu.au

At the end of the survey, you are asked to provide your employee number. Providing your number is completely voluntary. If you do provide your employee number, it will form a code, which will help us to identify changes in employee perceptions over time. Only members of the university research team will see your survey responses, including your employee number. However, the researchers will not have access to employee names, and hence they will not be able to link your number with your name. Any feedback to [REDACTED] will be reported in summary form only and individuals will not be identifiable in this information.

Please note that answering some of the questions presented in the questionnaire may result in some strong feelings. If this is the case, we strongly recommend that you discuss your feelings with someone who you feel comfortable with, such as a close friend, or for professional assistance, please contact the Clinical Services Unit on ###. In addition, employees may contact the HR Support Line on ###, which is a 24 hour service including the Employee Support & Welfare Program.

Should you have any concerns about the conduct of this research project, please contact the Secretary, Ethics Committee, Research Services, Deakin University, 221 Burwood Highway, Burwood Victoria 3125. Tel (03) 9251 7123

Background: These questions are designed to provide a background summary of the staff taking part in this survey. In the case of Question 2, providing your employee number is optional and will assist the researchers in identifying changes in perceptions over time. Keep in mind that no one other than the university researchers will have access to the information you provide here.

Please tick one option for each question.

1 *Gender*

Male	<input type="checkbox"/>	1
Female	<input type="checkbox"/>	2

3 *Age Range*

Less than 20	<input type="checkbox"/>	1
20-29	<input type="checkbox"/>	2
30-39	<input type="checkbox"/>	3
40-49	<input type="checkbox"/>	4
50-59	<input type="checkbox"/>	5
60+	<input type="checkbox"/>	6

5 *Time spent in current position*

1-4 years	<input type="checkbox"/>	1
5-9 years	<input type="checkbox"/>	2
10-14 years	<input type="checkbox"/>	3
15-19 years	<input type="checkbox"/>	4
20 years plus	<input type="checkbox"/>	5

2 *Employee Number* (optional – see note above)

<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
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4 *Length of employment at organisation*

9 years or less	<input type="checkbox"/>	1
10-19 years	<input type="checkbox"/>	2
20 years or more	<input type="checkbox"/>	3

6 *Employment Classification*

Sworn (including PSOs)	<input type="checkbox"/>	1
Public Servant (including FOs)	<input type="checkbox"/>	2

7 *Type of Employment*

Full-time	<input type="checkbox"/>	1
Part-time	<input type="checkbox"/>	2

Effort and Reward: Below are a number of statements that refer to the amount of effort you put into your job. Please read each statement carefully and indicate the extent to which you agree.

	Strongly disagree		Neither agree or disagree		Strongly agree
Please circle <u>one</u> number for <u>each</u> statement:					
1 I have constant time pressure due to a heavy work load	1	2	3	4	5
2 I have many interruptions and disturbances in my job	1	2	3	4	5
3 I have a lot of responsibility in my job	1	2	3	4	5
4 I am often pressured to work overtime	1	2	3	4	5
5 Over the past few years, my job has become more and more demanding	1	2	3	4	5
6 My job is physically demanding	1	2	3	4	5

Below are a number of statements that refer to how you are rewarded for your efforts at work. Please read each statement carefully and indicate the extent to which you agree. (Please circle one number for each statement)

6 I receive the respect I deserve from my superiors	1	2	3	4	5
7 I receive the respect I deserve from my colleagues	1	2	3	4	5
8 I experience adequate support in difficult situations	1	2	3	4	5
9 I am treated unfairly at work	1	2	3	4	5
10 Considering all my efforts and achievements, I receive the respect and prestige I deserve at work	1	2	3	4	5
11 My job promotion prospects are poor	1	2	3	4	5
12 My current occupational position adequately reflects my education and training	1	2	3	4	5
13 Considering all my efforts and achievements, my work prospects are adequate	1	2	3	4	5
14 Considering all my efforts and achievements, my salary/income is adequate	1	2	3	4	5

15 I have experienced or expect to experience an undesirable change in my work situation	1	2	3	4	5
16 My job security is poor	1	2	3	4	5

Overcommitment: Please indicate the extent to which you agree with these statements:

Please circle <u>one</u> number for <u>each</u> statement:	Strongly disagree		Neither agree or disagree		Strongly agree
22 I get easily overwhelmed by time pressures at work	1	2	3	4	5
23 As soon as I get up in the morning I start thinking about work problems	1	2	3	4	5
24 When I get home, I can easily relax and 'switch off' work	1	2	3	4	5
25 People close to me say I sacrifice too much for my job	1	2	3	4	5
26 Work rarely lets me go, it is still on my mind when I go to bed	1	2	3	4	5
27 If I postpone something that I was supposed to do today I'll have trouble sleeping at night	1	2	3	4	5

Type A Personality: Below are a number of statements that refer to aspects of peoples' personality. Please read each statement carefully and respond by circling the number that most applies to you. (Please circle one number for each statement).

1 How much does your job 'stir you into action?'	Much less than others		Neutral		Much more than others
	1	2	3	4	5
2 Nowadays, do you consider yourself to be:	Very hard-driving		Neutral		Very relaxed and easy going
	1	2	3	4	5
3 How would your best friends or others who know you well rate your general level of activity?	Too slow		Neutral		Very active: should slow down
	1	2	3	4	5

4 How seriously do you take your work?	Much more than most 1	2	Neutral 3	4	Much less than most 5
5 How often do you set deadlines or quotas for yourself in your work or other activities?	Very Often 1	2	Neutral 3	4	Almost never 5
6 Compared with co-workers, the amount of effort I put forth is:	Much more 1	2	Neutral 3	4	Much less 5
7 Compared with co-workers, I approach life in general:	Much more seriously 1	2	Neutral 3	4	Much less seriously 5
8 When a person is talking and takes too long to come to the point, how often do you feel like hurrying the person along?	Very frequently 1	2	Neutral 3	4	Almost never 5
9 Typically, how easily do you get irritated?	Extremely easily 1	2	Neutral 3	4	Not at all easily 5
10 Do you tend to do most things in a hurry?	Definitely true 1	2	Neutral 3	4	Not at all true 5
11 How is your 'temper' these days?	Very hard to control 1	2	Neutral 3	4	I seldom get angry 5
12 When you have to wait in line such as at a restaurant, the movies, or the post office, how do you usually feel?	Accept calmly 1	2	Neutral 3	4	Feel very impatient and refuse to stay long 5

Hostility: Take a few seconds to think about the previous week both at home and at work. Please read and respond to each of the following statements according to the frequency of whether it has occurred in the last week.

Please circle <u>one</u> number for <u>each</u> statement:	Not at all		Moderately		All the time
13 I sometimes spread gossip about people I don't like	1	2	3	4	5
14 When I am mad, I sometimes slam doors	1	2	3	4	5
15 When I am angry, I sometimes sulk	1	2	3	4	5
16 I sometimes pout when I don't get my own way	1	2	3	4	5
17 I can remember being so angry that I picked up the nearest thing and broke it	1	2	3	4	5
18 I sometimes show my anger by banging on the table	1	2	3	4	5

Job Satisfaction: The following set of items deals with how you personally feel about your job.

Please circle <u>one</u> number for <u>each</u> item:	Strongly disagree			Neutral			Strongly agree
1 Generally speaking, I am very satisfied with this job	1	2	3	4	5	6	7
2 I am generally satisfied with the kind of work I do in this job	1	2	3	4	5	6	7
3 Most people in this job are very satisfied with the job	1	2	3	4	5	6	7

Commitment: The statements below refer to your commitment to the organisation.

Please circle <u>one</u> number for <u>each</u> statement:	Strongly disagree		Neutral		Strongly agree
1 I would be very happy to spend the rest of my career with this organisation	1	2	3	4	5
2 I enjoy discussing my organisation with people outside of it	1	2	3	4	5
3 I really feel as if this organisation's problems are my own	1	2	3	4	5
4 I think that I could easily become as attached to another organisation as I am to this one	1	2	3	4	5
5 I do not feel like 'part of the family' at my organisation	1	2	3	4	5
6 I do not feel 'emotionally attached' to this organisation	1	2	3	4	5
7 This organisation has a great deal of personal meaning for me	1	2	3	4	5
8 I do not feel a strong sense of belonging to my organisation	1	2	3	4	5

Psychological Health: Below are a number of questions that refer to your health.

In the last 30 days how often:	All of the time	Most of the time	Some of the time	A little of the time	None of the time
1 Did you feel tired out for no good reason?	1	2	3	4	5
2 Did you feel nervous?	1	2	3	4	5
3 Did you feel so nervous that nothing could calm you down?	1	2	3	4	5
4 Did you feel hopeless?	1	2	3	4	5
5 Did you feel restless or fidgety?	1	2	3	4	5
6 Did you feel so restless you could not sit still?	1	2	3	4	5
7 Did you feel depressed?	1	2	3	4	5
8 Did you feel that everything was an effort?	1	2	3	4	5
9 Did you feel so sad that nothing could cheer you up?	1	2	3	4	5
10 Did you feel worthless?	1	2	3	4	5

Appendix C – Lagged regression analyses

Independent Variable (T1)	Psychological Distress (T2)				Job Satisfaction (T2)				Affective Commitment (T2)				Absenteeism (T2)			
	B	SE	β	ΔR^2	B	SE	β	ΔR^2	B	SE	β	ΔR^2	B	SE	β	ΔR^2
Dependent variable	.70	.09	.62***		.39	.08	.38***		.61	.08	.57***		.15	.06	.22**	
Gender - Male	-.75	1.09	-.04		.29	.62	.03		.20	1.06	.01		-1.49	.68	-.17*	
Age – Less than 39	3.49	1.64	.22*		-1.55	.95	-.20		-.61	1.63	-.05		-.92	1.04	-.13	
Age – 40 to 49	2.35	1.31	.15		-.92	.75	-.12		-.20	1.29	-.02		-.87	.85	-.13	
Tenure – 9 years or less	-.43	1.34	-.02		-.14	.77	-.02		.58	1.34	.04		-.45	.84	-.05	
Tenure – 10 to 19 years	-.44	1.09	-.03	.58***	1.42	.64	.18*	.34***	1.30	1.11	.10	.37***	-.04	.71	-.01	.07*
Effort	.24	.12	.11		-.22	.07	-.21**		.01	.13	.01		-.03	.08	-.03	
Esteem Rewards	-.13	.14	-.06		.10	.08	.10		.13	.14	.07		.06	.09	.06	
Status Rewards	.19	.19	.06		.20	.11	.12		.43	.19	.16*		-.14	.12	-.10	
Security Rewards	-.29	.17	-.10	.01	.21	.10	.14*	.09***	.60	.17	.23**	.08***	-.23	.11	-.17*	.04
Overcommitment	-.07	.10	-.05	.00	-.02	.05	-.03	.00	-.01	.09	-.01	.00	-.02	.06	-.03	.00
Achievement Striving	-.03	.10	-.02		.13	.06	.16		-.24	.11	-.16*		.02	.07	.02	
Impatience-Irritability	.01	.13	.00		-.04	.07	-.04		.25	.13	.15*		.11	.09	.13	
Indirect Hostility	.09	.19	.07		.10	.12	-.02		-.34	.20	-.12		-.16	.12	-.11	

Appendix C cont – Lagged regression analyses

	Psychological Distress (T2)				Job Satisfaction (T2)				Affective Commitment (T2)				Absenteeism (T2)			
Expressive Hostility	.23	.21	.03	.00	-.03	.11	.06	.02	.34	.19	.12	.05**	.03	.12	.02	.02
Effort × Esteem Rwd	.06	.04	.12		.01	.02	.04		-.01	.04	-.02		.02	.02	.11	
Effort × Status Rwd	.04	.05	.06		-.03	.03	-.07		-.04	.06	-.05		.02	.02	.06	
Effort × Security Rwd	.02	.05	.02		-.02	.03	-.05		-.01	.05	-.01		-.05	-.05	-.15	
Effort × OVC	.01	.02	.03		.02	.01	.09		-.02	.02	.01		-.00	.02	-.01	
Esteem Rwd × OVC	-.02	.03	-.06		.04	.02	.23**		.02	.03	.08		.01	.02	.07	
Status Rwd × OVC	-.00	.04	-.00		.00	.02	.01		.04	.04	.08		.01	.03	.02	
Security Rwd × OVC	.01	.04	.02		-.03	.02	-.10		-.02	.04	-.04		-.03	.02	-.14	
Effort × AS	-.01	.03	-.02		.03	.02	.11		.01	.03	.01		-.03	.02	-.14	
Effort × II	.02	.04	.03		.01	.02	.03		.02	.04	.05		-.00	.02	-.00	
Effort × IH	.00	.05	.00		.01	.03	.02		-.03	.05	-.04		-.09	.02	-.23**	
Effort × EH	.07	.05	.09		-.00	.03	-.00		-.00	.05	-.01		-.00	.03	-.00	
Esteem Rwd × AS	.01	.04	.02		-.00	.02	-.02		-.01	.04	-.01		-.00	.02	-.00	
Esteem Rwd × II	.01	.04	.02		-.02	.02	-.07		.01	.04	.02		.01	.03	.04	
Esteem Rwd × IH	-.01	.08	-.01		.03	.04	.07		.06	.07	.09		-.02	.04	-.05	
Esteem Rwd × EH	-.10	.09	-.10		-.04	.05	-.08		-.16	.08	-.18		-.12	.05	-.32**	
Status Rwd × AS	-.03	.05	-.04		.01	.03	.03		.01	.05	.02		.04	.03	.12	
Status Rwd × II	.02	.06	.02		.02	.03	.05		-.01	.06	-.02		-.04	.04	-.11	

Appendix C cont – Lagged regression analyses

	Psychological Distress (T2)			Job Satisfaction (T2)			Affective Commitment (T2)			Absenteeism (T2)						
Status Rwd \times IH	-.04	.09	-.03	.00	.05	.00	-.07	.10	-.06	-.00	.06	-.00				
Status Rwd \times EH	-.15	.10	-.08	-.06	.06	-.07	.06	.10	.04	.08	.06	.15				
Security Rwd \times AS	-.03	.04	-.04	.02	.02	.07	.04	.04	.08	.01	.03	.03				
Security Rwd \times II	.11	.05	.14	-.05	.03	-.12	.01	.05	.01	-.01	.03	-.02				
Security Rwd \times IH	-.18	.11	-.15	-.01	.06	-.01	-.05	.10	-.05	.02	.05	.04				
Security Rwd \times EH	.16	.10	.11	.07	.02	.06	.03	.09	.07	.10	.06	.04	.09	.05	.17	.16

Note. Rwd= Reward, OVC = Overcommitment, AS = Achievement striving, II = Impatience-irritability, IH = Indirect hostility, EH = Expressive hostility. *p<.05, **p<.01, ***p<.001.

Appendix D – Reverse-causal analyses

Personality exposure effect

Table 1. Reverse-causal analysis testing the relationship between personality at T1 and effort at T2

Independent variable	B	SE B	β	ΔR^2
Step 1				
Effort T1	.59	.07	.58***	
Gender – Male T1	-.49	.60	-.05	
Tenure – 9 years or less T1	-.59	.76	-.06	
Tenure – 10 to 19 years T1	.24	.65	.03	
Age – 39 years or less T1	.52	.91	.07	
Age – 40 to 49 years T1	-.14	.71	-.02	.35***
Step 2				
Overcommitment T1	.08	.05	.12	
Achievement Striving T1	-.01	.06	-.01	
Impatience-Irritability T1	-.18	.07	-.18*	
Indirect Hostility T1	.01	.11	.01	
Expressive Hostility T1	.00	.11	.00	.03

* $p < .05$, ** $p < .01$, *** $p < .001$

Table 2. Reverse-causal analysis testing the relationship between personality at T1 and esteem reward at T2

Independent variable	B	SE B	β	ΔR^2
Step 1				
Esteem reward T1	.52	.07	.51***	
Gender – Male T1	-.16	.60	-.02	
Tenure – 9 years or less T1	.45	.75	.05	
Tenure – 10 to 19 years T1	.49	.65	.06	
Age – 39 years or less T1	-.55	.92	-.07	
Age – 40 to 49 years T1	-.58	.71	-.08	.30***
Step 2				
Overcommitment T1	-.03	.05	-.05	
Achievement Striving T1	.01	.06	.01	
Impatience-Irritability T1	.01	.07	.01	
Indirect Hostility T1	-.21	.11	-.13	
Expressive Hostility T1	-.08	.11	-.05	.03

* $p < .05$, ** $p < .01$, *** $p < .001$

Table 3. Reverse-causal analysis testing the relationship between personality at T1 and status reward at T2

Independent variable	B	SE B	β	ΔR^2
Step 1				
Status reward T1	.57	.06	.56***	
Gender – Male T1	.48	.40	.08	
Tenure – 9 years or less T1	-.48	.50	-.08	
Tenure – 10 to 19 years T1	-.16	.43	-.03	
Age – 39 years or less T1	.08	.60	.02	
Age – 40 to 49 years T1	-.13	.47	-.03	.32***
Step 2				
Overcommitment T1	-.02	.03	-.04	
Achievement Striving T1	.01	.04	.03	
Impatience-Irritability T1	-.02	.05	-.02	
Indirect Hostility T1	.06	.07	.06	
Expressive Hostility T1	-.07	.07	-.08	.01

* $p < .05$, ** $p < .01$, *** $p < .001$

Table 4. Reverse-causal analysis testing the relationship between personality at T1 and security reward at T2

Independent variable	B	SE B	β	ΔR^2
Step 1				
Security reward T1	.57	.06	.57***	
Gender – Male T1	-.43	.39	-.07	
Tenure – 9 years or less T1	-.11	.49	-.02	
Tenure – 10 to 19 years T1	-.02	.42	-.00	
Age – 39 years or less T1	.50	.59	.09	
Age – 40 to 49 years T1	-.41	.46	-.08	.41***
Step 2				
Overcommitment T1	.00	.03	.01	
Achievement Striving T1	-.03	.04	-.05	
Impatience-Irritability T1	-.06	.05	-.10	
Indirect Hostility T1	-.06	.07	-.05	
Expressive Hostility T1	-.06	.07	-.05	.03

* $p < .05$, ** $p < .01$, *** $p < .001$

Occupational socialisation

Table 5. Reverse-causal analysis testing the relationship between stressors at T1 and achievement striving at T2

Independent variable	B	SE B	β	ΔR^2
Step 1				
Achievement Striving T1	.75	.05	.73***	
Gender – Male T1	-.71	.56	-.06	
Tenure – 9 years or less T1	-.36	.72	-.03	
Tenure – 10 to 19 years T1	-.43	.61	-.05	
Age – 39 years or less T1	.62	.88	.07	
Age – 40 to 49 years T1	-.03	.68	-.00	.60***
Step 2				
Effort T1	.12	.06	.10	
Esteem reward T1	-.01	.07	-.01	
Status reward T1	.02	.10	.01	
Security reward T1	.03	.09	.02	.01

* $p < .05$, ** $p < .01$, *** $p < .001$

Table 6. Reverse-causal analysis testing the relationship between stressors at T1 and impatience-irritability at T2

Independent variable	B	SE B	β	ΔR^2
Step 1				
Impatience-Irritability T1	.69	.05	.71***	
Gender – Male T1	-.27	.48	-.03	
Tenure – 9 years or less T1	.01	.61	.00	
Tenure – 10 to 19 years T1	.53	.52	.07	
Age – 39 years or less T1	-.21	.75	-.03	
Age – 40 to 49 years T1	.11	.57	.02	.58***
Step 2				
Effort T1	.07	.05	.07	
Esteem reward T1	-.02	.06	-.02	
Status reward T1	.00	.08	.00	
Security reward T1	-.14	.08	-.10	.01

* $p < .05$, ** $p < .01$, *** $p < .001$

Table 7. Reverse causal analysis testing the relationship between stressors at T1 and indirect hostility at T2

Independent variable	B	SE B	β	ΔR^2
Step 1				
Indirect Hostility T1	.63	.06	.63***	
Gender – Male T1	-.47	.33	-.08	
Tenure – 9 years or less T1	-.17	.43	-.03	
Tenure – 10 to 19 years T1	.26	.36	.05	
Age – 39 years or less T1	-.87	.52	-.19	
Age – 40 to 49 years T1	-.88	.40	-.20*	.43***
Step 2				
Effort T1	-.00	.04	-.00	
Esteem reward T1	.01	.04	.01	
Status reward T1	-.11	.06	-.12	
Security reward T1	-.05	.05	-.06	.02

* $p < .05$, ** $p < .01$, *** $p < .001$

Table 8. Reverse causal analysis testing the relationship between stressors at T1 and expressive hostility at T2

Independent variable	B	SE B	β	ΔR^2
Step 1				
Expressive Hostility T1	.51	.05	.62***	
Gender – Male T1	.05	.30	.01	
Tenure – 9 years or less T1	.40	.38	.08	
Tenure – 10 to 19 years T1	.31	.33	.07	
Age – 39 years or less T1	-.55	.47	-.13	
Age – 40 to 49 years T1	-.40	.36	-.10	.40***
Step 2				
Effort T1	.01	.03	.01	
Esteem reward T1	.03	.04	.05	
Status reward T1	-.03	.05	-.03	
Security reward T1	-.11	.05	-.14*	.02

* $p < .05$, ** $p < .01$, *** $p < .001$

Strain-Stressor association

Table 9. Reverse causal analysis testing the relationship between strains at T1 and effort at T2

Independent variable	B	SE B	β	ΔR^2
Step 1				
Effort T1	.60	.07	.58***	
Gender – Male T1	-.23	.60	-.02	
Tenure – 9 years or less T1	-.54	.76	-.06	
Tenure – 10 to 19 years T1	.31	.65	.04	
Age – 39 years or less T1	.51	.93	.07	
Age – 40 to 49 years T1	-.19	.75	-.03	.34***
Step 2				
Psychological distress T1	-.01	.04	-.03	
Job satisfaction T1	.11	.08	.11	
Affective commitment T1	-.01	.05	-.01	
Absenteeism T1	-.07	.05	-.09	.02

* $p < .05$, ** $p < .01$, *** $p < .001$