

Measuring Work Engagement and Positive Accountability and Exploring Their
Relationships with Other Constructs.

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Statement of Originality

The work contained in this thesis has not been previously submitted either in whole or in part for a degree at CQUniversity or any other tertiary institution. To the best of my knowledge and belief, the material presented in this thesis is original except where due reference is made in text.

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Abstract

In the globalised economy of the 21st century organisations are under more pressure than ever to get the most out of their employees. The concepts of engagement and accountability are widely thought to be critical to organisational success in contemporary organisations, yet both are under-conceptualised and under-researched.

This thesis provides an empirical investigation of work engagement and positive accountability. The research was conducted within the context of the Australian mining industry using cross-sectional survey data. The research had two main focuses. The first was to bring further clarity to the concepts by drawing on well established theories of work to test their relationships with other variables. The second was the development and testing of the Work Engagement Scale (WES) and Positive Accountability Scale (PAS).

The research presents work engagement as a motivational state characterised by vigor, dedication and absorption. Positive accountability was studied as a work environment construct that is embedded within the social structures of work. It was operationalised in terms of four core characteristics of the work environment: expectations, feedback, discipline, and salience. The results provided strong theoretical and empirical support for the reliability and construct validity of the WES and PAS. Their practical utility and nomological validity was demonstrated via substantial relationships with a range of important work-related variables.

The research emphasises the importance of adopting a flexible and integrative approach to work engagement and positive accountability in

contemporary organisations, but also the need for well-defined and properly operationalised work constructs that are open to empirical research and practical application.

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Abbreviations

4DSQ	Four-Dimensional Symptom Questionnaire
BDI	Beck Depression Inventory
CI	Confidence Interval
CES-D	Centre for Epidemiological Studies – Depression Scale
CFA	Confirmatory Factor Analysis
CLC	Corporate Leadership Council
CMV	Common Method Variance
DV	Dependent Variable
EM	Estimation Maximization
GDP	Gross Domestic Product
GLM	Generalized Linear Model
HR	Human Resources
HRM	Human Resource Management
IV	Independent Variable
JCT	Job Characteristics Theory
JD-R	Job-Demands Resources
KMO	Kaiser-Meyer-Okin
LL	Lower Limit
MBI	Maslach Burnout Inventory
MAR	Missing at Random
MCAR	Missing Completely at Random
NSW	New South Wales
OCB	Organisational Citizenship Behaviour
OCI	Organisational Culture Inventory
OEI	Organisational Effectiveness Inventory
SCQ	Safety Climate Questionnaire
SEM	Structural Equation Modelling
PAS	Positive Accountability Scale
POS	Perceived Organisational Support
QLD	Queensland
WES	Work Engagement Scale
UL	Upper Limit
UWES	Utrecht Work Engagement Scale
VIF	Variance Inflation Fact

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Chapter 1. Introduction

In today's turbulent and competitive world organizations must exert deliberate and considerable effort to survive and prosper. Globalization, corporate restructurings, technological advances, and competitive pressures have revolutionized the way organisations function and have redefined the nature of the employment relationship (Fried, Levi & Laurence, 2008; Tsui & Wu, 2005). These changes have been paralleled by an increased focus on managing people, or human capital, at work with the recognition that employees are one of an organisations most valuable resource (Crook, Todd, Woehr & Ketchen, 2010). Indeed, the ability to get the most out of employees has become a significant source of competitive advantage, hence the central role that the "HR department" now plays in almost every major organisation.

The practice of managing people at work is predominantly informed by management and Human Resource (HR) fields and organisational psychology. Research in these fields has led to remarkable advancements in the way organisations manage their human capital through the study of a diverse range of subjects such as: job design, organisational culture, psychometric testing, and organisational structure. However, research is struggling to keep pace with the rate of organisational change that now typifies the contemporary world of work. In practice, much research still draws heavily on theories of work developed in the 1950's and 60's that today reflect less well the current societal and work contexts (Grant et al., 2010).

Whilst organisations face many complex challenges, two that have particular salience in the current climate of change are how to engage employees in their work and how to hold them accountable in a world characterized by increasingly flexible boundaries. Interest in work engagement is driven by organisations desire to motivate their employees to give their full capabilities to their work. At the same time changing power relations, organisational forms and an increased need for employee flexibility have necessitated a re-think of how accountability is understood in modern organisations.

The lack of clarity surrounding both engagement and accountability requires resolution if increased work engagement and positive accountability are to be considered as effective strategies in the search for competitive advantage.

1.1 Aim and Scope

The primary aim of the research is to reduce some of the confusion surrounding the understanding of work engagement and positive accountability. This, along with appropriate measurement tools, will assist organisations in the further development of work engagement and employee accountability.

1.1.1 Engagement. Engagement is a term that is well known and widely used in the business world that is built on ideas of the human contribution to organisational success. The phrases “employee engagement” and “work engagement” are often used interchangeably. However, employee engagement (a term widely use by organizational consultants) typically refers to an employee’s relationship with the organisation, while work engagement (a term more widely used

by academic researchers) typically refers to an employee's relationship with the work they do.

The distinction between employee and work engagement is important. Employee engagement is typically considered as an all encompassing construct that includes psychological states, traits and behaviours. It subsumes related constructs like job satisfaction, job involvement, organisational commitment, extra-role commitment, and psychological empowerment (e.g., Macey and Schneider, 2008). In contrast, work engagement is conceptualised as a psychological (motivational) state. It is grounded in established theories of work motivation, it is more clearly differentiated from related constructs, and it is open to more rigorous theory-based operationalisation. Whilst the research does explore employee engagement for the purpose of comparison with work engagement, the primary focus of this research is on work engagement.

1.1.2 Accountability. Accountability is a versatile term with several nuanced meanings depending on the context of its use. It is frequently used in the context of corporate governance (see Davis, Schoorman, & Donaldson, 1999; Kolk, 2008). This macro-level research is concerned with how organisational structure and the laws and regulations of the region monitor, control and encourage management to work to the interests of shareholders and other stakeholders (e.g., Chan & Cheung, 2007). The term is also used regularly in educational research in the context of the use of standardized achievement tests to increase the accountability of teachers and schools for the quality of education they achieve (e.g., Wiliam, 2010).

Accountability is often used interchangeably with responsibility but they are separate constructs. It is important to delineate them here in order to avoid any conceptual confusion or misunderstandings about the nature of accountability. Responsibility involves notions of causal influence and duty (Cummings & Anton, 1990; Schlenker, Britt, Pennington, Murphy & Doherty, 1994) but does not necessarily involve an evaluative audience. However, an evaluative audience (real or perceived) is a core component of accountability (Frink & Klimowski, 1998; Hall et al., 2006).

At the individual level accountability has predominantly been studied from a sociological perspective in terms of its effects on social judgments and decision making in work situations (Lerner & Tetlock, 1999; Quinn & Schlenker, 2002; Tetlock, 1992). These studies have been mostly laboratory based where accountability is an objective, experimental manipulation. For example, where participants are asked to rate the performance of others under conditions of either knowing that they have to justify their judgments (accountability condition) or not having to justify their judgments (no accountability condition).

More recently, authors have begun to focus on describing the felt characteristics of employee accountability (e.g., Hochwarter, Perrewe, Hall & Ferris, 2005), with the recognition that accountability is a subjective construct embedded within the social structures of work. This approach essentially presents accountability as job characteristic in much the same way that job complexity (Warr, 1994) or job demands (Karasek, 1979; 1998; de Jonge, Dollard, Dormann, Le Blanc, & Houtman, 2000) are conceptualised as job characteristics. The advantage of the

job characteristic approach to accountability is that it provides a measurement framework that focuses on the individual perception of the work environment. Furthermore, at a practical level such a measurement framework provides a platform for job design and redesign.

This research considers the nature of accountability as a supportive rather than an overly controlling characteristic of the work environment and adopts the term “positive accountability” to refer to this. As a positive work environment construct, positive accountability links into the broader job design/redesign (e.g., job characteristics theory [JCT]; Hackman & Oldham, 1976; 1980) and employee motivation (e.g., work engagement) areas of research. More specifically, positive accountability as a work characteristic implies that it is best positioned and understood as supporting work motivation rather than being an outcome of work motivation. This positioning of positive accountability is discussed further in Chapter 3.

1.2 Overview

The first chapter introduces the thesis and the research problem and sets the boundaries for the research. In Chapter 2 a review and integration of the literature relating to work engagement and employee accountability is presented. It illustrates the uncertainty surrounding current theory and measurement of both constructs. It then draws together the extant research to set forth a basic theoretical framework for understanding and operationalising both constructs. Chapter 3 details the research hypotheses, the design of the research and the context for the research.

In Chapter 4 an initial exploration of the constructs within an archival data set is presented. Proxy measures are developed from an existing item pool and data base in order to gain initial insight into the constructs and how they are measured. Furthermore, their relationships with workplace safety are explored in order to demonstrate their practical significance.

Chapters 5 and 6 describe the development and testing of custom designed survey measures of work engagement and employee accountability. The psychometrics of the measures are tested and evaluated and their relationships with a range of other variables are tested in order to develop a clearer conceptual understanding.

Chapter 7 provides an evaluation of the measures in two completely independent samples, as well as further testing of their relationships with other practically relevance variables. In addition, the measures are tested across different occupational groups of employees and further theoretical consideration of the constructs is detailed in post hoc analyses.

Chapter 8 brings together the key results and conclusions and discusses them in relation to the literature and the basic model of motivation that underpins the research. The chapter concludes with the limitations, implications for organisations and practitioners and offers directions for future research and final concluding statements.

Chapter 2. Review of the Literature

This chapter describes and investigates the research literature relating to engagement and accountability.

2.1.1 Approaches to understanding engagement. The engagement literature can be broadly divided into two categories: business and academic. Each adopts different approaches to understanding and measuring engagement.

Business approach (employee engagement). In the business world engagement is increasingly seen as a way to describe employee commitment to the organisation and their jobs and a central part of creating more effective organisations (Harter, Schmidt & Hayes, 2002; Towers-Perrin, 2003). The business approach is driven by a need to describe employee motivation and commitment to the organisation in a changing labor market characterized by moves from collective to individual employment contracts (Guest, 2004; Meyer & Herscovitch, 2001; Wooden, 1999; Rousseau, 2005), labor flexibility (Houseman, 2001), and moves away from traditional organisational hierarchy to flatter organisational structures and self-directed work teams (Guttman, 2009; Kuipers & Stoker, 2009).

The Gallup Organization conducts the most influential international business survey of employee engagement, with the Gallup Q12 engagement survey completed by over 5 million employees from 455 organisations (Gallup, 2008). Other major research firms have conducted similar but smaller scale investigations of employee engagement. For example Towers-Perrin conducted a large-scale international employee engagement study using data from over 36,000 employees from 41 organisations (Towers-Perrin, 2003). Many other research and consultancy firms are

increasing their focus on employee engagement surveys to keep up with the growing demands from businesses. This growing demand illustrates the importance that organizations place on employee engagement.

Large consulting firms such as The Gallup Organisation, Towers-Perrin, the Corporate Leadership Council (CLC), and Hewitt argue that engagement has a substantial impact on improving employee productivity and retaining employees (thereby reducing the costs associated with turnover). For example, Hewitt (2001, p.1) state that they “have established a conclusive, compelling relationship between engagement and profitability through higher productivity, sales, customer satisfaction and employee retention”. However, they do not provide any substantiative evidence for this statement. Harter et al., (2002) argued that the relationship between engagement (measured using the Q12) and performance at the business/work unit level is substantial and highly generalisable across organizations. They reported a correlation between employee engagement and composite performance of .38 (corrected for measurement error).

Furthermore, consultants argue that modern organisations face an engagement deficit, where few employees are actively engaged at work. Gallup researchers report that, on average, only 33% of employees are “actively engaged” at work (Gallup, 2008). They also estimate the costs of disengaged employees at 300 billion a year in the US due to low productivity. Towers-Perrin (2003) argue that employee engagement is the ultimate prize for employers but reported similar findings from their survey of employees in that only 17% of the sample were highly engaged and 19% were completely disengaged.

One of the criticisms of the business approach to engagement is that definitions of the construct vary considerably and often overlap with more established constructs (see Macey & Schnieder, 2008; Schaufeli & Bakker, 2010; Welfand & Downey, 2009). For example, The Gallup Organisation define engagement as “involvement and satisfaction with as well as enthusiasm for work” (Harter et al., 2002, p. 269). Whereas Towers-Perrin define engagement as “the extent to which employees put discretionary effort into their work, beyond the required minimum to get the job done, in the form of extra time, brainpower or energy” (Towers-Perrin, 2003, p. 2) and the CLC use the definition “the extent of employees’ commitment, work effort, and desire to stay in an organization” (CLC, 2004). Just within these three definitions alone are references to extra-role behaviour, organisational commitment, intention to stay, job satisfaction and job involvement. Each of these is a well established organisational construct. This tendency of consultants to define engagement in terms of more established constructs (e.g., organisational commitment) has led to criticisms that engagement is simply “old wine in a new bottle” (Saks, 2006; Schaufeli & Bakker, 2010).

Academic approach. Academic interest in engagement is only just beginning to catch up to practitioner interest with Bakker and Leiter’s 2010 book “Work Engagement: A handbook of essential theory and research” the most recent milestone. There are two broad historical streams of engagement research. First, Kahn (1990) is often cited as an early academic scholar who described engagement as it relates to work. He used the term “personal engagement” to describe employee attachment to and identification with their work roles. Later, work stress researchers

adopted the term “job engagement” to refer to the positive antithesis of burnout (Maslach Schaufeli & Leiter, 2001; Maslach & Leiter, 1997). This work has been extended and refined in recent years with many authors now using the term “work engagement” to refer to a unique motivational construct (Schaufeli & Bakker, 2010).

Kahn (1990) developed a theoretical framework of engagement from interviews with architectural firm employees and summer camp counsellors about moments of engagement and disengagement at work. He described personal engagement with work as “the harnessing of organization members’ selves to their work roles; in engagement, people employ and express themselves physically, cognitively, and emotionally during role performances” (p. 694). Personal disengagement was referred to as “the uncoupling of selves from work roles; in disengagement, people withdraw and defend themselves physically, cognitively, or emotionally during role performances” (p. 694). Kahn also argued that personal engagement means to be psychologically present when occupying and performing an organizational role. With psychological presence characterised by being attentive, connected, integrated, and focused; and the experience of being present allowing growth, learning, change, and productivity to occur (Kahn, 1992).

Kahn was concerned with employees’ identification with their work roles and specific moments and situations of engagement or disengagement in role performances. Put simply, Kahn argued that engaged employees put effort into their work because they identify with it and viewed engagement as a momentary feeling rather than a more pervasive psychological state.

A somewhat different view was adopted by researchers interested in work stress who began referring to job engagement as the positive antithesis of burnout (Maslach et al., 2001; Maslach & Leiter, 1997). Burnout is characterized by three dimensions: exhaustion, cynicism and ineffectiveness. It was originally argued that job engagement is characterized by the direct opposite of the three burnout dimensions, namely: energy, involvement and efficacy.

However, this approach has been criticized for over simplifying engagement. Firstly, if work engagement were the perfect opposite of burnout there is little to be gained from engagement research beyond what is already known from burnout research (Bakker & Schaufeli, 2008). In addition, assuming that burnout and engagement are perfect counterparts is not psychologically feasible i.e. not feeling burned-out doesn't necessarily mean that one is engaged and vice versa (Schaufeli & Salanova, 2011). Finally, it is unlikely that the same mechanisms that drive employee ill-health and malfunctioning also drive employee health and optimal functioning (Bakker & Schaufeli, 2008; Tetrick, 2002).

The empirical evidence also suggests that engagement is not the direct opposite of burnout. It has been repeatedly shown that burnout items and engagement items load on distinct latent factors (Schaufeli & Bakker, 2004; Schaufeli, Taris, & van Rhenen, 2008). In his recent meta-analysis Halbesleben (2010) showed that correlations between work engagement and burnout range from $-.24$ to $-.65$, depending on the dimensions involved. In addition, other studies have shown that burnout and engagement share different patterns of relationships with a

range of other work-related variables (see Schaufeli & Bakker; 2004; Schaufeli et al., 2008).

The alternative and more widely adopted view considers work engagement as a concept that, whilst negatively related to burnout, is a unique motivational (psychological) state that requires independent measurement, conceptualisation and definition (Bakker & Schaufeli, 2008; Schaufeli et al, 2002; Schaufeli & Bakker, 2010). According to this view engagement is defined and operationalised as a “positive, fulfilling, work-related state of mind that is characterized by vigor, dedication and absorption (Nerstad, Richardsen, & Martinussen, 2010; Schaufeli et al., 2008; Schaufeli & Bakker, 2004; 2010).

Schaufeli and Bakker (2010) describe vigor in terms of high levels of energy and mental resilience while working, a willingness to invest effort in work, and persistence in work even when difficulties are faced. Dedication is referred to as a strong sense of psychological involvement in work, as well as a sense of inspiration, significance, pride, enthusiasm and challenge. Finally, they describe absorption as characterized by being fully engrossed in ones work, having total concentration on and being immersed in work

Rather than the momentary state described by Kahn (1990; 1992), work engagement is seen as a pervasive and persistent psychological state. Also, while Kahn’s personal engagement was concerned with personal identification with the work role, work engagement is a motivational construct directly linked to the work activity or work itself.

2.1.2 The JD-R model of work engagement. Studies of engagement have drawn on the Job Demands-Resources (JD-R) model more than another model (Demerouti, Bakker, Nachreiner, & Schaufeli, 2001; Hakenen & Roodt, 2010; Llorens, Bakker, Scahufeli, & Salanova, 2007; Salanova et al., 2005; Schaufeli & Bakker, 2004; Mauno, 2007) (see Figure 2.1). The JD-R is grounded in balance theories of work stress (e.g., the demands-control model; Karasek, 1979) and motivation (e.g., JCT; Hackman & Oldham, 1976; 1980; and two factor theory; Herzberg, Mausner & Snyderman, 1959; Herzberg, 1966) and argues that the characteristics of the work environment can be divided into two categories: job resources and job demands. Job demands are described as physical, psychological, social or organisational aspects of the job that require physical or psychological effort from an employee or result in physical or psychological costs. Conversely, job resources include physical, psychological, social or organisational aspects of the job that contribute to achieving work goals, and reduce the impact of job demands and the costs associated with them (Schaufeli & Bakker, 2004).

In its basic form the JD-R is a dual process model. It includes a health impairment process in which job demands exhaust employees mental and physical resources that leads to burnout and negative health related outcomes, and a motivational process that leads to positive outcomes. In addition to the main effects there are also interaction effects for example, job resources become more salient in the face of high job demands.

The focus for engagement researchers is on the motivational process of the JD-R. That is, job resources lead to motivation (work engagement) which leads to

positive outcomes. More specifically, job resources can act as both intrinsic and extrinsic motivational factors (see Bakker & Demerouti, 2008). Intrinsically they foster employees' growth, learning and development thereby fulfilling basic human needs such as autonomy and competence (Deci & Ryan, 1985). For example, performance based rewards foster learning, thereby enhancing job competence. This intrinsic motivational potential of job resources also underpins JCT (Hackman & Oldham, 1976; 1980). Extrinsically, job resources are instrumental in achieving work goals which encourages willingness to dedicate effort towards work tasks. For instance, a supportive supervisor will increase the likelihood of being successful in achieving work goals.

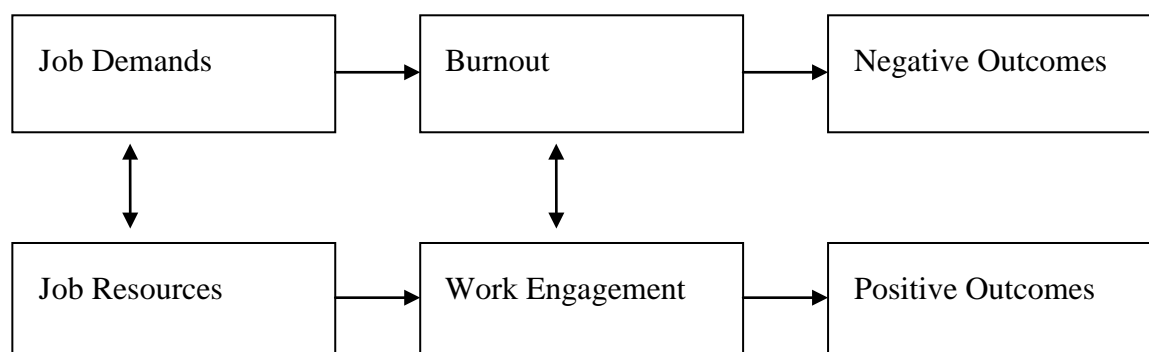


Figure 2.1. Overview of the JD-R model of work engagement.

2.1.3 Support for work engagements relationships with positive

outcomes. One of the key drivers of interest in work engagement is that it is thought to be linked to individual performance and, therefore, organisational effectiveness. Research has found consistent support for the argument that engaged employees

perform better. For example, engaged employees receive higher ratings on measures of in-role and extra-role performance (Bakker & Bal, 2010; Bakker, Demerouti & Verbeke, 2004; Halbesleben & Wheeler, 2008; Schaufeli & Bakker, 2004; Sonnetag, 2003) and proactive work behaviour (Salanova & Schaufeli, 2008). Work engagement has also been negatively associated with intention to quit (Halbesleben & Wheeler, 2008; Schaufeli & Bakker, 2004) and actual turnover (DeLange, DeWitt & Notelaers, 2008). In his meta-analysis Halbesleben (2010) also reported significant associations between work engagement and important outcomes such as: commitment, performance, health and turnover intention. Moreover, some authors argue that high levels of work engagement trigger complex, reciprocal and upward spiraling relationships between job resources, work engagement and positive outcomes, termed “gain spirals” (Llorens et al., 2007; Salanova, Schaufeli, Xanthopoulou & Bakker, 2010).

2.1.3 Related constructs. As stated above, engagement is often criticized for sounding much like other, more established constructs. For engagement to be treated as a unique construct it must be clearly delineated from related constructs so that research can provide a meaningful and valid contribution to the literature.

Job involvement. The job involvement literature has suffered many of the problems of engagement literature such as poor definition, conceptual overlaps and weak operationalisations. However, in his review of job involvement research Brown (1996) notes that the clearest and most precise conceptualization stresses job involvement as a component of self-image, reflecting the extent of psychological or cognitive identification with one's job, based on the notion that work satisfies certain

needs and expectations. Job involvement is clearly related to the dedication component of work engagement, but work engagement also involves energy (vigor) and dedication components.

Job satisfaction. Locke's (1976) definition: "job satisfaction is a pleasurable or positive emotional state resulting from an appraisal of one's job or job experiences" (p. 1300) is one of the most widely cited. Job satisfaction is a general cognitive evaluation of an employees' overall work experience that connotes satiation. Work engagement, on the other hand, connotes activation in terms of enthusiasm and excitement (Schaufeli & Bakker, 2010).

Organisational commitment. According to its most often cited definition, organisational commitment is "the relative strength of an individual's identification with and involvement in a particular organization" (Mowday, Steers, & Porter, 1979, p. 226). Organisational commitment is clearly concerned with attachment to the organisation whereas work engagement is concerned with the individual and the work itself.

Organisational Citizenship Behaviour (OCB). OCB is defined as "performance that supports the social and psychological environment in which task performance takes place" (Organ, 1997, p. 95). OCB involves voluntarily doing more than the job requires. Work engagement is a motivational state that supports formal role performance rather than extra-role or voluntary behavior. Indeed, engaged employees might or might not display extra-role behavior.

Workaholism. Engagement is similar to workaholism in that both workaholics and engaged employees work hard, are involved in their work and are

happily engrossed in their work (Bakker & Demerouti, 2008). However, for workaholics work is an addiction. A workaholics drive or need to work can be so exaggerated that it endangers health, and can interfere with social relationships and social functioning (Bakker & Demerouti, 2008). Engaged employees work out of a sense of enjoyment and challenge, not addiction (Schaufeli & Bakker, 2010).

Whilst work engagement clearly relates to these constructs it is also conceptually distinct from each of them. In addition, work engagement has been shown to be empirically distinct from job involvement and organisational commitment (Hallberg & Schaufeli, 2006), workaholism (Schaufeli et al., 2008), and using a somewhat different operationalisation of engagement Saks (2006) showed that job engagement was not the same as OCB. Taken together, the research evidence supports the view that work engagement is a distinct construct that adds unique value over and above the related constructs described above.

2.1.4 Assessing engagement. There is a plethora of survey instruments used to assess engagement based on a variety of conceptualisations of the construct. Consultants often do not provide the psychometric data for their measures (with the exception of the Gallup Q12) hence it is not possible to review their reliability and validity here. By far the two most widely used measures in the academic literature are the Maslach Burnout Inventory (MBI) and the Utrecht Work Engagement Scale (UWES). However, there are several other academic measures available that have limited application.

Q12. The Gallup conceptualisation of engagement was developed over several decades from interviews, focus groups, surveys, and business studies and has

been completed by over 5 million employees (Gallup, 2008). According to the Gallup Organisation there are 12 key expectations, that when satisfied, form the foundation for strong feelings of employee engagement (see Thackray, 2001). The Q12 was designed as a management tool, with each of its 12 items representing an “actionable” area for managers in creating change.

Harter et al. (2002) reported excellent internal consistency for the Q12 ($\alpha = .91$) at the business unit level of analysis. They also state that it is a unidimensional measure because factor analysis revealed that the ratio of the first to second eigenvalue is 5.9 times greater than the second to the third. However they do not provide the results of the analysis.

The Q12 is criticised as assessing the perceived level of resources in an employees’ job and not the level of engagement, that is, antecedents of engagement rather than the experience of engagement (Schaufeli & Bakker, 2010). Moreover, the Gallup conceptualisation of engagement is virtually identical to job satisfaction. The Q12 items align closely with what Herzberg et al. (1959) called “motivators” from his motivation-hygiene theory of job satisfaction and are also antecedents to job satisfaction and other affective constructs.

Indeed, Harter et al. (2002) reported a correlation of .72 (.91 corrected for measurement error) between the Q12 and overall job satisfaction at the business-unit level. Engagement and job satisfaction also explained almost identical amounts of variance in a composite measure of business performance i.e. observed $r = .22$ for both, and corrected for measurement error $r = .37$ for engagement, and $r = .38$ for satisfaction. Furthermore, they discuss results in terms of “employee satisfaction-

engagement” suggesting that the Q12 could also be described as tapping antecedents to job satisfaction. As such, it is not clear whether the Q12 is a measure of job satisfaction or engagement.

MBI. The MBI is a widely used instrument for the measurement of employee burnout (see Schaufeli, Leiter, Maslach & Jackson, 1996). It consists of three subscales labeled: exhaustion, cynicism and ineffectiveness. It is argued that low scores on these scales correspond to three components of engagement i.e. energy, involvement and efficacy.

The internal reliability of the MBI subscales has been reported to be appropriate across various countries with Cronbach’s alpha statistics between .72 and .91 for exhaustion, .73 to .86 for cynicism and .73 to .83 for ineffectiveness (Schaufeli, et al., 1996). Studies have also supported its factor structure invariance across various occupational groups (e.g., Leiter & Schaufeli, 1996), and across nations (Schutte, Toppinen, Kalimo, & Schaufeli, 2000).

Schaufeli and Bakker (2010) criticise the use of the MBI to measure engagement arguing that rejection of a negatively worded burnout statement (e.g., “I feel burnout out from my work”) does not mean automatic agreement with a positively worded one. In other words not being burned out does not make one engaged. As has been discussed previously, they propose that burnout and work engagement are two independent but negatively related concepts that require independent measurement.

UWES. The UWES was developed by researchers from Utrecht University (see Schaufeli et al., 2002) and assesses work engagement as an independent

construct that is constituted by vigor, dedication and absorption. It was originally developed with samples of university students and professional employees (e.g., technical/support staff, human services, sales and laboratory staff) but has since been used with over 60,000 employees from various professions (Schaufeli & Bakker, 2010).

Schaufeli and Bakker (2010) provide a comprehensive summary of the psychometric properties of the UWES. They note that meta-analyses (33 samples from various countries, $N = 19,940$) has shown that the three subscales of the UWES are sufficiently internally consistent with the Cronbach alpha exceeding .80 and exceeding .90 for the composite score. In addition, the factorial structure has been shown to be invariant across nations and different occupational groups and invariant over time (3 years). In contrast, Shimazu, Schaufeli, Miyanaka and Iwata (2011) argue that cultural differences in the way employees respond to engagement items causes decreased measurement accuracy, particularly when considering western versus eastern cultures. The discriminant validity of the UWES with measures of burnout, personal initiative, job involvement, organisational commitment and workaholism has also been supported.

The majority of research finds support for the three-factor structure of the UWES (see Schaufeli & Bakker, 2010). However, Sonnetag (2003) did not find this structure with the results supporting a single factor-solution. In addition, Hallberg and Schaufeli (2006) found equal support for a one-dimensional and three-dimensional structure of the UWES. While Nerstad et al. (2010) also found some support for a two-dimensional factor structure (with vigor and dedication combined).

The three dimensions are also reported to be highly correlated (correlations $> .65$ between observed factors and $.80$ to $.90$ between latent factors). It is for these reasons Schaufeli & Bakker (2010) recommend that, for practical purposes, a total UWES score be used as an indicator of work engagement.

The UWES is available in three different forms: the original 17-item measure, a shorter 9-item measures and a student version. Nerstad et al. (2010) recommend the use of the short 9-item version over the longer 17-item version as it provides a better fit to the three dimensional model of work engagement.

Other measures with limited application. Parker and Griffin (2011) more recently argued that research should not restrict itself to using only the UWES and should draw from a wider nomological net stating that “A measure should tap important aspects of a construct, but it should not define the domain of research” (p. 61). Bakker, Albright and Leiter (2011b) agree with this view but note the importance of agreement and mutual understanding about the nature of work engagement to meaningful and effective future research. However, there are few alternatives to the UWES available in the academic literature, and the alternatives that are available have received only limited attention.

May, Gilson and Harter (2004) operationalised engagement according to Kahn’s (1990; 1992) dimensions of cognitive, physical and emotional engagement using a 13-item scale. Cognitive, physical and emotional engagement overlap significantly with absorbtion, vigor and dedication, respectively. For example, the item “Time passes quickly when I perform my job” used to measure cognitive engagement is very similar to “Time flies when I’m working” from the UWES.

Factor analysis suggested that it was a unidimensional scale that had appropriate internal consistency ($\alpha = .77$).

Rich, Lepine and Crawford (2010) adopted a similar view to May et al. (2004) using 18 items to operationalise engagement in terms of cognitive, physical and emotional engagement. A three-factor solution provided a better fit to the data than a single factor solution and the total scale was internally consistent ($\alpha = .95$). The item content of the Rich et al. measure also overlaps significantly with the UWES. For example, the item “I am proud of my job” is almost identical to the UWES item “I am proud of the work I do”.

Also based on Kahn’s work, Rothbard (2001) conceptualised role engagement in terms of work attention and work absorption. Attention refers to cognitive availability and the amount of time one spends thinking about a role. Absorption refers to being engrossed in the role and the intensity of one’s focus and is related to intrinsic motivation. Attention and absorption were measured as specific to work and family roles, that is, work engagement and family engagement were measured separately. The attention (4 items) and absorption (5 items) scales showed appropriate internal consistency ($\alpha = .77$ to $.87$) and loaded on distinct latent factors.

Saks (2006) operationalised engagement in terms of job engagement (5 items) and organisation engagement (6 items). Each scale showed appropriate internal consistency ($\alpha = .82$ and $.90$, respectively). The scales were moderately related ($r = .62, p < .01$) but shared different patterns of relationships with other work variables supporting meaningful distinction between the two.

2.1.5 Accountability in organisations. Accountability has been called the most fundamental factor in organisational functioning, necessary for the effective operation of any enterprise (Frink & Klimoski, 1998; Frink & Klimoski, 2004; Lerner & Tetlock, 1999). This is because within any social system there must be some level of agreement about rules and expectations that guide behaviour. Indeed, many of the world's largest organisations list accountability in their core value statements on their company websites, including: CocaCola, General Electric, National Health Service (NHS) and Rio Tinto.

2.1.6 Implicit themes of accountability. Themes and issues of accountability are deeply embedded within many well established streams of organisational research. For example, there is considerable research that explores how employee rewards/punishment (Locke & Latham, 1990; Podsakoff, Todor & Skov, 1982) and performance feedback (Carroll & Schneider, 1982; Fletcher, 1995; Jawahar, 2006) shape individual behaviour. Similarly, in the work stress literature it is argued that role conflict/ambiguity emanate from the clashing or misalignment of employee accountabilities at work (Katz & Kahn, 1978).

Accountability is also implicit in the leadership literature because organisational hierarchy positions leaders as the principal agents of accountability (Erdogan, Sparrowe, Liden & Dunegan, 2004; Wood & Winston, 2007). That is, leaders monitor performance, set standards for work, discipline employees and provide rewards and feedback – all key features of accountability. Informally, leaders may also model accountability through their own behaviour or social interactions (Erdogan et al., 2004).

Themes of accountability are also evident in research on organisational structure. The research on span of control started with early management researchers wanting to examine organisational structure as a determinant of organisational performance (Gulick, 1937; Urwick, 1956). The logic was relatively simple, that leaders should only supervise a limited number of subordinates because as the number increases the leader has more difficulty monitoring them and therefore, holding them accountable (Meir & Bohte, 2000).

Whilst accountability is clearly important and is frequently talked about in the organisational sciences it has received surprisingly little direct research attention.

2.1.7 Definitions of employee accountability. Accountability has been described as “complex and chameleon-like” (Mulgan 2000, p. 555) and a diversity of definitions can be found in the management and psychology literatures. Defining the construct is inevitably difficult because it includes both formal and informal systems, objective and subjective evaluations and rewards, and internal and external audiences (Frink & Klimoski, 2004). Table 2.1 provides examples of definitions of accountability.

Table 2.1

Definitions of Accountability

Definition	Source
The need to justify one's views to others.	Roch (2007)
Accepting and meeting ones personal responsibilities, being and/or feeling obligated to someone else or oneself, or having to justify ones actions to others about whom we care.	London (1997)
The extents to which one's actions are evaluated by some external constituency who has salient rewards or sanctions that are made contingent on the evaluation.	Ferris et al., (1995)
"Answerability" to a higher authority for one's actions or behaviours.	Kearns (1996) and Shafritz and Russell (2003)
A moral and ethical discipline that assumes willingness to take responsibility for decisions and resultant consequences.	Fry (1995)
As meeting the performance expectations of multiple stakeholders.	Bogart (1995), and Fredericksen and Levin (2004)
An implicit or explicit expectation that one's decisions or actions will be subject to evaluation by some salient audience(s) (including oneself), with the belief in the potential for either rewards or sanctions based on these evaluations.	Hall et al. (2006)
Accountability refers to being answerable to audiences for performing up to certain prescribed standards, thereby fulfilling obligations, duties, expectations, and other charges.	Schlenker and Weigold (1989)
The implicit or explicit expectation that one may be called on to justify one's beliefs, feelings, and actions to others.	Lerner and Tetlock (1999)

There is considerable variation across these definitions but there are two themes common to most definitions of accountability. The first concerns an evaluation of action by others and resulting feedback, and the second concerns the context i.e. who and what is involved in a situation (Frink & Klimoski, 2004).

2.1.8 Tetlock's social contingency model of accountability. Much of the academic research on accountability as an individual-level construct is based in social psychology and largely informed by the work of Tetlock (1985; 1992). Tetlock was a proponent of what has been labelled the phenomenological view of accountability (Frink & Klimoski, 1998). Under this view, accountability is seen as a subjective state of mind rather than an external condition. Although objective, external conditions are seen as important because these conditions influence subjective assessments of accountability. More importantly, it is this subjective interpretation of objective conditions that drives behaviour. This view of accountability has formed the conceptual foundation for much of the subsequent accountability research.

Tetlock's central argument was that accountability is the fundamental social contingency driving individuals' behaviours and decisions. It is based on an assumption that individuals are concerned about their image and status and will employ numerous strategies to maintain and/or advance that image or status. That is, because accountability implies a potential evaluation or at least the expectation of a potential evaluation, individuals position themselves to defend decisions or behaviours should an evaluation occur. Tetlock proposed a number of coping strategies that individuals use when faced with accountability demands with the use of each strategy depending on when an individual becomes aware of being accountable, referred to as pre- or post-decisional accountability, and whether the preferred outcome or view of the audience is known versus unknown.

Briefly, these strategies are described as: the acceptability heuristic, pre-emptive self-criticism, and retrospective rationality. The acceptability heuristic refers to a strategy where people act in a manner that they believe will be most acceptable to the relevant audience. This strategy is most likely to be used if the person discerns an accountability requirement and the preferred outcome is known prior to making a decision. Pre-emptive self-criticism involves the increases use of cognitive resources to anticipate the relevant audience reactions. The resulting behavior is intended to be the most easily defended. This is most likely to occur when individuals do not know the preferred outcome of their audience prior to their behavior. Retrospective rationality is employed when individuals learn of an accountability requirement after they have made a decision or engaged in a behavior. It refers to the process of generating post hoc explanations for behavior.

2.1.9 Criticisms of investigations based on the social contingency model.

Despite the argument that accountability is a subjective, internal condition research from a phenomenological perspective generally experiment with accountability as an objective, external condition. Tetlock and Kim's (1987) experiment is a typical example. In this study students were asked to give their impressions of others' personality based on personality test data. Students in the no accountability condition were assured that their impressions of the test-takers would be completely confidential. Students in a "pre-exposure" condition learned before reading the results that they would be interviewed (and taped) about why they formed their impressions. Students in a "post-exposure" condition were also asked to participate in an interview but only after they had already provided written personality sketches

of the test-takers. The results showed that students in the pre-exposure condition reported more integratively complex impressions, made more accurate behavioral predictions, and reported greater levels of confidence in their predictions than did student in either the no-accountability or post-exposure conditions.

Laboratory experiments have been criticized because the dynamics of accountability operate differently in work settings than in the laboratory. In laboratory settings subjects' experience of accountability ends once the experiment is concluded. However, in organisations accountability cannot simply be turned on or off (see Hockwarter, Ferris, Zinko et al., 2007). Moreover, there are many potential individual and/or contextual factors that can influence employee accountability in real-world organisational settings. Indeed, Lerner and Tetlock (1999) recognize this limitation noting that people do not think and act in a social vacuum and that institutional settings represent a necessary setting for examining accountability.

Finally, the practical utility of breaking down accountability into its most elemental parts in contrived laboratory settings is limited. Lerner and Tetlock's conclusions illustrate this point well:

Two decades of research now reveal that (a) only highly specialized subtypes of accountability lead to increased cognitive effort; (b) more cognitive effort is not inherently beneficial; it sometimes makes matters even worse; and (c) there is ambiguity and room for reasonable disagreement over what should be considered worse or better judgment when we place cognition in its social or institutional context. In short accountability is a logically complex construct that interacts with

characteristics of decision makers and properties of the task environment to produce an array of effects— only some of which are beneficial. (Lerner & Tetlock, 1999, p. 270).

2.1.10 Role theory perspective. Frink & Klimoski (2004) argue that accountability can be understood from a role theory perspective. According to role theory behaviour is guided by expectations that are held by an individual and other people (role senders) (Katz & Kahn, 1978). Expectations correspond to different roles that people perform or occupy, such as father, teacher or lawyer. For example, a father is expected to provide care for his child and a lawyer is expected to abide by certain ethical expectations.

Within the role theory framework the interplay between role sender/s and individuals expectations and behaviours, occurs in an ongoing, dynamic, mutual influence process, and in both direct and indirect ways (Frink & Klimoski, 2004). In this sense the individual is seen as a negotiator rather than a passive recipient. The process results in an ongoing redefinition of roles and expectations, and increasing clarity and understanding (and predictability) in a relationship.

In an organisational context norms develop around the appropriate division of labour and activities, that is, what is expected, from whom, and by when. These sets of norms are usually referred to as roles. In terms of accountability, Frink and Klimoski argue that it is the perception of expectations on the part of the individual that manifests itself as the feeling of accountability. This felt accountability then influences subsequent behaviours, expectations and values of the individual via the processes described above. One of the key assumptions of this perspective is that

people exist within a complex web of accountability because people occupy multiple roles at work (e.g., coworker, mentor or subordinate) and because they can be accountable for multiple expectations or behaviours from multiple sources.

2.1.11 Accountability as a workplace stressor. Building on previous research and working from a phenomenological perspective a stream of research has emerged that conceptualises employee accountability as a potential workplace stressor (see Ferris et al., 2009; Green, Visser, & Tetlock, 2002; Hall et al., 2003; Siegel-Jacobs & Yates, 1996). Studies in this area generally argue that accountability can act both positively and negatively. For example, accountability has been shown to be associated with positive outcomes like job satisfaction (Hochwarter et al., 2007), job involvement and citizenship (Hall et al., 2003). At the same time studies report that accountability is associated with stress and tension (Ferris et al., 1995; Hochwarter et al., 2005; Hochwarter et al., 2007; Siegel-Jacobs & Yates, 1996).

There is an implicit assumption that optimal levels of accountability exist that are neither too constraining nor too flexible (Ammeter, Douglas, Ferris & Goka, 2004; Ferris et al., 2009). However, the focus for much of this research is on demonstrating that high levels of accountability acts as a workplace stressor, or on identifying moderator variables such as negative affectivity (Hochwarter et al., 2005), job autonomy (Hall et al., 2006) and political skill (Hochwarter et al., 2007) that moderate the accountability-stress relationship.

From this perspective accountability acts as a stressor because of the anxiety-provoking effects of evaluation and increased scrutiny and the potential for role conflict, ambiguity and overload (Hall et al., 2003). High levels of accountability are

characterized by strict reporting relationships and excessive external and bureaucratic organisational control. For example, operationalisations of accountability in these studies include items such as “To what extent do people who do the same work you do feel they are constantly being watched to see that they obey the rules?” (Ferris et al., 2009) and “Co-workers, subordinates, and bosses closely scrutinize my efforts at work” (Hochwarter et al., 2003).

Dose and Klimoski (1995) argue that such control can not only lead to stress and strain reactions but also dysfunctions such as outright resistance, blind conformity and childlike dependency as well as the use of strategic behaviours that enable favourable evaluations but do not benefit the organisation (e.g., false reporting and impression management).

Interestingly, research in this stream gives limited attention is given to describing optimum states of accountability or the environmental conditions that support them. Yet it is this knowledge would be particularly valuable to organisations and practitioners wanting to encourage and generate accountability for its positive benefits.

2.1.12 Positive accountability in the 21st century organisation.

Accountability theory and research has been shaped significantly by a top-down command-and-control approach and contingent models of goal-directed behaviour (Martin-Rios, 2006). According to Dose and Klimoski (1995) new workplace realities such as downsizing, flatter organisational structures, technological advances, self-management, and self-directed teams require a more progressive and positive approach to accountability. They argue that top-down,

hierarchical control systems are unsuited to modern organisations where adaptability and flexibility are often key to organizational success. Gruman and Saks (2011) express a similar view but also contend that performance management is as much about managing the context in which performance occurs as it is about managing performance itself. Indeed, in most organisations operating in dynamic and highly competitive markets, managers cannot spend all their time and effort making sure everyone is doing what is expected. Moreover, those expectations are increasingly varied and subtle as well as increasingly determined by employees themselves (Wrzesniewski & Dutton, 2001).

Positive accountability, therefore, recognises the need to balance external control with flexibility. It is also more strongly tied to social interactions and less strongly embedded within hierarchical control systems. The relationship between the principal (party to whom one is accountable) and the employee is particularly salient. This is because in today's world where boundaries are less clear the informal work environment becomes more important.

Dose and Klimoski (1995) suggested three environmental supports for positive accountability. The first is the structuring of expectations via a negotiated or consultative techniques rather than a directive management style. Second, is enhanced personal control through job-relevant feedback, greater discretion setting rules and goals and a supportive supervisor-subordinate relationship. Third, enhanced significance of an activity also strengthens employee accountability.

The positive view of accountability highlights that there are characteristics of the work environment that are likely to encourage optimal states of accountability in

a more flexible world of work. However, research has not adequately explored which work environment characteristics encourage positive accountability or whether positive accountability is linked to positive outcomes. To do so requires a framework for understanding work environment characteristics as they apply to positive accountability.

2.1.13 Work characteristics that support positive accountability.

Traditionally, research has drawn on theories of work such as JCT (Hackman & Oldham, 1976; 1980) to explore how work environment characteristics influence employee attitudes and behavior. Briefly, JCT focused on five structural characteristics of jobs (task variety, autonomy, feedback, significance and identity) that could enhance work motivation, satisfaction and performance by cultivating experiences of meaningfulness, responsibility, and knowledge of results (for a review see Grant et al., 2010). However, JCT emerged in the 1960's and 70's when the world of work was an extremely different place. Several attempts have been made to refine JCT to more accurately reflect the current work context (e.g., Jackson, Wall, Marton & Davids, 1993; Humphrey, Nahrgang & Morgeson, 2007; Morgeson & Humphrey, 2006; Parker, Wall & Cordery, 2001) but these attempts have received only limited attention in subsequent research. Indeed, Grant et al. (2010) notes that existing models and theories of job design no longer reflect, and have yet to integrate, the impact of the dramatic changes in work context that have occurred over the last few decades. One consistent criticism of JCT is that it doesn't give enough attention to the social context of work (Grant et al., 2010; Grant & Parker, 2009, Humphrey et al., 2007, Parker et al., 2001)

Thus, exploring the work environment characteristics that support positive accountability in 21st century organisations requires a view of the work environment that recognises these changes. As has been discussed, the work environment characteristics that support positive accountability are likely to span the social/informal characteristics of work as much as the objective or structural characteristics. As such, there is a need to rethink how we conceptualise work characteristics and how these characteristics support and shape employee behaviour. In the next chapter three work environment characteristics are identified from existing knowledge and research on accountability and brought together under a proposed model of positive accountability.

2.1.14 Measures of accountability. There are few empirical measures of positive accountability and none that focus specifically on the work environment characteristics that support positive accountability.

Thoms, Dose and Scott (2002) designed a three-dimensional measure of employee accountability with two forms reflecting accountability to different audiences, these were: accountability to co-workers (Chronbach's alpha = .86) and accountability to management (Chronbach's alpha = .90). They report that each form of accountability was predictive of job satisfaction, trust in management and trust in the supervisor. Both forms shared the same underlying three-factor structure: (a) *awareness* (by co-workers /management of employee job performance) - the only factor that was significantly related to job satisfaction and trust; (b) *impact* (of the employees work on co-workers/management); and (c) *justification* (extent of required justification of employee's work to co-workers/management).

Hall, Hochwarter, and Ferris (2003) report an 8-item measure of “felt accountability”. Items included: “I am held very accountable for my actions at work”; “I often have to explain why I do certain things at work”; “Top management holds me accountable for all of my decisions”; “If things at work do not go the way that they should, I will hear about it from top management”; “To a great extent, the success of my immediate work group rests on my shoulders”; “The jobs of many people at work depend on my success or failures”; “In the grand scheme of things, my efforts at work are very important”; and “Coworkers, subordinates, and bosses closely scrutinize my efforts at work”. The scale was shown to be internally consistent ($\alpha = .74$) and unidimensional (Hall et al., 2006; Hochwarter et al., 2005). However, its focus is on positive accountability as being at the tipping point of an inverted-U continuum.

Both measures address aspects of the social context of work with both including accountability to management and to the work group. However, both present accountability as an aspect of the social context of work that is characterised by response to, rather than interaction with management and the work group.

Chapter 3. Research Design: Goals, Theoretical Model, Methodology, Limitations and Context for the Research

The previous chapters set the aim and scope for the research and reviewed the relevant literature. In this chapter the goals of the research and the overall theoretical and methodological frameworks are presented. The limitations of the methodology and the context for the research are also discussed.

3.1.1 Goals and contributions of the research. The aim of the research is to reduce some of the confusion surrounding the understanding of work engagement and positive accountability. The research addresses this aim through three main goals, namely:

- To develop purpose designed empirical measures of work engagement and positive accountability.
- To establish the reliability, validity and practical significance of the measures.
- To describe the relationships of work engagement and positive accountability with other constructs.

3.1.2 Research agenda and theoretical framework. The research adopts the dominant academic view of work engagement as a unique motivational state characterized by vigor, dedication and absorption in order to operationalise the construct. It is in a useful position to test whether work engagement, as a motivational construct, transfers well to employees in management and operational positions within the heavy industry sector and to add to the availability of alternative measures of work engagement. The research also extends the nomological validity of

work engagement by testing its relationships with major antecedents and consequences. This research agenda is one echoed recently by Parker and Griffin (2011).

In addition, by conceptualising and operationalising positive accountability in terms of characteristics of the work environment that are embedded within the social structures of work this research builds forward from the traditional structural view (e.g., JCT) of work characteristics that support positive employee states. In addition, this approach to positive accountability recognises the changing work context whereby the balance between organisational control and flexibility has shifted and employee behavior is increasingly shaped and guided by the social context of work.

The research is set within a broad theoretical framework in order to more clearly conceptualise the constructs and to enable them to be considered in terms of existing research and theory. It is a guiding framework rather than a prescriptive model but it is a framework that underlies theory in many areas of organisational research such as organisational culture, work motivation, work stress and job design, and can be considered a basic tenet of Human Resource Management (HRM) (see Becker & Huseleid, 1998; Combs, Liu, Hall, & Ketchen, 2006; Deci & Ryan, 1985; Hackman & Olham, 1976; 1980; Herzberg et al., 1959). Put simply, the research assumes that the work environment influences psychological states of employees which, in turn, lead to work outcomes (see Figure 3.1). Whilst the potential for reciprocal relationships, moderators and other variables is recognised, the framework offers a relatively straightforward starting point with which to orient the research within a well established research paradigm.

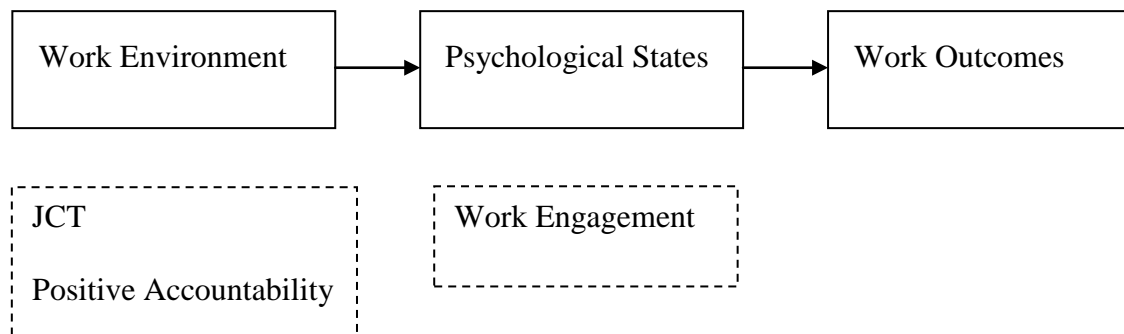


Figure 3.1. Basic theoretical framework.

Within this basic framework work engagement is considered as a psychological state. As was discussed in the literature review studies of work engagement are generally framed in terms of the JD-R model to explain antecedents and consequences of work engagement. The JD-R model, in effect, is an extension of the simple framework presented above. It classifies each component of the framework into positive and negative. For example, work environment characteristics are classed as either job demands or resources. Thus, this framework is conceptually consistent with previous work engagement theory and research.

Positive accountability, on the other hand, is conceptualised in this research in terms of the perceived features of the work environment that support accountability. Accordingly, it is placed as a work environment construct. As a work environment construct it sits in a similar theoretical space to the job design characteristics described by JCT.

3.1.3 Theoretical model of work engagement. As stated above this research conceptualises and operationalises work engagement as a persistent motivational state characterized by vigor, dedication and absorption (see Schaufeli & Bakker,

2004; 2010). These features of work engagement were discussed in detail in Section 2.1.1 and are presented below in Figure 3.2. This model forms the basis for the development of a purpose designed empirical measure of work engagement in this research.

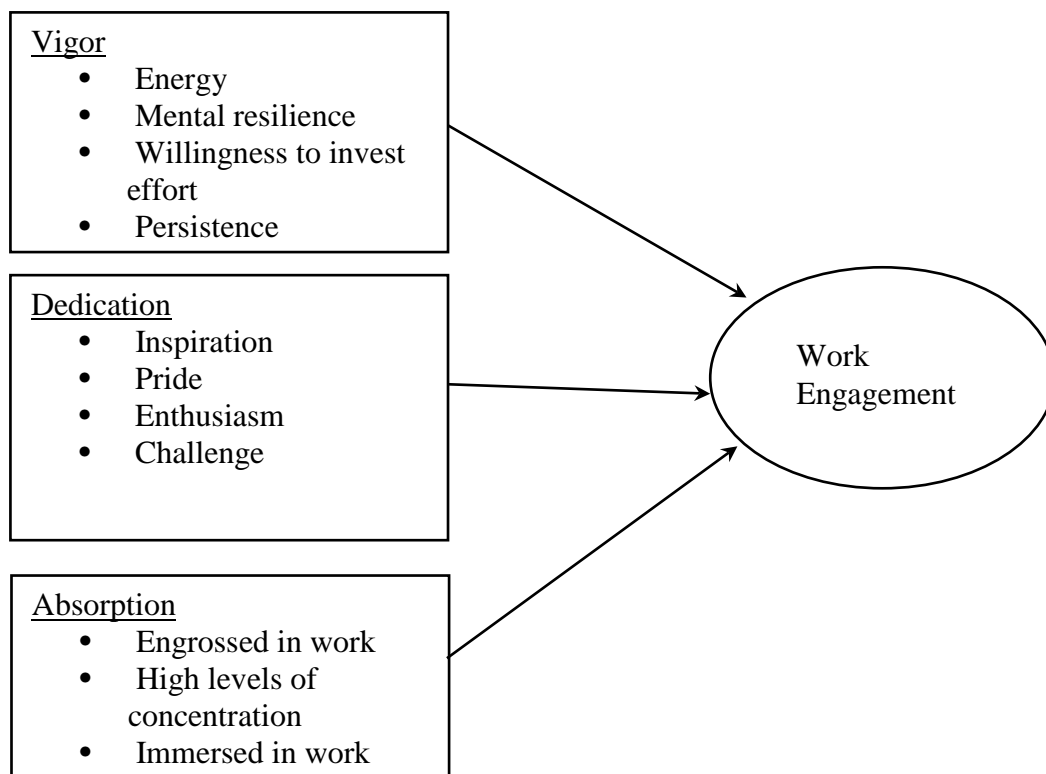


Figure 3.2. Theoretical model of work engagement.

3.1.4 Proposed model of positive accountability. The research on accountability is diverse and fragmented and research that describes features of the work environment that support positive accountability is particularly scant. However, there are three key themes that emerge from the accountability literature regarding environmental conditions that are critical for generating accountability.

These are described below and together form the foundation that guides the operationalisation of positive accountability in this research (see Figure 3.3).

Expectations. Accountability fundamentally involves an evaluation of whether expectations are met (Frink, 2004; Hall et al., 2003; Lerner & Tetlock, 1999; Tetlock, 1992). However, this evaluation is complicated by a number of factors including who decides the expectations, how reasonable they are, what they encompass (e.g., specific tasks, behaviours, or outcomes), when do they or don't they apply, how do they align with each other, who will evaluate the expectations and when. Because what is expected of employees is becoming increasingly diverse and complex, expectations are a particularly salient issue in modern organisations. This is why authors generally agree that clarity around expectations is critical to accountability (Breux, Munyon, Hochwarter & Ferris 2009; Dose & Klimoski, 1995; Hall et al., 2003; Schlenker, 1994; Tetlock, 1992; Thoms et al., 2002). The logic behind this argument is that an employee cannot be held accountable, or will not feel accountable, for something they are unaware of.

According to Breux (2009) and Tetlock (1991) accountability failures will occur unless three conditions relating to clarity and understanding around expectations are met. The first is that employees know the tasks for which they are answerable; the second is that the behaviours considered acceptable for completion are known; and the third is knowledge of who will evaluate the expectations.

Schlenker et al. (1994) offered a slightly more comprehensive view via their triangle model of accountability. Briefly, they argued that the clarity of expectations, as well as the appropriateness of expectations to an employees' role or identity within the

organisation; and how achievable expectations are, will all affect the extent to which employees feel accountable.

Feedback. Frink and Klimoski (2004) and Hall et al. (2006) argue that in order for accountability to influence behaviour there must be feedback system. According to these researchers feedback serves two primary functions. Appropriately used, feedback provides positive and negative reinforcement to shape behaviour in the desired direction. Secondly, it encourages an ongoing learning and understanding around expectations.

In its most basic form feedback can be used to reinforce desired behaviour and extinguish unwanted behaviour (Skinner, 1938; 1953). However, feedback can be explicit or implicit, and also objective or subjective (Frink & Klimoski, 2004). Within organisations feedback might include performance rewards and remuneration, performance review, informal social exchanges or even non-verbal communications such as body language.

In dynamic modern organisations expectations can take on a degree of complexity because the work environment is more susceptible to change. In this context the role of feedback in deepening and bringing clarity to understanding of the match between expectations and individual performance is given added significance.

Accountability salience. Traditional job design literature presents the degree to which employees feel that their work contributes to the organisation in important ways or impacts others as a key motivator of performance (Hackman & Oldham, 1976; 1980). Several authors argue that these same feelings or perceptions directly

affect an individual's interpretation and experience of accountability (Dose & Klimoski, 1995; Hall, Bowen, Ferris, Todd-Royle & Fitzgibbons, 2007; Hochwarter et al., 2003, Thoms et al., 2002). Hall et al. (2007) refer to this as accountability salience. Salience effectively means that an individual whose work or performance is linked to important or significant outcomes will feel more accountable than those whose work is not perceived to be as important. This reflects the organisational reality that expectations exist on a continuum of importance with those expectations judged to be more important also more likely to be met.

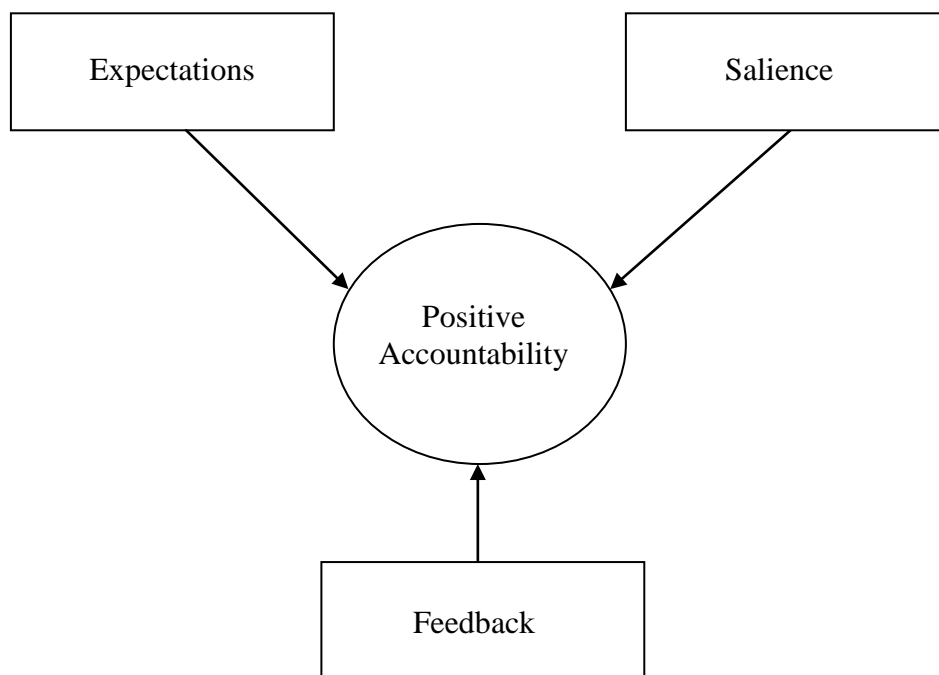


Figure 3.3. Proposed model of work environment characteristics that support positive accountability.

3.1.5 Methodology. In order to achieve the goals described above the research focuses on the quantification of the constructs according to the theoretical

models presented, rather than the further development of theory from an ideographic perspective. As such, the research requires a methodology that enables an examination of the constructs that is well served by quantitative research methods.

In addition, the applied nature of the research context limited the opportunity to explore more qualitative research methods. Specifically, conducting the research was contingent upon the participating organisations gaining access to data from purpose designed survey measures of work engagement and positive accountability. A further restriction due to the applied nature of the research was that it was not possible to collect longitudinal data. All data used in this research is cross-sectional, therefore it is not possible to establish causal relationships.

Item selection. Item design for the measures is guided by the proposed models of work engagement and positive accountability described in Sections 3.1.3 and 3.1.4 with content chosen to reflect conceptual and semantic agreement with the models. Furthermore, item content and the appropriateness of the language and terminology to mining employees was discussed with representatives from the participating organisations. This consultation process supported the face validity of the survey questions and maximised the capacity of the items to capture the relevant concepts with mining samples. However, it is recognised that all items and constructs represent an attempt to describe real world phenomena and are subject to review and reformulation (Reed, 2005). Indeed, the research approach is iterative: it consists of a series of survey studies with each study building upon results of the earlier research. In this way, the item content of the measures of work engagement and positive accountability are refined from study to study.

Methodological approach. The research necessarily uses correlational methods to analyse the data.

There are five potential approaches to quantitative, correlational data analysis that utilise different combinations of: Exploratory Factor Analysis (EFA), regression analysis, Confirmatory Factor Analysis (CFA), and Structural Equation Modeling (SEM) (Dr. A. Keen, personal communication, March 18, 2012). The five approaches are represented below in Figure 3.4. Broadly speaking, EFA and CFA are tools used to identify common ground upon which observations rest while regression and SEM are used to test relationships among constructs. EFA and CFA allow researchers to gauge how well the constructs have been captured and is therefore conducted before testing relationships among constructs.

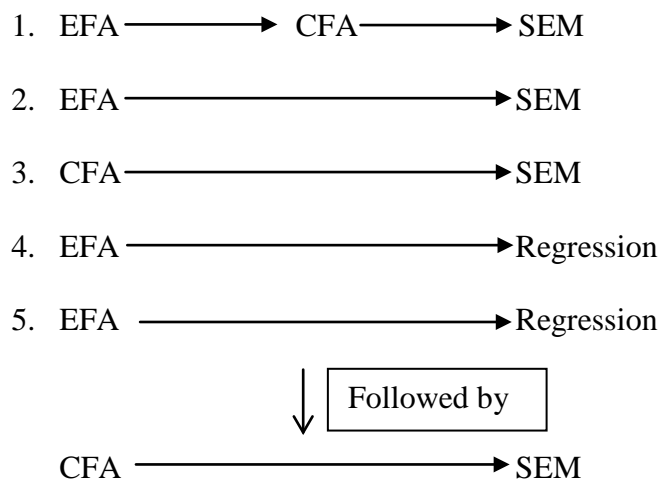


Figure 3.4. Five potential approaches to data analysis.

The goal of EFA is to reduce a large number of variables to a smaller number of factors, to concisely describe (and further understand) the relationships among variables, or to test theory about underlying processes (Tabachnick & Fidel, 2001). For example, the major use of EFA in psychology is the development of objective tests for measurement. The goal of regression analyses is typically to analyse the relationships between a dependent variable and a set of independent or predictor variables (Ho, 2006; Tabachnick & Fidel, 2001).

Simply put, when EFA is combined with regression the analysis is SEM (Tabachnick & Fidel, 2001). SEM is a sophisticated family of techniques that allow questions to be answered that involve multiple regression analyses of factors. SEM consists of two parts: the measurement model and the structural model. The measurement model tests how well the specified observed variables (e.g. items) represent underlying latent variables (i.e. factors). The measurement model of SEM is the CFA. The structural model defines and tests the interrelationships among latent and observed variables e.g. predictive relationships.

SEM differs from EFA and regression analysis in that multiple analysis can be conducted in the same analysis, it also estimates and corrects for measurement error thereby improving statistical estimation. However, the flexibility and versatility of SEM is not without some costs. SEM is associated with greater complexity and ambiguity than are EFA and regression analysis (Tabachnick & Fidel, 2001). Furthermore, because of the flexibility and control it gives to the researcher conducting the analysis it is particularly prone to inappropriately supporting research hypotheses.

There is considerable debate about the use of EFA and regression versus SEM and CFA (e.g., Hurley et al., 1997; Kelloway, 1995; and Schmitt, 2011), but ultimately the methodological approach adopted by a researcher should depend on the goals of the research. The structural model of SEM fundamentally answers the same question as regression analysis, albeit with more flexibility and capability for dealing with more complex analyses. However, EFA and CFA answer different research questions about the data. EFA examines the underlying structure of a set of measures whereas CFA addresses whether a specific hypothesized measurement structure (with both the number of factors and the pattern of item-factor loadings specified) provides an adequate explanation of the co-variance between observed variables (Ho, 2006). In simple terms, with EFA the researcher is asking “what is my data doing?” while with CFA the researcher makes an argument and then asks “how well does my explanation fit the data?”.

Furthermore, SEM (CFA) is theory driven therefore researchers must have a strong justification for the specification of relationships, whereas EFA is theoretically less demanding (Tabachnick & Fidel, 2001). The choice between the two techniques ultimately depends on how much knowledge the researcher is willing to assume about the number of factors and on which factors specific items should, and should not, load (Kelloway 1995). The more constraints the researcher is willing to specify the closer they come to being able to use a confirmatory analysis.

In this research EFA and regression analyses (see Figure 3.4) are the methods predominantly used to answer the research questions. This is because both work engagement and positive accountability are not well defined or theoretically strong

constructs and the EFA and regression approach makes fewer assumptions about their meaning and structure. In addition, the measures of work engagement and positive accountability are developed specifically for this research and misspecification of the number of factors at an early stage of scale development will typically not be detected by CFA (Kelloway, 1995). Moreover, as the measures are in early stages of development it is expected that they will require some modification based on the results of analysis. Measure modification using an EFA approach is appropriate whereas CFA is a confirmatory method hence any modifications render the analysis exploratory. Therefore, the most appropriate approach is to use EFA rather than CFA. However, the EFA approach is supported by CFA of the measures in Appendix J.

3.1.6 Limitations to the methodology: Threats to validity. Because the research is quantitative and cross-sectional the major limitations relate to factors affecting validity. There are four major types of validity that are typically considered in the context of applied, quantitative research: statistical conclusion validity, construct validity, external validity and internal validity (Christensen, 2003). Each type of validity must be considered in applied research however the importance of aspects of each may vary depending on the research questions.

External validity. External validity relates to the generalisation of results across different samples, settings, treatments, outcomes and times (Christensen, 2003). In terms of the present research the external validity may be limited outside of the mining industry as all data came from mining employees. However, analysis was conducted across a large number of participants, across a broad range of

occupational groups within the industry, as well as across multiple organisations and operations. This strongly suggests that the results are likely to be generalisable to other Australian mining populations.

Construct validity. In quantitative research it is never possible to completely and accurately capture phenomena of interest due to the inherent limitations associated with measuring and defining constructs (Edwards & Bagozzi, 2000). Hence, the measures used to represent constructs in the present study were, by definition, limited in their ability to accurately capture the constructs. Both work engagement and positive accountability have not been clearly defined in the research literature. So in order to maximise the construct validity of the measures a broad review of the available literature was drawn upon and integrated in the development of the measures.

Because of the shared control over survey design and content the research relied on measures and items already included in the surveys to measure a range of constructs. While some, (e.g., employee wellbeing and organisational culture) were established measures with available psychometric data, others (e.g., job stress and fatigue-risk) were developed specifically for this research. While the measures all showed adequate internal consistency it is noted that all the measures were used under the assumption that constructs and measures represent an attempt to describe phenomena of interest and as such are subject to review and reformulation. Hence future research would likely benefit from revision and improvement of the measures and/or the use of more established measures.

Internal validity. Internal validity refers to the extent to which accurate inferences can be made about the causal relationships between independent and dependent variables (Christensen, 2003). This research was based on a cross-sectional design which precludes cause-effect relationships being established and automatically allows for lower degrees of internal validity than conclusions drawn on the basis of experimental manipulation of the independent variables. On the other hand, many of the threats to internal validity associated with longitudinal designs (e.g., history and maturation effects) are not present seeing that the study was cross-sectional.

When considering the conclusions drawn from the research it is also recognised that it is possible that relationships between constructs may be due to spurious effects of other variables not included in the analysis. In practical terms it is impossible to include all of the constructs that may influence the dependent variable in studies such as the present one. However, a careful review of the literature did support the inclusion of relevant variables.

Internal validity may also be threatened by differences in those who responded to the survey compared to those who did not, with most psychological experiments having to contend with this source of bias at some time (Christensen, 2003). Several strategies were employed to reduce the problem of non-response. Respondents' anonymity was assured by not requesting any individually identifying information on the survey. And given the very high response rate across all of the studies in this research, non-response bias likely had little effect on the internal validity of the study.

Conclusion validity. Conclusion validity refers to the validity of inferences made about the covariation of the independent and dependent variables (Christensen, 2003). This type of validity involves ensuring adequate sampling procedures, appropriate statistical tests, and reliable measurement procedures. More specifically, Austin, Boyle and Lualhati (1998) argue that it is an integrated evaluation of statistical power, significance testing and effect size.

This research relied on a number of statistical methods, including multiple regression and factor analysis that further rely on certain assumptions about the data as well as a certain sample sizes. Where sample size or data assumptions were an issue it was noted in the relevant chapter and discussed accordingly. For example, in Chapter 6 there was multicollinearity among the organisational culture scales that reduced the sensitivity of regression analysis, and several variables from the study in Chapter 7A displayed skew. However, in general the statistical analysis described in this study met the assumptions about the data and met or exceeded the minimum sample sizes required for the analysis.

Common method variance. Finally, the role of common method variance (CMV) in cross-sectional, self-report studies is recognized as presenting a possible problem in research (Podsakoff, MacKenzie, Lee & Podsakoff, 2003). Common method variance involves the possibility of spurious covariance shared among variables because of the common method used in collecting the data (Buckley, Cote, & Comstock, 1990). This research sought to reduce CMV via the careful design of survey items to avoid ambiguity, vague concepts, using simple, concise items and ensuring participant anonymity (Podsakoff et al., 2003). In addition, the use of

different survey instruments in different survey contexts as well as the magnitude of relationships observed all suggests that CMV was not unduly problematic in the research. It should also be noted here that Dotty and Glick (1998) suggest that while CMV is cause for concern it does not invalidate many research findings.

3.1.7 Context for the research. The research was conducted in the context of the Australian mining industry. The mining industry is vitally important to the Australian economy. It contributed 7.7% of Australia's gross domestic product (GDP) in 2007-2008, and in 2008-2009 accounted for 51.5% of the total value of goods exported from Australia (Australian Bureau of Statistics, 2010). In a report published by the consultancy firm Deloitte (2011) one of the top 10 challenges for the mining industry is attracting and retaining talent because Australia is experiencing a significant labor shortage. Older, skilled workers are beginning to wrap up their careers, but low participation in the last two decades has left a serious gap. Mines are now often flying employees thousands of kilometers and offering extremely attractive employment packages in order to fill the labor shortage. Couple this with the exceptional mobility of today's skilled workers and mining companies are facing a serious challenge.

One of the key recommendations of the Deloitte report is for mining organisations to “get more aggressive about talent retention by better engaging their employees” (p. 9). That is, mining organisations not only need to attract employees but they need to engage and motivate them so they want to stay with the organisation.

At the same time, the labor shortages and increased mobility of employees have significant implications for power relations and accountability within the mining sector. Employees are in a more powerful position than ever to negotiate their role requirements and work arrangements and organisations must adopt a more flexible approach to employees if they are to remain competitive.

In addition, accountability is listed as a core company value on the websites of many of Australia's largest mining organisations including: Rio Tinto, Xstrata, Anglo American, AngloGold Ashanti and Alcoa. Yet accountability is not well understood nor has been previously quantified in the mining industry. There is, therefore, a pressing need to bring clarity to the construct in real world mining organisations and also a need for a practically relevant metric of accountability.

Exploring work engagement and positive accountability in the mining industry offers a particularly unique and practically relevant context for studying the constructs. Indeed, the main participating organisation (see below) expressed specific interest in quantifying engagement and accountability as part of their organisational development program.

Three different organisations participated in the research. Briefly, the first organisation was a large mining organisation that provided access to archival organisational culture survey data as well as allowing the inclusion of purpose designed items in the 2008 organisational culture survey on the provision that they received access to, and feedback on the survey results. Two smaller, independent organisations also allowed inclusion of work engagement and positive accountability items in fatigue and safety –based surveys. They also sought feedback on the survey

results. More detailed descriptions of the organisations and the context for each study are provided in the relevant chapters.

Chapter 4. Archive Data Study - Initial Investigation of Employee Engagement (Based on a Surrogate Gallup Q12 Measure) and an Exploratory Measure of Positive Accountability

This chapter describes an empirical investigation of employee engagement (not work engagement – see below) and positive accountability using archival survey data within the context of the Australian mining industry. The aims of the study were:

- (1) To develop a surrogate measure of employee engagement.
- (2) To develop a surrogate measure of positive accountability, and
- (3) To establish support for further investigation of the constructs within the Australian mining industry.

4.1.1 Work engagement versus employee engagement. Interest in the concept of engagement has grown considerably in the last decade. Its popularity stems from its wide use in the business world. It is frequently talked about in the business literature and is heavily marketed by consultants (Welfand & Downey, 2009). Academic interest has lagged industry interest but it has more recently gained momentum. Differences between the academic (work engagement) and practitioner (employee engagement) approaches to engagement were discussed in the literature review.

Whilst the main focus of the research is on work engagement, this archival study approached engagement from a practitioner perspective (i.e., employee engagement). This was for two reasons. First, the available item bank did not include items relevant to measuring work engagement (i.e., vigor, dedication and absorption)

but did include items similar to those used in the Q12 measure of employee engagement (see Harter et al., 2002). Second, by conducting an initial exploration of employee engagement the research is better placed to compare and contrast work engagement and employee engagement in later study (see Chapter 5).

4.1.2 The Gallup Q12. This study includes a measure of engagement based on the Gallup Q12 (see Harter et al., 2002). A review of the Q12 was provided in Chapter 2 (Section 2.1.4). Briefly, the Gallup Organization conducts the most influential business survey of employee engagement, with the Q12 engagement survey completed by over 5 million employees (Gallup, 2008). Gallup defines engagement as an “individual’s involvement and satisfaction with as well as enthusiasm for work” (Harter et al., 2002) and each of the 12 items in the Q12 measures processes and issues actionable by the workgroup supervisor or manager levels.

4.1.3 Measuring positive accountability. This research conceptualises positive accountability in terms of key characteristics of the work environment that support employee behavior and functioning. Three key characteristics of positive accountability were identified in Section 3.1.4 (see Figure 3.3). This study operationalises the proposed model of accountability using archival data and tests whether positive accountability is indeed linked to positive outcomes e.g. workplace safety.

4.1.4 Workplace safety in the Australian mining industry. Changes in stakeholders and stakeholder values, safety regulations and legislation, social and ethical demands, and the costs associated with workplace accidents have driven the

increasing reliance on workplace safety as an important indicator of organisational performance (Kaminski, 2001; Macik-Frey, Quick, & Nelson, 2007). Safety is a particularly salient issue for mining employees because of the nature of the work and the working environment, that is, work involving heavy machinery and remote and underground locations. Indeed, mining is considered one of the most dangerous occupations (Bayjpayee, Rehak, & Ingram, 2004; Poplin et al., 2008) and has become a highly regulated industry in Australia (see Laurence, 2005).

Therefore, this research considers workplace safety an important performance indicator in the mining industry and one well suited to establishing the practical significance of employee engagement and positive accountability.

4.1.5 Employee engagement and workplace safety. The relationship between employee engagement and workplace safety is yet to be investigated in the context of the mining industry. Given the salience of safety as a performance indicator in mining, the relationship warrants investigation. There is some evidence that engaged workers are also safe workers in other industries. For example, in their meta-analysis of 36 studies (mostly in retail and service organisations) carried out by Gallup, Harter et al. (2002) reported a true score correlation between engagement and safety (measured by lost time/workday rate) of .32. Furthermore, in an extension of that study Harter, Schmidt, Killham and Asplund (2006) reported that business units scoring in the top 50% on the Q12 had a much lower probability of injuries or lost workdays. With the binomial effect size indicating a 78% higher success rate (scores above the median) for the higher engagement group. As such, it is expected that employee engagement will be linked to workplace safety in this study.

4.1.6 Positive accountability and workplace safety. Similarly, few, if any, studies have investigated positive accountability in the context of the mining industry or explored its relationship with workplace safety. This research conceptualises positive accountability in terms of work environment characteristics that support employee performance. Because workplace safety is a widely used and important indicator of performance in the mining industry it is expected that positive accountability will be positively linked to workplace safety.

4.2 Method

The study used archival (collected in 2005) data from an organisational culture survey. The participating organisation conducts organisational culture surveys every 3 to 4 years as part of an ongoing organisational development program. The private consulting firm Human Synergistics was contracted to provide the survey instrument. The Human Synergistics survey package consisted of 126 items relating to organisational effectiveness measured by the organisational effective inventory (OEI); and 96 items relating to organisational culture measured by the organisational culture inventory (OCI). Appendix A provides an overview of the OCI and OEI measures. The survey also included 60 additional items measuring safety culture developed by Smith, Garret and Calvert (2006).

Items from the OEI and safety culture measure were used to build a surrogate measure of employee engagement with construct equivalence to the Gallup Q12 (see Payne, Finch & Tremble, 2003), a measure of positive accountability (as per the proposed model described in Section 3.1.4) and a workplace safety measure.

4.2.1 Participants. The archival data set contained 543 cases from across eleven mining operations and one office site. As discussed below, the final sample used was 516 cases. Of these, 41 were female, 427 were male and 48 did not respond. The majority of respondents (71.5%) were 30-59 years of age. In addition, 89 employees indicated that they had less than 1 year working with the organization, approximately a quarter (133) for 1-6 years, almost half (243) more than 6yrs, and 51 chose not to respond.

4.2.2 Measures. Responses to the OEI items were made on a 5-point Likert scale that ranged from 1 (*not at all likely*) to 5 (*almost certain*) for items phrased as questions, or 1 (*disagree*) to 5 (*agree*) for statement items. The safety culture items were scored on a 5-point response scale from 1 (*strongly disagree*) to 5 (*strongly agree*). See Appendix A for item content of the scales.

E12. Twelve items were taken from the OEI that were considered representative of the items found in the Gallup Q12 measure of employee engagement (see Table A3 in Appendix A for matched items). The process for selecting items for inclusion in the employee engagement (i.e., E12) measure was for the author to match items from the available item bank for meaning with the Q12 measure. Each Q12 item was compared with all of the OEI items and the OEI item that was most similar in meaning to the Q12 item, as judged by the author, was selected as a match.

The Q12 was designed to reflect two broad categories of employee survey items: those measuring attitudinal outcomes (e.g., satisfaction, loyalty, pride, customer service intent, and intent to stay with the company) and those measuring or identifying issues within a manager's control that are antecedents to attitudinal outcomes (Harter et al., 2002). Examples of matched items included "Do you know what is expected of you at work?" (Q12) with "You know exactly what is expected of you at work" (E12); and "Are your associates (fellow employees) committed to doing quality work?" (Q12) with "Employees here are actively involved in improving the organisation and increasing its productivity" (E12). The Q12 is scored on a 6-point scale from strongly disagree to strongly agree and includes a don't

know/does not apply option. As stated above, the E12 items were scored on a 5-point scale (see above for anchors).

The Q12 is reported to have strong internal consistency ($\alpha = .91$) (Harter et al., 2002). The E12 measure also had strong internal consistency ($\alpha = .84$). Harter et al. (2002) also report that upon principal components analysis of the Q12, the ratio of the first eigenvalue to the second was 5.9 times the ratio of the second to the third, suggesting that it is a unidimensional measure. The E12 consisted of 3 factors with eigenvalues over 1. The factors were labeled: organisational engagement (6 items), supervisor engagement (3 items) and job engagement (3 items). The ratio of the first to the second eigenvalue was 1.9 times the ratio of the second to the third. See results section for results of the principal components analysis.

Positive accountability. The measure of positive accountability was developed from the OEI item bank. Items were chosen that most closely aligned with the dimensions of accountability described in the introduction i.e. expectations, feedback and salience. Example items included “You know exactly what is expected of you” (expectations) and “If you perform well you will be praised” (feedback). This scale had appropriate internal consistency ($\alpha = .75$). The scale consisted of four components labeled: expectations (2 items), negative feedback (3 items), positive feedback (3 items) and salience (2 items). Results of the principal components analysis are presented in the results section.

Safety system rating. A 7-item measure of safety system rating was developed from the Safety Culture Questionnaire (SCQ). The SCQ was developed by Smith, Garrett and Calvert (2006) and contains items relating to the organisations

safety system. Example items from the safety system rating scale include: “In general my working conditions enable me to do my job safely” and “I would recommend (organisation) as a safe place to work”. This scale was scored on a 5-point Likert scale that ranged from 1 (*strongly disagree*) to 5 (*strongly agree*) and had strong internal consistency ($\alpha = .89$).

4.2.3 Preparation of the data for analysis. The data was initially inspected to ensure that all scores were within the scale response limits. Twenty-seven cases were removed based on the criteria that they had greater than 20% missing values. Little’s missing completely at random (MCAR) test suggested that the remaining missing cells were not missing completely at random, $p < .001$. However, examination of the separate variance *t*-tests revealed that the data were missing at random (MAR). Under these conditions, Estimation Maximization (EM) was used to impute data for the scale variables as recommended by Tabachnick and Fidel (2001).

4.2.4 Data screening and analysis. The statistical procedures used in the study rely on a number of assumptions about the data. These assumptions include normality, homoscedacity and linearity. Tabachnick and Fidel (2001) recommend assessing normality of variables by both statistical and graphical methods. The univariate skewness values ranged from -1.32 to 0.25 . The univariate kurtosis statistics ranged from -0.60 to 1.78 .

Shapiro-Wilks tests of normality revealed significance levels less than .05 on all but the positive accountability scale. Normal probability plots representing the actual distributions closely followed the diagonal for the study variables except for the expectations subscale of accountability. Examination of frequency histograms

revealed normal distributions for all variables except expectations. Inspection of bivariate scatter plots supported the linearity of the variables. The expectations variable was reversed and log transformed in order to correct its nonnormal distribution as per the recommendations of Tabachnick & Fidel (2001). Analysis was conducted with the transformed and untransformed variable and negligible effects on overall results were observed. As such nontransformed data was used in the study.

Examination of histograms and normal probability plots of residuals calculated through the regression analysis revealed normal distributions. In addition, scatter plots of predicted and residual scores suggested that bivariate linearity and homoscedasticity were appropriate. Inspection of tolerance and Variance Inflation Factor (VIF) statistics did not suggest multicollinearity among the variables for any of the regression analyses. Multivariate outliers were assessed by inspection of Mahalanobis distance statistics. Regression analyses were conducted with and without multivariate outliers and negligible effects on results were observed, hence outlier cases were retained in the final analysis.

Principal components analyses of the E12 and positive accountability measures were conducted using varimax rotation to enhance the interpretability of the factor structure. Multiple regression analysis was then used to examine the relationships between the dimensions of the E12 measure and safety rating, and the dimensions of accountability and safety rating.

4.3 Results

4.3.1 Principal components analysis of the E12. Principal components analysis was used to explore the dimensionality of the E12. The case to variable ratio was 43.8:1 and far exceeded the 5:1 recommended by Tabachnick and Fidel (2001). Examination of the Kaiser-Meyer-Okin (*KMO*) measure of sampling adequacy revealed the data was suitable for factor analysis ($KMO = .86$), and Bartlett's test of sphericity indicated appropriate collinearity among the items $\chi^2(66) = 1751.15, p < .001$. Three components with eigenvalues greater than 1 were revealed by the analysis. Inspection of the scree plot confirmed a three-component solution that cumulatively explained 53.44% of the variance.

Table 1 shows the percentage of variance explained by each component as well as the variable loadings. The item content of each identified component was related to hierarchical levels within the organisation i.e. items loading on the first component referred to organisational level phenomena, items loading on the second component referred to the supervisor level, and items loading on the third component referred to job level phenomena. Hence the components were labelled organisation engagement, supervisor engagement and job engagement. Whilst two of the items cross-loaded across two components, the higher loadings were as would be expected from the interpretation of the structure described above. When cross loading items were dropped from the scale the structure became difficult to interpret, hence all items were retained in the scale.

Table 4.1

Component Loadings and Percentage of Variance Explained for the E12

	Component		
	1	2	3
Eigen value	3.26	1.52	1.35
Variance explained	36.30%	8.67%	8.50%
Organisational Engagement			
When people do not perform up to their potential, action is taken to help them improve	.68		
There is a good match here between the requirements of jobs and the skills/interests of the people assigned to them	.67		
Management holds a widely-shared philosophy that provides employees with a real understanding of what this organisation stand for	.66		
From the time people begin working here, they receive the orientation and training they need to do their best	.60		
Employees here are actively involved in improving the organisation and increasing its productivity	.57		
This organisation shows very little interest in the professional growth and development of its people	.47	.33	
Supervisor Engagement			
When you do your job particularly well, how likely is it that you will be praised		.62	
Your supervisor... willingly listens to your problems		.81	
Your supervisor... pays attention to your opinions		.84	
Job Engagement			
You know exactly what is expected of you			.79
I am expected to do things without the necessary resources (such as equipment, information and/or assistance)	.34		.43
You can count on your co-workers when teamwork is needed			.68

4.3.2 Descriptive statistics and correlations: Employee engagement and

safety. The mean score on the E12 measure was 3.34 ($SD = 0.72$) and the E12 and safety rating were moderately correlated ($r = .50, p < .01$) (see Table 2). There were moderate correlations among the E12 subscales and between the E12 subscales and safety rating. The strongest correlation was between organization engagement and

safety rating ($r = .47, p < .01$), followed by job engagement ($r = .41, p < .01$) and then supervisor engagement ($r = .34, p < .01$).

Employees rated themselves higher on the job engagement subscale ($M = 3.71, SD = 0.82$) than the organisation engagement ($M = 3.27, SD = 0.82$) or supervisor engagement subscales ($M = 3.14, SD = 0.98$). *T*-tests were conducted in order to investigate whether these differences in ratings on the engagement subscales were statistically significant. The results of paired *t*-tests indicated significant differences between: organisation engagement and supervisor engagement, $t(515) = 2.98, p < 0.01$; organization and job engagement, $t(515) = -11.74, p < .01$; and supervisor and job engagement $t(515) = -13.03, p < .01$. In other words, employees reported significantly more positive perceptions of job engagement than both organization engagement and supervisor engagement. They also rated themselves significantly higher on organization engagement than supervisor engagement.

Table 4.2

Descriptive Statistics and Correlations of E12 Factors and Safety Rating

<i>M</i> (<i>SD</i>)	E12	Organisation Engagement	Supervisor Engagement	Job Engagement	Safety Rating
---------------------------	-----	----------------------------	--------------------------	-------------------	------------------

E12	3.34 (0.72)	1				
Organisation Engagement	3.27 (0.82)	.90**	1			
Supervisor Engagement	3.14 (0.98)	.84**	.58**	1		
Job Engagement	3.71 (0.82)	.69**	.47**	.43**	1	
Safety Rating	3.79 (0.73)	.50**	.47**	.34**	.41**	1

Note. * $p < .05$. ** $p < .01$.

To investigate how well each of the E12 subscales predicted safety ratings a standard multiple regression was conducted. The regression results are presented below in Table 4.3. Overall, organisation, supervisor and job engagement accounted for 27.1% of the variance in safety rating, $F(3, 512) = 62.98, p < .01$. However, only organisation engagement and job engagement were significant predictors of safety rating, accounting for 7% and 4% of the unique variance respectively ($p < .01$).

Table 4.3

E12 Regression Analysis Predicting Safety Rating

Variables	<i>B</i>	<i>SE</i>	β	sr^2	R^2
Organisation Engagement	0.29**	0.04	.33	.07	
Supervisor Engagement	0.04	0.04	.05	.00	
Job Engagement	0.21**	0.04	.24	.04	
					.27**

Note. * $p < .05$. ** $p < .01$.

4.3.3 Principal components analysis of the positive accountability

measure. A principal components factor analysis was conducted to explore the dimensionality of the positive accountability measure. The case to variable ratio was

51.6:1. Examination of the *KMO* measure of sampling adequacy revealed the data was suitable for factor analysis (*KMO* = .72), and Bartlett's test of sphericity indicated appropriate collinearity among the items $\chi^2 (45) = 1480.02, p < .01$. Four factors with eigenvalues greater than 1 were revealed by the analysis. Inspection of the scree plot confirmed a four-factor solution that cumulatively explained 71.57% of the variance.

Table 4 shows the percentage of variance explained by each factor as well as the variable loadings. Employees clearly differentiated between items relating to positive and negative feedback. The first component included items that referred to negative feedback while the second component items measured positive feedback. Items loading on the third component related to employee perceptions of how clear they were about what was expected of them i.e. expectations. Finally, items on the fourth component described the extent to which work affected others i.e. accountability salience.

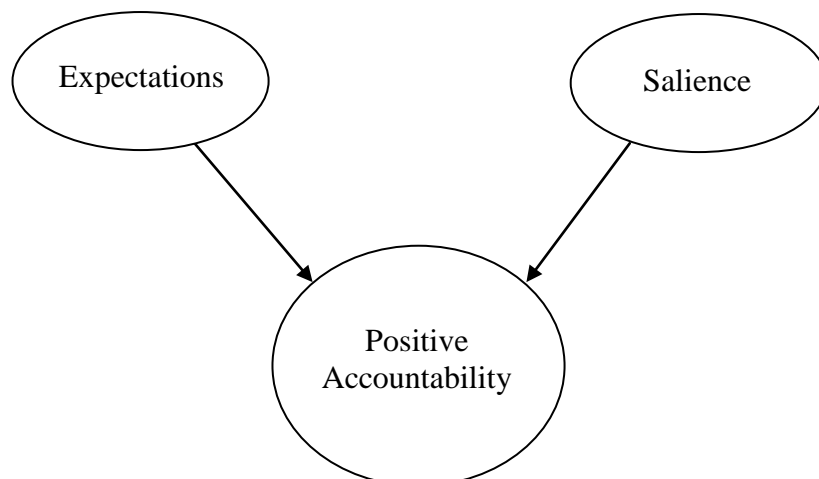
Based on these results the proposed model of accountability was modified to reflect the distinction between positive and negative feedback (see Figure 4.1).

Table 4.4

Results of Principal Components Analysis of the Accountability Measure

	Component			
	1	2	3	4

Eigen value	3.26	1.52	1.35	1.03
Variance explained	32.55%	15.17%	13.54%	10.31 %
<hr/>				
Negative Feedback				
If you perform poorly you will be given less desirable tasks to do	.86			
If you perform poorly you will be punished in some other way	.83			
If you perform poorly your supervisor(s) will openly criticise you	.77			
Positive Feedback				
If you perform well you will be praised		.85		
If you perform well your supervisor(s) will notice good work		.81		
If you perform well you will get a bigger raise or bonus		.68		
Expectations				
You clearly know what's required of you to "fit in" as a member of your department			.85	
You know exactly what is expected of you regarding your job and workgroup			.85	
Salience				
A lot of people can be affected by how well I do my work				.85
My job has a substantial impact on the work or lives of other people				.85
<hr/>				



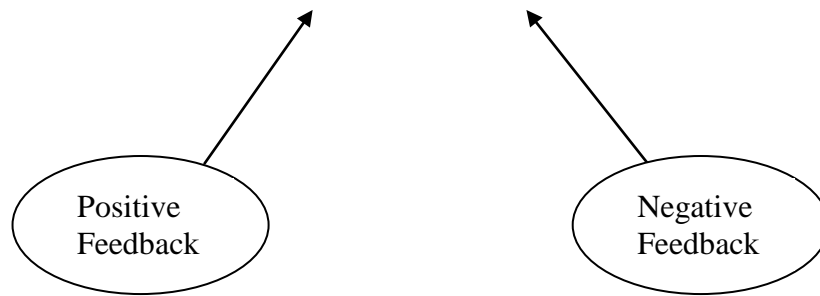


Figure 4.1. Modified model of work environment characteristics that support positive accountability.

4.3.4 Descriptive statistics and correlations: Positive accountability and safety. The means, standard deviations and correlations among the accountability variables and safety rating are presented below in Table 5. Employees reported generally positive perceptions of accountability ($M = 3.48$, $SD = 0.61$). They felt that they were clear about what was required of them ($M = 4.27$, $SD = 0.84$), but they also reported that they received more negative feedback ($M = 3.52$, $SD = 0.94$) than positive feedback ($M = 2.60$, $SD = 0.91$). They also felt that their work was salient ($M = 3.96$, $SD = 0.95$).

Positive accountability and safety ratings were moderately correlated at $r = .43$, $p < .01$. When the subscales of positive accountability were examined, negative feedback shared the strongest correlation with safety rating ($r = .36$, $p < .01$), followed by positive feedback ($r = .30$, $p < .01$) then expectations ($r = .29$, $p < .01$). Accountability salience shared a weak but statistically significant relationship with safety ratings ($r = .15$, $p < .01$).

The correlations among the accountability subscales revealed that positive and negative feedback were moderately related ($r = .41, p < .01$) that salience was not significantly correlated with negative feedback ($r = .07, p > .05$), but was significantly, though weakly, correlated with positive feedback ($r = .20, p < .01$) and expectations ($r = .18, p < .01$).

Table 4.5

Descriptive Statistics and Correlations

	<i>M</i> (<i>SD</i>)	1	2	3	4	5	6
1. Accountability (total scale)	3.48 (0.61)	1					
2. Negative Feedback	3.52 (0.94)	.75**	1				
3. Positive Feedback	2.60 (0.91)	.76**	.41**	1			
4. Expectations	4.27 (0.84)	.56**	.29**	.20**	1		
5. Salience	3.96 (0.95)	.49**	.07	.20**	.18**	1	.
6. Safety Rating	3.79 (0.73)	.43**	.36**	.30**	.29**	.15**	1

Note. * $p < .05$. ** $p < .01$.

Multiple regression analysis was conducted to determine how well positive accountability was able to predict safety rating. Each dimension of positive accountability was entered as independent variables. The regression results are presented in Table 4.6. Overall, positive accountability significantly accounted for 19% of the variance in safety rating, $F(4, 511) = 30.80, p < .001$. Negative feedback, positive feedback and expectations were significant predictors of safety rating accounting for 5%, 2% and 3% of the unique variance, respectively ($p < .01$).

Accountability salience did not account for a statistically significant amount of variance in safety rating.

Table 4.6

Accountability Regression Analysis Predicting Safety Rating

Variables	<i>B</i>	<i>SE</i>	β	sr^2	R^2
Negative Feedback	0.18**	0.04	.23	.05	
Positive Feedback	0.13**	0.04	.16	.02	
Expectations	0.16**	0.04	.18	.03	
Salience	0.05	0.03	.07	.01	
					.19**

Note. * $p < .05$. ** $p < .01$.

4.3.5 Exploratory analysis. In this study supervisor engagement shared a significant correlation with safety rating, however when entered into a regression equation alongside job engagement and organisation engagement it did not add to the prediction of safety rating. This was somewhat surprising given that research has typically found that employee perceptions of their leaders are related to perceptions of workplace safety (Barling, Loughlin & Kelloway, 2002; Hoffman & Morgeson, 1999; Mullen & Kelloway, 2009; Simard & Marchand, 1997). There is also a long history of research that has shown that how employees see their leaders and their relationship with their leaders has a pervasive influence on how they relate to their job and their organisation (Gerstner & Day, 1997; Graen & Uhl-Bien, 1995; Judge, Piccolo & Ilies, 2004; Meyer, Stanley, Herscovitch, & Topolnytsky, 2002).

One explanation for the results above is that supervisor engagement affects safety indirectly through its affects on organisation engagement and job engagement

(see Figure 4.2). To test this hypothesis a multiple-mediation analysis was conducted.

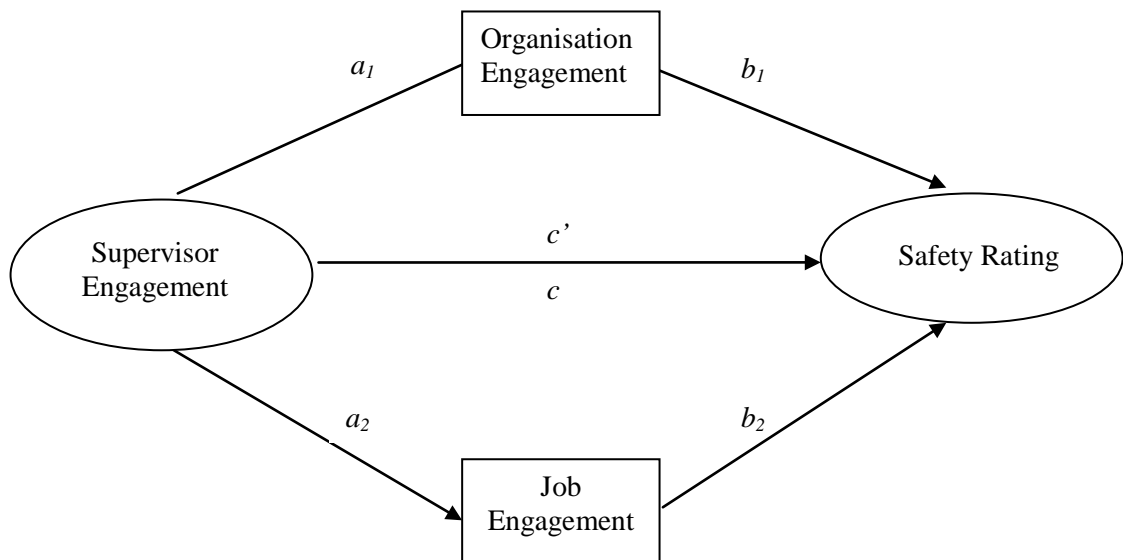


Figure 4.2. Proposed mediation model for the relationship between supervisor engagement and safety rating.

The analysis was conducted in line with the procedure described by Preacher and Hayes (2008). A multiple mediation analysis can do everything that a single mediation analysis can do. However, it also allows for multiple mediators, statistical controls for covariates, and all possible pairwise comparisons between indirect effects. Further, bias-corrected, as well as bias-corrected and accelerated bootstrap confidence intervals (CIs) and the percentile-based bootstrap CIs are also produced. A bootstrapping procedure was used in order to obtain estimates of the indirect effects, as well to test the significance of these effects using confidence intervals. This procedure is recommended as it overcomes problems that may arise from unmet

assumptions of multivariate normality of the paths of the indirect effects, as well as those of total and specific indirect effects (Preacher & Hayes, 2008). An SPSS macro was used (available for download from quantpsy.org) that accompanies the paper by Preacher and Hayes (2008) to conduct the analysis.

The formula $a_1b_1 + a_2b_2$, was used in order to test the total indirect effect associated with the two mediators (organisation engagement and job engagement). The two terms in the formula represent (a) the indirect effect of supervisor engagement on safety rating through organisation engagement; (b) the indirect effect of supervisor engagement on safety rating through job engagement. Three steps were involved in calculating the specific indirect effects (i.e. a_1b_1 , a_2b_2) (see Preacher & Hayes, 2008): 1. Estimates of regression coefficients (a and b) and the indirect effect estimates (ab) were calculated. 2. This process was repeated 1000 times, creating 1000 estimates of the indirect effect of interest. 3. The mean of the 1000 indirect effect estimates was calculated.

The 95% CI of the estimate was examined, and if zero was not included in the interval, it was concluded that the indirect effect was statistically significant (Preacher & Hayes, 2008). Table 4.7 displays the bootstrapped estimates for the total and specific indirect effects. SPSS output from the multiple mediation is also provided in Appendix B.

Together, organisation engagement and job engagement do mediate the effect of supervisor engagement on safety rating. As can be seen in Figure 4.3 the total and direct effects of supervisor engagement on safety rating are 0.27, $p < .001$ and 0.05, $p = .17$, respectively. The difference between the total and direct effects is the total

indirect effect through the mediators, with a point estimate of .22 and a 95% bias-corrected and accelerated (BCa) bootstrap CI of 0.16 to 0.27. Hence we can say that the difference between the total and direct effect of supervisor engagement on safety rating is different from zero. The path coefficients are consistent with the interpretation that greater supervisor engagement leads to greater organisation and job engagement, which in turn leads to more positive perceptions of safety rating.

An examination of the specific indirect effects indicates that both organisation and job engagement are mediators, since both 95% CIs do not contain zero. The pairwise contrast of the indirect effects (C1 in Appendix B) shows that the specific indirect effects are not significantly different from each other with a BCa 95% CI of -0.00 to 0.12.

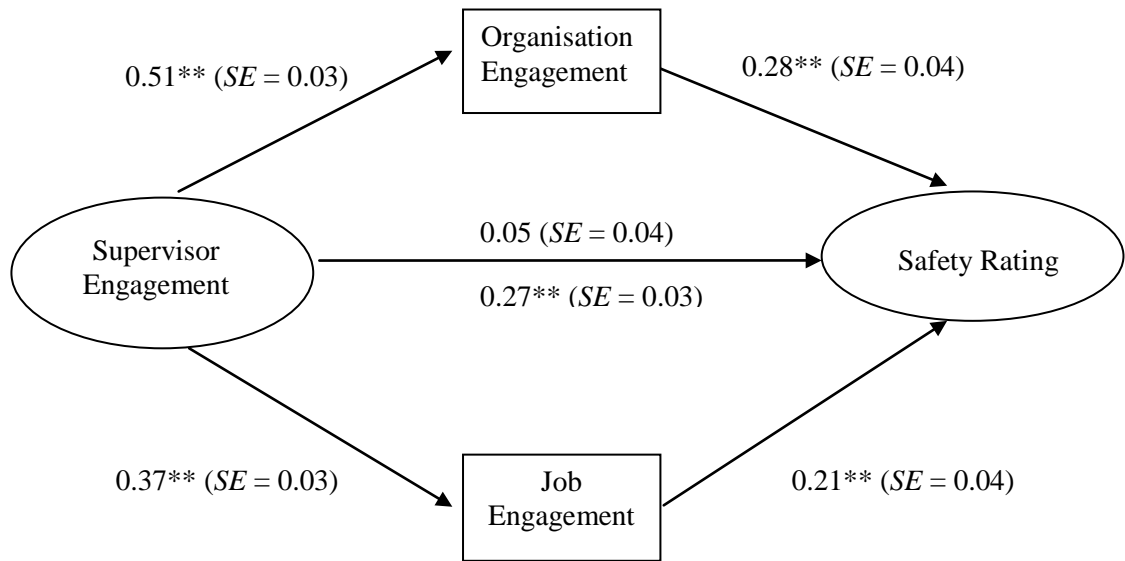


Figure 4.3. The estimated mediation model for the relationship between supervisor engagement and safety rating. ** $p < .01$.

Table 4.7

Indirect Effects of Supervisor Engagement on Safety Rating through Organisation Engagement and Job Engagement

Mediator	Bootstrap Estimate	SE	BCa 95% CI Lower	BCa 95% CI Upper
Organisation Engagement	.14	0.02	0.10	0.19
Job Engagement	.08	0.02	0.05	0.11
Total indirect effect	.22	0.03	0.17	0.28

Note. Based on 1000 bootstrap samples. BCa = biased corrected and accelerated.

4.4 Discussion

In this study empirical measures of employee engagement and positive accountability were developed from archival survey data. Their psychometric properties and predictive relationships with safety ratings were examined. The results suggested that employee engagement and positive accountability are multi-dimensional constructs. Furthermore, they predicted 27% and 19% of the variance in safety ratings, respectively, supporting the practical relevance and continued investigation of the constructs.

4.4.1 Measuring and understanding employee engagement via the E12.

The E12 consisted of three dimensions with employees clearly differentiating between items relating to the organisation, supervisor and job. Whilst it is recognised that the E12 is an approximation of the Q12 in that items were subjectively matched from a limited item pool, this result was somewhat surprising because Harter et al. (2002) described the Q12 as a uni-dimensional scale (on the basis of the ratio of the first eigenvalue to the second being 5.9 times the ratio of the second to the third). It may be that Australian mining employees respond differently to items included in measures such as the E12 or Q12 than the predominantly retail and service sector employees from which Harter et al. based their results.

Despite these differences some support was found for the convergent validity of the E12. That is, previous research has linked the Q12 to measures of workplace safety (Harter et al., 2002) and in this study the E12 was also linked to workplace safety. The E12 will be used in later chapters as a measure of employee engagement and considered representative of practitioner measures such as the Gallup Q12.

This study measured engagement indirectly in terms of how employees perceived different aspects of organisational life i.e. the organisation, the supervisor and the job or work itself. Not surprisingly, it was found that employees felt differently about each of these aspects. The advantage of this measurement approach is the ability to measure a broad range of organisational phenomena that are “actionable” for management. Nonetheless, whilst perceptions of the job, supervisor and organisation have practical utility, they add little value to the understanding of engagement.

Indeed, practitioner approaches to measurement have been criticised as putting old wine in a new bottle (Saks, 2006; Schaufeli & Bakker, 2010) because they add limited value over and above traditional, related concepts such as organisational commitment, job involvement and job satisfaction. In particular, the Gallup Q12 approach taps a general sense of satisfaction with various aspects of work (i.e., job satisfaction) and does not measure the underlying psychological construct of engagement (Schaufeli & Bakker, 2010).

4.4.2 Employee engagement and workplace safety. The results suggest that how employees perceive, or are satisfied with, the organisation, the supervisor and the job (i.e., employee engagement) is related to their perceptions of safety at work. This was not surprising as it is well established employees subjective interpretation of the work situation influences their safety behaviour (Christian, Bradley, Wallace, & Burke, 2009; Cooper, 2000). In this study how employees felt about the organisation explained the most variance in safety ratings followed by how they felt

about the job or work itself. Surprisingly, how they perceived the supervisor was not a significant predictor of safety ratings.

However, further investigation revealed that supervisor engagement affected safety ratings indirectly via its relationships with organisation and job engagement. In other words, the impact of supervisor engagement on safety ratings is constrained to some extent by the way they see the immediate environment (job engagement) and the broader organisational environment (organisation engagement). Due to the exploratory nature of the analysis results it is difficult to draw strong conclusions from the results. Furthermore, although it was specified that supervisor engagement affects job and organisation engagement and these in turn affect safety ratings it is impossible to demonstrate that variables are not changing simultaneously, influencing one another reciprocally, or causing one another in reverse of what was hypothesised. In this context the multiple mediation results should be interpreted with some caution and would require replication in order to make stronger assumptions about the relationships.

4.4.3 Measuring and understanding positive accountability. The results of this study lend support to a multidimensional framework for understanding and measuring positive accountability. However, the results supported a four dimensional model, whereby feedback was separated into positive and negative, over the proposed three dimensional model. A modified model of the work environment characteristics that support positive accountability was presented in Figure 4.1.

Despite the restrictions of working with an archival data set and item bank the measure showed appropriate internal consistency and an interpretable and

meaningful factor structure. However, improvement to the item content to more closely match the theoretical framework is warranted. For example, the measurement of expectations included items relating to the clarity of expectations, whereas research suggests that the achievability and appropriateness of expectations are also important considerations (Schlenker et al., 1994).

One of the key findings was that, in this study, positive accountability was primarily driven by negative feedback (i.e., negative feedback explained the most variance in the data). This result is somewhat counter-intuitive considering this research has argued for a more positive and less conventional approach to understanding accountability. However, research shows that negative feedback is strongly, and positively, linked to employee attitudes and performance when it is contingent on performance as opposed to when it is non-contingent (Podsakoff, Bommer, Podsakoff, & MacKenzie, 2006).

Indeed, contingent negative feedback is positively associated with perceptions of fairness and integrity and with greater role clarity (Farh, Podsakoff & Organ, 1990; Podsakoff et al., 2006). Furthermore, it has been shown that when employees feel they are being treated fairly they are more likely to work towards organisational goals (Konovsky & Pugh, 1994; Moorman, 1991). In terms of our understanding of the work characteristics that support positive accountability and employee performance it might be that negative feedback administered in a performance-contingent fashion speaks to a sense of discipline and integrity of leadership within the organisation.

It is also worth mentioning here that negative feedback may, in fact, be interpreted differently in a work environment where employees have considerable security and bargaining power due to labour shortages. Clearly, further investigation of the role negative feedback plays in different organisational contexts to support positive accountability is warranted.

4.4.4 Positive accountability and workplace safety. For employees in this study positive accountability predicted how they viewed safety in their organisation. The clarity of expectations and positive and negative feedback all explained a significant amount of variance in safety ratings. This was not surprising given that expectations provide boundaries and direction for employees around desired behaviour, while feedback (positive and negative) helps to shape and maintain that direction while also enhancing understanding. However, the perceived importance or salience of the work did not predict safety ratings suggesting that not all work characteristics that support positive accountability also support workplace safety.

It is important to recognise that expectations and feedback are not solely driven by formal job descriptions, performance appraisals and operating procedures but involve leaders engaging employees in an ongoing conversation focused on individual progress towards expectations and effective performance. In this sense the results of this study are consistent with recent trends in the safety literature on exploring the influence of the social context of work on workplace safety over the more traditional focus on workplace design, rules, procedures and compliance (see Hoffman & Morgeson, 1999; Neal, Griffin & Hart, 2000).

4.4.5 Conclusions. In this study both employee engagement and positive accountability were measured in terms of employee perceptions of the work environment. This measurement approach fits well with how positive accountability is conceptualised in this research (i.e., as embedded within the formal and informal work environment), and was meaningful, practically relevant and offered fresh insights into how organisations shape and guide employee behavior in a world of more flexible boundaries. However, the main focus of this research is with engagement conceptualised as a motivational state of work engagement. As this archive data study has shown, treating engagement as a feature of the work environment highlights practically relevant and widely studied work domains (i.e., organisation, supervisor and job), but adds little that is new. Indeed, the results support the argument that such an approach is little more than old wine in new bottles.

Chapter 5: Exploring Work Engagement

This study describes an investigation of work engagement within the Australian mining industry. The aims of the study were:

- (1) To develop and examine the psychometric properties of the Work Engagement Scale (WES) - a measure of work engagement that was specifically designed for this study. In designing the measure, question items that related to a sense of vigor, dedication, and a sense of absorption were used (see Figure 3.2).
- (2) To compare and contrast an academic perspective (WES) and practitioner perspective (E12) measure of engagement.
- (3) To explore the relationships of the WES with other work-related variables that were available through the organisational survey (OEI).
- (4) To explore, through a short series of questions added specifically for this purpose, the value of measuring engagement in different roles (e.g. engagement with the team and the organisation).
- (5) To explore engagement within different hierarchical sub-groups.

5.1.1 Developing an alternative measure of work engagement. The UWES is the most widely used measure of work engagement in the academic literature. Indeed, 83% of the work engagement articles in PsycINFO use this scale (Schaufeli & Salanova, 2011). However, Parker and Griffin (2011) and Schaufeli and Salanova (2011) argue that research relies too heavily on the UWES with the risk that work engagement is defined operationally rather than conceptually. The few alternatives to the UWES were described in Section 2.1.4, but these measures were developed within different conceptual frameworks to the UWES and have had limited

application. This study shares the conceptual framework that underpins the UWES: of work engagement as a unique motivational state, characterised by vigor, dedication and absorption, but takes the opportunity to develop an alternative measure of work engagement for use with resources sector and other heavy industry employees.

5.1.2 Practitioner (E12) versus academic (WES) approach to engagement. The different conceptual and measurement approaches to engagement that academics and practitioners adopt were discussed in Chapter 2 (see Sections 2.1.1 and 2.1.4). Briefly, practitioners adopt diverse conceptual and measurement approaches to engagement but the most widely used is that of Gallup who measures engagement in terms of features of the working environment using the Q12. Measures like the Q12 continue in the tradition of measures like the Job Descriptive Index (JDI; Smith, Kendall & Hulin, 1969), a widely used measure of job satisfaction, by asking employees about a range of working conditions. Indeed, Harter et al. (2002) describe the Q12 as a measure of employee satisfaction-engagement.

Academics (for the most part) understand engagement as a motivational state characterised by vigor, dedication and absorption, and measure it directly in terms of work engagement (see Schaufeli & Bakker, 2010). Whilst it is clear that the two measurement approaches are quite different, it is not known how, or if, they are related. Indeed, Welfand and Downey (2009) noted that they were unable to find any published research that directly compares the two types of measures and argue that

there is a need to more fully understand how the two measures (constructs) are connected.

5.1.3 Engagement in different work roles. The major focus of this research is on work engagement as a persistent and pervasive motivational state. This is the most widely adopted view by academics (see Bakker & Demerouti, 2008; Bakker et al., 2011; Schaufeli & Bakker, 2010). However, Kahns (1990; 1992) original conceptualisation of engagement was concerned with employees' identification with their work roles and specific moments and situations of engagement or disengagement in role performances. Under this view an employee can be highly engaged in their role as an employee of the organisation but at the same time disengaged from their role as a subordinate or team member.

Based on Kahn's understanding of engagement Rothbard (2001) argued that employees must indeed engage in multiple roles to fulfil job expectations. She investigated the interplay between employee engagement in work and family roles showing that the linkages were quite different for women than men. More recently, Saks (2006) examined the antecedents and consequences associated with engagement with the job and engagement with the organisation. He found some support for conceptual distinctness between job and organisation engagement because they shared different patterns of relationships with other work variables.

This study will explore role engagement. However, there are a plethora of different roles that employees may be engaged with. This study focuses on four roles: the job role (i.e., engaged with the job), the team-member role (i.e., engaged with the team), the subordinate role (i.e., engaged with the supervisor) and the

organisation member role (i.e., engaged with the organisation). This choice enables the research to replicate and extend the findings of Saks (2006) and also to remain applicable to a large proportion of employees, therefore aiding the generalisability of the results.

5.1.4 Engagement for different employee groups. An examination of the engagement literature reveals that engagement has been studied across diverse working populations and in a number of different industries and countries. Some studies utilise samples from within the one organisation, while others utilise more heterogeneous samples from a variety of industries and organisations. Examination of research results also reveals that there is considerable diversity, and sometimes contradictions, in findings. For example, Schaufeli et al. (2008) reported that supervisory support did not predict work engagement in sample ($N=854$) of middle managers from a telecom company. However, Hakanen, Bakker and Schaufeli (2006) found that supervisor support did predict work engagement in a large sample ($N=2038$) of school teachers. One explanation is that these contrasting results were a function of sample differences. However, there are few, if any, studies that have examined engagement across different employee groups.

Among all possible grouping categories that can exist within organisations, hierarchical level is the most salient and visible (Mintzberg, 1983). Many studies analyse the upper and lower levels (typically classified as blue collar and white collar) of organisational hierarchy separately in order to gain insight into a range of organisational constructs such as organisational commitment (Cohen, 1992), job satisfaction (Hu, Kaplan & Dalal, 2009; Tierney & Farmer, 2002) and self-efficacy

(Pousette & Hanse, 2002). As has been shown with job satisfaction, blue and white collar employees not only experience the work environment differently (e.g., perform different tasks and have different levels of control/autonomy), but they also perceive it in qualitatively different ways as well (Hu et al., 2009).

The traditional blue collar/white collar distinction is becoming less relevant as job boundaries blur due to the changing landscape of work e.g. increasing trends for flatter organisational structures, self-directed teams, shared leadership and moves from production to service economies. However, in production-based industries such as mining, the blue collar/white collar distinction is still quite salient and visible. This study explores work engagement across blue and white collar employees in the mining industry.

5.1.5 Antecedents to engagement. The exploration and identification of workplace factors that predict engagement has featured heavily in the engagement literature. This is not surprising given the direct practical implications of an improved understanding of the factors likely to generate work engagement. In addition, this research approach has theoretical utility because it enhances the understanding of the work engagement.

Often, studies of antecedents to work engagement are framed in terms of the Job Demands-Resources (JD-R) model (for examples see Llorens et al., 2007; Mauno et al., 2007; Schaufeli & Bakker, 2004). The JD-R model was described in Section 2.1.2. Briefly, the model argues that the characteristics of the work environment can be divided into job resources and job demands. Job demands are aspects of the job that require physical or psychological effort from an employee or

result in physical or psychological costs. Job resources are aspects of the job that contribute to achieving work goals, and reduce the impact of job demands and the costs associated with them. Furthermore, job resources act as motivational factors (see Bakker & Demerouti, 2008).

Research has identified a range of job resources that are potential causes of work engagement. These include: supervisor support (Bakker, Hakanen, Demerouti & Xanthopoulou, 2007; Hakanen et al., 2006), relationship with coworkers (Schaufeli et al., 2008), perceived organisational support (POS) (Rich et al., 2010), appreciation (Bakker et al., 2007) and job design variables (Van den Broek, Vansteenkiste, Witte & Lens, 2008). However, as was pointed out above, not all job resources predict work engagement for all employees.

This study continues in the tradition of exploring the workplace factors that predict work engagement. It includes previously studied job resources such as supervisor support and perceived organisational support so that the results of this research can be compared with those of previous studies while also enabling an evaluation of the convergent validity of the WES. It also includes previously unexplored workplace factors such as fairness, rewards and opportunities for training/development. This is for three reasons. First, it enables a test of the JD-R model in that these workplace factors can be considered job resources (i.e., aspects of the job that contribute to achieving work goals, and reduce the impact of job demands and the costs associated with them) and therefore, according to the JD-R model, should predict work engagement. Second, by exploring work engagements relationships with other variables a better understanding of the construct can be

developed. Finally, the identification of workplace factors that predict work engagement has direct practical relevance to organisations wanting to engage their workforce.

5.2 Method

5.2.1 Background/context of the research. The research was made possible via an opportunity to work collaboratively with a HRM team responsible for the conduct of an organisation wide culture survey within the QLD mining sector. This survey was the next to be conducted following the 2005 survey that was described in Chapter 4. The main survey package included the organisational culture inventory (OCI) and organisational effectiveness inventory (OEI) (see Appendix A).

The HRM team indicated that the organisation was specifically interested in work engagement and accountability as these were regarded as core company values but were not well understood and had not been previously quantified. They were aware that there were many practitioner measures of engagement available to them, but were interested in approaching engagement from a more rigorous perspective. They also indicated a desire to be involved in the development of a custom built measure that would have relevance to their organisation.

The HRM team agreed that, in addition to access to the data collected as part of their main survey package, approximately 40 additional questions could be included to focus specifically on work engagement and positive accountability, and to identify sufficient demographic information to allow exploration of subgroups relevant to the research. It was also agreed that a measure of safety culture (see Smith et al., 2006) would also be included in the survey, as it had been in earlier surveys of the organisation.

To assist the reader a copy of the full survey is attached in Appendix C. To make best use of the opportunity and to build forwards from the analysis of the

earlier organisational survey data within survey length constraints, items from the OCI survey were included, where possible, in the study scales (see details below).

5.2.2 Sample. The participating organisation was spread geographically over 19 different locations around metropolitan, regional and rural Queensland. These included a central office, regional offices, a supply facility, and industry and transport associated sites. A total of 2867 employees completed the survey out of 3000 surveys that were sent out representing an overall response rate of 95.6%. However, the data used for this study consisted of two subsets (i.e., blue collar and white collar employees) of the total survey data so that the specific research questions could be addressed using statistically appropriate sample sizes (Tabachnick & Fidel, 2001).

Blue and White Collar Categorisation. Inclusion of employees in the blue collar and white collar subsamples was dependent on consideration of the structure of the participating organisation and an understanding of the roles and responsibilities associated with particular job titles. Employees who were categorised as blue collar indicated that they worked in trades and front-line operational roles. Both of these roles were considered at the bottom end of the hierarchy within the organisation, and the mining industry. Because a large proportion of the sample indicated that they worked in trade and operational roles it was possible to identify a subset of the total blue collar sample from a single site that was of comparable size to the white collar sample, and of appropriate size for use in the study (see below).

Employees who were categorised as white collar indicated that they worked in the following roles: vice president, general manager, site senior executive,

manager, superintendent, supervisor, and professional. Employees in these roles received higher pay than tradesmen or operators and generally experienced greater autonomy and influence at work. There were very few female employees (5 blue collar and 20 white collar) in the sample. They were excluded from the analysis in order to retain more homogenous samples.

The use of the above categorization strategy was also practical in that it allowed the use of two similar sized subsamples from the total sample and avoided spurious results due to large sample sizes (Tabachnick & Fidel, 2001). In addition, it enabled remaining data to be utilised for other analysis (see Chapter 7C and D). The blue collar sample consisted of 484 male employees and the white collar sample consisted of 525 male employees. More detailed demographic characteristics are presented in the results section.

5.2.3 Procedure. The survey was the fourth in a series of organisational culture surveys conducted every 3 to 4 years by the participating organisation. There was already an established process in place for the distribution, administration and collection of surveys. Human resource officers at each location were briefed on the administration process. These officers took employees in groups of approximately 20 during their shift and asked them to complete the survey. Employees were advised that participation was completely voluntary and that they could withdraw at any time without penalty. The survey took approximately 1hr to complete. Completed surveys were returned via post to Human Synergistics offices where OCI, OEI and the additional surveys were coded to enable linkage of data. Human synergistic carried out the data entry for their own surveys and then forwarded additional surveys and

OCI and OEI data to the University. Additional survey data was then aligned with OEI/OCI data.

5.2.4 Scale development. This study included a purpose built scale measure of work engagement (i.e., the WES), the E12 (see Chapter 4), a series of single-item measures of role engagement and nine job resource variables that were used as independent variables to predict work engagement. Appendix D provides the item content for all of the study measures and Section 3.1.5 explains how items were designed to reflect the conceptual model of work engagement.

Selection of job resource variables was based on consideration of variables identified by previous research including: supervisor support, POS, relationship with coworkers, and job characteristics). In addition, variables were selected that were classified as job resources because they contribute to achieving work goals and/or reduce the impact of job demands. These were: reward/recognition, training/development opportunities, fairness, role clarity, and organisational mission clarity.

5.2.5 Measures. Responses to the items were made on a 5-point Likert scale that ranged from 1 (*not at all likely*) to 5 (*almost certain*) for items phrased as questions, or 1 (*disagree*) to 5 (*agree*) for statement items. Cronbach's alpha was calculated separately for the blue and white collar samples.

Reward/recognition. Items taken from the OEI to reflect reward and recognition included “In your department, when you do your job particularly well, how likely is it that you will be praised?” and “In your department, when you do your job particularly well, how likely is it that you will get a bigger raise or bonus.

This scale contained four items and was more internally consistent in the white collar data ($\alpha = .75$) than blue collar data ($\alpha = .65$).

Fairness. Items taken from the OEI to reflect fairness and justice included the item “When a position needs to be filled in this organisation, the best person for the job is the one who gets it”. The scale included four items with similar internal consistency in the blue collar ($\alpha = .79$) and white collar ($\alpha = .80$) samples.

Supervisor support. Two items were designed for this study to measure the employee-supervisor relationship. These were: “My supervisor values my work” and “My supervisor takes a genuine interest in my well-being”. Four additional items were taken from the OEI that also described an employees’ relationship with their supervisor. Example items are “Your supervisor pays attention to your opinions?” and “Your supervisor willingly listens to your problems?” The six item scale had strong internal consistency in the blue collar ($\alpha = .88$) and white collar ($\alpha = .89$) data.

Relationship with coworkers. Two items designed to measure an employees’ relationship with their coworkers were included in the survey. These were: “I trust my coworkers” and “I have good relationships with my coworkers”. Four additional items were also selected from the OEI. These included: “The people you work with are helpful to you in getting the job done” and “You can count on your coworkers when teamwork is needed”. This total six item scale was sufficiently internally consistent in the blue collar ($\alpha = .69$) and white collar data ($\alpha = .76$).

POS. Two items were included to measure POS. These were: “The organisation takes a genuine interest in my well-being” and “The organisation values

my work”. Three additional items were selected from the OEI including: “From the time people begin working here, they receive the orientation and training they need to do their best” and “All members of the organisation are treated with respect and dignity”. The 5 item scale had appropriate internal consistency in the blue collar ($\alpha = .76$) and white collar ($\alpha = .80$) data.

Job characteristics. The five job characteristics: autonomy, task identity, skill variety, task significance, and feedback first described by Hackman and Oldham (1976), were measured with items selected from the OEI. For example, skill variety was measured with the item “I get a lot of different things to do in my job” and the item “My job has a substantial impact on the work or lives of other people” was used to measure task significance. The total scale included 13 items that were more internally consistent in the blue collar ($\alpha = .70$) data than the white collar ($\alpha = .65$) data. In the post hoc analysis the five job characteristics are entered separately as IVs in regression analyses. The item content and Cronbach’s alphas for the subscales are presented in Appendix D.

Training and development. Items were taken from both the OEI and safety climate questionnaire to measure employee perceptions of the training they receive and opportunities for professional development. Items included “People receive the orientation and training they need to do their best” and “This organisation shows very little interest in the professional growth and development of its people” (reversed item). The five item scale was more internally consistent in the white collar data ($\alpha = .74$) than the blue collar data ($\alpha = .68$).

Role clarity. Three items were selected from the OEI to measure employee perceptions of role clarity. An example item was “You know exactly what is expected of you”. The scale had similar internal consistency in the blue collar ($\alpha = .68$) and white collar ($\alpha = .70$) samples.

Organisational mission clarity. The articulation of organisational mission represents the mechanism by which organisations explicitly communicate their values and the direction of the organisation to employees. Three items from the OEI were used to measure a sense of purpose and clarity around the direction of the organisation. An example item was “The objectives and priorities of this organisation are clear and well understood by all members”. The scale was internally consistent in the blue ($\alpha = .77$) and white ($\alpha = .78$) collar samples.

WES. Six items were used to measure work engagement. The items related to each dimension of engagement identified in the theoretical model, that is, vigor, dedication, and absorption. Section 3.1.5 explains how items were designed to reflect the conceptual model of work engagement. For example, the dedication dimension of work engagement is referred to as a strong sense of psychological involvement in work, as well as a sense of inspiration, significance, pride, enthusiasm and challenge (Schaufeli & Bakker, 2010). The item “I’m proud of the work I do” was designed to capture the concept of dedication as it directly refers to a sense of pride. The full list of items and the rationale for the design of each item is presented below in Table 5.1.

Table 5.1

Rationale for the design of each of the WES items

Dimension	WES Item	Rationale
Vigor:	I avoid working too hard at work (r)	Designed to measure an employee's willingness to invest effort and level of energy at work
<ul style="list-style-type: none"> • Energy • Mental resilience • Willingness to invest effort • Persistence 	I get a buzz out of my work	Designed to measure the energy (or "buzz") an employee feels at work
Dedication:	I put my heart into my job	Designed to measure an employee's psychological involvement with work
<ul style="list-style-type: none"> • Inspiration • Pride • Enthusiasm • Challenge 	I'm proud of the work I do	Designed to measure the pride aspect of dedication
Absorption:	I can get so into my work that I forget everything else	Designed to measure the extent to which an employee is engrossed/immersed in their work and concentration
<ul style="list-style-type: none"> • Engrossed in work • High levels of concentration • Immersed in work 	Time seems to fly when I'm working	Designed to measure the extent to which an employee is engrossed/immersed in their work and concentration

The six item scale was internally consistent in the blue ($\alpha = .71$) and white ($\alpha = .72$) collar samples. While three dimensions of WES were able to be identified in this study (see Section 5.3.4) the results did not support the use of individual subscales because: (a) the number of items per dimension was limited, particularly

vigor (1 item); (b) the analysis had to be manually set to detect three components (there were not 3 eigenvalues over 1); and (c) the cross loading of items.

Single item measures of role engagement. While it is often assumed that multiple indicators are necessary to measure variability in latent constructs, Nagy (2002) and Wanous, Reichers & Hudy (1997) provide some support for the use of single item measures, particularly with unambiguous constructs such as job satisfaction. Engagement is generally viewed and measured as a multidimensional construct. However, the study was limited by survey length constraints. As such, single item measures were used to measure the strength of engagement in different work roles. These were considered general or indicative measures that might lack the sensitivity of a multi item measure but were sufficiently sensitive to allow comparisons among the measures. Engagement has been criticised as generally not being well defined in the literature (Schaufeli & Bakker, 2010). To overcome some of this ambiguity a concise definition was provided to guide participants in their responses to the single item measures (see below).

Four items were included that asked participants about their level of engagement with: the organisation, the supervisor, the team, and the job. Items were scored on a 5 point Likert scale from 1 (*not at all*) to 5 (*strongly*). Participants were provided with the following definition of engagement “People who are engaged are enthusiastic about the things they are engaged with – not indifferent to or disconnected from them”.

E12. The development of the E12 was described in Chapter 2. Briefly, it includes 12 items selected from the OEI, matched to items from the Gallup Q12. The

E12 was found to be multi-dimensional with items relating to the job, supervisor and organisation forming distinct dimensions. In this study only the total scale was utilised as sub-scales were not required to answer the research question. The internal consistency of the scale was similar in the blue ($\alpha = .83$) and white ($\alpha = .87$) collar data to that reported in chapter 4 ($\alpha = .84$).

Job satisfaction. Four items from the OEI were used to measure job satisfaction. An example item was “You are satisfied being a member of this organisation”. The scale was internally consistent in the blue collar ($\alpha = .81$) and white collar ($\alpha = .82$) data and consistent with the findings of Human Synergistics (2001) ($\alpha = .82$).

5.2.6 Data screening. The data was initially inspected to ensure that all scores were within the scale response limits. Fifty two cases were removed from the total blue and white collar sample based on the criteria that they had greater than 20% missing values. SPSS missing values analysis indicated that there were no variables with greater than 5% missing data (the highest was 1.5%). Little’s MCAR test ($\chi^2 = 16036.2$ $df = 14340$, $p < .001$) indicated that the data was not missing completely at random. However due to the very small proportion of missing data the missing values were assumed to be missing at random. Under these conditions EM was used to impute data for the scale variables as recommended by Tabachnick and Fidel (2001).

The statistical procedures used in the study rely on a number of assumptions about the data. These assumptions include normality, homoscedacity and linearity. Tabachnick and Fidel (2001) recommend assessing normality of variables by both

statistical and graphical methods, however they note that in larger samples such as in the present study graphical methods are more reliable than formal inference tests.

The univariate skewness values ranged from – 1.07 to 0.20 and the univariate kurtosis values ranged from –0.56 to 1.57 in the blue collar data. The univariate skewness values ranged from – 1.24 to - 0.24 and kurtosis values ranged from – 0.46 to 2.05 in the white collar data.

Shapiro-Wilk tests of normality revealed significance levels less than 0.01, however normal probability plots representing the actual distribution closely followed the diagonal for variables in both sets of data. Examination of frequency histograms revealed relatively normal distributions and inspection of bivariate scatter plots supported the linearity of the variables across both samples on all variables except for engagement with the job and role clarity. Based on the above findings the majority of the variables were assumed to have normal distributions. However, for both samples the engagement with the job and role clarity displayed the greatest departures from normality. Any analysis involving these variables was carried out using both transformed (square-root, logarithmic and inverse) and untransformed data as per the recommendations of Tabachnick and Fidel (2001) for variables with negative skew. There was negligible impact on overall results hence untransformed data was retained for use in the final analysis.

Examination of histograms and normal probability plots of residuals calculated through the regression analysis revealed normal distributions. Scatter plots of predicted and residual scores suggested that bivariate linearity and homoscedasticity were appropriate. In addition, inspection VIF statistics did not

suggest multicollinearity among the variables for any of the regression analyses with all VIF statistics less than 3, which is well below the cut-off of 10 recommended by Pallant (2007). Multivariate outliers were identified via examination of casewise diagnostics, Mahalanobis distance, Cook's distance and leverage values.

Regressions were conducted with and without multivariate outliers to determine whether these cases unduly influenced the regression results. Negligible affects on overall results were observed and all multivariate outliers were retained in the final analysis.

5.3 Results

A brief overview of the organisation of the results is provided below.

- Demographic characteristics of the samples, descriptive statistics, and between-group differences on the engagement measures;
- Correlations between the WES, E12, single item measures of role engagement and job satisfaction;
- Paired sample *t*-tests exploring the differences between engagement in different roles;
- Analysis of the structure of the WES;
- Correlations between job resources and work engagement (i.e., WES);
- Regression analysis: Job resources predicting work engagement;
- Post hoc analysis: Job design variables predicting work engagement.

Note that all analysis was conducted separately for blue collar and white collar employees except where they were directly compared (i.e., *t*-tests of differences in mean scores on the engagement measures).

5.3.1 Demographics, descriptive statistics and between group differences.

The demographic and descriptive statistics for the blue collar ($N = 484$) and white collar ($N = 525$) samples are presented below. Figure 5.1 shows the age groupings of the blue collar and white collar samples. For both groups over half (53.8% of blue collar and 65.4% of white collar employees) of employees were between 30 and 50 years. However, inspection of the graph indicates that a higher proportion of the blue

collar sample (23.7%) compared to the white collar sample (12.5%) were in the 20 - 29 year age group. There were no white collar employees under 20 years of age.

Figure 5.2 shows that approximately 25% of each sample had been with the organisation for more than 15 years, and approximately 25% of each sample had been with the organisation between 2 and 4 years.

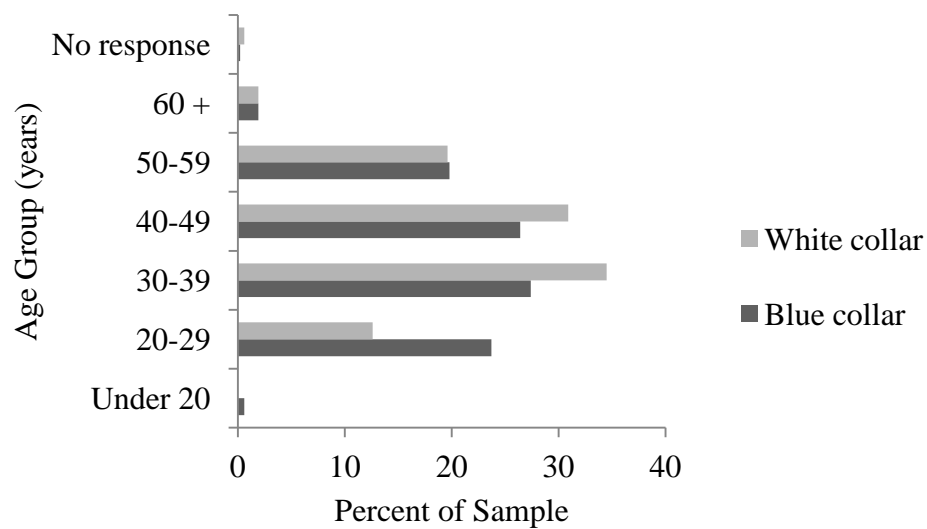


Figure 5.1. Age (years) groupings of the blue collar and white collar samples.

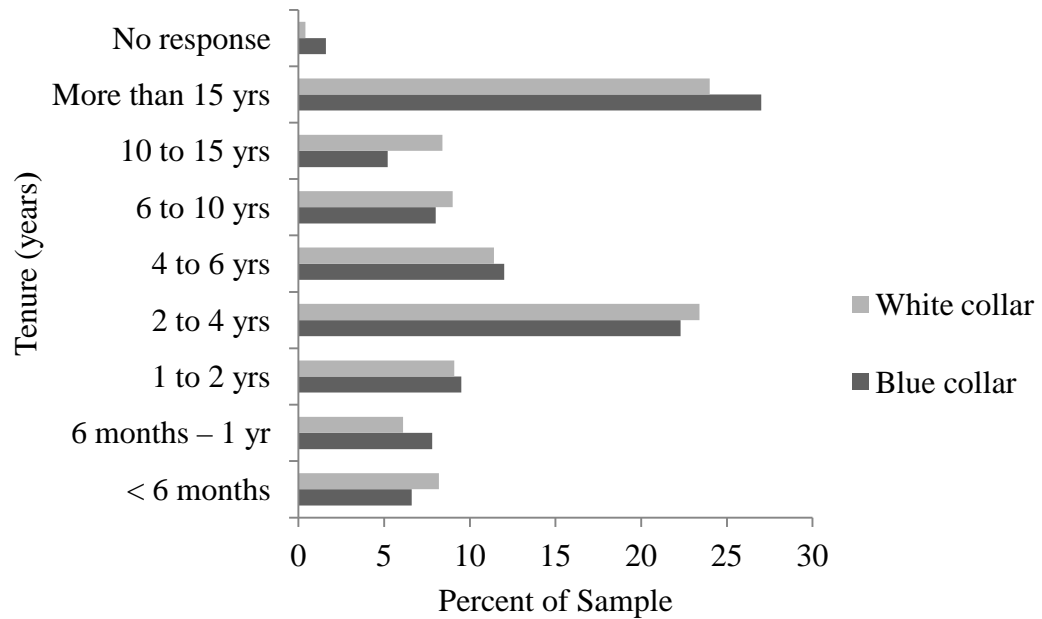


Figure 5.2. Tenure (years) groupings of the blue collar and white collar samples.

Descriptive statistics are presented in Table 5.2. Scale scores were calculated by averaging the item scores for that scale. Hence all scale scores have a possible maximum of 5 and minimum of 1 with higher scores indicating a more positive response to that scale. The highest mean scores for blue collar employees were on engagement with the job ($M = 4.10$, $SD = 0.86$), role clarity ($M = 4.05$, $SD = 0.82$), and engagement with the team ($M = 4.05$, $SD = 0.88$). The lowest mean score was on reward/recognition ($M = 2.39$, $SD = 0.77$). This suggests that blue collar workers felt less positive about receiving appropriate recognition and reward at work, but generally felt engaged in the job and team roles and felt a sense of clarity around the requirements of the job.

For white collar workers the highest mean score was on the WES ($M = 4.25$, $SD = 0.61$) followed by engagement with the job ($M = 4.21$, $SD = 0.84$) suggesting that white collar workers were primarily engaged through the job itself. Similar to their blue collar colleagues the lowest mean score for white collar employees was on the reward/recognition variable ($M = 3.03$, $SD = 0.85$). In addition, white collar employees gave more positive responses on all of the study variables, suggesting that overall they felt more positive about work.

For both blue and white collar employees the level of engagement decreased as a function of distance from the job, that is, they reported being more engaged with their job than their team, more engaged with their team than their supervisor, and more engaged with their supervisor than the organisation (see paired t -tests in Table 5.3). It is possible that the extent to which an employee is engaged with the job impacts on their engagement with other roles. If this were the case then it could be expected that there would be few employees who reported low job engagement but high team, supervisor or organisation engagement compared to employees who reported high job engagement but low team, supervisor or organisation engagement. The distributions of blue collar and white collar employee responses on the job engagement versus organisation engagement items were examined to see whether this was the case. Figures 5.3 and 5.4 shows these distributions with all midrange responses removed so that only the employees with the highest and lowest scores are presented. As can be seen, a large proportion of employees ($N = 168$ blue collar and $N = 308$ white collar) reported high engagement with the job and organisation. Also, there were a considerably higher proportion of employees who reported high job

engagement but low organisation engagement than those who reported low job engagement but high organisation engagement. Interestingly, this ratio was much higher for blue collar employees (68:1) than for white collar employees (10.3:1).

Table 5.2

Means and Standard Deviations on the Study Variables for Blue Collar and White Collar Employees

Variable	Blue Collar	White Collar
	<i>M (SD)</i>	<i>M (SD)</i>
Reward	2.39 (0.77)	3.03 (0.85)
Fairness	2.66 (0.92)	3.50 (0.91)
Relationship Coworkers	3.96 (0.71)	4.08 (0.68)
Supervisor support	3.59 (0.89)	3.69 (0.87)
POS	3.18 (0.91)	3.67 (0.84)
Job Characteristics	3.70 (0.77)	4.13 (0.64)
Training/Development	3.07 (0.74)	3.41 (0.77)
Role Clarity	4.05 (0.82)	4.18 (0.82)
Organisational Mission	3.36 (0.94)	3.72 (0.89)
WES	3.96 (0.71)	4.25 (0.61)
Engagement - Organisation	3.14 (1.00)	3.70 (0.94)
Engagement – Supervisor	3.61 (1.00)	3.90 (1.00)
Engagement – Team	4.05 (0.88)	4.17 (0.77)
Engagement - Job	4.10 (0.86)	4.21 (0.84)
E12	3.19 (0.66)	3.51 (0.70)
Job Satisfaction	3.77 (0.97)	3.91 (1.00)

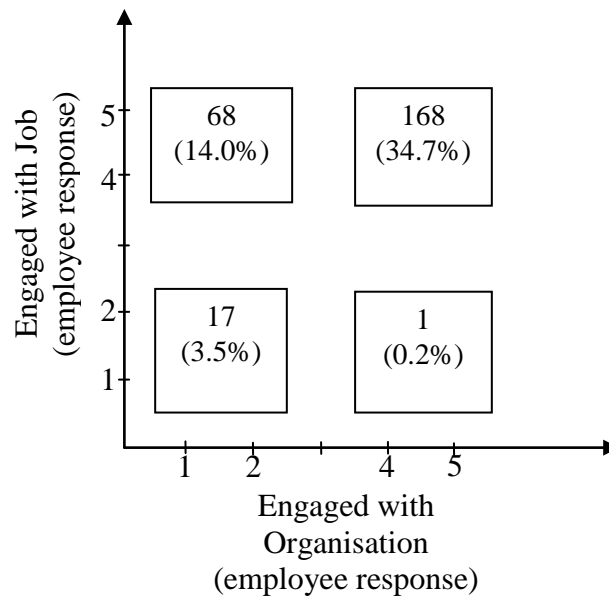


Figure 5.3. Grouped distributions of the blue collar employee responses on the engaged with the job (y-axis) and engaged with the organisation (x-axis) single item measures. Responses were made on a 5-point response scale ranging from 1 (*not at all likely*) to 5 (*almost certain*) and are grouped according to high (i.e., 4 and 5) and low (i.e., 1 and 2) responses. Numbers in the boxes indicate the number of employees in each grouping and numbers in parenthesis indicate this number as a percentage of the sample.

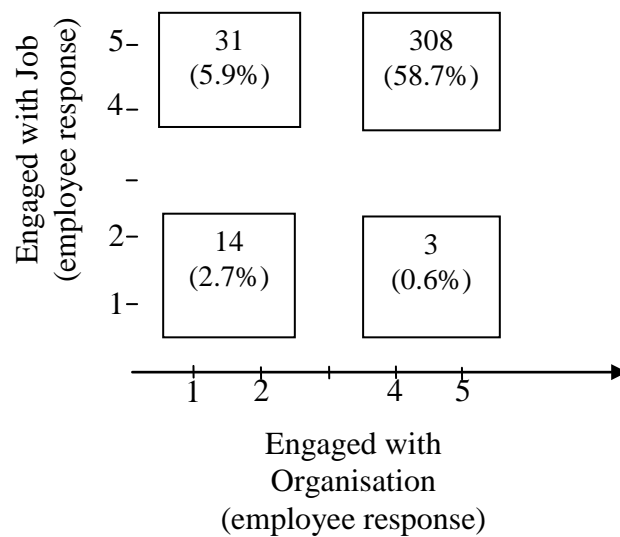


Figure 5.4. Grouped distributions of the white collar employee responses on the engaged with the job (y-axis) and engaged with the organisation (x-axis) single-item measures. Responses were made on a 5-point response scale ranging from 1 (*not at all likely*) to 5 (*almost certain*) and are grouped according to high (i.e., 4 and 5) and low (i.e., 1 and 2) responses. Numbers in the boxes indicate the number of employees in each grouping and numbers in parenthesis indicate this number as a percentage of the sample.

Independent samples *t*-tests revealed that white collar employees scored significantly higher on the WES and single item engagement measures ($p < .05$) (see Table 5.3) ¹. Effect sizes were calculated using the Hedge's *g* statistic. Both Klein (2004) and Rosnow and Rosenthal (2003) suggest that for the testing of mean differences between two independent samples with unequal sample sizes Hedges's *g* is an appropriate statistic as it relies on a pooled standard deviation. Hedges's *g* was calculated by the formula $g = M1 - M2 / Sp$, where *M1* and *M2* equal the group means and *Sp* equals the square root of the pooled within-groups variance, with $Sp =$

¹ Table E1 in Appendix E provides more details of between group differences.

$SQRT\{[(n_1 - 1)s_1^2 + (n_2 - 1)s_2^2]/[n_1 + n_2 - 2]\}$, where n_1 and n_2 are the samples sizes and s_1 and s_2 are the standard deviations (Klein, 2004, p. 101).

Examination of the effect sizes revealed that blue collar employees felt particularly less engaged with the organisation than their white collar colleagues ($g = 0.57$) as compared to engaged with the job ($g = 0.13$). The differences and effect sizes on the single item measures (role engagement) increased with hierarchical distance from the job. That is, blue and white collar employees differed least in terms of their engagement with the job and most in terms of their engagement with the organisation. Blue and white collar employees were also quite different in their level of engagement as measured by the WES ($g = 0.48$). The blue/white collar differences might reflect the organisational reality that white collar employees are more organisationally integrated than blue collar employees because of their position within the organisational hierarchy.

Table 5.3

T-Tests of Differences Between Means for Blue Collar and White Collar Employees on the WES and Role Engagement Measures

		Levene's Test		Test of equality of means			Hedges's <i>g</i>
Measure		<i>F</i>	Sig.	<i>t</i>	<i>df</i>	Sig. (2-tailed)	
WES	Equal variances assumed	7.83	.01	-6.97	1007	.00	0.48
	Equal variances not assumed			-6.93	956.95	.00	
Engaged with Organisation	Equal variances assumed	0.00	.99	-9.02	1007	.00	0.57
	Equal variances not assumed			-9.00	986.29	.00	
Engaged with Supervisor	Equal variances assumed	1.55	.21	-4.44	1007	.00	0.28
	Equal variances not assumed			-4.44	1002.78	.00	
Engaged with Team	Equal variances assumed	0.24	.62	-2.42	1007	.02	0.15
	Equal variances not assumed			-2.40	964.78	.02	
Engaged with Job	Equal variances assumed	0.63	.43	-2.01	1007	.04	0.13
	Equal variances not assumed			-2.01	996.62	.05	

5.3.2 Comparing academic (WES) and practitioner (E12) measures of

engagement. In this study the E12 (based on the popular Gallup Q12) and the academically derived WES were compared. Table 5.4 provides the item content of both measures. It can be seen that the items are not similar in content.

Table 5.4

Item Content of the Practitioner Based E12 Measure of Engagement and the WES Measure Designed for this Study

E12	WES
You know exactly what is expected of you (concerning your job and workgroup)	I put my heart into my job
I am expected to do things without the necessary resources (such as equipment, information and/or assistance)	I'm proud of the work I do
There is a good match here between the requirements of jobs and the skills/interests of the people assigned to them	I get a buzz out of my work
In your department, when you do your job particularly well, how likely is it that you will be praised?	I can get so into my work that I forget everything else
(Your supervisor) - willingly listens to your problems	Time seems to fly when I'm working
(Your supervisor) - pays attention to your opinions	I avoid working too hard at work (r)
Management holds a widely-shared philosophy that provides employees with a real understanding of what this organisation stands for	
Employees here are actively involved in improving the organisation and increasing its productivity	
You can count on your coworkers when teamwork is needed	
When people do not perform up to their potential, action is taken to help them improve	
This organisation shows very little interest in the professional growth and development of its people	
From the time people begin working here, they receive the orientation and training they need to do their best	

The WES was specifically designed as a measure of work engagement as a psychological state while the E12 was designed as a management tool that identifies “actionable” antecedents of engagement. The correlations presented in Table 5.5 show that the E12 and WES shared a positive association correlating at $r = .29$ and $r = .27$ ($p < .01$) for the blue and white collar employees, respectively. This suggests that the measures are related, but are not measures of the same construct.

Furthermore, the E12 and WES shared different patterns of association with the single item measures of role engagement. The E12 was more strongly related to supervisor and organisational engagement than team and job engagement whereas the WES was most strongly associated with job engagement. This was not surprising as the E12 item content refers directly to supervisors and the organisation while the WES is concerned only with the work or job itself.

Table 5.5

Correlations Between the E12, WES and Single Item Measures of Engagement and Job Satisfaction

	E12 Blue collar/ White collar	WES Blue collar/ White collar
E12	1	
WES	.29/.27	1
Engaged with Organisation	.43/.48	.30/.41
Engaged with Supervisor	.52/.62	.22/.42
Engaged with Team	.28/.37	.18/.48
Engaged with Job	.30/.45	.41/.53
Job Satisfaction	.59/.68	.31/.32

Note. All correlations were significant at $p < .01$.

The Q12 has been criticised as tapping a general sense of satisfaction with various aspects of work (i.e., job satisfaction) (Schaufeli & Bakker, 2010) rather than the underlying construct of engagement. Indeed, Harter et al. (2002) reported a correlation at the business-unit level of .77 and .91 after controlling for measurement error. In this study the E12 correlated with job satisfaction at $r = .59$ (blue collar) and .68 (white collar), while the WES correlation with job satisfaction was substantially weaker, $r = .31$ (blue collar) and $r = .32$ (white collar; all correlations significant at $p < .01$). These results are consistent with the argument that measures such as the Q12 and E12 are more closely aligned with measures of satisfaction with the work environment than measures of motivational states (i.e., work engagement). At the same time they illustrate that the WES is linked to positive outcomes such as job satisfaction.

5.3.3 Engagement for different groups of employees (paired T-tests). A series of paired sample t -tests were conducted to examine whether employee ratings of engagement differed significantly depending on the role. The mean scores (see Table 5.2) decreased as hierarchical distance from the job increased (for blue and white collar employees), hence, to avoid unnecessary inflation of type I error, the set of t -tests was limited to the three tests presented in Tables 5.6 and 5.7. Cohen's d was used as a measure of effect size as recommended by Rosnow and Rosenthal (2003) for single sample t -tests. The same pattern of results was observed for both groups of employees with engagement increasing significantly from engagement with the organisation to engagement with supervisor ($p < .01$), and engagement with supervisor to engagement with team members ($p < .01$). Also, for both employee groups team engagement was not rated differently from job engagement ($p > .05$).

Blue collar employees reported larger differences than white collar employees as evidenced by the larger effect sizes. The magnitude of the organisation to supervisor difference and the supervisor to team difference was the same for blue collar employees ($d = 0.41$). However, for white collar employees the difference between supervisor and team engagement was larger ($d = 0.39$) than the difference between their engagement with the organisation and engagement with supervisor ($d = 0.19$). This further illustrates an effect of employee hierarchical position within the organisation on perceptions of engagement.

Table 5.6

Paired Sample T-tests of Blue Collar Employee Ratings of Role Engagement

Paired Differences 95% C.I.									
Pair	Mean Difference	SD	Std. Error Mean	LL	UL	<i>t</i>	<i>df</i>	Sig.	Cohen's <i>d</i>
Organisation - Supervisor	-0.48	1.15	0.05	-0.58	-0.37	-9.12	483	.00	0.41
Supervisor - Team	-0.43	1.03	0.05	-0.52	-0.33	-9.09	483	.00	0.41
Team - Job	-0.06	0.82	0.04	-0.13	0.02	-1.19	483	.14	0.05

Note. LL = lower limit; UL = upper limit.

Table 5.7

Paired Sample T-tests of White Collar Employee Ratings of Role Engagement

Paired Differences 95% C.I.									
Pair	Mean Difference	SD	Std. Error Mean	LL	UL	<i>t</i>	<i>df</i>	Sig.	Cohen's <i>d</i>
Organisation - Supervisor	-0.21	1.06	0.05	-0.30	-0.12	-4.46	524	.00	0.19
Supervisor - Team	-0.27	0.93	0.04	-0.35	-0.19	-6.63	524	.00	0.29
Team - Job	-0.04	0.79	0.03	-0.11	0.03	-1.11	524	.27	0.05

Note. LL = lower limit; UL = upper limit.

5.3.4 Principle components analysis of the WES. In order to explore the dimensionality of the WES measure of work engagement a principal components factor analysis with varimax rotation was used. The number of components was set to three, consistent with the three-dimensional model of work engagement (see Figure 3.2). The case to variable ratios were 81:1 (Blue collar analysis) and 88:1 (White collar analysis) and far exceeded the 5:1 recommended by Tabachnick and Fidel (2001). For the blue collar analysis, examination of the *KMO* measure of sampling adequacy indicated the data was suitable for factor analysis ($KMO = .75$), and Bartlett's test of sphericity indicated appropriate collinearity among the items $\chi^2 (15) = 690.54, p < .001$. For the white-collar analysis, examination of the *KMO* measure of sampling adequacy indicated the data was suitable for factor analysis ($KMO = .79$), and Bartlett's test of sphericity indicated appropriate collinearity among the items $\chi^2 (15) = 732.42, p < .001$.

The three component solutions cumulatively explained 75.51% (blue collar) and 75.39% (white collar) of the variance in the data. Tables 5.8 and 5.9 give the eigenvalues, percentage of variance explained by the components as well as the variable loadings for each analysis. The resulting structure was consistent across both samples, with the white collar results displaying a little more noise in the results as evidenced by the cross loading of two of the items. However, it should be noted that some noise in the data was to be expected given the limited number of items used in the scale. Finally, the item "I get a buzz out of my work" that was originally developed to measure a sense of vigor at work loaded on the dedication dimension in both analyses.

A total work engagement score (as opposed to subscale scores) was used in all subsequent analysis. This was because of the variability in the number of items across the dimensions of work engagement. That is, dedication consisted of three items while vigor consisted of only a single item. It was not possible to be confident that a single item accurately captured the vigor dimension of work engagement. In addition, Schaufeli et al. (2006) recommended the use of a total work engagement scores over subscale scores for practical purposes, citing mixed evidence regarding the dimensionality of work engagement as the reason.

Table 5.8

Principal Components Analysis of the WES (Blue Collar)

	Component		
	1 Dedication	2 Absorption	3 Vigor
Eigen value	2.69	1.05	0.79
Variance explained	44.79%	17.51%	13.21%
I put my heart into my job	.85		
I'm proud of the work I do	.80		
I get a buzz out of my work	.76		
I can get so into my work that I forget everything else		.81	
Time seems to fly when I'm working		.83	
I avoid working too hard at work (r)			.98

Note. (r) = reverse coded item

Table 5.9

Principal Components Analysis of the WES (White Collar)

	Component		
	1 Dedication	2 Absorption	3 Vigor
Eigen value	2.74	0.95	0.84
Variance explained	45.63%	15.85%	13.92%
I put my heart into my job	.75	.32	
I'm proud of the work I do	.85		
I get a buzz out of my work	.75		
I can get so into my work that I forget everything else		.92	
Time seems to fly when I'm working	.44	.66	
I avoid working too hard at work (r)			.98

Note. (r) = reverse coded item

5.3.5 Correlations between the study variables. Bivariate correlations between the study variables are presented in Table 5.10 (blue collar employees) and Table 5.11 (white collar employees). Because of the large sample sizes all correlations shown were statistically significant at $p < .01$. In addition, the high number of correlations (84 per sample) increased the likelihood of making a Type 1 error i.e. the expected number of spurious results is 4.2 (84 times 0.05% chance of detecting a significant correlation when there is none). In this context the size of the correlations were of primary concern rather than the statistical significance of the associations.

Blue collar results. Correlations among the study variables ranged from $r = .13$ to $r = .70$. Due to the high number of correlations presented only a brief overview of the strongest and most relevant (to the later regression analyses) relationships is given. The strongest correlation ($r = .70$) was between training/development and POS. The variable with the strongest correlation with the WES was engagement with the job ($r = .41$) which, as mentioned above is not surprising because the WES items refer to the job or work level. Other workplace variables related to work engagement (WES) of particular note were POS ($r = .35$), and supervisor support ($r = .30$). The variables with the weakest associations were relationship with coworkers ($r = .13$) and fairness ($r = .14$).

The single item role engagement measures were all interrelated with correlations ranging from $r = .26$ to $r = .55$. Each role engagement measure shared a different pattern of relationships with the job resource variables. For example, the variables with the strongest correlations with engagement with the organisation were POS ($r = .53$) and training and development ($r = .45$). While for engagement with

the team it was relationship with coworkers ($r = .42$) followed by supervisor support ($r = .29$). Not surprisingly, one pattern that emerged was that supervisor, organisation and team engagement were most strongly associated with supervisor support, POS and relationship with coworkers, respectively.

White collar results. Overall, correlations were stronger for white collar employees ranging from $r = .20$ to $r = .76$. The strongest correlation ($r = .76$) was between supervisor support and engagement with supervisor. Similar to the blue collar employees, the variable with the strongest association with work engagement (WES) was engagement with the job ($r = .44$). In terms of job resource variables, job characteristics ($r = .44$) and role clarity ($r = .35$) shared moderate correlations with engagement, while fairness ($r = .23$) and reward/recognition ($r = .26$) shared weaker relationships.

The single item role engagement measures were all interrelated with correlations ranging from $r = .31$ to $r = .56$. Engaged with supervisor and engaged with the job shared the strongest association. As with the blue collar employees, each single item measure shared a different pattern of relationships with the other work-related variables. The variables with the strongest correlations with engagement with the organisation were POS ($r = .55$) and training and development ($r = .45$). While for engagement with the job it was supervisor support ($r = .49$) followed by role clarity ($r = .44$). The same pattern whereby supervisor, organisation and team engagement were associated most strongly with supervisor support, POS and relationship with coworkers, respectively, was found.

Table 5.10

Correlations Between the WES, Single-Item Role Engagement Measures and Job Resource Variables (Blue Collar)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. WES	1													
2. Reward/Recognition	.18	1												
3. Relationship Coworkers	.13	.25	1											
4. Supervisor Support	.30	.51	.39	1										
5. POS	.35	.52	.35	.59	1									
6. Fairness	.14	.55	.34	.46	.58	1								
7. Job Characteristics	.28	.24	.34	.34	.35	.29	1							
8. Training/Development	.28	.51	.33	.44	.70	.58	.23	1						
9. Role Clarity	.25	.21	.44	.41	.44	.34	.37	.32	1					
10. Organisational Mission	.22	.40	.28	.43	.67	.48	.23	.63	.39	1				
11. Engaged Organisation	.30	.25	.18	.34	.53	.31	.25	.45	.20	.41	1			
12. Engaged Supervisor	.22	.38	.33	.69	.44	.36	.25	.34	.30	.33	.34	1		
13. Engaged Team	.18	.15	.42	.29	.24	.20	.21	.19	.23	.20	.26	.40	1	
14. Engaged Job	.41	.18	.20	.32	.35	.23	.27	.25	.20	.23	.41	.43	.55	1

Note. All correlations statistically significant at $p < .01$.

Table 5.11

Correlations Between the WES, Single-Item Role Engagement Measures and Job Resource Variables (White Collar)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. WES	1													
2. Reward/Recognition	.20	1												
3. Relationship Coworkers	.24	.40	1											
4. Supervisor Support	.27	.65	.47	1										
5. POS	.30	.58	.55	.63	1									
6. Fairness	.20	.58	.44	.55	.63	1								
7. Job Characteristics	.44	.26	.30	.35	.31	.28	1							
8. Training/Development	.23	.59	.45	.54	.69	.64	.24	1						
9. Role clarity	.31	.36	.48	.46	.52	.41	.41	.45	1					
10. Organisational Mission	.24	.48	.47	.47	.65	.49	.32	.63	.56	1				
11. Engaged Organisation	.32	.37	.35	.40	.55	.37	.22	.45	.33	.41	1			
12. Engaged Supervisor	.28	.53	.37	.76	.49	.47	.31	.45	.40	.38	.42	1		
13. Engaged Team	.33	.27	.43	.35	.33	.28	.30	.27	.36	.29	.31	.48	1	
14. Engaged Job	.44	.32	.37	.49	.42	.34	.39	.34	.44	.34	.41	.56	.53	1

Note. All correlations statistically significant at $p < .01$.

5.3.6 Predicting work engagement. Multiple regression analysis was used to examine how well the selected job resource variables predicted work engagement. The analysis was conducted separately for the blue collar and white collar employees

Predicting work engagement for blue collar employees. Overall, the job resources accounted for 19% of the variance in work engagement, $F(9, 474) = 11.96, p < .001$. As shown in Table 5.12, the statistically significant predictors of work engagement were job characteristics, POS, supervisor support, fairness and training/development ($p < .01$). Job characteristics was the strongest predictor, accounting for 3% of the unique variance, followed by POS accounting for 2% of the unique variance, and the remaining variables each accounting for 1% of the unique variance in work engagement.

The bivariate correlation between fairness and work engagement was relatively weak ($r = .14$) compared to the other significant predictors identified in the analysis (i.e., $r = .28$ to $r = .35$) and its regression weight was negative, suggesting the presence of net or negative suppression (see Tabachnick & Fidel, 2001, pp. 148-149 for a discussion of suppressor variables). The presence of suppression artificially inflates the R^2 value, in this case via the enhanced effect of fairness on work engagement. In this context the R^2 must be interpreted with some caution.

It was not possible to identify a single suppressor variable, instead a series of regressions where each independent variable (IV) was systematically dropped from the analysis (as per the recommendations of Tabachnick & Fidel (2001) for identifying suppressor variables in regression analysis, p. 149) indicated that

relationship with coworkers, supervisor support, POS and training/development all exerted some suppression effect on the fairness variable.

Table 5.12

Regression Analysis for Predicting Work engagement (Blue collar).

Variables	<i>B</i>	<i>SE</i>	β	sr^2	R^2
Reward/Recognition	-0.02	0.05	.02	.00	
Relationship Coworkers	-0.08	0.05	-.08	.00	
Supervisor support	0.10*	0.04	.14	.01	
POS	0.16*	0.05	.22	.02	
Job Characteristics	0.15**	0.04	.17	.03	
Fairness	-0.11*	0.04	-.16	.01	
Training/Development	0.13*	0.05	.15	.01	
Role Clarity	0.08	0.04	.10	.00	
Organisational Mission	-0.03	0.04	-.05	.00	
					.19

Note. * $p < .05$. ** $p < .01$.

Predicting work engagement for white collar employees. Overall, the job resources accounted for 26% of the variance in work engagement, $F(9, 514) = 19.78, p < .001$. As shown in Table 5.13, the statistically significant predictors of work engagement were job characteristics, POS, and role clarity. Job characteristics was by far the strongest predictor accounting for 11% of the unique variance in work engagement ($p < .01$), followed by POS and then role clarity, each accounting for an additional 1% of unique variance ($p < .05$).

Again, there were some suppression effects in the results as evidenced by the positive correlations between the three job resources: fairness, supervisor support, organisational mission, and work engagement, but negative beta weights for these variables. Hence the R^2 may be inflated and needs to be interpreted with caution.

There was, again, no single IV that could be identified as causing the suppression; it was the combined influence of a number of IVs. It should also be noted here that some “noise” in the results was not surprising given that the analysis involved conceptually related variables.

Table 5.13

Regression Analysis for Predicting Work engagement (White Collar)

Variables	<i>B</i>	<i>SE</i>	β	sr^2	R^2
Reward/Recognition	0.00	0.04	.00	.00	
Relationship Coworkers	-0.01	0.04	-.01	.00	
Supervisor Support	0.03	0.04	.05	.00	
POS	0.11*	0.05	.16	.01	
Job Characteristics	0.34**	0.04	.37	.11	
Fairness	-0.03	0.04	-.05	.00	
Training/Development	0.01	0.04	.02	.00	
Role Clarity	0.09*	0.04	.13	.01	
Organisational Mission	-0.04	0.04	-.05	.00	
					.26

Note. * $p < .05$. ** $p < .01$.

5.3.7 Post hoc analysis. For blue and white collar employees job design characteristics (as a total scale) emerged as the strongest predictor of work engagement. The job design characteristics scale included items that address the five core job characteristics from JCT (see Hackman & Oldham, 1976). It was possible to use each job design characteristic as an independent subscale measure to gain more detailed insight into the relationship between job design and work engagement. The item content and internal consistency scores for each subscale are presented in Appendix D. Multiple regression analysis was the method chosen to investigate this

relationship with the five job characteristics entered as independent variables to predict work engagement.

Descriptive statistics and correlations. Both groups of employees reported positive perceptions of the five job characteristics (see Table 5.14). They rated task variety the highest, $M = 3.95$, $SD = 1.00$ (blue collar) and $M = 4.45$, $SD = 0.73$ (white collar). Blue collar employees rated task identity lowest of the job characteristics ($M = 3.47$, $SD = 0.90$), while white collar employees rated task feedback the lowest ($M = 3.85$, $SD = 0.77$).

Table 5.14

Means and Standard Deviations on the Job Characteristics Variables for Blue Collar and White Collar Employees

Variable	Blue Collar <i>M (SD)</i>	White Collar <i>M (SD)</i>
Autonomy	3.78 (0.97)	4.42 (0.62)
Variety	3.95 (1.00)	4.45 (0.73)
Feedback	3.69 (0.73)	3.85 (0.77)
Identity	3.47 (0.90)	3.99 (0.83)
Significance	3.71 (0.85)	4.28 (0.72)

Correlations between the job characteristics and work engagement are presented in Table 5.15. The white collar correlations were generally stronger than the blue collar correlations. White collar employees associated task variety most strongly with work engagement ($r = .41$, $p < .01$), while for blue collar employees it was task feedback ($r = .29$, $p < .01$).

Table 5.15

Correlations Between Job Characteristics and Work engagement

	1	2	3	4	5	6
1. WES	1	.35	.41	.28	.36	.31
2. Autonomy	.19	1	.48	.35	.38	.26
3. Variety	.25	.50	1	.38	.47	.37
4. Feedback	.29	.42	.49	1	.40	.33
5. Identity	.24	.43	.50	.45	1	.40
6. Significance	.21	.34	.32	.30	.36	1

Note. White collar correlations are presented above the diagonal and blue collar correlations below

the diagonal. All correlations were significant at $p < .01$.

Regression results. For blue collar employees the five job characteristics accounted for 12% of the variance in work engagement, $F(5, 478) = 12.04, p < .001$ (Table 5.16). Only task feedback and task significance were statistically significant predictors, accounting for 2% and 1% of the unique variance, respectively.

Table 5.16

Multiple Regression Results for Job Characteristics Predicting Work Engagement (Blue Collar)

Variables	<i>B</i>	<i>SE</i>	β	sr^2	R^2
Autonomy	0.02	0.04	.03	.00	
Variety	0.05	0.04	.08	.00	
Feedback	0.16**	0.05	.18	.02	
Identity	0.05	0.04	.07	.00	
Significance	0.09*	0.04	.11	.01	
					.12

Note. * $p < .05$. ** $p < .01$.

For white collar employees job characteristics accounted for 25% of the variance in work engagement, $F(5, 518) = 32.24, p < .001$ (Table 5.17). Task variety, autonomy, identity and significance all emerged as statistically significant predictors, accounting for 3%, 2%, 1% and 1% of the variance respectively.

Table 5.17

Multiple Regression Results for Job Characteristics Predicting Work Engagement (White Collar)

Variables	<i>B</i>	<i>SE</i>	β	sr^2	R^2
Autonomy	0.14**	0.04	.14	.02	
Variety	0.17**	0.04	.22	.03	
Feedback	0.04	0.03	.05	.00	
Identity	0.10**	0.03	.14	.01	
Significance	0.10**	0.04	.12	.01	
					.25

Note. * $p < .05$. ** $p < .01$.

The five job characteristics predicted more than double the amount of variance in work engagement for the white collar employees (25%) as for the blue collar employees (12%). The pattern of results demonstrated that different aspects of job design predicted work engagement for different employee groups within the organisation. For blue collar employees feedback from the job was the best predictor of engagement, while for white collar employees it was task variety.

5.4 Discussion

The key findings of this study are:

- The WES was psychometrically consistent with the conceptual model of work engagement (i.e., vigor, dedication and absorption) as a motivational work construct.
- The academically derived WES and the practitioner-based E12 were related but were not measures of the same construct.
- The strength of engagement in different work roles decreased as a function of distance from the job (i.e., from job to team, to supervisor, to organisation).
- Job resources predicted a significant amount of variance in work engagement but not all job resources predicted engagement for all employees.
- Different job design characteristics predicted work engagement for blue and white collar employees.

These findings are discussed below.

5.4.1 Examining the different measurement approaches to engagement.

The main focus of the study was the development and testing of a measure of work engagement (the WES) according to the dominant academic conceptualisation of the construct. However, the research also took the opportunity to explore and evaluate a practitioner-based approach to understanding and measuring engagement (i.e., employee engagement) and an approach that sees engagement as a role-related construct (i.e., role engagement).

WES. The psychometric properties of the WES were consistent with the three-dimensional theoretical model of work engagement (i.e., vigor, dedication and

absorption) and the internal consistency of the scale was appropriate. The results therefore support use of the WES as an alternative measure to the UWES.

For both groups of employees the item “I get a buzz out of my work”, that was designed to measure vigor loaded on the dedication factor. Clearly employees associated getting a buzz out of work with pride in their work and putting their heart into their jobs, rather than with energy and working hard. This left a single item as a measure of vigor, raising questions about how well this item was able to accurately capture this dimension of engagement. Further research might consider adding items to the measure that better capture vigor. An added benefit of this would be the increased potential to use engagement subscales in future analysis.

Comparing the WES and E12. There is a clear divide between academics and practitioners about the nature and measurement of engagement. This study made use of a rare opportunity to compare an academic (WES) and a practitioner-based (E12) measure. The analysis shows that the measures were related, correlating at .31 (blue collar) and .32 (white collar). However, the strength of the relationships also confirms that they are not measures of the same construct. In addition, the WES and E12 shared different strength relationships with the single item measures of role engagement and job satisfaction. Importantly, the E12 was more strongly related to a measure of job satisfaction ($r = .59$ and $.68, p < .01$) than it was to the WES ($r = .31$ and $.32, p < .01$) consistent with arguments (see Schaufeli & Bakker, 2010) that measures such as the Q12 overlap with traditional concepts such as job satisfaction and add little to the understanding of work engagement.

The divergence between academics and practitioners, as illustrated here, offers some explanation of the confusion around the construct domain of

engagement, and criticisms that it is essentially a practitioner repackaging of older constructs such as organisational commitment and job satisfaction. In the academic literature the concept of engagement emerged from research into motivation and work roles (Kahn, 1990; Katz & Kahn, 1978) and was later shaped by interest in individual well being and performance e.g. stress and burnout (Maslach et al., 2001; Maslach & Leiter, 1997). Practitioner approaches to engagement come from a different historical framework driven by a need to describe employee commitment to the organisation in a changing labor market characterised by moves from collective to individual employment contracts (Guest, 2004; Wooden, 1999; Rousseau, 2005), labor flexibility (Houseman, 2001), and moves away from traditional organisational hierarchy to flatter organisational structures and self-directed work teams (Guttman, 2009; Kuipers & Stoker, 2009)

Practitioner measures are also associated with the view that a more informed and better educated workforce is more appropriately related to the organisation as empowered individuals rather than as a collective. This drives the use of measures that inform and shape potential action that can increase individual employee commitment to the organisation. In contrast, academic measures of engagement are driven by research that seeks to increase the understanding of the nature of work engagement as a psychological construct.

Role engagement. Several authors (i.e., Kahn, 1990; Rothbard, 2001; Saks, 2006) view engagement as role-specific. Employees in this study did report differences in their levels of engagement depending on the role and the patterns of differences and relationships with other variables revealed some unique insights into role engagement.

The pattern of mean scores suggests that employees are most likely to engage with or in their immediate job role, but are less likely to engage as hierarchical distance from the job increases. The job represents the greatest investment of time and energy for most employees and is most relevant to individuals. In this context, it could be argued that the extent to which employees engage in the job is likely to affect how much they engage in other roles. For example, if an employee feels disengaged from the work role (i.e., the thing that they spend most of their day doing), it would seem unlikely that they would feel highly engaged with the organisation. Alternatively, it would seem more reasonable that an employee can be engaged with the job, but not think highly of the supervisor or organisation. Indeed, this is what was found when the distributions of employee responses were examined.

The variation in the strength of relationships between the role engagement measures and job resources provided further support for arguments (see Kahn, 1990; Rothbard, 2001; Saks, 2006) that engagement is role-specific. However, they also demonstrate the need to clarify the use of the term engagement, for example: role engagement (e.g., Kahn, 1990); employee satisfaction-engagement (e.g., Harter et al., 2002); or work engagement (e.g., Bakker & Leiter, 2010). In addition, given the potential complexity and number of roles that employees can occupy at work and the organisational reality that employees can occupy multiple roles at a time and/or different roles at different times it would be fair to question the practical utility of a role-specific understanding of engagement.

5.4.2 Comparing work engagement for blue and white collar employees.

This study aimed to answer the question of whether work engagement was different for groups of employees at different hierarchical levels within a single organisation.

Two subsamples were drawn from the total study sample defined by their hierarchical level within the organisation (i.e., blue collar and white collar employees). White collar employees reported significantly higher levels of work engagement (WES) than their blue collar colleagues. Also, work engagement shared different patterns of relationships with other study variables (i.e., job resources, role engagement measures and employee satisfaction-engagement) for blue collar and white collar employees. The job resources-work engagement relationships are discussed in more detail in the next section (Section 5.4.3).

Furthermore, while the overall structure of the WES was consistent across blue and white collar employees there were also subtle differences in the way they responded to the items. For example, the item “time seems to fly when I’m working” cross loaded on the dedication and absorption dimensions of work engagement for white collar employees, but loaded only on the absorption dimension for blue collar employees. These slight, but important, differences support the understanding that blue and white collar employees have nuanced understandings and experiences of work engagement.

The results of this study therefore suggest a possible explanation of the inconsistencies in past research concerning work engagements relationships with other variables is that different occupational groups of employees experience work engagement differently.

5.4.3 Predicting work engagement. The popularity of work engagement has led to an increasing demand to know and understand the best ways to engage employees. According to the JD-R model job resources encourage engagement by reducing the impact of job demands and also through their intrinsic and extrinsic

motivational potential (Bakker & Demerouti, 2008; Schaufeli & Bakker, 2004). In this research job resources did predict work engagement and there appears to be some job resources that are stronger predictors than others but suppression² may have clouded the picture of the relative strengths. In other words, it seems that while job resources can and do predict engagement, not all job resources predict engagement for all employees.

The importance of job design characteristics as a predictor of work engagement across both employee groups is consistent with the understanding of work engagement as a job specific, motivational construct. Indeed, traditional JCT was concerned with employee motivation through the design of work (Hackman & Oldham, 1976). However, in this study different groups of employees were engaged through different elements of job design. In addition, differences in the predictive strengths of other job resources both within each sample and across the blue and white collar samples illustrate the organisational reality that the job is set within an organisational context.

Therefore, it can be argued from the results that context (i.e., employees' position within the organisation) plays an important role in determining which job resources are engaging. For example, in this study role clarity was a key predictor of work engagement for white collar employees but not blue collar employees. White collar employees experienced a broader range of responsibilities and a greater number of responsibilities than blue collar employees. In addition, they were

² In both sets of multiple regression results there was evidence of suppression (i.e., positive correlations between IVs and DVs, but negative beta weights).

generally embedded within more complex networks of work relationships. Blue collar employees, on the other hand, generally reported to a single supervisor, were not responsible for any direct reports and had more predictable and consistent role responsibilities. Given the complexity inherent to white collar positions it is not surprising that for white collar employees role clarity was a motivating and engaging job resource. At the same time, given the generally more routine and predictable work involved in blue collar positions it fits that blue collar employees did not find role clarity engaging. Indeed, this is an argument supported by Latham and Pinder (2005) who stressed the importance of context to employee motivation and Humphrey et al. (2007) who confirmed the importance of work context in their meta-analysis based summary of the work-design literature.

It is possible that context (i.e., employee position within the organisation) affects the interplay between job resources and work engagement by influencing the way in which employees appraise job resources (i.e., as positive or negative). For example, in this research opportunities for training/development predicted work engagement for blue collar but not white collar employees. It might be that blue collar employees perceived extra training as a positive and engaging job resource while white collar employees saw it as disruptive or unnecessary. This explanation is supported by a study by Crawford, LePine and Rich (2010) who found that the relationship between job demands and work engagement varied as a function of how employees appraised the nature of the job demand (i.e., as a challenge or a hindrance).

5.4.4 Conclusions. In conclusion the results: (1) support the importance of distinguishing between work engagement (a motivational construct), employee

satisfaction-engagement (an appraisal of the work environment); and role engagement (identification with work roles); (2) support the link between job resources and work engagement; and (3) highlight the importance of context in determining which job resources are positive in building and sustaining work engagement.

Chapter 6: Exploring Positive Accountability

This chapter describes an investigation of positive accountability within the Australian mining industry. The main aims of the study were:

1. To develop and test the psychometric properties of the positive accountability scale (PAS) - a multidimensional measure of positive accountability.
2. To explore the strength of perceived accountability to self and others in the workplace.
3. To establish the practical significance of positive accountability in terms of its relationships with performance indicator variables.
4. To identify the styles of organisational culture that predict positive accountability.

6.1.1 Developing a purpose designed measure of positive accountability.

The literature review (see Section 2.1.6) highlighted that themes and issues of accountability are embedded in many of the traditional and widely studied areas of organisational psychology. Furthermore, authors generally agree that accountability is a fundamental to organisational functioning (e.g., Ferris et al., 2009; Frink & Klimoski, 2004). However, it has received little direct attention as an independent construct. Consequently, research studies generally lack a consistent conceptual framework with which to understand and measure accountability. Indeed, there are few empirical measures of accountability available in the research literature.

In Chapter 4, using archival data, a measure of accountability as a positive feature of the work environment (i.e., positive accountability) was designed based on a three-dimensional conceptual model consisting of: expectations, feedback, and salience. However, analysis of the structure of the measure suggested that it was

four-dimensional with employees differentiating between positive and negative feedback. This led to a revision of the model, with positive accountability driven by positive and negative feedback, expectations, and perceptions of the importance of the work (salience). As an archive study, the design of items was restricted to making best use of the available survey questions rather than generating items as required. In this study it was possible to operationalise positive accountability using items specifically designed for the purpose via the PAS. Each dimension is briefly discussed below and the final model is shown in Figure 6.1. Particular focus is on refining the measurement of expectations and negative performance feedback, as discussed below.

Expectations. A key feature of accountability is expectations (Frink, 2004; Hall et al., 2003; Lerner & Tetlock, 1999; Tetlock, 1992). The measure of positive accountability described in Chapter 4 included items relating to the clarity of expectations. However, there are other aspects of expectations that affect the extent to which employees feel accountable. For example, Schlenker et al. (1994) argues that the appropriateness of expectations to an employees' role or identity within the organisation and the achievability of expectations also influence accountability. In this study items relating to these additional aspects of expectations will be included in the measure in order to better capture this dimension of positive accountability.

Feedback. Accountability involves a feedback system that guides behaviour (Frink & Klimoski, 2004; Hall et al., 2006). In Chapter 4 it was shown that employees differentiated between positive and negative feedback with the results suggesting that negative feedback was the key driver of positive accountability. That

is, negative feedback accounted for the most variance in the data. It has been shown that negative feedback delivered in a performance contingent and legitimate/fair fashion is strongly linked to positive employee attitudes and performance (Farh et al., 1990; Podsakoff et al., 2006). In this research it is argued that negative feedback, when performance-contingent and delivered with integrity and discipline, is a key environmental support for positive accountability because it lets people know where they stand in a world of more flexible boundaries. As such, negative feedback is referred to in the remainder of this thesis as *discipline* to avoid its confusion with blame attribution and punishment and to reflect its understanding as a positive feature of the work environment.

Salience. Analysis of the positive accountability measure in Chapter 4 supported considering salience as an important environmental support of positive accountability. This study further explores the role of accountability salience in positive accountability.

6.1.2 Conceptual model of positive accountability. The conceptual model of positive accountability is presented in Figure 6.1. In short, the model argues that accountability is driven by: (a) clear, appropriate and achievable expectations; (b) positive, performance based feedback; (c) discipline and consistency in the delivery of negative feedback; and (d) perceptions of the importance or salience of the work.

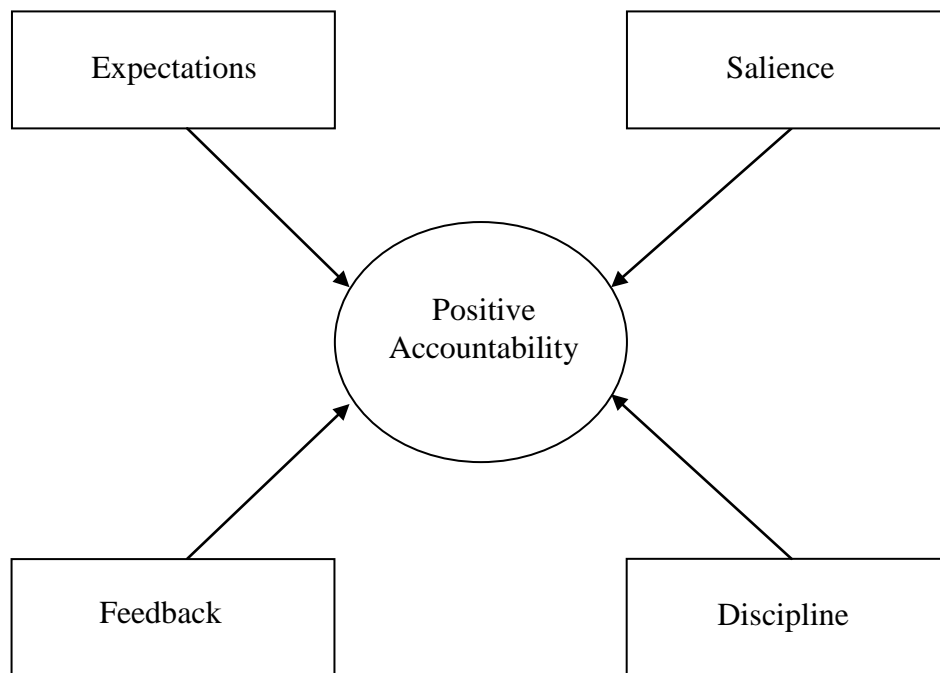


Figure 6.1. Revised model of work environment characteristics that support positive accountability.

6.1.3 Accountability source (accountable to whom). Frink and Klimoski (1998; 2004) approached accountability from a sociological perspective arguing that employees exist within a web of accountabilities, that is, that they feel accountable for multiple expectations or behaviours and to multiple sources. They also suggested that under circumstances where people are accountable to multiple sources, employees will feel more or less accountable to depending on who/what that source is. This raises questions about how employees manage multiple accountabilities and what factors determine which accountabilities are judged as most salient. To date there has been very little, if any, empirical research that has examined differences in the strength of perceived accountability to different sources.

As a starting point, this research intends to examine accountability to five different sources: organisation, site, supervisor, co-workers and self in order to gain a better understanding of employees' experience of accountability at work. These sources were specifically chosen as they are common to many organisations and they also represent levels of organisational hierarchy allowing an examination of the structure of employee perceptions of accountability across organisational levels.

6.1.4 The practical significance of considering positive accountability to researchers, practitioners and organisations. Research has not adequately addressed the relationship between positive accountability and individual and organisational performance. The literature review described research that associates accountability with several positive outcomes including job involvement (Hall et al., 2003) and extra-role performance (Ricketta & Landerer, 2002). However, some authors argue that accountability can also act as a stressor, reporting that accountability is associated with negative outcomes associated with stress (e.g., Hall et al., 2006; Hochwarter, et al., 2005). Part of the confusion stems from differences in conceptualisations of accountability. In this research accountability is conceptualised as a positive construct. However, further research is required if an improved understanding of positive accountability is to be established. In addition, it is important to establish the practical significance of positive accountability to researchers, practitioners and organisations if research on positive accountability is to move forward.

This study includes four variables loosely described as performance indicators that were chosen to reflect practical as well as theoretical significance.

These were: job satisfaction, safety performance, job stress and intention to stay with the organisation. While these variables are treated as outcome variables the cross-sectional design of the study can, of course, only establish the strength or weakness of associative links with positive accountability.

6.1.5 Organisational culture and positive accountability. Organisational culture is widely recognised as a key driver of individual behaviour and organisational effectiveness (Deal and Kennedy, 1982; Gregory, Harris, Armenakis & Shook, 2008). It is generally described as a set of beliefs, values and assumptions that are shared by members of an organisation (Schein, 1992). The culture of an organisation influences individual behaviour because people rely on the assumptions and values to guide their decisions and behaviours. This study aims to determine whether organisational culture influences accountability, and if it does, to identify the types of culture most likely to encourage accountability.

Organisations invest considerable effort and resources in managing and shaping organisational culture. Indeed, much of the data for this research was collected as part of an organisational culture management program. An understanding of how organisational culture relates to positive accountability will enable organisations to better manage culture management and change efforts. In addition, it will help to shape the understanding of positive accountability.

Organisational culture is inherently complex and difficult to measure because it involves elements of subjectivity that exist within a fluid organisational environment. Despite this, much effort has been directed towards developing typologies of organisational culture that allow quantification and description (e.g.,

Denison, 1990; Hofstede, Bond & Luk., 1993; Quinn & Rohrbaugh, 1983; Reichers & Schneider, 1990; Schein, 1996). This study utilises a typology where 12 behavioral styles drive three general types of organisational culture, as measured by the OCI (Cooke & Lafferty, 1987; see also Cooke & Szumal, 1993).

6.2 Method

6.2.1 Background/context of the research. This study used data from the same survey described in Chapter 5 to answer a different set of research questions. These questions related to measuring and understanding positive accountability. Section 5.2.1 provides the details of the background and context for the study.

6.2.2 Sample. This study used data from blue and white collar employees as in the previous chapter, thus allowing differences between occupational groups with the organisation to be examined. The blue collar sample consisted of 465 employees while the white collar sample included 500 employees.

6.2.3 Procedure. The procedure for data collection was described in Section 5.2.3.

6.2.4 Measures. The item content of scale measures used in this study can be found in Appendix A for the measures of organisational culture and Appendix F for the remainder. Responses to the OEI and purpose designed scale items were made on a 5-point Likert scale that ranged from 1 (*not at all likely*) to 5 (*almost certain*) for items phrased as questions, or 1 (*disagree*) to 5 (*agree*) for statement items for statement items. The OCI is measured on a 5-point Likert scale ranging from 1 (*not at all*) to 5 (*to a very great extent*) with items preceded by the phrase “To what extent are people expected or implicitly required to ...” For the single item measures of different sources of accountability the items were scored on a 5-point Likert scale from 1 (*not at all*) to 5 (*strongly*). Cronbach alphas were calculated separately for each sample.

PAS. The measure of positive accountability included items from the OEI as well as items designed specifically for this study. Items were chosen to reflect the four dimensions of positive accountability that were presented in Figure 6.1. Section 3.1.5 describes how items were designed to conceptually and semantically reflect the proposed models. For example, expectations was proposed as a dimension of positive accountability with the understanding that clarity around expectations is critical to accountability (see Breaux, Munyon, Hochwarter & Ferris 2009; Dose & Klimoski, 1995; Hall et al., 2003; Schlenker, 1994; Tetlock, 1992; Thoms et al., 2002). Hence the item: “Rules and standards at work are clear and unambiguous”, was designed to capture this aspect of positive accountability. Similarly, the item: “Discipline is talked about but rarely acted on” was designed to capture the discipline aspect of positive accountability. The full list of items and the rationale for the design of each item is presented below in Table 6.1. The 11-item scale was more internally consistent in the white collar ($\alpha = .75$) than blue collar ($\alpha = .65$) data.

Table 6.1

Rationale for the design of each of the PAS items

Dimension	Item	Rationale
Expectations	Rules and standards at work are clear and unambiguous	Designed to measure clarity of expectations
	What I'm accountable at work is appropriate to my job	Designed to measure appropriateness of expectations
Salience	I can achieve what I'm accountable for at work	Designed to measure achievability of expectations
	A lot of people can be affected by how well I do my work	Designed to measure the extent to which the employee feels that their work is linked to important outcomes
	My job has a substantial impact on the work or lives of other people	Designed to measure the extent to which the employee feels that their work is linked to important outcomes
Discipline	Poor performance on my part would have little or no impact on others	Designed to measure the extent to which the employee feels that their work is linked to important outcomes
	Officially there are consequences for poor performance but in reality not much happens	Designed to measure the extent to which negative feedback is performance contingent and delivered with consistency
	Discipline is talked about but rarely acted on	Designed to measure the consistency and integrity with which negative feedback is delivered
	I am rarely held accountable for my actions at work	Designed to measure the consistency and integrity with which negative feedback is delivered
Feedback	I get regular feedback about my performance	Designed to measure the extent to which feedback is delivered
	I am rewarded if I achieve what I'm accountable for at work	Designed to measure the extent to which performance contingent feedback is delivered

The results of principal components analysis supported a four-dimensional scale structure with items separating cleanly onto distinct factors (i.e., expectations,

positive feedback, salience and discipline). Details of the analysis are presented in the results. Cronbach's alpha statistics for the subscales are shown below in Table 6.2.

Table 6.2

Internal Consistency of the PAS Subscales.

Subscale	α	
	<i>Blue Collar</i>	White Collar
Expectations	.71	.67
Discipline	.63	.70
Salience	.58	.66
Positive Feedback	.63	.68

Accountability source. In order to examine the strength of accountability to different sources a series of single items were included that asked participants about how strongly they felt accountable to: the organisation, their site/port/office, their supervisor, their co-workers, and themselves.

Job stress. A measure of job stress was developed from the OEI item bank. The items measured the extent to which employees felt they were pushed beyond their normal range of comfort by organisational demands, pressures or conflicts. An example item was "Your job situation tends to be frustrating". The four item scale was more internally consistent in the white collar ($\alpha = .73$) than blue collar ($\alpha = .68$) data.

Intention to stay. Two items from the OEI were used to measure intention to stay with the organisation. The items were: "You will probably look for a new job in the next year" (reverse scored) and "Do you expect to be with this organisation two

years from now?” The scale was internally consistent in the blue collar ($\alpha = .73$) and white collar ($\alpha = .71$) samples.

Job satisfaction. Four items were selected from the OEI to measure job satisfaction. An example item is: “In general you like working here”. The scale was internally consistent in the blue collar ($\alpha = .77$) and white collar samples ($\alpha = .86$) with similar internal consistency to that reported by Human Synergistics (2001) ($\alpha = .82$).

Safety system rating. The 7-item measure of safety rating was identical to that described in Chapter 4 (see also Smith et al., 2006). Example items were: “In general my working conditions enable me to do my job safely” and “I would recommend my organisation as a safe place to work”. In the Chapter 4 study the scale was internally consistent ($\alpha = .89$) although it was less internally consistent in the blue ($\alpha = .80$) and white ($\alpha = .78$) collar samples in this study.

Organisational culture. The OCI (Cooke and Lafferty, 1987) includes 120 items that are designed to measure behavioural styles and expectations present in organisations. The OCI items are said to represent three general types of organisational culture termed: constructive, passive/defensive and aggressive/defensive. These cultural types are further broken into 12 cultural styles with each style measured using 10 items. A description of the OCI is provided in Appendix A and includes the item content of the scales. Balthazard, Cooke and Potter (2006) provide internal reliability statistics for the culture scales. The Cronbach’s alphas that were calculated in this study can be found in Table A2.

6.2.5 Data screening. The data was initially inspected to ensure that all scores were within the scale response limits. Cases that had more than 20% missing values on the study variables were removed (44 cases) from the data. Because this study included a different set of variables from those used in Chapter 3, the final blue and white collar samples were slightly different due to the additional loss of cases with too much missing data.

SPSS missing values analysis indicated that there were no variables with greater than 5% missing data. Little's MCAR test indicated that the data was not missing completely at random ($\chi^2 = 73032.5$ $df = 67402$, $p < .001$). However, due to the small proportion of missing data the missing values were assumed to be missing at random. Under these conditions EM was used to impute data for the scale variables as recommended by Tabachnick and Fidel (2001). The blue collar sample in this study consisted of 465 employees, while the white collar sample included 500 employees.

The statistical procedures used in the study rely on a number of assumptions about the data. These assumptions include normality, homoscedacity and linearity. Tabachnick and Fidel (2001) recommend assessing normality of variables by both statistical and graphical methods.

Scale Measures. For the scale variables the univariate skewness values ranged from – 0.71 (intention to stay) to 0.56 (avoidance) and the univariate kurtosis values ranged from –0.75 (positive feedback) to 1.40 (safety performance) for the blue collar data. In the white collar data the univariate skewness values ranged from

– 1.00 (salience and job satisfaction) to 0.75 (avoidance style). The univariate kurtosis values ranged from – 0.99 (intention to stay) to 1.36 (safety).

To further assess the univariate normality of the study variables Shapiro-Wilk tests revealed significance levels less than or equal to .05, however normal probability plots representing the actual distribution closely followed the diagonal for scale variables in both samples. In addition, examination of frequency histograms revealed relatively normal distributions for all variables and inspection of bivariate scatter plots supported the linearity of the variables across both samples. Based on the above findings the scale variables were assumed to have approximately normal distributions.

Examination of histograms and normal probability plots of residuals calculated through the regression analysis revealed normal distributions. In addition, scatter plots of predicted and residual scores suggested that bivariate linearity and homoscedasticity were appropriate. In addition, inspection VIF statistics did not suggest multicollinearity among the variables for any of the regression analyses with all VIF statistics less than 3, which is well below the cut-off of 10 recommended by Pallant (2007). Multivariate outliers were identified via examination of casewise diagnostics, Mahalanobis distance, Cook's distance and leverage values. Regressions were conducted with and without multivariate outliers to determine whether these cases unduly influenced the regression results. Negligible effects on results were observed for all regressions included in the results.

Single-Item Measures of Accountability Source. Two of the single-item measures of accountability source did show more obvious departures from

normality. Frequency histograms and normal probability plots showed clear skew for the accountability to coworkers and accountability to self single-item measures, with most participants in both samples reporting feeling strongly accountable to their coworkers and themselves.

For the single item measures of accountability source univariate skewness ranged from -1.71 (accountable to self) to -0.78 (accountable to organisation) and the univariate kurtosis ranged from 2.94 (accountable to self) to 0.53 (accountable to organisation), in the blue collar data. Univariate skewness ranged from -1.27 (accountable to self) to -0.30 (accountable to site) and the univariate kurtosis ranged from 1.53 (accountable to self) to -0.02 (accountable to organisation) in the white collar data.

Data from the single-item measures were used to compute t-test statistics. The t- test assumes approximately normal distributions. However, Moore (1995) suggests that for *t*-tests data may be markedly skewed when sample sizes are greater than 40. The data (particularly the accountable to self item) were strongly negatively skewed but transformations of the data to reduce skew had negligible effect on overall results. As such, untransformed data was used in the analysis.

6.3 Results

6.3.1 Demographics. Presented below are the demographic and descriptive statistics for the blue collar and white collar samples that were used in the analysis. The demographics are very similar to those reported for the blue and white collar samples in Chapter 5, however there were slight differences due to the removal of individual cases with too much missing data (i.e., 19 from the blue collar sample and 25 from the white collar sample).

Figure 6.2 presents the age groupings of the blue collar ($N = 465$) and white collar ($N = 500$) samples. For both samples the majority (54.0% of blue collar and 65.8% of white collar employees) of employees were between 30 and 50 years. However, there was a higher proportion of the blue collar sample (23.0%) compared to the white collar sample (12.2%) were in the 20-29yr age group. There were no white collar employees under 20 years of age. Figure 6.3 shows that approximately 25% of each sample had been with the organisation for more than 15 years, and approximately 25% of each sample had been with the organisation between 2 and 4 years. Overall, the blue collar and white collar samples were similar terms of tenure.

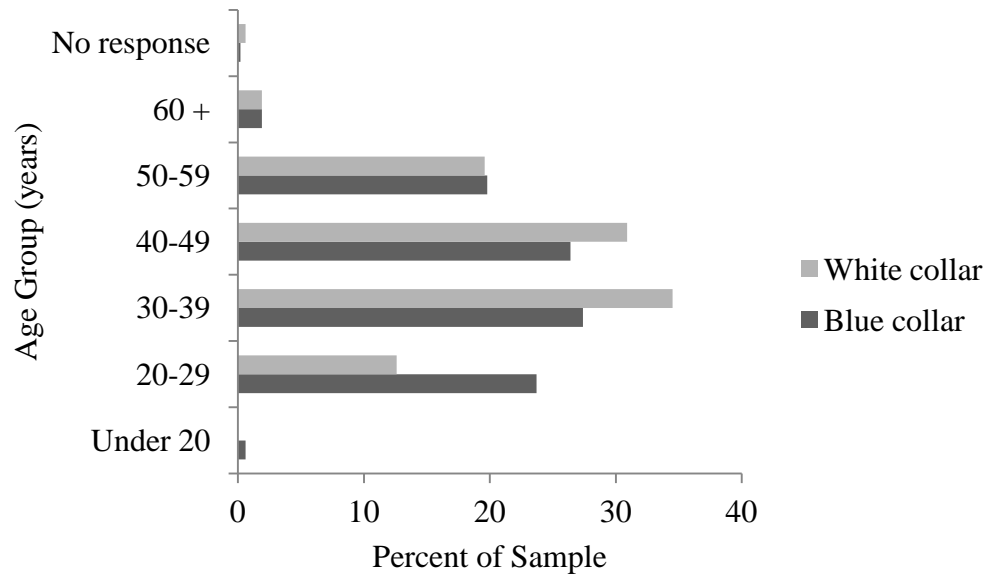


Figure 6.2. Age (years) groupings of the blue and white collar samples.

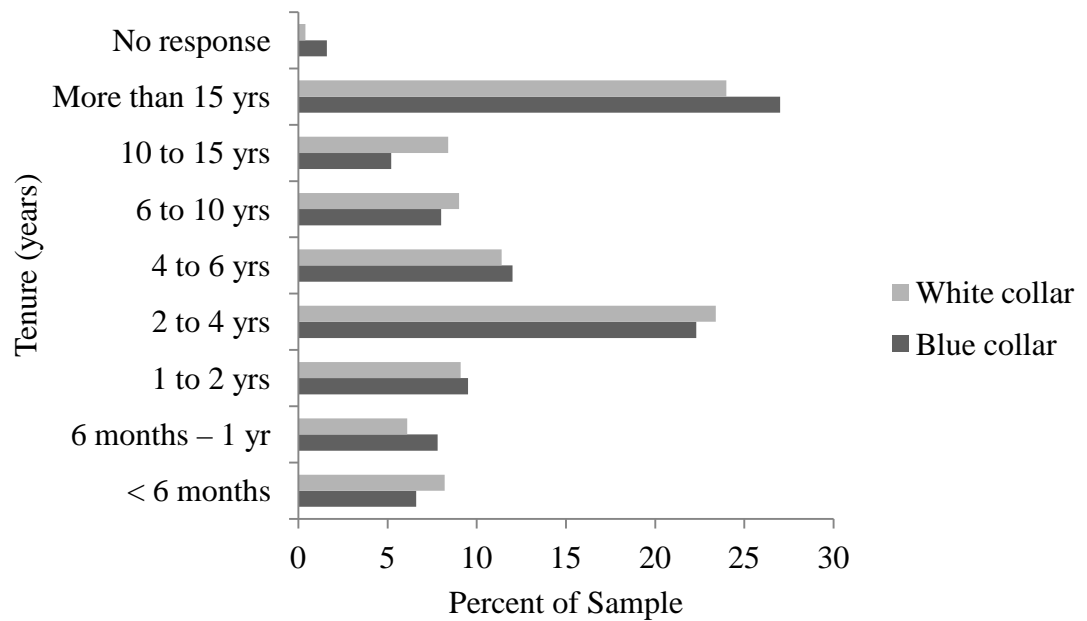


Figure 6.3. Tenure (years) groupings of the blue and white collar samples.

6.3.2 Descriptive statistics and *t*-tests. Descriptive statistics are presented in Table 6.3 and are briefly discussed below. All scale and subscale scores were calculated by averaging the item scores for that scale, hence all scale scores have a possible maximum of 5 and minimum of 1. The highest mean PAS subscale score for blue collar employee was on expectations ($M = 3.84$, $SD = 0.74$) suggesting that blue collar workers felt that expectations were clear, appropriate and achievable, however they also reported receiving limited performance based feedback and rewards at work ($M = 2.55$, $SD = 1.06$).

In terms of organisational culture, the blue collar employees reported highest ratings on the constructive cultural styles; affiliative and humanistic/encouraging ($M = 3.34$, $SD = 0.80$ and $M = 3.30$, $SD = 0.80$, respectively). The lowest mean score was on the avoidance scale ($M = 2.23$, $SD = 0.74$). Finally, blue collar employees reported generally positive perceptions of safety ($M = 3.61$, $SD = 0.58$), job satisfaction ($M = 3.71$, $SD = 0.87$), intention to stay ($M = 3.74$, $SD = 1.21$), and low work stress ($M = 2.43$, $SD = 0.84$).

White collar employees felt more positive about accountability salience ($M = 4.27$, $SD = 0.73$) than the other PAS subscales indicating that white collar employees perceived their work as being important and having an impact on others. Similar to the blue collar employees, they also rated receiving rewards and feedback lowest of the PAS subscales ($M = 3.17$, $SD = 1.09$).

White collar employee perceptions of organisational culture were also similar to their blue collar colleagues with the highest mean scores on the humanistic/encouraging ($M = 3.68$, $SD = 0.71$) and affiliative ($M = 3.62$, $SD = 0.73$)

styles, and the lowest on the avoidance style ($M = 2.09$, $SD = 0.75$). They also had higher means scores on the job satisfaction, safety rating, intention to stay, and work stress measures.

Employee perceptions of feedback and reward warrant additional comment. Both employee groups rated feedback as the lowest of the PAS subscales. In addition, the feedback subscale had the most variability in responses i.e. highest standard deviations. This suggests that performance based feedback and reward was an important issue for both groups of employees.

For the single item measures of accountability sources the means decreased with hierarchical distance for both samples i.e. employees reported feeling most accountable to themselves, followed by the team, then supervisor, site and lastly the organisation. There was a clear ceiling effect with most employees reporting a strong sense of accountability to themselves, with skew = -1.26 (blue collar) and skew = -1.72 (white collar).

Overall, the white collar employees reported higher levels of positive accountability at work on the scale and the single-item measures. Differences between blue and white collar perceptions of the organisational culture suggested that white collar employees perceived the organisation as more constructive and aggressive and less passive than blue collar employees. The white collar sample also reported more positive perceptions of safety at work and job satisfaction, but reported more work stress and less intention to stay than the blue collar employees.

Table 6.3

Means and Standard Deviations on the Study Variables for Blue Collar and White Collar Employees

Variable	BlueCollar <i>M (SD)</i>	Whitecollar <i>M (SD)</i>
PAS	3.31 (0.55)	3.61 (0.62)
Expectations	3.84 (0.74)	3.82 (0.83)
Discipline	3.04 (0.94)	3.31 (0.93)
Salience	3.71 (0.84)	4.27 (0.73)
Positive Feedback	2.55 (1.06)	3.17 (1.09)
<i>Accountable to..</i>		
Organisation	3.43 (0.98)	3.90 (0.90)
Site	3.45 (0.96)	4.05 (0.86)
Supervisor	3.80 (0.99)	4.29 (0.82)
Coworkers	4.20 (0.81)	4.45 (0.70)
Self	4.46 (0.71)	4.67 (0.57)
<i>OCI Cultural Styles</i>		
Achievement	3.19 (0.71)	3.47 (0.62)
Self-Actualisation	3.03 (0.66)	3.16 (0.61)
Humanistic-Encouraging	3.30 (0.80)	3.68 (0.71)
Affiliative	3.34 (0.80)	3.62 (0.73)
Approval	2.68 (0.70)	2.46 (0.68)
Conventional	2.94 (0.68)	2.81 (0.72)
Dependent	3.04 (0.60)	2.83 (0.61)
Avoidance	2.23 (0.74)	2.09 (0.75)
Oppositional	2.50 (0.56)	2.35 (0.55)
Power	2.25 (0.71)	2.38 (0.77)
Competitive	2.24 (0.80)	2.29 (0.81)
Perfectionistic	2.75 (0.66)	2.92 (0.70)
<i>Performance Indicators</i>		
Safety	3.61 (0.58)	3.88 (0.51)
Satisfaction	3.71 (0.87)	3.87 (0.93)
Intention to stay	3.74 (1.21)	3.66 (1.28)
Stress	2.43 (0.84)	2.70 (0.89)

A series of paired sample *t*-tests were conducted to examine whether participant ratings of accountability to different sources were significantly different from each other. Given that the means displayed in Table 6.3 decreased as distance from self increased, and to avoid unnecessary inflation of type I error, the set of *t*-tests is limited to the four tests presented below in Tables 6.4 and 6.5 . Cohen's *d*

was used as a measure of effect size as recommended by Rosnow and Rosenthal (2003, p. 224) for single sample *t*-tests. The *t*-tests revealed that in almost all cases accountability decreased significantly as proximity from the individual increased ($p < .05$). The only accountability sources that were not significantly different were blue collar ratings of accountability to the organisation and the site ($p = .66$). For the blue collar employees the largest difference was between accountability to the supervisor and team (Cohen's $d = -0.43$), while for the white collar employees it was between accountability to team and self (Cohen's $d = -0.34$).

Table 6.4

Paired Sample T-tests of Blue Collar Employee Ratings of Accountability to Different Sources

Pair	Paired Differences 95% C.I.					<i>t</i>	<i>df</i>	Sig.	Cohen's <i>d</i>
	Mean Difference	<i>SD</i>	Std. Error Mean	LL	UL				
Organisation - Site	-0.01	0.63	0.03	-0.07	0.04	-0.44	464	.66	0.02
Site - Supervisor	-0.35	0.95	0.04	-0.44	-0.26	-7.88	464	.00	0.37
Supervisor - Team	-0.40	0.94	0.04	-0.49	-0.32	-9.23	464	.00	0.43
Team - Self	-0.26	0.64	0.03	-0.32	-0.20	-8.78	464	.00	0.41

Note. LL = lower limit; UL = upper limit.

Table 6.5

Paired Sample T-tests of White Collar Employee Ratings of Accountability to Different Sources

Paired Differences. 95% C.I.									
Pair	Mean Difference	SD	Std. Error Mean	LL	UL	<i>t</i>	<i>df</i>	Sig.	Cohen's <i>d</i>
Organisation - Site	-0.15	0.75	0.03	-0.21	-0.08	-4.41	499	.00	0.02
Site - Supervisor	-0.24	0.83	0.04	-0.32	-0.17	-6.59	499	.00	0.29
Supervisor – Team	-0.16	0.67	0.03	-0.21	-0.10	-5.21	499	.00	0.24
Team - Self	-0.22	0.65	0.03	-0.28	-0.17	-7.68	499	.00	0.34

Note. LL = lower limit; UL = upper limit.

6.3.3 Determining the practical relevance of different sources of

accountability. The results above demonstrated a proximity effect whereby blue and white collar employees felt most accountable to themselves, with the strength of accountability decreasing for each source with proximity or distance from themselves. This result raises further questions about whether different sources of accountability can be more or less practically relevant to individual and organisational performance and also how the alignment of accountabilities impacts on performance.

To answer the first question correlations between each source of accountability and the performance indicators: job satisfaction, work stress, safety performance and intention to stay with the organisation were examined. The correlations in Tables 6.6 and 6.7 indicate that accountability to self followed by

accountability to the team shared the weakest associations with all of the performance indicators for both employee groups. Accountability to the organisation, site and supervisor shared stronger relationships with the performance indicator variables. A key difference between self and coworkers, and the organisation, site and supervisor is that the latter sources hold formal accountability power in terms of rewards and sanctions and role structuring. The results, therefore, support the argument that sources of accountability with greater perceived formal influence over employees are likely to have greater influence on performance.

Table 6.6

Correlations Between Sources of Accountability and Performance Indicators (Blue Collar)

	Accountability Source				
	Organisation	Site	Supervisor	Team	Self
Job Satisfaction	.41**	.40**	.38**	.29**	.19**
Work Stress	-.29**	-.27**	-.39**	-.25**	-.17**
Safety	.38**	.39**	.37**	.21**	.16**
Performance					
Intention to	.17**	.17**	.20**	.15**	.13**
Stay					

Note. * $p < .05$. ** $p < .01$.

Table 6.7

Correlations Between Sources of Accountability and Performance Indicators (White Collar)

	Accountability Source				
	Organisation	Site	Supervisor	Team	Self
Job Satisfaction	.33**	.36**	.41**	.31**	.19**
Work Stress	-.16**	-.14**	-.11*	-.10*	-.07
Safety	.32**	.26**	.27**	.20**	.21**
Performance					
Intention to Stay	.24**	.19**	.28**	.19**	.12**

Note. * $p < .05$. ** $p < .01$.

6.3.4 Alignment of accountability sources. Organisations implement accountability mechanisms in an effort to align employee behaviour with organisational goals (Ferris et al., 1995; Hall et al., 2009). Using the single item measures of strength of accountability to different sources it was possible to explore whether employees who were aligned with the organisation, in terms of the strength of accountability, were different from those who were not.

A cross-tabulation of blue and white collar employee responses on the accountable to self and accountable to the organisation items (Tables 6.8 and 6.9) revealed that there were large proportions of employees (221 blue collar and 361 white collar) who felt strongly accountable to themselves and the organisation (strongly accountable was defined as a 4 or 5 response, while weakly accountable was defined as a 1 or 2 response). This group was labelled *aligned* and could be described as better organisationally integrated and more likely to be aligned with organisational goals. There were no employees who reported weak accountability to self but strong accountability to the organisation, and few employees who reported weak accountability to self and the organisation (5 blue collar and 2 white collar).

There were, however, a larger proportion of employees who reported strong accountability to self but weak accountability to the organisation (54 blue collar and 36 white collar). These employees were labelled *not aligned* and can be described as less organisationally integrated, and less likely to align their behaviour with organisational goals. It could further be argued that these employees were more likely to be driven by their own expectations and standards rather than organisational expectations and standards.

Table 6.8

Cross-Tabulation of Blue Collar Employee Strength of Accountability to Self and the Organisation

Accountable to Self	Accountable to Organisation				
	1	2	3	4	5
1	1	0	0	0	0
2	2	2	1	0	0
3	2	3	31	3	0
4	4	20	62	65	1
5	10	20	83	93	62

Note. Responses were made on a 5-point Likert scale ranging from 1 “*not at all*” to 5 “*strongly*”.

Table 6.9

Cross-Tabulation of White Collar Employee Strength of Accountability to Self and the Organisation

Accountable to Self	Accountable to Organisation				
	1	2	3	4	5
1	0	0	0	0	0
2	0	2	1	0	0
3	0	0	10	5	1
4	2	11	26	81	5
5	5	18	58	154	121

Note. Responses were made on a 5-point Likert scale ranging from 1 “*not at all*” to 5 “*strongly*”.

It was expected that aligned employees would feel more accountable, more satisfied and less stressed at work, and were more likely to stay with the organisation

than the not aligned employees. The mean scores on each of these measures supported these expectations (see Table 6.10). A series of independent samples *t*-tests were conducted to test whether the differences were statistically significant.

Table 6.10

Means and Standard Deviations on Selected Study Variables for Aligned and Not Aligned, Blue Collar and White Collar Employees

Variable	Blue Collar		White Collar	
	Aligned <i>M (SD)</i>	Not Aligned <i>M (SD)</i>	Aligned <i>M (SD)</i>	Not Aligned <i>M (SD)</i>
PAS	3.51 (0.58)	2.99 (0.44)	3.73 (0.59)	3.13 (0.64)
Job Satisfaction	4.02 (0.83)	3.07 (0.92)	4.04 (0.85)	3.22 (1.13)
Job Stress	2.20 (0.86)	2.83 (0.76)	2.63 (0.90)	3.04 (0.96)
Intention to Stay	3.90 (1.24)	3.32 (1.20)	3.73 (1.25)	3.14 (1.30)
Safety Performance	3.80 (0.58)	3.21 (0.65)	3.97 (0.48)	3.62 (0.49)

Note. Aligned *N* = 221 (blue collar) and *N* = 361 (white collar); Not Aligned *N* = 54 (blue collar) and

N = 36 (white collar).

Aligned employees reported higher positive accountability, job satisfaction, and safety ratings, stronger intention to stay with the organisation, and lower job stress than those employees who were not aligned ($p < .05$) (see Table 6.11 and 6.12). Effect sizes were calculated using the Hedge's *g* statistic as per the recommendations of Klein (2004) and Rosnow and Rosenthal (2003) for testing differences between two independent samples with unequal sample sizes. Aligned and not aligned blue collar employees showed the largest difference on the job satisfaction scale, while aligned and not aligned white collar employees were most different on the PAS.

Table 6.11

T-Tests of Differences Between Means for Aligned and Not Aligned Employees on Selected Study Variables (Blue Collar)

		Levene's Test		Test of equality of means			
		<i>F</i>	Sig.	<i>t</i>	<i>df</i>	Sig. (2-tailed)	Hedges's <i>g</i>
PAS	Equal variances assumed	2.42	.12	-6.13	273	.00	0.93
	Equal variances not assumed			-7.24	103.14	.00	
Job Satisfaction	Equal variances assumed	3.08	.08	-7.38	273	.00	1.12
	Equal variances not assumed			-6.93	75.45	.00	
Job Stress	Equal variances assumed	5.16	.02	4.98	273	.00	0.75
	Equal variances not assumed			5.73	89.37	.00	
Intention to Stay	Equal variances assumed	0.09	.76	-3.07	273	.00	0.47
	Equal variances not assumed			-3.14	82.92	.00	
Safety Performance	Equal variances assumed	1.59	.21	-6.53	273	.00	0.98
	Equal variances not assumed			-6.09	74.84	.00	

Table 6.12

T-Tests of Differences Between Means for Aligned and Not Aligned Employees on Selected Study Variables (White Collar)

		Levene's Test		Test of equality of means			
		<i>F</i>	Sig.	<i>t</i>	<i>df</i>	Sig. (2-tailed)	Hedges's <i>g</i>
PAS	Equal variances assumed	1.66	.20	-5.78	395	.00	1.01
	Equal variances not assumed			-4.48	41.36	.00	
Job Satisfaction	Equal variances assumed	7.67	.01	-5.39	395	.00	0.94
	Equal variances not assumed			-4.27	39.03	.00	
Job Stress	Equal variances assumed	0.32	.57	2.61	395	.01	0.46
	Equal variances not assumed			2.46	41.25	.02	
Intention to Stay	Equal variances assumed	0.02	.89	-2.71	395	.01	0.47
	Equal variances not assumed			-2.63	41.75	.01	
Safety Performance	Equal variances assumed	0.05	.83	-4.21	395	.00	0.74
	Equal variances not assumed			-4.13	41.96	.00	

6.3.5 Principal components analysis of the PAS. Principal components

analysis with varimax rotation was conducted for both the blue and white collar data to explore the underlying structure of the PAS. Varimax was the method of rotation chosen as it tends to produce the simplest and most interpretable solution (Tabachnick & Fidel, 2001). The item “I face negative consequences if I don’t achieve what I’m accountable for at work” was dropped from the final analysis due to low communalities of .2 (blue collar) and .3 (white collar). Each analysis was set to four factors consistent with the proposed theoretical framework of positive accountability (see Figure 6.1). For the final analyses the case to variable ratios were 42:1 (blue collar analysis) and 45:1 (white collar analysis) and far exceeded the 5:1 recommended by Tabachnick and Fidel (2001).

For the blue collar analysis examination of the *KMO* measure of sampling adequacy indicated the data was suitable for factor analysis ($KMO = .65$), and Bartlett’s test of sphericity indicated appropriate collinearity among the items $\chi^2 (55) = 911.26, p < .001$. For the white-collar analysis, examination of the *KMO* measure of sampling adequacy indicated the data was suitable for factor analysis ($KMO = .77$), and Bartlett’s test of sphericity indicated appropriate collinearity among the items $\chi^2 (55) = 1136.71, p < .001$.

The four-component solutions cumulatively explained 63.00% (blue collar) and 64.12% (white collar) of the variance and were consistent with the theoretical four-dimensional structure of positive accountability. Tables 6.13 and 6.14 give the eigenvalues, percentage of variance explained by the components as well as the variable loadings for each analysis. The overall four-component solution was similar

across both samples in terms of the item loadings and total amount of variance accounted for. However, there was some variation in the variance explained by each component. For example, in the blue collar analysis the expectations component accounted for the most variance in the data whereas for white collar employees it was the discipline component. These results suggest that blue collar and white collar employees take slightly different views of positive accountability and respond differently to some of the items, but that the overall meaning of the construct is consistent for each group.

In the white collar analysis only three factors were identified with eigenvalues greater than 1. However, the consistency of the four-component solution with the blue collar results, the interpretability of the solution and the consistency with the conceptual model of accountability all support manually setting the analysis to detect four components.

Table 6.13

Principal Components Analysis Results of the PAS (Blue Collar)

	Component			
	1	2	3	4
Eigen value	2.63	1.72	1.34	1.24
Variance explained	23.93%	15.59%	12.14%	11.28%
What I'm accountable at work is appropriate to my job	.84			
I can achieve what I'm accountable for at work	.82			
Rules and standards at work are clear and unambiguous	.67			
Discipline is talked about but rarely acted on		.82		
Officially there are consequences for poor performance but in reality not much happens		.77		
I am rarely held accountable for my actions at work		.67		
A lot of people can be affected by how well I do my work			.81	
My job has a substantial impact on the work or lives of other people			.72	
Poor performance on my part would have little or no impact on others			.64	
I am rewarded if I achieve what I'm accountable for at work				.81
I get regular feedback about my performance				.80
<i>Note.</i> Component 1 =Expectations; Component 2 = Discipline; Component 3 = Salience; Component 4 = Feedback.				

Table 6.14

Principal Components Analysis Results of the PAS (White Collar)

	Component			
	1	2	3	4
Eigen value	3.16	1.58	1.44	0.90
Variance explained	28.71%	14.39%	13.05%	8.14%
Officially there are consequences for poor performance but in reality not much happens	.80			
Discipline is talked about but rarely acted on	.78			
I am rarely held accountable for my actions at work	.74			
A lot of people can be affected by how well I do my work		.82		
My job has a substantial impact on the work or lives of other people		.81		
Poor performance on my part would have little or no impact on others		.67		
I can achieve what I'm accountable for at work			.81	
What I'm accountable at work is appropriate to my job			.72	
Rules and standards at work are clear and unambiguous			.71	
I am rewarded if I achieve what I'm accountable for at work				.83
I get regular feedback about my performance				.80
<i>Note.</i> Component 1 = Discipline; Component 2 = Salience; Component 3 = Expectations; Component 4 = Feedback.				

6.3.6 Organisational culture and positive accountability. Correlations

between the PAS and the 12 organisational culture styles are presented in Tables 6.15 and 6.16. Because of the high number of correlations (78 per sample) and large sample sizes the likelihood of making a Type 1 error is almost certain, that is, the expected number of spurious results is 3.9 (78 times 0.05% chance of detecting a significant correlation when there is none). In this context the size and direction of the correlations was of primary concern, not the statistical significance of the relationships (all correlations shown were statistically significant at $p < .01$).

Positive accountability was most strongly associated with the constructive cultural styles (i.e., achievement, self-actualising, humanistic, affiliative; see Cooke and Lafferty, 1987) with $r = .34$ to $r = .43$ and the avoidance style ($r = -.31$) in the blue collar sample. The remaining cultural styles were only weakly correlated with accountability ($r = .02$ to $r = -.14$). The correlations among the cultural styles raise some questions about multicollinearity among the variables for use in regression analysis (see below). For example, the four constructive cultural styles were moderately to highly correlated ($r = .71$ to $r = .83$).

For white collar employees the PAS was most strongly correlated with the avoidance cultural style ($r = -.48$) and the constructive cultural styles (i.e., achievement, self-actualising, humanistic, affiliative; $r = .40$ to $r = .45$). The remaining cultural styles were all negatively associated with accountability ($r = -.18$ to $r = -.39$). Again, the correlations raise some questions about multicollinearity among the variables, particularly the four constructive cultural styles with correlations ranging from $r = .67$ to $r = .79$.

The associations between the cultural styles and positive accountability were generally stronger for white collar employees and there was also some variability in the pattern of relationships between the employee groups. For example, some of the passive and aggressive behavioural styles (e.g., dependent, conventional and competitive) were only weakly related to accountability for blue collar employees but more strongly related for white collar employees.

Table 6.15

Correlations Among the OCI Cultural Styles and Positive Accountability (Blue Collar)

	1	2	3	4	5	6	7	8	9	10	11	12	13
1. PAS	1												
2. Achievement	.34**	1											
3. Self-Actualizing	.34**	.76**	1										
4. Humanistic	.43**	.78**	.71**	1									
5. Affiliative	.43**	.78**	.78**	.83**	1								
6. Approval	.02	.36**	.34**	.32**	.34**	1							
7. Conventional	-.07	.08	.05	-.04	.03	.55**	1						
8. Dependent	.03	.27**	.21**	.17**	.20**	.64**	.62**	1					
9. Avoidance	-.31**	-.21**	-.14**	-.31**	-.31**	.39**	.61**	.41**	1				
10. Oppositional	-.09	.29**	.34**	.56**	.17**	.58**	.43**	.42**	.49**	1			
11. Power	-.13**	.06	.14**	-.04	-.02	.48**	.57**	.44**	.70**	.60**	1		
12. Competitive	-.14**	.17**	.21**	-.01	.03	.59**	.48**	.47**	.57**	.70**	.66**	1	
13. Perfectionistic	.08	.43**	.45**	.31**	.37**	.55**	.54**	.52**	.33**	.51**	.58**	.53**	1

Note. * $p < .05$. ** $p < .01$.

Table 6.16

Correlations Among the OCI Cultural Styles and Positive Accountability (White Collar)

	1	2	3	4	5	6	7	8	9	10	11	12	13
1.PAS	1												
2.Achievement	.43**	1											
3.SelfActualizing	.43**	.72**	1										
4.Humanistic	.45**	.75**	.67**	1									
5.Affiliative	.40**	.68**	.73**	.79**	1								
6.Approval	-.32**	-.16**	-.16**	-.21**	-.13**	1							
7.Conventional	-.39**	-.23**	-.28**	-.33**	-.25**	.71**	1						
8.Dependent	-.30**	-.09	-.16**	-.20**	-.13**	.73**	.72**	1					
9.Avoidance	-.48**	-.40**	-.37**	-.49**	-.45**	.60**	.73**	.56**	1				
10.Opositional	-.34**	-.09*	-.06	-.26**	-.19**	.59**	.56**	.57**	.62**	1			
11.Power	-.38**	-.24**	-.23**	-.42**	-.37**	.56**	.66**	.61**	.68**	.65**	1		
12.Competitive	-.37**	-.16**	-.20**	-.35**	-.32**	.66**	.67**	.64**	.68**	.72**	.77**	1	
13.Perfectionistic	-.18**	.08	-.00	-.15**	-.08	.46**	.60**	.60**	.41**	.49**	.65**	.58**	1

Note. * $p < .05$. ** $p < .01$.

Multiple regressions were used to identify which cultural styles best predicted positive accountability. As noted above, the bivariate correlations between some of the cultural styles suggested multicollinearity among the IVs. Tabachnick and Fidel (2001) suggest that while it typically takes bivariate correlations of .9 or more create statistical problems, correlations of approximately .7 or more can represent logical problems due to measurement redundancy.

Despite the potential for multicollinearity effects, all 12 behavioural styles were included in the regression analyses. This was for two reasons. First, the structure of the OCI subscales has been established across a wide range of organisations (Cooke and Lafferty, 1987; see also Balthazard, Cooke & Potter, 2006), and while they are related, the subscales are also different in meaningful ways. As such, the utilisation of the twelve cultural styles also allowed for a more detailed description of organisational culture. Second, tolerance values remained above 0.1 and VIF values below 10, which are common cut-off values used to test whether multicollinearity in the data is a problem (Hair, Anderson, Tatham, & Black, 1998; Ho, 2006).

However, colinearity increases standard errors of measurement and decreases partial correlations making it difficult to assess the importance of individual predictors. While the results fell within the statistical parameters described above, it was likely that multicollinearity limited the sensitivity of the regressions to detect the importance of individual predictors. This was evidenced by the gap between the overall R^2 compared with the sum total of the unique (partial) variance values of the individual predictors.

Overall, the cultural styles were able to account for 25% of the variance in employee accountability in the blue collar sample, $F(12, 452) = 12.47, p < .01$. As can be seen in Table 6.17 the only statistically significant individual predictors were the humanistic/encouraging and avoidance styles, each accounting for 2% of unique variance in accountability ($p < .01$).

Table 6.17

Regression Results for Organisational Culture Predicting Positive Accountability (Blue Collar)

Variables	<i>B</i>	<i>SE</i>	β	sr^2	R^2
Achievement	-0.03	0.06	-.04	.00	
Self-Actualising	0.08	0.06	.09	.00	
Humanistic	0.17**	0.06	.24	.02	
Affiliative	0.11	0.06	.16	.00	
Approval	-0.08	0.05	-.10	.00	
Conventional	0.09	0.05	.11	.00	
Dependent	0.06	0.05	.06	.00	
Avoidance	-0.15**	0.05	-.21	.02	
Oppositional	-0.11	0.06	-.11	.00	
Power	0.04	0.05	.05	.00	
Competitive	-0.00	0.05	-.00	.00	
Perfectionistic	-0.02	0.05	-.02	.00	
					.25**

Note. * $p < .05$. ** $p < .01$.

Table 6.18

Regression Results for Organisational Culture Predicting Positive Accountability (White Collar)

Variables	<i>B</i>	<i>SE</i>	β	sr^2	R^2
Achievement	0.16*	0.07	.16	.01	
Self-Actualising	0.20**	0.06	.20	.02	
Humanistic	0.05	0.06	.06	.00	
Affiliative	-0.04	0.06	-.04	.00	
Approval	0.00	0.06	.00	.00	
Conventional	-0.03	0.06	-.04	.00	
Dependent	-0.01	0.06	-.01	.00	
Avoidance	-0.15**	0.06	-.18	.01	
Oppositional	-0.15*	0.07	-.14	.01	
Power	-0.04	0.06	-.05	.00	
Competitive	-0.02	0.05	-.02	.00	
Perfectionistic	0.02	0.05	.02	.00	
					.34**

Note. * $p < .05$. ** $p < .01$.

Overall, the 12 cultural styles accounted for 34% of the variance in positive accountability for white collar employees, $F(12, 487) = 20.84, p < .01$. As can be seen in Table 6.18 the statistically significant predictors of positive accountability were self-actualising, avoidance, achievement and oppositional cultural styles ($p < .01$). Self-actualising was the strongest predictor and accounted for 2% unique variance with the remaining variables accounting for 1% unique variance in positive accountability.

6.3.7 Establishing the practical significance of positive accountability.

There is a dearth of studies that have examined positive accountability and how it relates to individual and organisational performance. Tables 6.19 and 6.20 give the correlations between the PAS (total and subscales) and the four work-related performance indicators: safety ratings, job satisfaction, job stress and intention to leave the organisation. For blue collar employees the PAS correlations with the four

performance indicators ranged from $r = .32$ to $r = .54$ ($p < .01$). Of the four PAS subscales, expectations and feedback were more strongly correlated with all of the performance indicator variables than discipline and salience.

Among the PAS subscales, the correlation between discipline and expectations was considerably weaker for blue collar employees ($r = .07$, $p > .05$) than for white collar employees ($r = .24$, $p < .01$). Similarly, the relationship between discipline and feedback was weaker for blue collar ($r = .07$, $p > .05$) than white collar ($r = .34$, $p < .01$) employees. These results suggest that blue collar and white collar employees responded differently to the discipline items. For blue collar employees a sense that negative feedback was delivered with discipline and integrity was weakly linked to having a sense of structure and clarity around expectations and reports of receiving positive performance feedback.

Table 6.19

Correlations Between the Positive Accountability Subscales and Performance Indicators (Blue Collar)

	1	2	3	4	5	6	7	8	9
1.PAS	1								
2.Expectations	.62**	1							
3.Discipline	.62**	.07	1						
4.Feedback	.61**	.30**	.07	1					
5.Salience	.55**	.24**	.17**	.16**	1				
6.Safety	.49**	.49**	.19**	.36**	.12*	1			
Performance									
7.Job	.54**	.50**	.16**	.38**	.31**	.48**	1		
Satisfaction									
8.Job Stress	-.45**	-.44**	-.17**	-.28**	-.24**	-.40**	-.61**	1	
9.Intention to	.32**	.28**	.14**	.23**	.18**	.18**	.61**	-.43**	1
stay									

Note. * $p < .05$. ** $p < .01$.

Table 6.20

Correlations Among the Positive Accountability Variables and Performance Indicators (White Collar)

	1	2	3	4	5	6	7	8	9
1.PAS	1								
2.Expectations	.73**	1							
3.Discipline	.71*	.24**	1						
4.Feedback	.72**	.46**	.31**	1					
5.Salience	.49**	.20**	.20**	.19**	1				
6.Safety	.49**	.46**	.27**	.39**	.15**	1			
Performance									
7.Job	.58**	.55**	.22**	.55**	.22**	.50**	1		
Satisfaction									
8.Job Stress	-.43**	-.49**	-.17**	-.37**	-.10*	-.34**	-.58**	1	
9.Intention to	.41**	.37**	.20**	.40**	.13**	.30**	.62**	-.38**	1
stay									

Note. * $p < .05$. ** $p < .01$.

There were similar patterns of relationships among the variables for white collar employees, with the PAS moderately correlated with all four of the performance indicators included in the study ($r = .41$ to $r = .58$, $p < .01$). The strongest correlations were with job satisfaction and safety performance ($r = .58$ and $r = .49$, $p < .01$). As with the blue collar employees, the expectations and feedback subscales shared stronger relationships with the four outcome variables than discipline and salience.

A series of regressions was conducted to test how well positive accountability predicted work performance indicators. In each regression the four accountability subscales (i.e., expectations, discipline, feedback, and salience) were entered as IVs. DVs were: job satisfaction, work stress, intention to stay with the

organisation and safety performance. All regressions were conducted separately for blue collar and white collar employees.

For the blue collar employees (Table 6.21) the PAS subscales explained a significant amount (31%) of the variance in safety performance, $F(4, 460) = 52.40$, $p < .001$; 35% of the variance in job satisfaction, $F(4, 460) = 61.01$, $p < .001$; 24% of the variance in work stress, $F(4, 460) = 38.85$, $p < .001$; and 12% of the variance in intention to stay, $F(4, 460) = 15.66$, $p < .01$.

Table 6.21 also provides the beta weights for individual predictors. Importantly, expectations was the strongest predictor of all performance indicators. Feedback was the second strongest predictor. This highlights the particular practical importance of these features of positive accountability.

Table 6.21

Summary of Regression Results for Predicting Performance Indicators from Positive Accountability Subscales (Blue Collar)

Variables	<i>B</i>	<i>SE</i>	β	sr^2	R^2
DV = Safety Performance					
Expectations	0.33**	0.03	.43	.18	
Discipline	0.09**	0.02	.15	.03	
Feedback	0.12**	0.02	.23	.06	
Salience	-0.03	0.03	-.05	.00	
					.31
DV = Satisfaction					
Expectations	0.46**	0.05	.39	.17	
Discipline	0.08*	0.04	.09	.01	
Feedback	0.19**	0.03	.23	.07	
Salience	0.17**	0.04	.16	.04	
					.35
DV = Stress					
Expectations	-0.41**	0.05	-.36	.13	
Discipline	-0.10**	0.04	-.11	.02	
Feedback	-0.11**	0.03	-.14	.02	
Salience	-0.11**	0.04	-.11	.02	
					.24
DV = Intention to stay					
Expectations	0.34**	0.08	.21	.04	
Discipline	0.13*	0.06	.10	.01	
Feedback	0.16**	0.05	.14	.02	
Salience	0.14*	0.07	.09	.01	
					.12
<i>Note.</i> * $p < .05$. ** $p < .01$.					

For the white collar employees the PAS subscales, together, accounted for 27% of the variance in safety performance, $F(4,495) = 45.33, p < .001$; 42% of the

variance in job satisfaction, $F(4, 495) = 89.58, p < .001$; 27% of the variance in work stress, $F(4, 495) = 45.32, p < .001$; and 21% of the variance in intention to stay, $F(4, 495) = 32.58, p < .001$ (Table 6.22).

Like the results for the blue collar employees, for the white collar sample it was found that expectations followed by positive feedback were the strongest individual predictors of safety performance, job satisfaction and stress regressions. However, the strongest predictor of intention to stay with the organisation was receiving feedback at work followed by clarity, appropriateness and achievability of expectations. The results also showed that, overall, discipline and salience were weaker predictors of the performance indicators for white collar employees than they were for blue collar employees.

Table 6.22

Summary of Regression Results for Predicting Performance Indicators from Positive Accountability Subscales (White Collar)

Variables	<i>B</i>	<i>SE</i>	β	sr^2	R^2
DV = Safety Performance					
Expectations	0.21**	0.03	.34	.11	
Discipline	0.07**	0.02	.13	.02	
Feedback	0.09**	0.02	.19	.03	
Salience	0.02	0.03	.02	.00	
					.27
DV = Satisfaction					
Expectations	0.41**	0.04	.37	.15	
Discipline	0.01	0.04	.01	.01	
Feedback	0.31**	0.03	.36	.14	
Salience	0.10*	0.05	.08	.05	
					.42
DV = Stress					
Expectations	-0.44**	0.05	-.41	.15	
Discipline	-0.02	0.04	-.02	.00	
Feedback	-0.15**	0.04	-.18	.03	
Salience	0.03	0.05	.02	.00	
					.27
DV = Intention to stay					
Expectations	0.35**	0.07	.23	.05	
Discipline	0.08	0.06	.06	.00	
Feedback	0.32**	0.06	.28	.07	
Salience	0.03	0.07	.02	.00	
					.21

Note. * $p < .05$. ** $p < .01$.

6.4 Discussion

The key findings of the study are:

- The PAS was psychometrically consistent with the proposed four-dimensional model of positive accountability (i.e., expectations, feedback, salience and discipline)
- In terms of accountability to different sources (a) the strength of accountability decreased with proximity from self (b) different accountability sources shared different relationships with performance indicators, and (c) the alignment of self and organisational sources of accountability was important to performance.
- Organisational culture predicted positive accountability but different aspects of culture predicted accountability for blue and white collar employees.
- Positive accountability predicted significant variance in performance indicators (i.e., safety ratings, job satisfaction, job stress and intention to stay).

6.4.1 Measuring accountability. There are very few measures of accountability available in the research literature, even less so, measures of positive accountability. In this study a framework for understanding positive accountability as a positive feature of the work environment was developed by integrating existing research and literature. This framework was operationalised for measurement as the PAS. Analysis of the structure of the PAS in blue and white collar samples was consistent with a four-dimensional understanding of positive accountability (i.e., expectations, feedback, discipline and salience) and the measure was sufficiently

internally consistent. The results, therefore, give support to the use of the PAS as a measure of positive accountability.

Whilst a four-dimensional solution fitted the data for blue and white collar employees there were also some subtle, but important, between group differences in the way that different dimensions accounted for variance. For example, expectations explained the most variance in the data for blue collar employees, while for white collar employees discipline explained the most variance. These subtle differences in emphasis support the understanding that employees at different levels within the organisation experience the organisation, and hence accountability, from different perspectives.

The results supported understanding negative feedback as an important and positive feature of the work environment (and positive accountability), when it is delivered with discipline and integrity. This is in contrast to traditional views of accountability that focus on punishment and blame attribution. It is an important distinction to make as it represents a historical shift in the way that organisations relate to and elicit conformity from their members. The results that discipline explained the most variance in the data for white collar employees and was second to expectations for blue collar employees further demonstrates its importance.

The results support an understanding of negative feedback and discipline as important and positive features of the work environment and, in particular, positive accountability. This is the case for both white and blue collar employees where discipline explains the most variance in the white collar sample and was second to expectations in the amount of variance explained in the blue collar sample. It

highlights that when performance expectations are seen as appropriate to the job, a norm of negative consequences for poor performance and positive consequences for good performance is a desirable work environment norm. It aligns well with results from the study of laissez-faire leadership (Skogstad, Einarsen, Torsheim, Schanke, & Hetland, 2007) where the absence of discipline was positively correlated with role conflict, role ambiguity and conflicts with coworkers. Negative feedback and discipline as positive features of a work environment characterised by positive accountability importantly shift the focus of accountability from punishment and blame attribution to a focus on enabling appropriate behavior.

6.4.2 Strength of accountability to different sources. In addition to the nature of accountability, its direction (i.e., accountable for what and accountable to whom) is of research interest (Frink & Klimoski, 1998; 2004). While not the primary focus of this study, the strength of accountability to different sources was explored.

The results supported Fink and Klimoski's (1998) argument that employees will feel more strongly or less strongly accountable depending on the source of accountability. Both blue and white collar employees felt most strongly accountable to themselves, but felt decreasingly accountable as proximity or hierarchical distance from themselves increased. An effect of proximity might also explain the result that accountability to the organisation was not significantly different from accountability to the site for blue collar employees; whereas for the white collar workers there was a significant difference. That is, an effect of proximity supports the interpretation that the site and organisation were sufficiently distant from blue collar employees that they were not perceived as distinct from one another. However, site and

organisation were more distinct and salient sources of accountability for white collar employees because of the position they occupy in the organisational hierarchy.

Employees reported that they felt most accountable to themselves and their team. However, correlations indicated that accountability to self and to co-workers were less strongly related to job satisfaction, work stress, safety ratings and intention to stay with the organisation, than accountability to the organisation, site and supervisors. One of the more important differences between organisation, site and supervisors versus individuals and team members is that the former have formal accountability powers in terms of reward, sanction, and role expectations; while the latter do not. The results, therefore, support the argument that accountability to sources with formal accountability power is likely to have stronger practical relevance than accountability to sources with no, or limited, formal powers (i.e., self or co-workers).

The results suggested that an additional consideration was the alignment of self and organisational (i.e., internal and external) sources of accountability. Blue and white collar employees who were highly accountable to themselves, but not the organisation (i.e., not aligned) reported significantly lower levels of accountability (PAS), job satisfaction, safety performance, work stress and intention to stay with the organisation, than employees who were highly accountable to themselves and the organisation (i.e., aligned). The results are consistent with the understanding that employees who internalise organisational styles, or align themselves with the organisation, experience greater accountability, job satisfaction, are more likely to stay with the organisation, see the organisation as safe and are less stressed.

In this study five specific sources of accountability were explored. However, the organisational reality is that employees can feel accountable to many sources (e.g. shareholders, professional boards or government regulatory bodies) and for different formal and informal expectations and behaviours. Indeed, Frink and Klimoski (2004) argue that employees exist within a complex web of accountabilities. Given this complexity it would be fair to question the practical utility of approaching accountability from this more sociologically oriented perspective.

6.4.3 Culture and accountability. This study aimed to identify whether, and what types, of organisational culture predict positive accountability. Organisational culture did predict significant amounts (25% for blue collar and 34% for white collar) of variance in positive accountability and the patterns of results revealed important insights into the construct. However, multicollinearity among the IVs may have limited the sensitivity of the regressions to assess the relative strengths of individual cultural styles.

A culture of avoidance (i.e., avoiding blame and decision making, shifting responsibility and not rewarding success but punishing mistakes; see Balthazard et al., 2006) was an important, and negative, predictor of positive accountability for both samples of employees. Furthermore, a person focussed, supportive culture with a participative management style (i.e., humanistic) predicted accountability for blue collar employees. For white collar employees a culture that values challenging goals and accomplishment (i.e., achievement), fosters creativity and personal growth (i.e., self-actualising) and is not confrontational or critical (i.e., oppositional) predicted

positive accountability. Together, these results: (a) shape and support the view of accountability as a positive feature of the work environment; (b) are consistent with the argument that positive accountability is an interactive construct embedded within the social structures of work (i.e., spans the immediate work and wider organisational environment); and (c) illustrate that employees at different levels of organisational hierarchy exist within different social and work contexts and that this context influences the way they see and experience positive accountability.

6.4.4 Practical significance of positive accountability. The results of this study support the practical significance of measuring and understanding positive accountability in terms of job satisfaction, work stress, safety ratings and intention to stay with the organisation. Importantly, the expectations and feedback dimensions of positive accountability consistently emerged as the strongest predictors of the performance indicator variables for both blue and white collar employees.

Previous studies have shown links between accountability and job satisfaction (i.e., Breux et al., 2007; Laird et al., 2009; Thoms et al., 2002) and positive accountability was linked to workplace safety in Chapter 4 of this research. However, this study extends earlier research by demonstrating that positive accountability is also linked to employee intention to stay with the organisation. Consistent with the understanding of positive accountability as a work environment construct that supports employee behaviour and functioning, positive accountability shared a negative relationship with work stress. In contrast, some authors have shown that increased accountability can lead to elevated stress at work due to increased scrutiny and associated anxiety and that low levels can also lead to stress

because of a lack of direction and structure (i.e., a curvilinear relationship; Hall et al., 2003; Hochwarter et al., 2005; Green et al., 2002; Siegel-Jacobs & Yates, 1996). These contrasting results illustrate the importance of being clear about the nature of accountability. In addition, this distinction is of practical importance in terms of the use of accountability measures in empirical research because correlation, regression and other members of the Generalised Linear Model (GLM) family assume linear relationships among variables.

In this research clear, appropriate and achievable expectations and feedback were more critical to performance than discipline and salience. The results therefore, illustrate the practical importance for organisations of signalling and defining appropriate target behaviours, and guiding and shaping employees towards those behaviours via feedback. However, there was less consistency in how well the discipline and salience dimensions of positive accountability related to performance.

Expectations and feedback are particularly salient in modern organisations because they encourage ongoing clarity and learning of boundaries in a world of work that is characterised by increasingly flexible and ambiguous boundaries. On the other hand accountability salience (or “task significance” as it is termed in traditional job characteristics theory) was found to be a key driver of motivation and performance in the 1960s and 70s but the perceived importance of work may be less relevant in more dynamic work environments with more mobile workforces. In terms of discipline, whilst critical to accountability, it might be that discipline is less critical to individual outcomes because it has become increasingly standardised and

legislated due to the current Industrial Relations (IR) climate (i.e. less flexible) and less strongly embedded in the social context of work.

The predictive strength of discipline and salience varied considerably for different outcomes and for blue and white collar employee groups. One of the differences between blue and white collar employees was that blue collar employees were receivers of discipline (i.e., they did not have any formal power to discipline other employees) while white collar employees were both able to give and receive discipline because they (generally) had direct reports. Similarly, because the nature of hierarchy white collar employees are likely to relate differently to the perceived importance and impact of the work on others (i.e., salience) than their blue collar colleagues. The results, therefore, illustrate that differences in the way blue and white collar employees experience work (e.g., discipline and salience) are likely to affect their performance (i.e., job satisfaction, work stress, safety ratings and intention to stay with the organisation).

6.4.5 Conclusions. In conclusion the results: (1) illustrate the need to be clear about the nature of accountability (i.e., as a positive construct or a stressor) and the approach to understanding accountability (i.e., as a work environment construct or breaking it down into its elemental parts e.g., accountable to whom and for what); (2) support understanding positive accountability as a work environment construct that spans the immediate job and wider organisational environments; and (3) demonstrate the practical relevance of positive accountability as a work environment characteristic.

Chapter 7. Consistency in the Structure of the WES and PAS Across Different Samples and Occupational Groups

7.1 Introduction

Chapters 4, 5 and 6 described the development and evaluation of measures of work engagement (i.e., the WES) and positive accountability (i.e., the PAS) and their relationships with other workplace variables. The results gave psychometric support for the use of the WES and PAS as measures of work engagement and positive accountability. This chapter builds upon these earlier chapters by exploring the constructs across three data sets collected from Australian mining employees. The research aims were:

- (1) To look for consistency in the factor structure of the WES and PAS using independent samples.
- (2) To investigate WES and PAS relationships with employee wellbeing and safety
- (3) To explore the applicability of the WES and PAS for use with employees in different occupational groups working at different professional and semi-professional levels
- (4) To explore the use and understanding of PAS as a work environment characteristic.

The chapter is divided into four sections summarised in Table 7.1.

Table 7.1

Overview of Chapter 7

Section	Description	Aim/s
A	This section describes a survey study of Queensland (QLD) mining employees within a health and safety survey context. The participating site was completely independent of the organisation described in previous chapters in this research.	(1) Describe the factor structure of the WES and PAS. (2) Investigate their relationships with employee wellbeing and safety.
B	This section describes a survey study of New South Wales (NSW) mining employees within a health and safety survey context. The participating site was completely independent of the other sites and organisations described in this research.	(1) Describe the factor structure of the WES and PAS. (2) Investigate their relationships with employee wellbeing and safety.
C	This section makes use of the remaining survey data from the large mining organisation that was not utilised in Chapters 5 and 6 to test the factor structures of the WES and PAS across different occupational groups.	(1) Describe the factor structure of the WES and PAS. (2) Support the use of the WES and PAS with different occupational groups.
D	This section describes a post hoc investigation that uses a subset of the remaining survey data that was not utilised in Chapters 5 and 6 to explore links between positive accountability, job characteristics and work engagement.	(1) Provide support for positive accountability as a work environment/job design construct.

7.1.1 Employee wellbeing and safety. The two independent study sites provided an opportunity to examine the relationships that WES and PAS have with employee wellbeing and safety.

7.1.2 Work engagement, positive accountability and employee psychological wellbeing. Psychological wellbeing is a relatively broad term that can include people's emotional responses, domain satisfactions, and global judgments of life satisfaction (Diener, Suh, Lucas & Smith, 1999). Psychological wellbeing is a subjective experience

and best thought of as a general area of interest rather than a specific, well-defined construct. Due to the inherent complexity of attempting to define and measure wellbeing, researchers often focus on specific aspects e.g. stress, depression, satisfaction or joy, as indicators of wellbeing (Diener et al., 1999).

In the work context the evidence indicates that the costs of poor wellbeing are significant and far-reaching. For example, in Australia the costs of mental health symptoms results in a loss of \$2.7 billion annually in lost productivity (Hilton, Scuffham, Vecchio & Whiteford, 2010). In the US it was estimated that depression alone costs employers 40 billion annually in lost productive work time (Steward et al., 2003). Consequently, there is considerable practical interest and value in studying employee wellbeing.

Work engagement and employee wellbeing. In a review of the work engagement literature Bakker and Demerouti (2008) argued that there are at least four reasons why engaged employee perform better, namely: engaged employees experience more positive emotions, better health, more control over their job and personal resources and they transfer their engagement to those around them. This is important because it highlights that work engagement is sought both to maximise employee performance and to ensure that employees get the most out of their work.

Authors that consider work engagement as the positive antipode of burnout conceptualise it as a positive indicator of employee wellbeing (Maslach et al., 2001; Schaufeli et al., 2008). Research has supported this view with negative relationships identified between work engagement and somatic health complaints such as headaches and chest pain (Demerouti et al., 2001), headaches, cardiovascular problems and stomach

aches (Schaufeli & Bakker, 2004). More recently, Schaufeli et al. (2008) and Haakanen, Schaufeli and Ahola (2008) reported that work engagement shared negative relationships with several indicators of subjective wellbeing including depression, anxiety and distress. This research will further examine whether work engagement is an indicator of employee wellbeing.

Positive accountability and employee wellbeing. As discussed in Chapter 2 (Section 2.1.11) there is some debate in the literature about whether accountability has a positive or negative relationship with employee wellbeing (particularly work stress). This uncertainty stems from inconsistencies in the way accountability is conceptualised. In this research accountability was conceptualised as a positive construct that lets people know where they stand in a work environment with more flexible boundaries. Positive accountabilities links with positive outcomes in Chapter 6 supported this perspective. However, given the importance of employee wellbeing to organisations and to individuals, further investigation of how positive accountability relates to employee wellbeing is warranted.

7.1.4 Work engagement, positive accountability and safety in the mining industry. Safety in the mining industry is an important area of research because of the inherent risks and demands associated with the work (see Section 4.1.4 for a more detail discussion). In Chapters 4 and 6 it was shown that positive accountability was associated with general perceptions of workplace safety however the work engagement-safety relationship is yet to be examined. In the 7A and 7B studies the links between specific safety indicators (i.e., fatigue-risk and safety empowerment) and work engagement and positive accountability are explored.

Fatigue. A key safety concern in the mining industry is human fatigue. Fatigue is particularly salient because Australian mine sites typically operate 24hrs a day. In addition, sites are often located in remote areas that require either staying in on-site accommodation or long travel times to and from work. Compounding the problem is the often repetitive nature of the work.

Fatigue interferes with concentration, motivation, motor coordination, attention, physical and psychological functioning (Lal & Craig, 2001; Sonnentag & Zijlstra, 2006; Zohar, Tzischinski, & Epstein, 2003). However, fatigue is a complex problem that is influenced by a range of variables. Both individual (e.g. diet, exercise, sleep) and work (e.g. conditions, type of work, roster system) factors play a role (Grech, Neal, Yeo, Humphreys, & Smith, 2009; Thiffault Bergeron, 2003; Peretti-Watel et al., 2009). Additionally, fatigue is difficult to measure because it is essentially a subjective experience (Aaronson et al., 1999; Dittner, Wessely, & Brown, 2004).

Many studies rely on self-report measures of fatigue because, typically, long duration standardized performance measurements are not practical (Dittner et al., 2004). In this research fatigue will be measured in terms of self-ratings of exposure to fatigue, fatigue-related impairment, and tolerance of fatigue. These reports give an indication of the extent to which employees are at risk of fatigue having an impact on their safety at work.

Safety empowerment. Employee psychological empowerment is typically viewed as a motivational construct that describes the extent to which employees are able to affect their work roles and work context (Conger & Kanungo, 1988; Spreitzer, 1995). Like work engagement, empowerment is a construct that is widely used in the management field.

Empowerment has been linked to a variety of positive organisational and individual outcomes such as job satisfaction (Harris, Wheeler & Kacmar, 2009; Patrick, Laschinger, 2006), reduced turnover intention (Harris et al., 2009), and greater in-role and extra-role performance (Logan & Ganster, 2007; Tuuli & Rowlinson, 2009). It is also influenced by the work environment e.g. rewards, supervision, and job design (Conger & Kanungo, 1988). This research takes particular interest in empowerment as it relates to safety. Specifically, the extent to which employees perceive they are able to control and influence safety at work.

At a conceptual level there are strong overlaps between work engagement and empowerment and also between positive accountability and empowerment. For example, work engagement and empowerment rely on the assumption that key drivers of motivation include the meaningfulness of the work and the level of confidence in one's ability to achieve desired outcomes (Kahn, 1990; May et al., 2004; Spreitzer, 1995). Furthermore, several authors (e.g., Conger and Kanungo, 1988; Sharma & Kaur, 2008; Speitzer, 1995) argue that performance-based feedback and role clarity (key features of positive accountability) act to facilitate empowerment. Given these conceptual overlaps it is expected that both work engagement and positive accountability will have a positive correlation with safety empowerment.

7A. QLD Mining Operation Study: Description of Factor Structures and Relationships with Employee Psychological Wellbeing and Safety.

This study aims to:

- (1) Describe the factor structure of the WES and PAS using a completely independent sample of QLD mining employees.
- (2) Explore the relationships between work engagement, positive accountability and employee psychological wellbeing and safety.

7A.1.1 Context for the study. The research was made possible via an opportunity to work collaboratively with a private consultancy firm and a mine site safety team responsible for an investigation into employee fatigue and safety. The site was jointly owned by three organisations and totally independent of the organisation and sites described in earlier chapters. It was a relatively new site that commenced operation in 2005. The site operated on a 7/7 12 hr roster cycle (7/7 indicates that employees work 7 day shifts, have 7 days off, then work 7 night shifts and so on). The initial stage of the investigation included the collection of data from employees via survey. The survey was designed by the consultancy firm with a specific focus on fatigue and safety. However, it was arranged to add the measures of work engagement and positive accountability to the survey and to have access to the entire survey data set.

7A.2 Method

7A.2.1 Sample. The participating site was an open-cut operation located in rural QLD. A total of 164 employees completed the survey out of 180 surveys that were sent out representing an overall response rate of 91.1%. Most employees (72%) lived on-site during a roster cycle. Over half (56.4%) of the employees indicated they lived more than 300km from site. The final number of cases used in the analysis was 152 after taking into account missing data (see below). More detailed demographics are provided in the results section. Gender data was not collected, but the human resource manager for the mine site indicated that almost all of the employees were male.

7A.2.2 Procedure. Safety representatives from the participating site reported that shift crew groups of employees were asked to complete the survey by the HR manager who had been briefed on the administration process before commencing the shift. Employees were advised that participation was completely voluntary and anonymous, and that they could withdraw at any time without penalty. The survey took approximately 15 min to complete. Completed surveys were placed in a sealed box that was returned to the private consultancy firm to ensure confidentiality. The data was subsequently forwarded by the consultancy firm to the University for use in this research. The complete survey is included in Appendix G.

7A.2.3 Measures

WES. The development of the WES is described in Chapter 5. The item “I get a buzz out of my work” was modified in this study to “I enjoy my work”. This modification was made after discussion with site management indicated that the original item might not

be well understood by some employees and was not typical of the language they would use. The modified scale was sufficiently internally consistent ($\alpha = .70$).

PAS. The development of the PAS is described in Chapter 6. In this study one item was added to the scale in order to better measure the expectations dimension of accountability. This item was: “You know exactly what is expected of you concerning your job and workgroup”. To meet management requirements that the survey should not be too long and responding to management concern that the item “Poor performance on my part would have little or no impact on others” could be misunderstood it was dropped from the scale. The scale was also broken down into four subscales for use in analysis, these were: expectations, feedback, discipline and salience. The total scale was internally consistent at ($\alpha = .64$) while the subscales were: discipline ($\alpha = .60$); feedback ($\alpha = .73$); expectations ($\alpha = .69$) and; salience ($\alpha = .60$). Analysis of the structure of the scale can be found in the results (see Section 7A.3.3).

Employee psychological wellbeing. The Centre for Epidemiological Studies – Depression Scale (CES-D) (Radloff, 1977) was used as a measure of psychological wellbeing. The CES-D is widely used to screen populations for depressive symptoms. It is a 20-item self-report checklist scale designed to measure depressive symptomatology in the general population. The items of the scale describe symptoms associated with depression, the response values are 4-point Likert scales, with range 0-3, with anchor points in terms of days per week ‘rarely or none of the time (less than one day)’ to ‘most or all of the time (5-7 days)’. The total score has a minimum of 0 and a maximum of 60, with a higher score indicating greater impairment.

Radloff (1991) reported very good internal consistency and adequate test-retest reliability for the scale. Validity has been established with high correlations with other measures of depression, by correlations with clinical ratings of depression, and discrimination between clinical and non-clinical groups (for a review see Eaton, Muntaner, Smith, Tien, & Ybarra, 2004). The Cronbach's alpha for this study was .86.

Fatigue-risk. The survey included four items relating to the experience of fatigue at work, fatigue-related impairment (e.g., near-misses and ability to work safely), and tolerance to fatigue. The items are included in Table 7A.1. The definition of a near miss that was provided as part of the survey was “an undesired event that, under slightly different circumstances, could have resulted in personal harm, property damage, or other loss”.

Table 7A.1.

Items in the Fatigue-Risk Scale

Item	Scoring
Over the last month of your work, how many “near misses” have you had which you believe was caused by fatigue?	Open-ended
Do you ever get so tired that it affects your ability to work safely?	4-point Likert scale from 1 “ <i>never</i> ” to 4 “ <i>consistently</i> ”
How many shifts during the last week were you so fatigued that it affected your ability to work safely?	Open-ended
I find coping with fatigue difficult	4-point Likert scale from 1 “ <i>strongly disagree</i> ” to 4 “ <i>strongly agree</i> ”.

The items were all significantly correlated with each other (see Table 7A.7) suggesting that there was a common underlying factor. Because the items were all scored

on different response scales it was not possible to use a combined scale score (as is the case for multiple-item scales throughout this thesis). Instead, factor scores were calculated from principal components analysis of the four items. This variable was labeled fatigue-risk. Details of the analysis are provided in the results section. The scale was sufficiently internally consistent for the purposes of this research ($\alpha = .65$).

Safety empowerment. Three items that asked employees how much they felt they are able to influence safety decisions and outcomes in the organisation were used to measure safety empowerment. The items are included in Table 7A.2. The items were scored on a 4-point Likert scale from 1 “*Strongly Disagree*” to 5 “*Strongly Agree*” and was internally consistent ($\alpha = .77$).

Table 7A.2

Safety Empowerment Items

Item
1. What I think about safe work practice doesn't have any influence where I work
2. I have little influence on how things are done at work, even though these things affect my safety
3. I can't do anything to change procedures at my place of work

7A.2.4 Data screening. The data ($N = 164$) was initially inspected to ensure that all scores were within the scale response limits. Twelve cases were removed based on the criteria that they had greater than 20% missing values leaving a final sample of $N = 152$. SPSS missing values analysis, indicated that there were no variables with greater than 5% missing data. Little's MCAR test ($\chi^2 = 2364.73$ $df = 2317$, $p = .24$) indicated that the data was missing completely at random. Under these conditions, Estimation Maximization (EM) was used to impute data as recommended by Tabachnick and Fidel (2001).

The statistical procedures used in the study rely on a number of assumptions about the data such as normality, homoscedacity and linearity. Tabachnick and Fidel (2001) recommend assessing normality of variables by both statistical and graphical methods. For the scale variables univariate skewness ranged from -1.08 (safety empowerment) to 1.20 (wellbeing) and the univariate kurtosis ranged from -0.92 (feedback) to 1.69 (fatigue-risk).

Shapiro-Wilk tests of normality revealed significance levels less than .05, however normal probability plots representing the actual distributions closely followed the diagonal for all scale variables except wellbeing and safety empowerment. In addition, examination of frequency histograms revealed relatively normal distributions for all variables except wellbeing and safety empowerment. Inspection of bivariate scatter-plots supported the linearity of the variables across both samples. Some skew of the wellbeing variable was not unexpected given that mood disorders such as depression are only estimated to affect approx 6% of the 16-85 year old population (ABS, 2009).

Wellbeing scores were recoded to reverse the variables skew from positive to negative then wellbeing and safety empowerment were log transformed as per the recommendations of Tabachnick and Fidel (2001) for correcting negative skew. Analysis was conducted with transformed and untransformed variables and negligible effects on overall results were observed. Hence, untransformed data was used in the final analysis.

7A.3 Results

7A.3.1 Sample demographics. A total of 152 cases were used in the analysis (after cases with too much missing data were removed; see Section 7A.2.4). Table 7A.3 below lists the numbers and proportion of employees from each work area. The majority of employees were operational people. Overall, the sample was representative of the site workforce. Within the *other* category, four employees indicated they worked as security, one as a store person, one as temporary maintenance and three employees did not enter a response.

Employees varied in age, experience with shiftwork and experience with mining operations. Over half (59.2%) were under 40 years of age, and less than half (40.6%) had five or more years experience with shiftwork. The participating site was a relatively new operation and 46% of employees had worked there for less than one year.

Table 7A.3

Employee Work Areas

Work Area	Frequency	Percent
Mine Production Operator	55	36.2
Mine Production Specialist	22	14.5
Staff - shift worker	3	2.0
Maintenance. on shift	24	15.8
Maintenance. staff	5	3.3
Maintenance permanent day	9	5.9
Staff	25	16.4
Other	6	4.6
Total	150	98.7
Missing	3	1.3
Total	152	100

Descriptive statistics are presented in Table 7A.4. The positive accountability, work engagement and safety empowerment scale and positive accountability subscale

scores were calculated by averaging item scores. The fatigue-risk scores were calculated through principal components analysis of four items (see results below) and as such have a mean of 0 and a *SD* of 1. For the measure of wellbeing (i.e., CES-D), scale scores were calculated by adding scores in accordance with Radloff (1977). Radloff's early general population samples reported mean scores of 7.9 to 9.3 (*SD* = 7.5 - 8.5) while her clinical sample of psychiatric patients (depression) reported a mean score of 24.4. She initially suggested a cutoff score of ≥ 16 for identifying elevated levels of depressive symptoms and found 15-20% of her samples in that category. Some years later she suggested a cutoff score of ≥ 23 for identifying Major Depressive Disorder (Radloff & Locke, 1986). The results from this sample are slightly higher than Radloff's early samples in terms of mean score ($M = 10.79$, $SD = 8.26$) and proportion scoring equal to or above 16 (i.e., 21.7%).

Table 7A.4

Means and Standard Deviations of the Study Variables

Variable	<i>M (SD)</i>
WES	4.02 (0.63)
PAS	3.58 (0.53)
Expectations	4.05 (0.79)
Feedback	2.75 (1.18)
Discipline	3.27 (0.83)
Salience	3.96 (0.86)
Wellbeing	10.79 (8.26)
Fatigue-Risk	0 (1.00)
Safety Empowerment	3.33 (0.75)

Note. The wellbeing scale had a maximum of 60 and a minimum of 0. The fatigue-risk scale consisted of regression scores with a mean of 0 and a *SD* of 1. All other scales had a maximum of 5 and a minimum of 1.

7A.3.2 Principal components analysis of the WES. A principal components analysis with varimax rotation was conducted to test the factor structure of the WES. The

number of components was set to three consistent with the three-dimensional model of work engagement and earlier analysis.

The case to variable ratio was approximately 25:1 and far exceeded the 5:1 recommended by Tabachnick and Fidel (2001). The *KMO* measure of sampling adequacy indicated the data was suitable for factor analysis ($KMO = .75$), and Bartlett's test of sphericity indicated appropriate collinearity among the items $\chi^2 (15) = 166.51, p < .001$.

The three factor solution cumulatively explained 73.41% of the variance and was consistent with the theoretical absorption, dedication and vigor dimensions of work engagement. Table 7A.5 gives the eigenvalues, percentage of variance explained, as well as the variable loadings. The item "Time seems to fly when I'm working", that was designed to measure absorption, double-loaded on both the dedication and absorption dimensions of engagement.

Table 7A.5

Principal Components Analysis of the WES

	Component		
	1 (Dedication)	2 (Absorption)	3 (Vigor)
Eigen value	2.53	1.00	0.88
Variance explained	42.14%	16.65%	14.62%
I'm proud of the work I do	.87		
I enjoy my work	.75		
I put my heart into my job	.69		
Time seems to fly when I'm working	.56	.56	
I get so focussed on my work that I lose track of time		.93	
I avoid working too hard (R)			.95

7A.3.3 Principal components analysis of the PAS. A principal components analysis with varimax rotation was used to test the structure of the PAS. The case to

variable ratio was 14:1 and far exceeded the 5:1 recommended by Tabachnick and Fidel (2001). The *KMO* measure of sampling adequacy indicated the data was suitable for factor analysis ($KMO = .61$), and Bartlett's test of sphericity indicated appropriate collinearity among the items $\chi^2(55) = 302.56, p < .001$.

The four factor solution cumulatively explained 62.94% of the variance and was consistent with the four-dimensional conceptual model of positive accountability (see Figure 6.1). Table 7A.6 gives the eigenvalues, percentage of variance explained as well as the variable loadings. The added item "You know exactly what is expected of you" loaded, as expected, on the expectations dimension.

Table 7A.6

Principal Components Analysis of the PAS

	Component			
	1	2	3	4
Eigen value	2.58	1.59	1.45	1.30
Variance explained	23.49%	14.43%	13.18%	11.84%
I can achieve what I'm accountable for at work	.84			
You know exactly what is expected of you	.79			
What I'm accountable for is appropriate to my job	.67			
Rules and standards are clear and unambiguous	.53			
I get regular performance feedback		.87		
I am rewarded if I achieve what I'm accountable for		.81		
Officially there are consequences but in reality not much happens			.79	
Discipline is talked about but rarely acted on			.78	
I am rarely held accountable for my actions			.61	
A lot of people can be affected by how well I do my work				.82
My job has an impact on others				.74

Note. Component 1 = Expectations; Component 2 = Feedback; Component 3 = Discipline; Component 4 = Salience.

7A.3.4 Developing the fatigue-risk scale. The four items relating to fatigue and safety were interrelated with correlations ranging from $r = .17$ to $r = .51$, $p < .05$ (Table 7A.7). A principal components factor analysis was used to determine whether there was a single dimension underlying the fatigue-risk items. Examination of the *KMO* measure of sampling adequacy indicated the data was suitable for analysis ($KMO = .69$), and Bartlett's test of sphericity indicated appropriate collinearity among the items $\chi^2(6) = 85.71$, $p < .001$.

Table 7A.7

Correlations Among the Fatigue-Risk Items

	1	2	3	4
1. Ever get so tired that it affects your ability to work	1			
2. How many shifts were you so tired	.51**	1		
3. How many near misses	.26**	.28**	1	
4. I find coping with fatigue difficult	.35**	.34**	.17*	1

Note. * $p < .05$. ** $p < .01$.

A single component solution was obtained that explained 49.61% of the variance. Table 7A.8 gives the eigenvalue, percentage of variance explained by the component as well as the variable loadings. A factor score was calculated from this analysis and saved for use as a dependent variable with the label *fatigue-risk*.

Table 7A.8

Principal Components Analysis Results of the Fatigue-Risk Scale

	Component
	1
Eigen value	1.98
Variance explained	49.61%
Ever get so tired that it affects your ability to work?	.79
How many shifts were you so tired?	.77
How many near misses?	.55
I find coping with fatigue difficult	.65

7A.3.5 Correlations among the study variables. The correlations presented below in Table 7A.9 suggest that positive accountability was significantly linked to psychological wellbeing ($r = -.35, p < .01$), fatigue-risk ($r = -.18, p < .05$) and safety

empowerment ($r = .38, p < .01$). Work engagement was not significantly associated with wellbeing, fatigue-risk or safety empowerment ($p > .05$).

An examination of the PAS subscales revealed that it was only expectations ($r = -.35, p < .01$) and feedback ($r = -.24, p < .01$) that were significantly related to wellbeing. Only feedback was significantly (though weakly) correlated with fatigue-risk ($r = -.21, p < .05$), while the three subscales: expectations ($r = .28, p < .01$), feedback ($r = .26, p < .01$) and discipline ($r = .24, p < .01$), were significantly correlated with safety empowerment.

Positive accountability and work engagement were associated ($r = .44, p < .01$) with the expectations, feedback and salience PAS subscales all sharing significant relationships with work engagement ($p < .01$).

Table 7A.9

Correlations Among the Study Variables

	1	2	3	4	5	6	7	8	9
1. PAS	1								
2. Expectations	.73**	1							
3. Feedback	.64**	.30**	1						
4. Discipline	.53**	.09	.08	1					
5. Salience	.43**	.09	.14	.08	1				
6. WES	.44**	.40**	.35**	-.05	.35**	1			
7. Wellbeing	-.35**	-.35**	-.24**	-.06	-.12	-.08	1		
8. Fatigue-Risk	-.18*	-.16	-.21*	.03	-.07	-.15	.32**	1	
9. Safety Empowerment	.38**	.28**	.26**	.24**	.10	.14	-.19*	-.16	1

Note. * $p < .05$. ** $p < .01$.

Previous research has shown positive links between work engagement and measures of wellbeing (e.g., Haakanen et al., 2008; Schaufeli et al., 2008). However, in this study no significant relationship was found. Employees from the participating mine site reported high levels of work engagement ($M = 4.02$, $SD = 0.63$; see Table 7A. 4). Schaufeli et al. (2008) surveyed middle managers of a Dutch telecom company who reported more moderate levels of work engagement (i.e., $M = 2.97$, $SD = 0.74$)³, while Haakanen et al., (2008) did not report descriptive statistics for their data. According to this comparison employees in this study were more highly engaged at work.

In addition, the employee wellbeing (i.e., CES-D) scale was skewed (skew = 1.20), with employees reporting generally low levels of depressive symptoms. The safety empowerment scale was similarly skewed (skew = -1.08). The combination of the skewed wellbeing and safety empowerment data with the generally high work engagement scores potentially created a ceiling effect that contributed to the weak relationships observed.

7A.3.6 Predicting employee wellbeing, fatigue-risk and safety empowerment.

Multiple regression analyses were conducted to evaluate how well positive accountability predicted employee wellbeing, safety empowerment and fatigue-risk. The analyses revealed that the positive accountability subscales, together, did account for a significant amount of variance in safety empowerment (15.3%), $F(4, 147) = 6.64$, $p < .01$, and employee psychological wellbeing (14.9%), $F(4, 147) = 6.43$, $p < .01$. Positive

³ Schaufeli et al.(2008) used a 7-point rating scale. The mean and standard deviation were corrected to fit a 5-point scale for ease of comparison with this studies results.

accountability did not predict a significant amount of variance in fatigue-risk, $F(4, 147) = 2.30, p = .06$. Table 7A.10 provides the details of the analyses.

Expectations and discipline were the strongest predictors of safety empowerment accounting for 4% of the unique variance while feedback accounted for 3%. Expectations was the only significant predictor of wellbeing accounting for 9% of the unique variance.

Table 7A.10

Summary of Regression Results for Predicting Safety Empowerment, Wellbeing and Fatigue-Risk

Variables	<i>B</i>	<i>SE</i>	β	sr^2	R^2
DV = Safety Empowerment					
Expectations	0.20**	0.08	.21	.04	
Feedback	0.11*	0.05	.17	.03	
Discipline	0.18**	0.07	.20	.04	
Salience	0.03	0.07	.04	.00	
					.15
DV = Wellbeing					
Expectations	-3.20**	0.84	-.30	.09	
Feedback	-0.92	0.56	-.13	.02	
Discipline	-0.19	0.77	-.02	.00	
Salience	-0.75	0.74	-.08	.00	
					.15
DV = Fatigue-risk					
Expectations	-0.14	0.11	-.11	.01	
Feedback	-0.15*	0.07	-.18	.03	
Discipline	0.08	0.10	.06	.00	
Salience	-0.05	0.10	-.04	.00	
					.06

Note. * $p < .05$. ** $p < .01$.

7A.3.7 Post hoc analysis: A closer examination of positive accountabilities relationship with fatigue-risk. It is well established that wellbeing, and in particular depression, shares symptoms with fatigue and that measures of fatigue and wellbeing are typically highly correlated (Buchwald & Rudick-David, 1993; Cathebras, Robbin, Kirmayer & Hayton, 1992). There is also evidence that wellbeing is linked to impaired safety primarily through the symptoms of depression which include headaches, confusion, and decreased attention span (Haslam, Atkinson, Brown & Haslam, 2005). In this study fatigue-risk was conceptualised as both a safety-related and fatigue-related variable; hence an association between wellbeing and fatigue-risk was expected, and found ($r = .32, p < .01$).

Positive accountability was only weakly related to fatigue-risk ($r = .18, p < .05$), however it was more strongly related to employee psychological wellbeing ($r = -.35, p < .01$). Given the relationships described above it could reasonably be argued that positive accountability might be associated with fatigue-risk through its relationship with wellbeing. That is, wellbeing mediates the relationship between accountability and fatigue-risk.

In order to test whether this was the case regression analysis and a Sobel test were conducted. Positive accountability did significantly predict fatigue-risk, $F(1, 150) = 4.84, p < .05$, accounting for 3.1% (2.5% adjusted) of the variance. Wellbeing predicted an additional 7.3% of the variance in fatigue risk, over and above accountability, which was a significant change in prediction, $F_{change}(1, 149) = 12.11, p = .001$. The predictive strength of positive accountability decreased once wellbeing was taken into account, with the direct relationship between accountability and fatigue-risk becoming non-significant, t

= -.93, $p = .36$. Accountability also predicted a significant amount of variance in wellbeing, $F(1, 150) = 20.69$, $p < .001$, accounting for 12.1% (11.5% adjusted) of the variance.

Based on the regression results a fully mediated model appeared likely, however to test the significance of the indirect pathway Sobel's test was used. The results supported a significant indirect pathway from positive accountability fatigue-risk, mediated by wellbeing (Figure 7A.1), Sobel test, $z = -2.77$, $p < .01$.

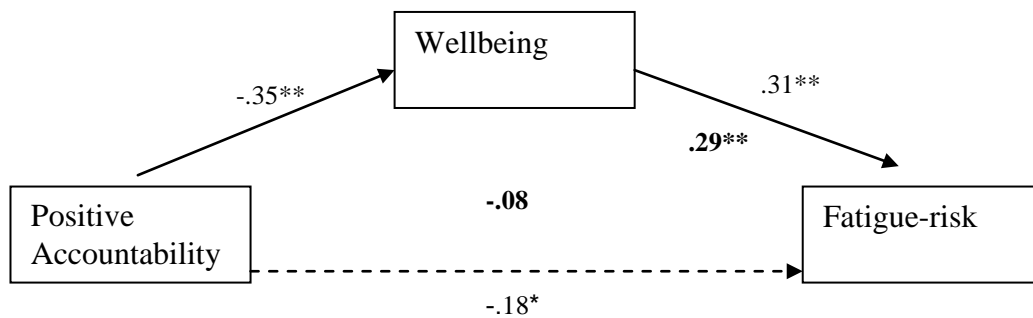


Figure 7A.1. Mediation model of positive accountability to fatigue-risk mediated by wellbeing. Standardized regression coefficients are presented. Original and modified (bold) coefficients are shown. * $p < .05$. ** $p < .01$.

7A.4 Discussion

This section described an investigation of work engagement and positive accountability within an independent sample of QLD mining employees. The key findings were:

- the structures of the WES and PAS were consistent with the conceptual models of work engagement and positive accountability and with previous results in this thesis;
- work engagement was weakly related to safety empowerment, fatigue-risk and psychological wellbeing;
- positive accountability predicted significant amounts of variance in safety empowerment and psychological wellbeing but not fatigue-risk.

7A.4.1 Measuring work engagement and positive accountability. Analysis of the structure of the WES and PAS was conducted using a fully independent sample of mining employees and in a different survey context. The participating site was newly established with a relatively young workforce, and the measures were embedded within a survey focused on health and safety rather than organisational culture. In addition, the operation was jointly owned by 3 organisations while in the previous studies employees have all been employed by one large, well established organisation. Given this contextual variability between this and the previous samples it was expected that there would be a degree of variability in the psychometrics of the scales but that overall, the scales would be shown to have appropriate psychometric properties to support further use. This is essentially what was found.

WES. The structure of the WES was consistent with the three-dimensional model of work engagement (i.e., vigor, dedication and absorption) and previous results (see Chapter 5), thereby providing support for its use in further study. However, the item “time seems to fly when I’m working” double loaded on the absorption and dedication components suggesting that employees in this study associated time flying at work equally with absorption in work and a sense of dedication to work.

PAS. The structure of the PAS was consistent with the four-dimensional conceptual model and previous results (see Figure 6.1 and Section 6.3.5). The additional item “You know exactly what is expected of you concerning your job and workgroup” loaded as expected on the expectations dimension of the measures and contributed well to the scale (i.e., returned the highest item-total correlation). The PAS and its subscales were less internally consistent in this study than in the previous (Chapter 6) study. Nonetheless, the Cronbach’s alpha values show that the subscales have an acceptable level of internal consistency (see Peterson, 1994; Schmitt, 1996).

7A.4.2 Employee wellbeing and safety.

Positive accountability. By demonstrating its links with employee wellbeing and safety the results further illustrate the practical significance of positive accountability and support its understanding as a positive construct. Positive accountability predicted 15% of the variance in both employee psychological wellbeing and safety empowerment but did not predict a significant amount of variance in fatigue-risk.

Expectations was the strongest predictor of wellbeing and safety empowerment illustrating its practical importance. This supports the understanding that employees who work in an environment that lets them know where they stand are better able to cope with

the demands of work and feel they have greater internal control and influence over their work environment. This aligns well with studies of role clarity that show that clear role expectations act as a buffer against work stressors or demands, encouraging a sense of resilience in employees that enables them to cope better with the demands of the work (Bliese & Castro, 2000; O'Driscoll & Beehr, 2000) and fosters a sense of personal empowerment (Conger and Kanungo, 1988, Sharma & Kaur, 2008; Spreitzer, 1995).

While positive accountability did not directly predict a significant amount of variance fatigue-risk, it was weakly associated with it via its relationship with employee psychological wellbeing. This result serves to highlight the potential indirect effects of positive accountability through its relationship with wellbeing.

Work engagement. In this study work engagement was not associated with employee psychological wellbeing, safety empowerment or fatigue-risk. This was surprising because Schaufeli et al. (2008) and Hakanen et al. (2008) reported that work engagement was negatively correlated with measures of wellbeing.

Differences in the measurement of work engagement and wellbeing are one explanation for this inconsistency. Both studies mentioned above used the UWES (Schaufeli et al., 2002) to measure work engagement and both the UWES and WES are based on the same theoretical understanding of work engagement (i.e., vigor, dedication and absorption). In addition, all three studies utilised commonly used measures of depression. Schaufeli et al. (2008) used the Four-Dimensional Symptom Questionnaire (4DSQ; Terluin, Van Rhenen, Schaufeli, & de Haan, 2004) and Haakanen et al. (2008) used the Beck Depression Inventory (BDI; Beck & Beck, 1972) and the CES-D (Radloff,

1977) was used in this study. Hence, whilst it cannot be ruled out, it is unlikely that the differences in results are related to differences in the measurement instruments.

The results of Chapter 5 highlighted the importance of considering context in studies of work engagement. Therefore, another explanation relates to contextual differences between studies. Schaufeli et al. (2008) studied mostly male (78%), middle managers of a Dutch telecom company, with 76% over the age of 35. Hakanen et al. (2008) studied Finnish dentists who were mostly women with more than 15 years experience in the profession. This study included Australian mining employees at a newly operational mine site who were relatively young, inexperienced and less educated than these other samples.

Another possible, and more likely, explanation for the conflicting results and also the weak relationships is that skew in data contributed to the relationships observed between work engagement and wellbeing and safety empowerment. However, fatigue-risk was not as skewed. The results, therefore, suggest that work motivation is not related to the experience of fatigue at work, fatigue-related impairment, and tolerance to fatigue. This may be because fatigue-risk is strongly linked to external factors (e.g., roster systems, hours of sleep, and work environment) and while an engaged employee might be motivated to manage themselves this cannot negate the effect of poor sleep or working long hours.

7A.4.3 Positive accountability and work engagement. In this study positive accountability (a work environment construct) and work engagement (a psychological/motivational construct) were related ($r = .44, p < .01$). This fits well with both the work design and work engagement literatures where a core assumption is that the

work environment influences employee psychological states and work outcomes. More importantly, the results of this study suggest that positive accountability can be considered a job resource that supports work motivation (i.e., work engagement) and employee wellbeing and safety.

7A.4.4 Conclusions. In conclusion the results: (1) support the underlying structures of the WES and PAS; (2) support the practical importance of positive accountability to employee wellbeing and safety; and (3) illustrate a possible limitation of inferring that work engagement is generally indicative of wellbeing and safety.

7B. NSW Mining Operation Study: Description of Factor Structures and Relationships with Employee Psychological Wellbeing and Safety.

This study aims to:

- (1) Describe the factor structure of the WES and PAS using a completely independent sample of NSW mining employees.
- (2) Explore the relationships between work engagement, positive accountability and employee psychological well being and safety.

In this study the analysis from the previous study (7A: QLD study) is repeated.

7B.1.1 Context for the study. This study was conducted via an arrangement between the researcher, private consultancy firm and the management team from an independent mine site located in NSW. The mine was an underground operation that had been actively operating for over 30 years. Shifts were organised according to permanent day, afternoon and night 8hr shifts, as well as 12hr weekend day and night shifts.

The survey was designed by the consultancy firm with a specific focus on fatigue and safety. However, it was arranged to add the measures of work engagement and positive accountability to the survey and to have access to the entire survey data set. The sample and survey instrument are described in more detail in the methods section.

7B.1.2 Refining the WES. It was argued in previous chapters that a single item may limited in its ability to capture the vigor dimension of work engagement. Vigor is described as the motivation to invest effort and high levels of energy and mental resilience while working (Schaufeli & Bakker, 2010). In this study items are added to the WES with the purpose of more adequately measuring employee vigor.

7B.2 Method

7B.2.1 Sample. The participating mine site was located in rural NSW. A total of 173 employees completed the survey out of 200 surveys that were sent out representing an overall response rate of 86.5%. The final number of cases used in the analysis was 166 after taking into account missing data. The majority (80%) of the sample lived within 30 minutes drive from work. Gender information was not collected but site representatives stated that employees surveyed were almost all male. More demographic data is provided in the results section.

7B.2.2 Procedure. Before commencing the shift employees were taken by the human resources manager in shift crew groups and asked to complete the survey. Employees were advised that participation was completely voluntary and anonymous, and that they could withdraw at any time without penalty. The survey took approximately 15 min to complete. Completed surveys were placed in a sealed box that was returned to the consultancy firm to ensure confidentiality. The consultancy firm then forwarded surveys to the University for use in this research. The survey is included in Appendix H.

7B.2.3 Measures. The measures of positive accountability (PAS), psychological wellbeing, safety empowerment and fatigue-risk were identical to those used in the previous study (see 7A.2.3). Table 7B.1 gives the Cronbach's alpha statistics for the scales in this study compared with the previous study. Principal components analysis was used to test the structure of the PAS (see Section 7B.3.4 for results).

Table 7B.1

Cronbach's Alpha Statistics for the PAS and Wellbeing and Safety Measures

Scale	α
PAS	.61
Expectations	.64
Feedback	.63
Discipline	.59
Salience	.59
Wellbeing	.84
Safety Empowerment	.60
Fatigue-Risk	.65

WES. A total of 8 items were used to measure work engagement. Three items were added to the WES in place of the vigor item “I avoid working too hard” (see Table 1 below). The item was dropped because discussions with site management indicated that this might be misinterpreted by employees and hence might not be a reliable indicator of vigor due to response bias. In consultation with members of site management three additional items were designed to measure vigor. Management were particularly interested in the effort aspect of vigor, that is, employee investment of extra or discretionary effort in their work. Given that engaged employees are said to be energetic, motivated to invest effort, and persistent in the face of difficulties (Schaufeli & Bakker, 2010) the use of items to measure vigor that tapped extra employee effort was deemed appropriate (see Table 7B.2 for items).

The scale was internally consistent ($\alpha = .75$). Principal components analysis was used to determine whether the structure of the WES remained consistent with the underlying theory (i.e., vigor, dedication and absorption).

Table 7B.2

Item Changes to the WES

Items Added	Item Removed
I put in extra effort if the job needs it	I avoid working too hard
I go the extra mile at work	
I work harder than I have to	

7B.2.4 Data screening. The data was initially inspected to ensure that all scores were within the scale response limits. Seven cases were removed based on the criteria that they had greater than 20% missing values. Following removal of these cases SPSS missing values analysis indicated that there were no variables with greater than 5% missing data. Little's MCAR test ($\chi^2 = 4273.52$ $df = 4187$, $p = .17$) indicated that the data was missing completely at random. Under these conditions EM was used to impute data as recommended by Tabachnick and Fidel (2001).

The statistical procedures used in the study rely on a number of assumptions about the data such as normality, homoscedacity and linearity that were assessed by both statistical and graphical methods. Univariate skewness ranged from -1.04 (dedication) to .61 (discipline) and the univariate kurtosis ranged from -0.56 (feedback) to 1.62 (dedication) for the study variables.

Shapiro-Wilks tests of normality revealed significance levels less than .05, on all but the accountability variable. However normal probability plots representing the actual distributions closely followed the diagonal for all of the study variables. In addition, examination of frequency histograms revealed relatively normal distributions for all variables. Inspection of bivariate scatterplots also supported the linearity of the variables across both samples.

7B.3 Results

7B.3.1 Sample demographics. A total of 166 cases were used in the analysis after 7 cases with too much missing data were removed. Table 7B.3 below lists the numbers and proportion of employees from each work area. The majority of respondents were operational people and overall, the sample was representative of the site workforce.

Employees varied in age, experience with shiftwork and experience with mining operations. Half (50.6%) of the employees were under 40 years of age and 45.8% were over 40 years. Almost a quarter of the sample worked day shift only (22.9%), while 62, or almost half (48.4%), of the remaining employees had worked shift work for 5 or more years. This site was a more well-established operation than the QLD operation described in the previous section (7A) with almost a third of employees (29.5%) employed at the site for more than 10 years, and most of the sample having worked there for more than a year (82.5%).

Table 7B.3

<i>Distribution of Employees in Different Work Areas</i>		
	Frequency	Percent
Production Operator	65	39.2
Outbye Support	23	13.9
Production supervisor	9	5.4
Outbye Supervisor	5	3.0
Panel Trades Person	23	13.9
Outbye Maintenance (Trade)	9	5.4
Engineering Shift Supervisor	1	.6
Process Owner (Engineer)	5	3.0
Other	1	.6
Missing	25	15.1
Total	166	100.0

Table 7B.4

Means and Standard Deviations of the Study Variables

Variable	<i>M (SD)</i>
WES	4.11 (0.54)
PAS	3.47 (0.51)
Expectations	4.06 (0.70)
Feedback	2.90 (1.11)
Discipline	2.69 (0.83)
Salience	4.00 (0.80)
Wellbeing	13.43 (8.21)
Fatigue-Risk	0 (1.00)
Safety Empowerment	3.23 (0.35)

Note. The wellbeing scale had a maximum of 60 and a minimum of 0. The fatigue-risk scale consisted of regression scores with a *M* of 0 and a *SD* of 1. All other scales had a maximum of 5 and a minimum of 1.

The means and standard deviations of the study variables are presented in Table 7B.4. Employees rated themselves higher on work engagement ($M = 4.11$, $SD = 0.54$) than positive accountability ($M = 3.47$, $SD = 0.51$) or safety empowerment ($M = 3.23$, $SD = 0.35$). On the PAS subscales employees perceived, on average, that discipline was lacking ($M = 2.69$, $SD = 0.83$) but that expectations were clear, appropriate and achievable ($M = 4.06$, $SD = 0.70$), and that their work was important ($M = 4.00$, $SD = 0.80$).

For the measure of wellbeing (i.e., CES-D), scale scores were calculated by adding scores in accordance with the scoring outlined by Radloff (1977). Radloff's early population samples reported mean scores of 7.9 to 9.3 ($SD = 7.5 - 8.5$) while her clinical sample of psychiatric patients (depression) reported a mean score of 24.4. She initially suggested a cutoff score of ≥ 16 for identifying elevated levels of depressive symptoms and found 15-20% of her samples in that category. Later she suggested a cutoff score of ≥ 23 for identifying Major Depressive Disorder (Radloff & Locke, 1986). The results from

this sample are higher than Radloff's early samples in terms of mean score ($M = 13.43$, $SD = 8.21$) and proportion scoring equal to or above 16 (i.e., 26.4%).

7B.3.2 Fatigue-risk scale. The four items relating to fatigue and safety were interrelated with correlations ranging from $r = .25$ to $r = .45$ ($p < .01$; Table 7B.5). In order to determine whether there was a single dimension underlying the items a principal components factor analysis was used. Examination of the *KMO* measure of sampling adequacy indicated the data was suitable for analysis ($KMO = .70$), and Bartlett's test of sphericity indicated appropriate collinearity among the items $\chi^2(6) = 99.63$, $p < .001$.

Table 7B.5

Correlations Among the Fatigue-Risk Items

	1	2	3	4
1. Ever get so tired that it affects your ability to work	1			
2. How many shifts were you so tired	.45**	1		
3. How many near misses	.34**	.38**	1	
4. I find coping with fatigue difficult	.41**	.25**	.27**	1

Note. * $p < .05$. ** $p < .01$.

A single component solution was obtained that explained 49.61% of the variance.

Table 7B.6 gives the eigenvalue, percentage of variance explained, and the variable loadings. A factor score was calculated from this analysis and saved for use as a dependent variable.

Table 7B.6

Principal Components Analysis of the Fatigue-Risk Scale

	Component
	1
Eigen value	2.05
Variance explained	51.34%
Ever get so tired that it affects your ability to work	.79
How many shifts were you so tired	.73
How many near misses	.69
I find coping with fatigue difficult	.66

7B.3.3 Principal components analysis of the WES. A principal components analysis with varimax rotation was conducted to test the structure of the WES. The number of factors was set to three, consistent with the three dimensional model of work engagement that underpins this research. The case to variable ratio was 21:1 and far exceeded the 5:1 recommended by Tabachnick and Fidel (2001). The *KMO* measure of sampling adequacy indicated the data was suitable for factor analysis ($KMO = .78$), and Bartlett's test of sphericity indicated appropriate collinearity among the items $\chi^2(28) = 269.36, p < .001$.

The three-component solution cumulatively explained 62.26% of the variance and was consistent with the three-dimensional theoretical model of work engagement. Table 7B.7 gives the eigenvalues, percentage of variance explained and the variable loadings.

The item "I put in extra effort if the job needs it" loaded with the dedication items rather than the vigor items. It appears that employees associated putting in extra work if the job needs it with a sense of dedication to work rather than a sense of energy and vigor at work.

Table 7B.7

Principal Components Analysis of the WES

	Component		
	1 Dedication	2 Absorption	3 Vigor
Eigen value	3.06	1.06	.80
Variance explained	38.30%	13.25%	11.02%
I'm proud of the work I do	.793		
I put in extra effort if the job needs it	.757		
I enjoy my work	.677		
I put my heart into my job	.556		
Time seems to fly when I'm working		.865	
I get so focussed on my work that I lose track of time		.656	
I work harder than I have to			.801
I go the extra mile at work			.570

7B.3.4 Principal components analysis of the PAS. A principal components analysis with varimax rotation was used to test the structure of the PAS. The case to variable ratio was 14:1 and far exceeded the 5:1 recommended by Tabachnick and Fidel (2001). The *KMO* measure of sampling adequacy indicated the data was suitable for factor analysis (*KMO* = .59), and Bartlett's test of sphericity indicated appropriate collinearity among the items $\chi^2(55) = 281.66, p < .001$.

The four-component solution cumulatively explained 59.95% of the variance and was consistent with the four dimensions of positive accountability described earlier in this thesis. Table 7B.8 gives the eigenvalues, percentage of variance explained and the variable loadings. In this study the item "I am rarely held accountable for my actions at work" loaded on both the discipline and salience components. It appears that participants associated rarely being held accountable for their actions with both discipline and, to a lesser degree, the importance of the job in terms of its impact on others. This suggests that being held accountable affects perceptions of how important the job is.

Table 7B.8

Principal Components Analysis of the PAS

	Component			
	1	2	3	4
Eigen value	2.57	1.58	1.29	1.14
Variance explained	23.39%	14.40%	11.76%	10.40%
I can achieve what I'm accountable for at work	.80			
You know exactly what is expected of you - concerning your job and work group	.78			
What I'm accountable for at work is appropriate to my job	.62			
Rules and standards at work are clear and unambiguous	.55			
Officially there are consequences for poor performance, but in reality not much happens		.80		
Discipline is talked about but rarely acted on		.69		
I am rarely held accountable for my actions at work		.64		.42
I am rewarded if I achieve what I'm accountable for at work			.82	
I get regular feedback about my performance			.79	
My job has a substantial impact on the work or lives of other people				.72
A lot of people can be affected by how well I do my work				.64

Note. Component 1 =Expectations; Component 2 = Discipline; Component 3 = Feedback; Component 4 = Salience.

7B.3.5 Correlations among the study variables. The correlations presented in Table 7B.9 show that positive accountability was significantly correlated with employee psychological wellbeing ($r = -.27, p < .01$), fatigue-risk ($r = -.21, p < .01$) and safety empowerment ($r = .47, p < .01$). Work engagement was associated with safety

empowerment ($r = .24, p < .01$) and wellbeing ($r = -.18, p < .05$) in this study but was not significantly correlated with fatigue-risk ($r = .10, p > .05$).

Each PAS subscale was significantly correlated with safety empowerment ($r = .19$ to $r = .34, p < .05$). Expectations and feedback were significantly correlated with wellbeing ($r = -.23$ and $r = -.17, p < .05$). Feedback also shared a significant correlation with fatigue-risk ($r = -.24, p < .01$).

Work engagement and positive accountability correlated at $.29 (p < .01)$. However, a negative association ($r = -.24, p < .01$) between discipline and work engagement was observed in this study highlighting the necessarily context dependent nature of the relationship.

Table 7B.9

Correlations Among the Study Variables

	1	2	3	4	5	6	7	8	9
1. PAS	1								
2. Expectations	.72**	1							
3. Feedback	.64**	.28**	1						
4. Discipline	.51**	.06	.05	1					
5. Salience	.55**	.27**	.28**	.02	1				
6. WES	.29**	.41**	.19*	-.24**	.39**	1			
7. Wellbeing	-.27**	-.23**	-.16*	-.13	-.13	-.18*	1		
8. Fatigue-Risk	-.21*	-.13	-.24**	-.14	.04	-.11	.51**	1	
9. Safety Empowerment	.47**	.34**	.33**	.19*	.29**	.24**	-.34**	-.28**	1

Note. * $p < .05$. ** $p < .01$.

7B.3.6 Predicting employee wellbeing, fatigue-risk and safety empowerment.

Multiple regression analysis with the PAS subscales entered as IVs was used to predict

safety empowerment, fatigue-risk and psychological wellbeing. Table 7B.10 provides a summary of the analyses.

Positive accountability accounted for significant variance in safety empowerment (23%), $F(4, 161) = 11.73, p < .01$, psychological wellbeing (8%), $F(4, 161) = 3.38, p < .05$, and fatigue-risk (9%), $F(4, 161) = 3.87, p < .05$. Expectations was the strongest predictor of safety empowerment and wellbeing accounting for 5% and 3% of the unique variance, respectively. However, feedback was the strongest and only significant predictor of fatigue-risk accounting for 3% of the unique variance.

Table 7B.10

Summary of Regression Results for Predicting Safety Empowerment, Wellbeing and Fatigue-Risk

Variables	<i>B</i>	<i>SE</i>	β	sr^2	R^2
DV = Safety Empowerment					
Expectations	0.21**	.07	.23	.05	
Feedback	0.12**	.04	.21	.05	
Discipline	0.13*	.05	.16	.03	
Salience	0.13*	.06	.16	.02	
					.23
DV = Wellbeing					
Expectations	-2.12*	.95	-.18	.03	
Feedback	-0.69	.60	-.09	.00	
Discipline	-1.11	.75	-.11	.01	
Salience	-0.54	.82	-.05	.00	
					.08
DV = Fatigue-risk					
Expectations	-0.12	.12	-.09	.01	
Feedback	-0.22*	.07	-.24	.05	
Discipline	-0.15	.09	-.12	.02	
Salience	0.16	.10	.13	.01	
					.07

Note. * $p < .05$. ** $p < .01$.

7B.3.7 Mediation analysis. In the QLD (7A) study an indirect pathway from positive accountability to fatigue-risk via employee wellbeing was identified. That is, the relationship between accountability and fatigue-risk was fully mediated by wellbeing. This pathway was tested again in this study.

Positive accountability did significantly predict fatigue-risk, $F(1, 164) = 7.18, p < .01$, accounting for 4.3% of the variance. Wellbeing predicted an additional 22.0% of the variance in fatigue-risk, over and above positive accountability, which was a significant change in prediction, $F_{change}(1, 163) = 28.16, p < .01$. The predictive strength of positive accountability decreased once wellbeing was taken into account, with the direct relationship between positive accountability and fatigue-risk becoming non-significant, $t = -1.06, p = .29$. Positive accountability also predicted a significant amount of variance in wellbeing, $F(1, 164) = 13.35, p < .01$, accounting for 7.5% of the variance.

Based on the regression results a fully mediated model appeared likely, however to test the significance of the indirect pathway Sobel's test was used. The results supported a significant indirect pathway from accountability fatigue-risk, fully mediated by wellbeing (Figure 7B.1), Sobel test, $z = -3.11, p < .01$.

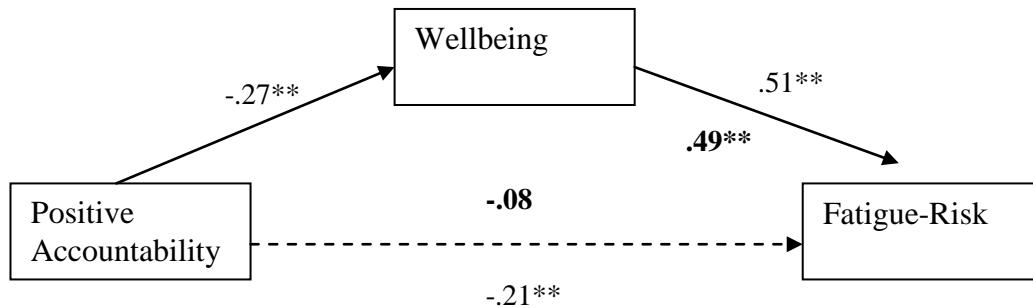


Figure 7B.1. Mediation model of positive accountability to fatigue-risk mediated by wellbeing. Standardized regression coefficients are presented. Original and modified (bold) coefficients are shown. * $p < .05$. ** $p < .01$.

7B.4 Discussion

This section described an investigation of work engagement and positive accountability within an independent sample of NSW mining employees. The key findings were:

- The structures of the WES and PAS were consistent with underlying theory and previous results in this thesis.
- Work engagement was related to safety empowerment, fatigue-risk and psychological wellbeing.
- Positive accountability predicted significant amounts of variance in safety empowerment and psychological wellbeing and fatigue-risk.

7B.4.1 Measuring work engagement and positive accountability. The results provided further support for the structure of the WES and PAS in an independent sample of Australian mining employees.

WES. Items were added to the WES in this study to more accurately capture the vigor dimension of work engagement. The item “I put in extra effort if the job needs it” was designed to measure vigor but loaded with the dedication items. The difference between this item and the other vigor items: “I work harder than I have to” and “I go the extra mile at work”, is that the latter items describe a more pervasive or consistent form of energy (i.e., non-contingent effort), rather than effort dependent on “when the job needs it”. Vigor is purported to be a sustained and persistent work state (Schaufeli et al., 2008), and the results of this study support this understanding. Of course the results also suggest that the willingness to invest effort “when the job needs it” was thought of in emotional terms, alongside pride in the job and enjoyment of work.

It can be argued that by modifying the item content of the WES the underlying meaning of the scale was also changed. However, the Cronbach alpha statistic indicated that the modified scale had a higher Cronbach's alpha suggesting that all of the items represented a single underlying construct and that the additional items had strengthened the internal consistency of the scale. In addition, the results of the principal components analysis were consistent with the three-dimensional theoretical model of work engagement that underpins this research.

PAS. The structure of the PAS was consistent with previous studies in this research providing further support for the reliability of the measure across different mining populations and in different survey contexts.

7B.4.2 Employee wellbeing and safety. Positive accountability again predicted significant amounts of variance in safety empowerment (23%) and employee wellbeing (8%). The relative predictive strengths of the PAS subscales were also consistent with previous results. However, in this study it also predicted a significant amount of variance in fatigue-risk (7%) but the results suggested that the relationship was fully mediated by employee wellbeing. It is not possible to draw strong conclusions about the direction of the relationships given the cross sectional nature of the study but the results illustrate the potential positive flow-on effects for employees of working in an environment that supports positive accountability.

Work engagement was more strongly related to employee wellbeing and safety in this study sharing weak, but significant relationships with psychological wellbeing ($r = -.18, p < .05$) and safety empowerment ($r = .24, p < .01$). However, the wellbeing and safety empowerment data were considerably less skewed and this might have contributed

to the stronger relationships that were found. Nonetheless, the relationships suggest that work motivation is only weakly linked to employee wellbeing and safety.

7B.4.3 Positive accountability and work engagement . Consistent with the basic understanding that the work environment influences employee psychological states, which, in turn influence outcomes (see Figure 3.1) positive accountability was associated with work engagement ($r = .29, p < .01$). The results suggest that a work environment characterised by clear, appropriate and achievable expectations and salient work is most likely to support work engagement. However, the result that discipline shared a weak but negative relationship ($r = -.24, p < .01$) with work engagement illustrates the necessarily complex and context dependent relationship between features of the work environment that can be seen as both positive and negative and work motivation (see also Skogstad et al., 2007)

7B.4.4 Conclusions. In conclusion the results: (1) support the underlying structure of the WES and PAS in an independent sample; (2) support the practical relevance of positive accountability to employee wellbeing and safety; and (3) suggest that work engagement is not synonymous with employee wellbeing.

7C: Testing the Structure of the WES and PAS in Different Occupational Groups

7C.1 Aim

In this section the factor structures of the WES and PAS are further examined in 5 different occupational groups of mining employees. The aim is to demonstrate the practical utility and reliability of the measures for use with different occupations.

7C.2 Method

7C.2.1 Sample. The unused data from the organisational culture survey described in Chapters 5 and 6 was utilised in this study. Demographic criteria were used to identify homogenous groups of employees of sufficient numbers to be included in the analysis. These criteria included: organisational role, level of education and gender. Descriptions of each occupational group and the criteria for inclusion in that group are presented below in Table 7C.1. Note that smaller groups e.g. apprentices and administrative staff, were identified but did not contain sufficient numbers to be included in the analysis.

Table 7C.1

Occupational Groups Included in the Analysis and the Selection Criteria Used to Identify Them

Occupational Group	Selection Criteria
1. Leaders ($N = 152$)	Indicated they were managers or superintendents.
2. Professionals ($N = 105$)	Indicated that they were professionals and possessed a degree or higher level of education.
3. Supervisors ($N = 100$)	Identified themselves as supervisors.
4. Tradesman ($N = 191$)	Indicated they were a skilled tradesman. Possessed a high school or some post-secondary level of education.
5. Operators ($N = 369$)	Indicated they worked in operational roles and possessed a high school education.

Note. Only males were included in the groups.

7C.2.2 Determining the minimum sample size. There are two approaches to determining the sample size required for principal components or factor analysis: (a) a minimum total sample size; or (b) the ratio of subjects to variables. Gorusch (1983) and Tabachnick and Fidel (2001) recommend a minimum case to variable ration of 5:1, while the widely cited Nunnally (1978) recommends 10:1. Alternatively, Comfrey and Lee (1992) argue for the following scale: 50 – very poor; 100 – poor; 200 – fair; 300 – good; 500 – very good; 1000 or more – excellent. Other estimates range from a minimum *N* of 50 (Barrett & Kline, 1981) to 400 (Aleamoni, 1976).

MacCallum, Widaman, Preacher, and Hong (2001) argued that there is no one approach or rule of thumb that will work in all cases; the number of items per factor, communalities and item loading magnitudes can make any particular ratio or minimum sample size overkill or hopelessly insufficient. In this study the aim was to determine a sample size that would allow the inclusion of multiple (and homogenous) groups of employees but was also sufficiently large to conduct the analysis. It was decided that a minimum sample size of 100 employees would be appropriate. That is, a sample of 100 would represent a case to variable ration of approximately 9:1 for analysis with the PAS and approximately 17:1 for the WES. While 100 is well short of Comfrey and Lees (1992) recommendation of 500 employees as a “good” sample size, considerations of the number of items and components of the scales, the size of communalities and loadings, and the resulting structures suggested that this was an appropriate selection.

7C.2.3 Measures. The item content and design of the WES and PAS was described in detail in Chapters 5 and 6. Cronbach’s alpha statistics for the scales are presented below in Table 7C.2. The values for the WES ranged from .69 to .79 indicating

appropriate internal consistency. Values ranged from .59 to .77 for the PAS and were considered appropriate for this research (see Peterson, 1994; Schmitt, 1996).

Table 7C.2

Internal Reliabilities of the WES and PAS for the Different Employee Samples

	WES	PAS
	α	α
Leaders	.69	.72
Professionals	.74	.77
Supervisors	.79	.70
Tradesman	.71	.59
Operators	.74	.65

7C.2.4 Analysis. Principal components analysis with varimax rotation was used to test the structure of both measures. Analyses of the WES were set to three components, while the PAS analyses were set to four, consistent with the theoretical structure of work engagement and positive accountability and previous analyses in this thesis.

7C.3 Results

The *KMO* measure of sampling adequacy indicated the each set of data was suitable for factor analysis ranging from .63 to .81. In addition, Bartlett's test of sphericity supported the factorability of the correlation matrix in each of the analyses ($p < .01$). Details of the analysis are presented in Appendix I and a brief summary is provided here.

In each analysis of the WES there was some cross-loading of items but for most of these items the higher loading was on the expected component. One exception was that for supervisors, tradesmen and operators the item "Time seems to fly when I'm working" loaded more strongly with the dedication items despite being designed to measure absorption and loading on the absorption component in earlier analysis (see Tables 5.7 and 5.8). Similarly, the item "I get a buzz out of my work", that had previously loaded on the dedication component (see Tables 5.7 and 5.8) loaded most strongly on the absorption dimension for tradesmen.

Analysis of the PAS showed that for operators and tradesmen there was no cross loading of items and each item loaded as expected. However there were some minor variations in the structure of the measure that are worth comment. The first was that for leaders (i.e., superintendents and managers) expectations and feedback items did not load as expected. While two distinct components emerged, the feedback and expectations items were mixed across the components. These dimensions were labelled *Expectations/Feedback 1* and *Expectations/Feedback 2* to reflect this mixing. Importantly, this mixing suggests that leaders felt differently about feedback and expectations than the other occupational groups and, more specifically, that feedback and expectations were less distinct from one another for leaders. The second set of variations worth comment

concerned the structure of the PAS for supervisors. For supervisors, the two items designed to measure accountability salience did not load as expected suggesting that supervisors responded differently to the salience items than the other occupational groups.

Finally, for both measures there were variations in the amount of variance explained by each dimension for different occupational groups. For example, for supervisors, operators and tradesman the expectations component of the PAS explained the most variance in the data, while for professionals it was the feedback dimension. These differences in emphasis are further evidence that employees in different occupational groups with different organisational roles and demands respond differently to some aspects of positive accountability.

7C.4 Discussion

This section described an investigation of the structure of the WES and PAS across different occupational groups of employees. In order to obtain a three-dimensional structure of the WES a degree of fitting of the data was required. For example, each analysis was manually set to three components. In none of the analyses did all three components demonstrate eigen values greater than 1. Furthermore, cross loading of some items suggests that there are subtle differences in the way different occupational groups understand work engagement. The results therefore, support understanding work engagement in terms of vigor, dedication and absorption but measuring it in terms of a total score using the WES.

Schaufeli and Bakker (2010) cite several studies that demonstrate that a three-factor model of work engagement fits the data better than a one-factor model across samples of employees from different countries. However, they concede that others (e.g., Sonnetag, 2003) have not found a clear three-dimensional structure because the dimensions of work engagement are closely related both empirically and conceptually. CFA of the WES and UWES in this thesis (see Appendix J) also did not support a clear three-dimensional structure. Based on these inconsistencies they also argue that engagement is a unitary construct that is constituted by different, but related, aspects and that for practical purposes it is best measured via a total score.

Overall the four-dimensional structure of the PAS was consistent across the five different occupational groups. The differences in the way that leaders responded to feedback and expectations items, and the way supervisors responded to salience items suggests that different occupational groups understand and experience accountability

differently, but that the overall meaning of the construct is similar . The structure of the PAS was most consistent for operators and tradesmen, with each item loading as expected with no cross-loading items. This illustrates the importance of understanding accountability across organisational levels and also suggests that at higher levels of organisational hierarchy accountability becomes more complex.

In conclusion this study provides support for the use of the WES and PAS in different occupational groups working at different professional and semi-professional levels.

7D: Post Hoc Investigation of Positive Accountability as a Work Environment/Job

Design Construct

In this post hoc study positive accountability is considered within the theoretical domain of job design. This is important because the results in terms of the psychometric strengths of the PAS and its relationships with practically relevant outcomes suggest that further theoretical consideration of the nature of positive accountability is worthwhile.

7D.1.1 Job design theory. Traditional job design theories such as job enrichment (Herzberg et al., 1959; Herzberg, 1966) and JCT (Hackman & Oldham, 1976; 1980) adopt a structural approach to the work environment that seeks to describe how the design of work impacts individual behaviour. They also aim to develop knowledge of how the work environment can be manipulated to promote desired behaviour and optimal functioning. However, a growing number of scholars are questioning the ability of traditional models and theories of job design to explain the current work context (Grant et al., 2010; Grant & Parker, 2009; Parker et al., 2001; Rousseau & Fried, 2001). Indeed, attempts have been made to extend and modify traditional job design theories to more accurately reflect the modern work environment (e.g., Jackson et al., 1993; Humphrey et al., 2007; Morgeson & Humphrey, 2006; Parker, et al., 2001). A common theme in the studies cited above is that traditional approaches to job design do not give enough importance to the social and relational aspects of work.

7D.1.2 Positive accountability as a 21st century job design variable. The salience dimension of positive accountability directly overlaps with task significance from JCT. Both refer to the perceived importance of an employees work in terms of its impact on others. Furthermore, feedback is a central feature of both job design theories and

positive accountability. JCT views feedback as coming from the job itself while for positive accountability feedback is from outside of the job and is more closely tied to the social structure of the work environment. In a similar way, expectations and discipline (i.e., negative feedback) are tied to informal social structures as well as formal structures of work.

Positive accountability, therefore, overlaps with JCT but gives more importance to the social and relational aspects of work. As such it can be argued that positive accountability is well placed to describe job design in 21st century organisations.

7D.1.3 Job design and work engagement in the 21st century. Theory and research places the work environment as antecedent to work engagement (Dijkers, Jansen, de Lange, Vinkenburgh, & Kooij, 2009; Schaufeli & Bakker, 2010). The results of Chapter 5 illustrated the particular importance of traditional job design characteristics (i.e., autonomy, feedback, task significance, skill variety and task identity) in predicting work engagement for blue and white collar mining employees. However, given that positive accountability may be better placed than traditional job design characteristics to describe the work environment in modern organisations it could be argued that positive accountability would be a stronger predictor work engagement. This study will provide a partial test of this argument by assessing the relative strengths of positive accountability and traditional job design characteristics as predictors of work engagement.

7D.2 Method

7D.2.1 Sample. This study used the data from the organisational culture survey used in section 7 C. It provided a sample of 1629 cases from which to extract a homogenous sample of male operators of appropriate size for the analysis ($N = 527$). More detail demographic information is presented in the results.

7D.2.2 Measures. Details of item content and psychometric properties of the WES and PAS (total and subscales) have been presented in Chapters 5, 6 and 7C. Appendix D provides the item content and internal reliabilities of the five job characteristics variables.

7D.2.3 Data screening. The data was screened to make sure it was suitable for regression analysis. The univariate skewness values ranged from $-.82$ to $.26$. The univariate kurtosis values ranged from $-.77$ to $.61$. Examination of histograms and normal probability plots of residuals calculated through the regression analysis revealed normal distributions. Scatterplots of predicted and residual scores suggested that bivariate linearity and homoscedasticity were appropriate, while VIF statistics did not suggest multicollinearity among the variables, except for task significance and accountability salience because these were measured using the same items. In the regression analysis only accountability salience was entered into the equation to avoid multicollinearity. Multivariate outliers were identified via examination of casewise diagnostics, Mahalanobis distance, Cook's distance and leverage values. Regressions were conducted with and without multivariate outliers to determine whether these cases unduly influenced the regression results. Negligible affects on overall results were observed and all multivariate outliers were retained in the final analysis.

7D.3 Results

7D.3.1 Demographics. Over half of the employees were between 30 and 50 years of age (55.5%) (Figure 7D.1). Similar proportions of employees were between 20 and 29 years (18.8%) and between 50 and 59 years (19.7%). Few employees were over 60 (5.7%) or under 20 (0.6%). There were over 25% of employees who had worked with the organisation for longer than 15 years, and most employees (77%) had been with the organisation for 2 or more years (see Figure 7D.2).

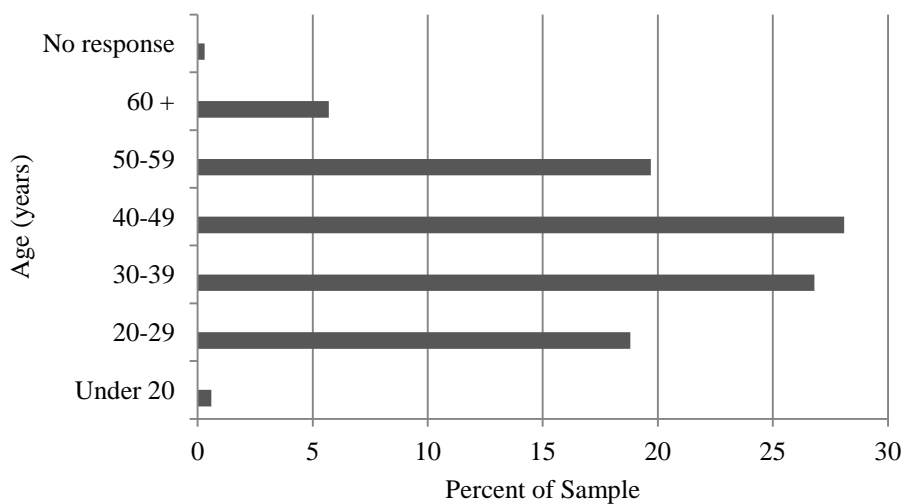


Figure 7D.1. Percentage of Employees in Each Age Group (years).

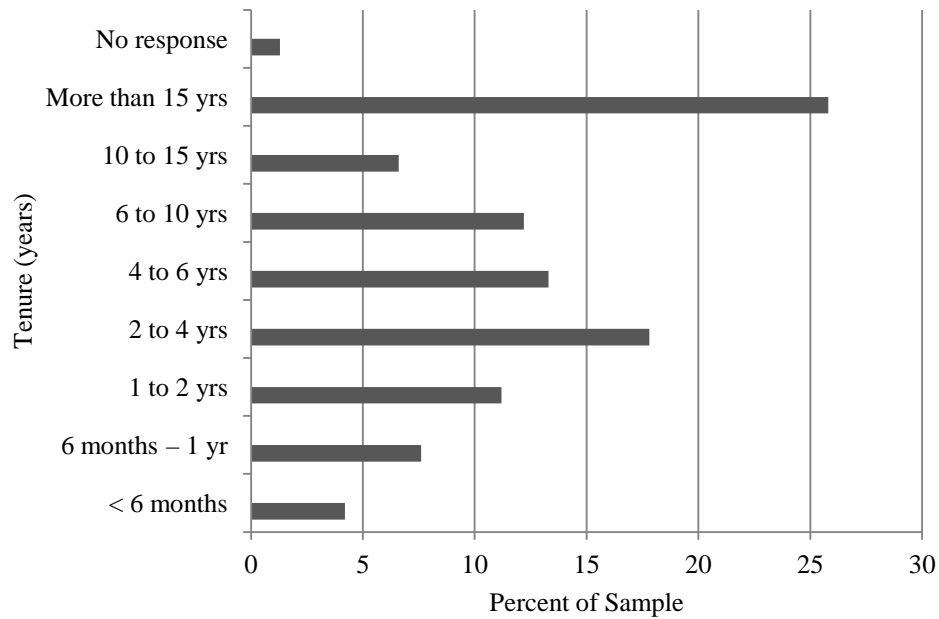


Figure 7D.2. Tenure Groupings of the Sample (years).

7D.3.2 Descriptive statistics and correlations. Employees reported generally positive perceptions of work engagement, positive accountability and the characteristics of their jobs with the highest ratings on the expectations subscale of the PAS ($M = 3.86$, $SD = 0.79$) (see Table 7D.1). However, participants were less positive about discipline at work ($M = 2.57$, $SD = 1.10$). Correlations among the variables are presented in Table 7D.2.

Table 7D.1

Means and Standard Deviations for the Study Variables

	<i>M (SD)</i>
WES	3.84 (0.68)
PAS Subscales	
Expectations	3.86 (0.79)
Feedback	3.07 (0.89)
Discipline	2.57 (1.10)
Salience	3.79 (0.84)
Job Characteristics	
Autonomy	3.62 (0.99)
Variety	3.81 (1.10)
Feedback	3.69 (0.79)
Identity	3.22 (0.96)
Significance	3.79 (0.84)

Table 7D.2

Correlations Among the Study Variables

	1	2	3	4	5	6	7	8	9	10
1.WES	1									
2.Expectations	.45**	1								
3.Discipline	.05	.12**	1							
4.Feedback	.23**	.28**	.08	1						
5.Salience	.31**	.28**	.07	.16**	1					
6.Autonomy	.26**	.24**	-.00	.23**	.24**	1				
7.Variety	.27**	.21**	.07	.27**	.25**	.45**	1			
8.Feedback	.29**	.37**	.05	.25**	.38**	.38**	.34**	1		
9.Identity	.29**	.26**	.08	.32**	.28**	.38**	.46**	.37**	1	
10.Significance	.31**	.28**	.07	.16**	1.00**	.24**	.26**	.38**	.28**	1

Note. * $p < .05$. ** $p < .01$.

The correlations show that positive accountability and traditional job design variables are related. Task significance and accountability salience, as noted above, were identical correlating at $r = 1$. Expectations and feedback was significantly related to each

of the job design characteristics ($r = .24$ to $r = .37$, and $r = .16$ to $r = .32$, respectively; $p < .01$). However, discipline was weakly related to all of the job design characteristics. These results illustrate that positive accountability and traditional job characteristics are related.

The expectations and salience dimensions of positive accountability shared stronger associations with work engagement ($r = .31$ to $r = .45$, $p < .01$) than the autonomy, variety, feedback and identity job characteristics ($r = .26$ to $r = .29$, $p < .01$). These results show that positive accountability is more strongly related to work engagement than the traditional job design characteristics.

7D.3.3 Regression results. Hierarchical multiple regression was used to test whether positive accountability was able to account for variance in work engagement over and above that explained by the job characteristics variables. In the first step the job design variables: autonomy, variety, feedback and identity were entered. The task significance job characteristic was not included in the first step in order to avoid multicollinearity as task significance and accountability salience were measured using the same items. Salience was included in step 2 of the analysis.

Overall the IVs significantly accounted for 27% of the variance in work engagement, $F(8, 518) = 23.99$, $p < .001$. As shown in Table 7D.3 the job characteristics variables together predicted a significant amount of variance in work engagement (14%), $p < .01$. Each of the four job characteristics accounted for significant unique variance in work engagement.

When the positive accountability variables were included in the analysis an additional 13% of the variance in work engagement was explained, $F_{\text{change}}(4, 518) = 23.10$, $p < .001$. However, in the second step none of the job design variables predicted

significant variance in work engagement. That is, the accountability variables predicted work engagement over and above the job characteristics variables.

Examination of the squared semi-partial correlations revealed that expectations and salience were the strongest predictors of work engagement, accounting for 11% and 2% of the unique variance respectively.

Table 7D.3

Summary of Hierarchical Regression Results

Variables	<i>B</i>	<i>SE</i>	β	sr^2	R^2
Step 1 – JCT Variables					
Autonomy	0.07*	0.03	.10	.01	
Variety	0.07*	0.03	.10	.01	
Feedback	0.15**	0.04	.17	.03	
Identity	0.10**	0.03	.14	.02	
					.14
Step 2 – All Variables					
Autonomy	0.04	0.03	.06	.00	
Variety	0.05	0.03	.08	.01	
Feedback	0.03	0.04	.03	.00	
Identity	0.05	0.03	.08	.01	
Expectations	0.29**	0.04	.34	.11	
Discipline	-0.01	0.03	-.02	.00	
Feedback	0.03	0.03	.05	.00	
Salience	0.12**	0.03	.14	.02	
					.27

Note. * $p < .05$. ** $p < .01$.

7D.4 Discussion

In this study support was found for viewing positive accountability within the theoretical domain of job design. Traditional JCT and positive accountability directly

overlap in terms of task significance and accountability salience. The results also showed links between the expectations and feedback dimensions of positive accountability and job characteristics. Discipline, however, was outside the scope of traditional JCT as evidenced by its non-significant relationships. The results, therefore, are consistent with the understanding that positive accountability is related to but different from traditional job design characteristics. More specifically, it is a work environment construct that bridges the structural aspects of job design and the social/relational aspects.

Therefore, positive accountability may be better placed to describe the work environment in modern organisations than job characteristics developed for use in jobs with more structurally limited boundaries. The fact that positive accountability predicted work engagement over and above traditional job characteristics supports this argument. Just as importantly, this result illustrates that structural approaches to encouraging motivation may be less effective than approaches that also recognise the importance of the social and relational elements of work design. This fits well with previous arguments that traditional theories of job design need to give more attention to the social aspects of work (see Grant et al., 2010)

By considering positive accountability from the theoretical perspective of job design this study establishes positive accountability within a rich area of theory and research that will allow researchers to build on previous knowledge to develop a clearer understanding of the work experience in modern organisations.

7.2 Summary of Key Results and Conclusions from Studies A to D

The key findings from the studies presented in this chapter are:

- There were minor variations, but the overall structures of the WES and PAS were consistent with the conceptual models of work engagement and positive accountability across different occupational groups and samples of employees.
- Positive accountability predicted employee wellbeing and safety indicators.
- Work engagement was only weakly linked to employee wellbeing and safety indicators.
- Positive accountability predicted work engagement over and above traditional job design characteristics.

7.2.1 Measuring work engagement and positive accountability. The results provided support for the consistency of the structures of the WES and PAS across different occupational groups and organisations. However, minor variations in the way items loaded across studies and between occupational groups suggest that whilst the overall meaning of the constructs is similar, researchers and users of the measures need to be cognizant that different populations of employees may respond to the items in slightly different ways.

In terms of work engagement such minor overlaps and inconsistencies might be expected considering that the three dimensions have been reported to be closely related (e.g. Schaufeli et al., 2008; Schaufeli & Bakker, 2004; Hallberg & Schaufeli, 2006). Importantly, the results lend support to the argument that work engagement can be described in terms of three related aspects (i.e., vigor, dedication and absorption), but that for practical purposes it is best treated as a unitary construct. In contrast, the results support the theoretical and practical utility of the use of the PAS subscales. These conclusions are further supported by CFA of the measures (see Appendix J).

7.2.2 Employee wellbeing and safety. Overall, positive accountability was more strongly related to employee wellbeing and safety than work engagement which showed weak relationships. The extent to which employees knew and understood what was expected of them (i.e., expectations) was the strongest individual predictor of psychological wellbeing and a sense of control and influence over safety at work. Thus the results are consistent with the argument that organisations that provide a well structured external work environment (i.e., clear, appropriate and achievable expectations) are likely to foster employees' internal sense of wellbeing and control.

Some authors conceptualise work engagement as the positive antithesis of burnout and, as such, a positive indicator of employee wellbeing (e.g. Maslach et al., 2001; Schaufeli et al., 2008). In this research, however, work engagement was not generally indicative of wellbeing. It seems that a motivated employee may not experience better psychological wellbeing and is not necessarily a safe employee. This is important as it highlights the limitations of inferring that work engagement is a panacea for organisations.

7.2.3 Positive accountability, job design and work engagement in modern organisations. The results support the understanding of positive accountability as a work environment construct that is similar to but also different from traditional job design characteristics. Furthermore, the findings suggest that positive accountability may offer a more relevant lens through which to understand job design and the work environment in modern organisations because it spans formal/structural and social work characteristics. This fits with calls for job design research to adopt a more relational perspective because

jobs roles and tasks are more socially embedded than ever before (see Grant et al., 2010; Grant & Parker, 2009)

Research has identified a range of work environment variables that predict work engagement (for examples see Bakker et al., 2007; Rich et al., 2010; Schaufeli et al., 2008; Van den Broek, 2008). The general conclusion is that well designed jobs support work engagement. The results of this research support this conclusion but also suggest that it is important to understand that traditional approaches to generating motivation through job design (i.e., JCT) are likely to be less effective than approaches that recognise the importance of the social characteristics of work (i.e., positive accountability).

7.2.4 Overall conclusions. In conclusion the results: (a) support the use of the WES and PAS with different occupational groups and samples of employees in the mining industry; (b) demonstrate the practical importance of positive accountability to employee wellbeing and safety and work engagement; (c) caution against inferring that work engagement is indicative of wellbeing; and (d) support the theoretical understanding of positive accountability as a job design construct.

Chapter 8: Summary and Conclusions

This thesis further develops theory and research on work engagement and accountability. It has described the exploration and measurement of both constructs through a series of survey based studies of Australian mining industry employees. Chapter 4 reported the results of an initial investigation into engagement and accountability using archival data. Chapters 5 and 6 reported on the development and testing of the WES and PAS and also explored their relationships with other organisational variables. Chapter 7 described further testing of the WES and PAS across two completely independent employee population and continued to explore the nature of the constructs in terms of their relationships with other workplace variables.

This chapter begins with a brief review of the background to the research, the research problem and the aims of the research. It then brings together the key results and conclusions from each of the chapters in order to identify the contributions of the research to the literature and discuss the implications for theory and practice. Finally, the limitations of the research and directions for future research are discussed.

8.1.1 Background and context for the research. The world of work has undergone significant transformation in the last few decades. Technology, competition and globalisation have seen dramatic changes in the structure and design of organisations leading to a redefinition of work itself (Cascio, 1995; Porter, 2008). There has been a global shift from manufacturing economies to knowledge and service economies and the nature of the workforce has changed with more women, greater ethnic diversity, better educated and more mobile employees, and altered psychological contracts between employers and employees (Fried et al., 2008). The pace of these changes means that there is more uncertainty and unpredictability in the workplace than ever before (Grant et al., 2010).

In order to reflect and illuminate these changes traditional theories of work and people at work must adapt and evolve. As a number of scholars have pointed out, current theoretical models and empirical studies of job design and work motivation are grounded in theory and research that emerged in the 1960's and 70's that no longer reflect the current work climate (Humphrey et al., 2007; Grant et al., 2010; Grant & Parker, 2009, Parker et al., 2001; Rousseau & Fried, 2001). The research presented in this thesis was well placed to contribute towards a shift forward in our understanding of work motivation and job design in modern organisations by advancing the theory and research on two constructs: work engagement and positive accountability.

Work engagement and positive accountability were selected for the focus of the research for three reasons. The first was that neither construct was well understood or had been previously quantified by the main participating organisation, but they indicated that they considered both constructs to be at the core of their future development. The second reason was that both were under researched and therefore less strongly embedded in theories of work psychology. The third reason was that both constructs are widely used by organisational practitioners in Australia and overseas.

The research was guided by an overarching theoretical framework of work and employee performance that links the work environment (e.g., job design) to psychological states (e.g., motivation and wellbeing) and work outcomes (see Figure 8.1). This framework underlies theories of organisational culture, work motivation, work stress and job design, for example, and may be considered a basic tenet of HRM (see Becker & Huselid, 1998; Combs et al., 2006; Deci & Ryan, 1985; Hackman & Olham, 1976; 1980; Herzberg et al., 1959; Herzberg, 1966).

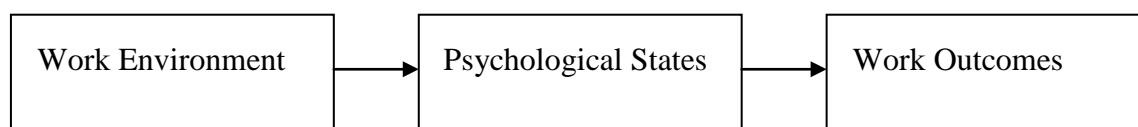


Figure 8.1. Basic Theoretical Framework.

Within this basic framework, and as operationalised in this thesis, work engagement is a psychological (motivational) state. Positive accountability, which describes formal and informal aspects of the work environment and working relationship, is a work environment construct and an antecedent of psychological states (e.g., work engagement) and work outcomes. Brief summaries of the state of the research concerning engagement and accountability are presented below along with the overall aims of the research.

Work engagement. In order to compete companies are striving to get the most out of one of their most valuable resource: employees. They want employees who are motivated, energetic and dedicated and willing to go the extra mile for the company. Organisations have traditionally looked to research on constructs such as job design (Hackman & Oldham, 1976; 1980), job involvement (Lodahl & Kejner, 1965), organisational commitment (Mowday et al., 1979), and job satisfaction (Locke, 1976) to address this need. However, the world of work and the way in which employees relate to the organisation and their jobs has undergone significant transformation in the last several decades. It is in this context that many organisations have turned to the concept of engagement.

However, there is a great deal of confusion about what exactly engagement is, what it does, and how best to secure and manage it. This confusion is driven by three key factors. The first is that there is a very large volume of practitioner literature relating to engagement that is conceptually and methodologically diverse making it difficult to find conceptual or

theoretical consistency and/or integrate findings. The second is that engagement is often conceptually confounded with other older, more established constructs such as job satisfaction, organisational commitment and job involvement. This has led to criticisms that engagement is simply “old wine in a new bottle”. The third is that the way that practitioners and academics approach, understand, measure and use engagement is often significantly different.

A key goal of this thesis was to develop, test and explore a measure of work engagement that is suitable for use with skilled employees working in an industrial context and which seeks to measure work engagement within a clear theoretical framework. As a starting point this research drew primarily on the dominant academic perspective of engagement that conceptualises it as a work-specific, motivational construct (i.e., work engagement; Schaufeli & Bakker, 2010). Two main reasons underpinned this choice:

- (1) Work motivation antecedent by work environment variables and leading to work performance outcomes is a core tenet of work psychology and HRM theory that underlies both academic and practitioner interest in the world of work and in engagement.
- (2) Work engagement as a motivational construct has a growing data driven academic research base that supports its measurement and integrates it within the broader conceptual framework of HRM and work psychology.

Positive accountability. Accountability is pervasive throughout society as well as the organisations within them (Frink et al., 2008; Lerner & Tetlock, 1999). It has been called the most fundamental factor in organising and organisations, yet also the most under-investigated (Frink & Klimoski, 1998).

Traditional views of accountability are grounded in top-down, hierarchical control systems (Dose & Klimoski, 1995; see also Ouchi, 1979). However, today’s world of work is characterised by labour flexibility and flatter organisational structures and the success of

organisations is often dependent on its capacity to adapt and change. In this context, procedural consistency and command and control contingency approaches to accountability can be restrictive or even detrimental (Dose & Klimoski, 1995; Ferris et al., 1995; Lerner & Tetlock, 1999). These factors necessitate a shift in the traditional view of accountability to one that recognises it as an interactive construct that bridges the immediate job and wider organisational environment and is embedded within the formal and informal (i.e. social and cultural) structures of work.

As a central and pervasive phenomenon accountability can be viewed through multiple theoretical lenses, to the extent of being described by Mulgan (2000) as “complex and chameleon like”. For example, themes and issues of accountability are implicit in many well established streams of research such as organisational culture (Schein, 1992), organisational structure (Gulick, 1937; Urwick, 1956), leadership (Bass, 1999; House & Aditya, 1997), and reward and punishment (Locke & Latham, 1990). Each of these areas of research is, to varying degrees, concerned with shaping employee behaviour through formal and/or informal means in order to align it with organisational goals; yet none directly address accountability.

It was in this context that this research approached accountability as a dynamic, positive feature of the work environment that is embedded in the social structures of work. The aim was to develop and test an empirical measure of positive accountability according to a multi-dimensional conceptual framework that would have practical relevance and utility in contemporary organisations.

8.2 Key results and conclusions

In the following sections the key results and conclusions of the research relating to work engagement followed by positive accountability are discussed.

8.2.1 Understanding and measuring work engagement. One of the main aims of the research was to develop and test an empirical measure of work engagement, the WES. To better understand this essentially motivational measure of work engagement it was necessary to consider it in the context of two other distinct approaches to measuring engagement: the Gallup Q12 and role-specific engagement. The three measures used were:

- (1) The WES: a purpose designed measure based on a three-dimensional theoretical model that directly measures work engagement.
- (2) The E12: an indirect measure of engagement based on the widely used practitioner measure, the Gallup Q12.
- (3) A series of single items designed to tap into and measure the strength of engagement with different work roles (i.e., job, team, subordinate, and organisation member roles).

WES. The WES was based on a three-dimensional theoretical model of work engagement (see Figure 3.2). According to the model work engagement is a unique motivational state that should be measured directly. Specifically, an engaged employee has a strong sense of energy and vigor at work, a sense of dedication and emotional attachment to work, and is absorbed in his or her work.

The internal consistency of the WES was assessed using the Cronbach's alpha statistic. The results revealed Cronbach scores ranging from .69 to .79 across the different employee groups from the main survey and the two smaller independent survey samples. Hence, it can be concluded that the WES is sufficiently internally consistent. It was also found that the WES was strongly correlated ($r = .82$) with the UWES supporting its validity as a measure of work engagement.

The underlying structure of the measure was also tested across different employee groups. Overall, the results were consistent with a three-dimensional model of work engagement across multiple occupational groups of employees from the main survey sample and also two completely independent samples of mining employees, although some fitting of the data was required. The consistency of this structure throughout the thesis provides strong support for the reliability of the measure and supports its use across different occupational groups of employees. Furthermore, the results provide psychometric support the use of the WES as an alternative measure to the widely used UWES.

In spite of this overall consistency it is nonetheless argued that work engagement is a motivational state that is best measured as the sum of three subscales rather than measured as three clearly distinct psychological states. This is supported by three main arguments.

Firstly, the feelings and attitudes that are linked to motivational constructs are difficult to communicate succinctly and with clarity. This was evident in this research. For example, different groups of employees responded to some of the items in different ways. For example, tradesmen associated the item “I get a buzz out of my work” with vigor and dedication, while other occupational groups did not.

Secondly, motivational constructs are fuzzy in nature (see Nowakowska, 1977) and when inferred from feelings, attitudes and behaviours, this fuzziness is further amplified. A multidimensional model of work engagement was found to be a useful in the development survey items that cover the breadth of the construct but not in eliminating its inherent fuzziness.

Thirdly, whilst most researchers have found some support for a three-dimensional model of work engagement (see Schaufeli & Bakker, 2010), others report the absence of a clear three-factor structure (e.g., May et al., 2004 and Sonnetag, 2003). Indeed, in this research it was necessary in each analysis to prescribe a three-factor solution, that is, a degree

of fitting of the data was required to obtain the three-dimensional structure and when CFA was applied to the measure no clear three-factor structure was found (see Appendix J).

The results from this research therefore give further support to a three-dimensional model of work engagement. This research also supports the proposition that the model represents an “underlying motivational process” (Schaufeli & Bakker, 2010, p. 22) that is an affective psychological state “which includes a behavioural-energetic (vigor), an emotional (dedication), and a cognitive (absorption) component “(Schaufeli and Bakker, 2010, p. 13).

E12. As has been frequently noted throughout this thesis, there are significant differences in the way academics and practitioners have understood and measured engagement. This research offered a rare opportunity to compare and contrast the WES (a measure based on work engagement understood as a motivational state) and the E12 (a measure based on the Gallup Q12: a widely used measure for which psychometric data is available).

The item content of the measures was very different. The WES is designed to tap vigor, dedication and absorption (i.e. the underlying motivational state of work engagement) whereas the item content of the E12 is designed to tap a range of workplace factors (e.g. attitudes towards the supervisor, organisation, job resources and co-workers) which the authors of the original Q12 argue taps potential antecedents of engagement (i.e. “antecedents of personal job satisfaction and other affective constructs” (Harter et al., 2002)).

Whilst the Q12 provides a useful workplace audit, Harter et al. (2002) reported a correlation of .72 (.91 corrected for measurement error) between the Q12 and a single item measure of overall job satisfaction. They also discuss their results in terms of “employee satisfaction-engagement” suggesting that the Q12 just as well be described as tapping antecedents to job satisfaction as engagement. In this research the E12 correlated with a measure of job satisfaction at $r = .59$ and $.68$ ($p < .01$) for blue and white collar employees

respectively. The WES correlation with job satisfaction was substantially weaker for both blue collar ($r = .31, p < .01$) and white collar ($r = .32, p < .01$) employees. These results lend further support to and understanding of the Q12 as a measure of antecedents to motivation and job satisfaction.

The strength of the correlations between the WES and the E12 (i.e., blue $r = .29$, white $r = .27, p < .01$) also supports the argument that the WES and the E12 are tapping different constructs. Moreover, the different pattern of correlations between the E12 and WES with the single item measures of role engagement further illustrates that the E12 and WES are not measures of the same construct.

The contrasting results for the WES and the E12 provide strong evidence that that “employee satisfaction-engagement” is distinct from the psychological state of work engagement. They also support understanding the E12 (i.e., Gallup Q12) as a work outcome measure that taps features of the work environment that may or may not be antecedent to work motivation, but is strongly linked to job satisfaction.

Role engagement. Several authors argue that employees engage more or less depending on the role (see Kahn, 1990; Rothbard, 2001; Saks, 2006). From this perspective the focus for engagement is an attachment or identification “with” something external to the individual rather than an internal motivational state. The conceptual overlap between role engagement as attachment or identification and straightforward measures of the quality of relationship is shown by the strength of correlations found between, for example, supervisor engagement and relationship with supervisor (blue $r = .69$, white $r = .76, p < .01$). Unlike the E12, role engagement is a direct measure of the strength of identification with different aspects of the work environment rather than the extent to which employees are satisfied with these different aspects.

Employees did report statistically significant ($p < .05$) differences in their levels of engagement across the different roles (i.e., the job, team-member, subordinate, and organisation member). The pattern of correlations suggested a hierarchical effect whereby employees most strongly engaged (identified) with the job role, but were decreasingly engaged with the team, the supervisor, and the organisation. Furthermore, there were very few employees who reported low job engagement and high organisation engagement (0.2% of the blue collar sample, 0.6% of the white collar sample) versus a much higher proportion who reported high job engagement and low organisation engagement (14.0% of the blue collar sample, 5.9% of the white collar sample). This result is consistent with the argument that the work role is at the core of engagement with co-workers, supervisors and the organisation providing the context within which the work or job is set.

Another key finding was that the role engagement measures shared different patterns of relationships with other workplace factors (i.e., job resources). Saks (2006) reported similar findings in relation to job and organisation engagement and argued that this indicated conceptual distinctness between job and organisation engagement. In this context the results from the analysis of the single items used in this research suggest that they were tapping into different work constructs rather than a persistent, underlying motivational state.

These results are indicative of the complexity of seeking an understanding of engagement as role specific. Not only are there a plethora of potential points of role engagement but also, as the results show, the nature of “engagement” may differ according to the role. Seen from the motivational perspective of engagement, identification with or attachment to different roles (i.e., role engagement) may best be understood as antecedent to work engagement rather than indicative of it.

8.2.2 Construct validity of the WES. The basic guiding framework that underpins this research essentially argues that work conditions influence the psychological state of

employees (in this case they operate to increase or decrease motivation), which, in turn, is associated with performance-based outcomes. Motivation has historically been sought through the design of the work environment (e.g. JCT) and linked to outcomes such as organisational commitment, job satisfaction and job involvement (Locke & Latham, 2004). Convergent validity of the WES, as a measure of work motivation, was achieved by demonstrating links to both work environment conditions and work outcomes (see Figure 8.2), and concurrent validity support achieved by demonstrating a strong relationship between the WES and UWES (see Appendix J).

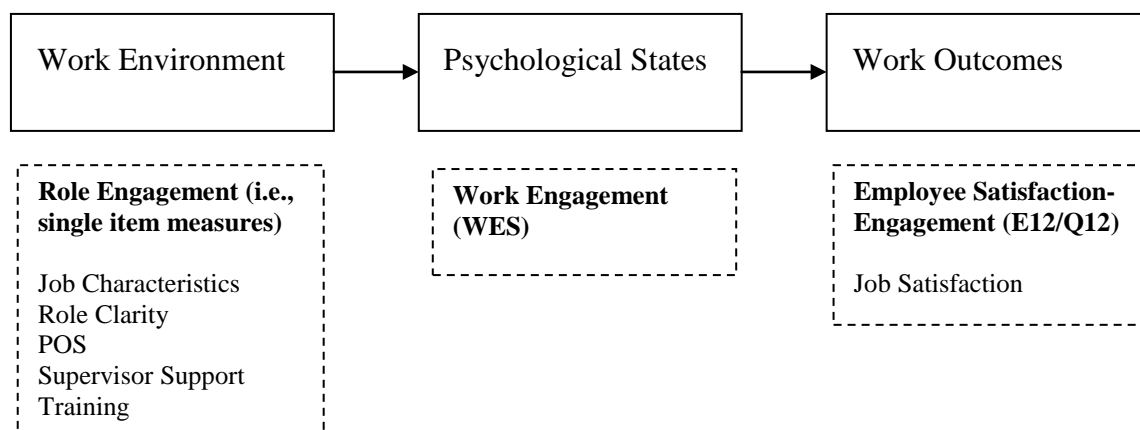


Figure 8.2. Conceptual model of where study variables and the different measurement approaches (in bold) to engagement sit in relation to the basic theoretical framework that underpins this research. It is an illustrative not a prescriptive model (i.e., only selected variables from the research are included and the direction of relationships and the positions of the variables in the model are not definitive).

Thus, whilst the correlations between the WES and work environment and outcomes support its convergent validity, just as importantly, the moderate strength of these correlations also supports the divergent validity of the WES. For example, work engagement was significantly correlated with both job characteristics (blue $r = .28$; white $r = .44$, $p < .01$) and role clarity (blue $r = .25$; white $r = .31$, $p < .01$). Job design has been widely linked to increased motivation across the organisational research literature (e.g., Oldham & Hackman,

2010), and work engagement (Hakanen & Roodt, 2010). At the same time the WES correlated with job satisfaction (blue $r = .31$ and white $r = .32, p < .01$) with which work engagement is related but often confused (Schaufeli & Bakker, 2010); with the strength of the association supporting both its convergent and divergent validity. The evidence of convergent and divergent validity of the WES supports its strength as a measure of work motivation, and the construct validity (derived from its item content) indicates that this strength is achieved by a more direct approach to measurement of work motivation.

Figure 8.2 also provides a conceptual framework for understanding the similarities and differences between more direct (e.g., WES) and less direct (e.g., E12, role engagement) measures that rely on work environment and/or outcome variables. Whilst the relationships support the WES as a motivational measure, the Q12, on the other hand, was strongly overlapped with outcome variables (i.e., job satisfaction) but the content tapped the work environment (e.g., supervisor support and work rewards) indicating that it is better understood as an amalgam of these variables. Role engagement (i.e., identification with or attachment to different work roles) can be positioned as a work environment construct within this framework.

8.2.3 Predicting work engagement. Research suggests that employee motivation is generated by creating the right conditions (Grant et al., 2009; Hackman & Oldham, 1980). The results of this research support this general argument, but, in terms of work engagement, offer clearer insight into what those conditions might be and in what contexts they might apply.

The results demonstrated that the drivers of work engagement may vary in content and in nature from one work setting to another and/or by occupational group. For blue collar employees, job characteristics, POS, training and development, fairness and supervisor support were significant predictors of work engagement. For white collar employees the

significant predictors of work engagement were job characteristics, POS and role clarity. Similarly, there were differences in the specific job characteristics that predicted work engagement for blue and white collar employees. Task feedback and significance predicted work engagement for blue collar employees, whereas task variety, autonomy and task identity predicted work engagement for white collar employees. These results fit with earlier research that has shown similar inconsistencies. For example, Bakker et al. (2007) reported that the quality of the employee-supervisor relationship predicted work engagement, while Shaufeli et al. (2008) found that the employee-supervisor relationship did not predict work engagement.

These results from blue and white collar employees are important for two reasons. First, they are consistent with established research and theory of work motivation whereby the work environment drives work motivation; hence they provide further support for the construct validity of the WES. Second, they highlight the context dependent nature of work engagement that, at least in part, may explain inconsistent results in this and past research. There are also important practical implications for organisations and consultants wanting to generate engagement and these are discussed in Section 8.4.3.

8.2.4 Work engagements relationships with employee wellbeing and safety.

Several recent studies have reported links between work engagement and employee wellbeing and safety (Hansez & Chmiel, 2010; Hakanen et al., 2008; Shaufeli et al., 2008). Part of the reason for the research interest in this area is that the concept of work engagement has roots in the study of occupational stress where it was considered the positive antithesis of burnout (e.g., Maslach et al., 2001). While many authors now consider work engagement an independent, distinct motivational construct (see Shaufeli & Bakker, 2010) there remains ongoing interest in work engagement as a positive indicator of wellbeing (see Demerouti, Mostert & Bakker, 2010; Maslach & Leiter, 2008). This research found weak support for

considering work engagement as an indicator of employee wellbeing and as weakly linked to safety.

Work engagement was weakly and non-significantly associated with fatigue risk in both the QLD (7A) and NSW (7B) studies. This is probably because fatigue-risk reflects the operation of conflicting demands and goals inside and outside the workplace impacting on the desired performance outcome of balancing sleep and wakefulness in order to manage fatigue (Smith, 1979). Work engagement was also weakly and non-significantly associated with employee wellbeing and safety empowerment in the QLD (7A) study. However, a ceiling effect due to skew in the data might have contributed the weak relationships found. Consistent with this argument, in the NSW (7B) study where variables were more normally distributed, stronger and statistically significant relationships were found. Nonetheless, the relationships were still weak and demonstrate that inferences about work engagement as indicative of, or synonymous with, psychological wellbeing should be treated with some caution.

8.2.5 Measuring positive accountability. One of the main aims of the research was to develop a self-report measure for quantifying positive accountability (i.e., the PAS). Positive accountability was operationalised according to a four-dimensional conceptual model that consisted of: expectations, feedback, salience and discipline (see Figure 6.1). The underlying structure of the PAS was consistent with this four-dimensional understanding across three independent samples of mining employees and occupational subgroups within those samples. The internal consistency scores for the PAS ranged from .59 to .77 and .59 to .73 for the individual subscales, which were considered appropriate (see Peterson, 1994; Schmitt, 1996).

Whilst the overall structure of the PAS was consistent there were minor variations in terms of item loadings and variance explained across the analyses. For example, when tested

across the five occupational groups (Chapter 7C) it was found that several items cross-loaded and/or did not load as expected for the groups of leaders, supervisors and professionals.

However, all items loaded as expected for the group of tradesmen and operators. This is not surprising because with higher hierarchical levels usually comes more generic work roles and job descriptions. There are also different relationships with, and understanding of, feedback and discipline by employees at higher organisational levels. This most likely is a consequence of these more senior employees being both sources and recipients of discipline and feedback.

In contrast to work engagement, positive accountability is best measured in terms of four distinct subscales. A total PAS score has practical utility as a benchmark measure but the use of the four subscales offers a deeper understanding of the construct as well as significantly greater diagnostic potential. For example, knowledge about how employees view each feature of positive accountability can identify potential areas for improvement thus directing practitioners or organisations to where their efforts will have the most value.

Overall, the results support the argument that there are core dimensions of positive accountability that are generalisable across organisational levels (i.e. the overall meaning of the construct is consistent) and provide substantial psychometric support for the use of the PAS.

8.2.6 Understanding positive accountability and assessing its construct validity. In this research accountability was conceptualised and operationalised as a positive construct (i.e., positive accountability) that represents an amalgam of formal and informal features of the work environment that together guide and shape employee behaviour. The results supported understanding positive accountability as a positive feature of the work environment and demonstrated its construct (convergent) validity via its links to: (a) the immediate and wider organisational environment (i.e., job design characteristics and organisational culture); (b) psychological states (i.e., work engagement and psychological wellbeing), and; (c) work

outcomes (i.e., attitudes and ratings). Figure 8.3 illustrates these relationships in terms of the basic theoretical framework that underpinned this research.

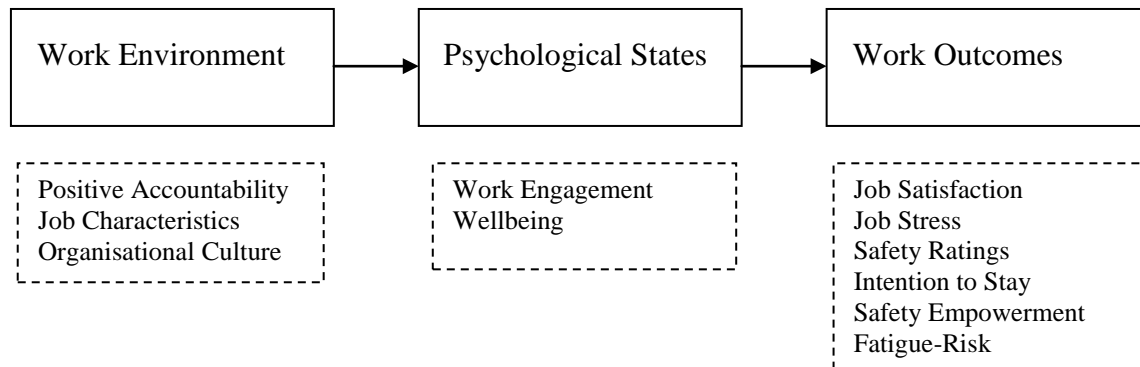


Figure 8.3. Conceptual model of where positive accountability and other study variables sit in relation to the basic theoretical framework that underpins this research. It is an illustrative not a prescriptive model. For example, organisational culture can be considered both a work outcome and work environment construct, and work stress can be considered both a psychological state and a work outcome. The presence of two way interactive relationships between variables therefore necessarily requires the framework to be descriptive rather than definitive.

Positive accountability directly overlapped with traditional job design characteristics (i.e., autonomy, feedback, task significance, skill variety and task identity; Hackman & Oldham, 1976). Salience (an accountability dimension) and task significance (a job characteristic) are conceptually and empirically identical (i.e., $r = 1$). Other subcomponents of each construct were also related, but less strongly. For example, expectations and task feedback correlated at $r = .37, p < .01$ (see Table 7D.2 for the full set of correlations).

Whilst positive accountability was linked to aspects of the immediate work environment it was also linked to the wider organisational work environment as evidenced by its relationship with organisational culture. Positive accountability shared relationships of varying strength with different aspects of organisational culture (see Tables 6.16 and 6.17 for the full set of correlations) but correlated most strongly with the people oriented aspects of organisational culture (i.e., achievement, self-actualising, humanistic, affiliative) with

correlations ranging from $r = .34$ to $.45$ ($p < .01$) for blue and white collar employees, and also with an avoidant culture (blue $r = -.31$, white $r = -.48$, $p < .01$). These results support and shape the understanding of positive accountability as a positive feature of the work environment (i.e., support its convergent validity), but also one that can be understood in terms of a wider conceptual framework that is embedded within the social structures of work.

A comparison of blue and white collar employees in terms of the strengths of correlations between the twelve culture norms and accountability offers a more nuanced understanding of the construct. Positive accountability was more closely related to organisational culture for white collar employees than it was for blue collar employees, both in terms of the relative strengths of correlations and the number of statistically significant correlations (i.e., all twelve cultural norms were significantly correlated with accountability for white collar employees, while for blue collar employees only seven of the twelve correlations were significant). These results support the argument that positive accountability is spread across a wider and more complex work environment at higher levels of organisational hierarchy. That is, because white collar employees are generally exposed to, and embedded within, a wider and more complex work environment than their blue collar colleagues, accountability is necessarily also more strongly embedded within a wider work environment for employees at higher levels of hierarchy.

The convergent validity of accountability was further demonstrated by its relationships with employee psychological states (e.g., work engagement and wellbeing) with correlations ranging from $.29$ to $.45$ ($p < .01$) across the different employee samples. Similarly, positive accountability was associated with a range of positive work outcomes (i.e., job satisfaction, safety ratings, safety empowerment, job stress, fatigue-risk, intention to stay) with relationships ranging from relatively weak, but statistically significant, to moderate ($r = -.21$, $p < .05$ to $r = .58$, $p < .01$). The strength and breadth of these associations provides

substantial support for the convergent validity of positive accountability as a positive measure of the work environment.

8.2.7 Predicting positive accountability. One of the significant challenges that organisations face is how to elicit conformity and guide employee behaviour in a world of work that is becoming less reliant on, and bound by, traditional accountability mechanisms. This requires a rethink of how accountability is viewed and how modern organisations seek to generate accountability. This research has made a case for an integrated view of accountability being supported by a synthesis of the features of the immediate job and the wider organisational work environment. Consistent with this view it was found that the culture of the organisation predicts a substantial amount of the variance in positive accountability.

Together the 12 OCI cultural norms predicted 25% (blue collar) and 34% (white collar) in positive accountability. Culture accounted for more variance in accountability for white collar employees than for blue, and there were differences in the specific cultural styles that predicted positive accountability between the employee groups. For blue collar employees a culture that emphasised supportive relationships was important, while for white collar employees it was a culture that emphasised personal achievement and growth.

These results suggest that different conditions may lead to positive accountability for different groups of employees. At a broader level they also illustrate the link between how individuals perceive, interpret and internalise the wider organisational work environment and how they view and experience accountability.

8.2.8 Establishing the practical relevance of positive accountability. It is a widely held belief that accountability is integral to organisational functioning yet only limited research evidence supports this assumption. This research assessed the practical significance of positive accountability via its predictive relationships with several practically relevant

performance indicators including: job satisfaction, work stress, safety performance, intention to stay, work engagement, safety empowerment, psychological wellbeing, and fatigue-risk.

The direction and the magnitude of the relationships and the diversity of dependent variables provides considerable support for the view that positive accountability is practically relevant to individual and organisational performance. For organisations that seek competitive advantage by attracting, retaining and motivating their employees, but at the same time need to ensure compliance and to shape and guide employee behaviour towards meeting organisational goals, facilitating positive accountability has considerable appeal.

Because positive accountability has been constructed and measured in terms of its work environment characteristics it is multidimensional and, therefore, it was possible to assess the relative importance of each dimension in terms of the dependent variables included in the research. The expectations and feedback dimensions consistently emerged as the strongest predictors demonstrating that clear, appropriate and achievable expectations and performance feedback and rewards are particularly powerful leverage points for organisations and practitioners. Discipline and salience predicted significant amounts of variance in some variables but not others, and their predictive strengths also varied considerably across blue and white collar analysis. These results illustrate the practical and diagnostic utility of the PAS for use with different occupational groups of employees.

8.2.9 Positive accountability and job design in the 21st century. As was discussed above, positive accountability predicted a substantial amount of variance in work engagement. This was not surprising given that this research (see Section 5.3.7), and other studies (see Hakanen & Roodt, 2010 for a review) identify job design characteristics (with which accountability overlaps) as an important driver of work engagement. Importantly, in this research positive accountability predicted work engagement over and above traditional job design characteristics.

Whilst JCT emerged in the 1960's and 70's (Hackman & Oldham, 1976; 1980) it still features strongly in organisational research today. Some authors have criticised its continued use arguing that it no longer reflects the current work context (Grant, et al., 2010; Grant & Parker, 2009, Humphrey et al., 2007, Parker et al., 2001). In the years since job design theories first emerged the world of work has seen vast changes in jobs, tasks and roles yet there have been relatively few attempts to orient job design research towards fresh topics and phenomena. For example, in the manufacturing economy of the 60s a traditional job design issue was the autonomy of employees had over their work methods. In today's world of work a more common example is task interdependence, or the degree to which employees' jobs are connected with other jobs (Moregeson & Humphrey, 2006). Furthermore, employees now play a more active role in taking initiative and shaping the task and relationship boundaries of their own jobs (Frese & Fay, 2001; Wrzesniewski & Dutton, 2001).

One of the most robust criticisms of traditional job design theory and research is that the social context of work is not given enough attention (Grant et al., 2010). The social context refers to the set of interpersonal relationships and interactions that are embedded in and influenced by the jobs, roles and tasks that employees perform and enact (Grant & Parker, 2009). Internal organisational relationships are becoming more vital with the increasing utilisation of flatter organisational structures and teams (Devine, Clayton, Philips, Dunford & Melner, 1999; Harrison & Humphrey, 2010) and the rise of the service sector has seen external relationships (e.g., with customers, clients and suppliers) become more widespread and important (Batt, 2002; Parker et al., 2001).

The results of this research lend support to arguments for job design research to give more attention to the social context. Positive accountability, as a measure that taps immediate job characteristics but also the social and relational characteristics of work, was a better predictor of work motivation than traditional job focussed design characteristics (see Table

7D.3). The ability to tap the social and relational characteristics of work are of particular importance in a measure of the work environment that addresses the greater flexibility of job boundaries which, in the 21st century, more significantly engage with both the job and organisational environment (Grant et al., 2010). Just as importantly was that the explanatory power of job design characteristics was subsumed by accountability in the prediction of work engagement, that is, positive accountability overlapped with, but went beyond job design characteristics in predicting work engagement. Based on these findings it can be argued that positive accountability offers an alternative, and relevant lens through which to view the motivational characteristics of the work environment in contemporary organisations and, perhaps, even a new direction for job design research.

8.2.10 Source of accountability. The main focus of this research was on operationalising the core dimensions of positive accountability as a perceived characteristic of the work environment. Whilst this provides a clear perspective from which to further understand the nature and function of accountability it does not directly address the focus of accountability in terms of who the individual is accountable to or what the individual is accountable for (e.g., Frink & Klimoski, 2004; Hall et al., 2007; Frink & Klimoski, 1998). Nonetheless, this research took the opportunity to explore the strength of accountability to several specific, work-related sources (i.e., to self, co-workers, supervisor, site and organisation).

This approach revealed three main findings. First, employees do feel more or less accountable depending on the source. Second, higher level sources (supervisor, site and organisation) that have explicit or formal influence over accountability (e.g., rewards, discipline) are more strongly associated with important work-related variables (i.e., job satisfaction, work stress, safety performance and intention to stay with the organisation) than lower level sources of accountability without formal powers (team members and self). Third,

the alignment between the strength of internal (self) accountability and accountability to the organisation has important practical implications. That is, employees who were highly aligned were more satisfied at work, less stressed, rated the safety of the organisation more positively, reported a greater willingness to stay with the organisation, and rated themselves higher on the PAS.

By narrowing the focus on accountability, or approaching it from what was essentially a bottom-up perspective, this research offered some new insights and directions. However, in doing so it looked at only one piece of the accountability puzzle. There are a potential plethora of different sources of accountability (e.g., shareholders, professional boards, communities, and family) and, as mentioned above employees can also be accountable for multiple outcomes (e.g., decisions, behaviours, tasks, financial outcomes, safety outcomes). Hence, this approach to understanding accountability is fundamentally about the organisational structure of accountabilities. The study of this structure and its inherent complexity is a research field in its own right (e.g., Frink & Klimoski, 2004). Increased understanding of the work environment characteristics that support accountability may nonetheless assist in further understanding the operation of the organisational structures of accountabilities. In particular, where similar structures result in very different outcomes it may be helpful to test whether the structural similarities mask differences in the work environment characteristics of accountability.

8.3 Contributions to Theory

Work engagement and positive accountability are both highly sought after by organisations. However, neither construct is strongly embedded within established theories of work. Indeed, the extant literature is characterised by diverse and unintegrated theoretical perspectives. This has led to unclear and sometimes conflicting conceptualisations of both constructs.

Work engagement is frequently defined in terms of its operationalisation rather than its underlying meaning. For example, in the academic literature engagement emerged out of studies of work stress where it was conceptualised and measured, using burnout scales, as the positive antithesis of burnout (e.g., Maslach et al., 2001). Work engagement is now most commonly measured using an engagement-specific measure, the UWES, yet it is also narrowly defined in terms of the three dimensions of the UWES which are negatively related to the three defining characteristics of burnout (Schaufeli & Bakker, 2010). In this sense work engagement has been given its meaning from measurement rather than theory. This approach to work engagement has been criticised by Parker and Griffin (2011) who argue that good measurement enhances theory but should not define work experiences.

Accountability research has historically adopted a functional approach to the construct (i.e., accountable to whom and for what) with only limited research that examines the nature of accountability (i.e., the work environment characteristics that support accountability). There is a body of psychological research that focuses specifically on cognitive processes, attitude formation, and social judgements and choices (see Lerner & Tetlock, 1999 for a review) that does indirectly address accountability. Similarly, Frink & Klimoski (2004) drew on role theory as a lens to view the underlying social processes of accountability in organisations. However, other authors have begun to give greater attention to the environmental supports of accountability within organisations (e.g., Hall et al., 2003; Hochwarter et al., 2007). Within these studies accountability is framed as a potential workplace stressor with high levels of accountability characterised by heightened expectations and scrutiny that provoke demands, ambiguities and strains. Yet only fleeting references are made to the work stress literature and the positive attributes of optimal levels of accountability are rarely considered.

In order to bring consistency and clarity to the construct domains of work engagement and positive accountability, and to provide a theoretical foundation for future research, this research brought together work engagement and positive accountability under a simple, but well established conceptual framework (see Figure 8.1).

8.3.1 Towards an integration. The basic theoretical framework broadly oriented the research by setting work engagement and positive accountability within well established construct domains. However, the results of the research enable a more detailed and elaborated understanding of both constructs when they are considered within an integrated framework. This integrated framework is presented below (Figure 8.4).

Specific relationships within this framework have been discussed previously. For example, the results demonstrated that positive accountability was related to work environment variables, and was also associated with psychological states and work outcomes. However, combining and ordering these relationships into an overall framework offers a straightforward and clear way to organise the results of this, and previous research, and to set a platform for future research. In addition, it provides a theoretical context that gives greater clarity of meaning to the measures.

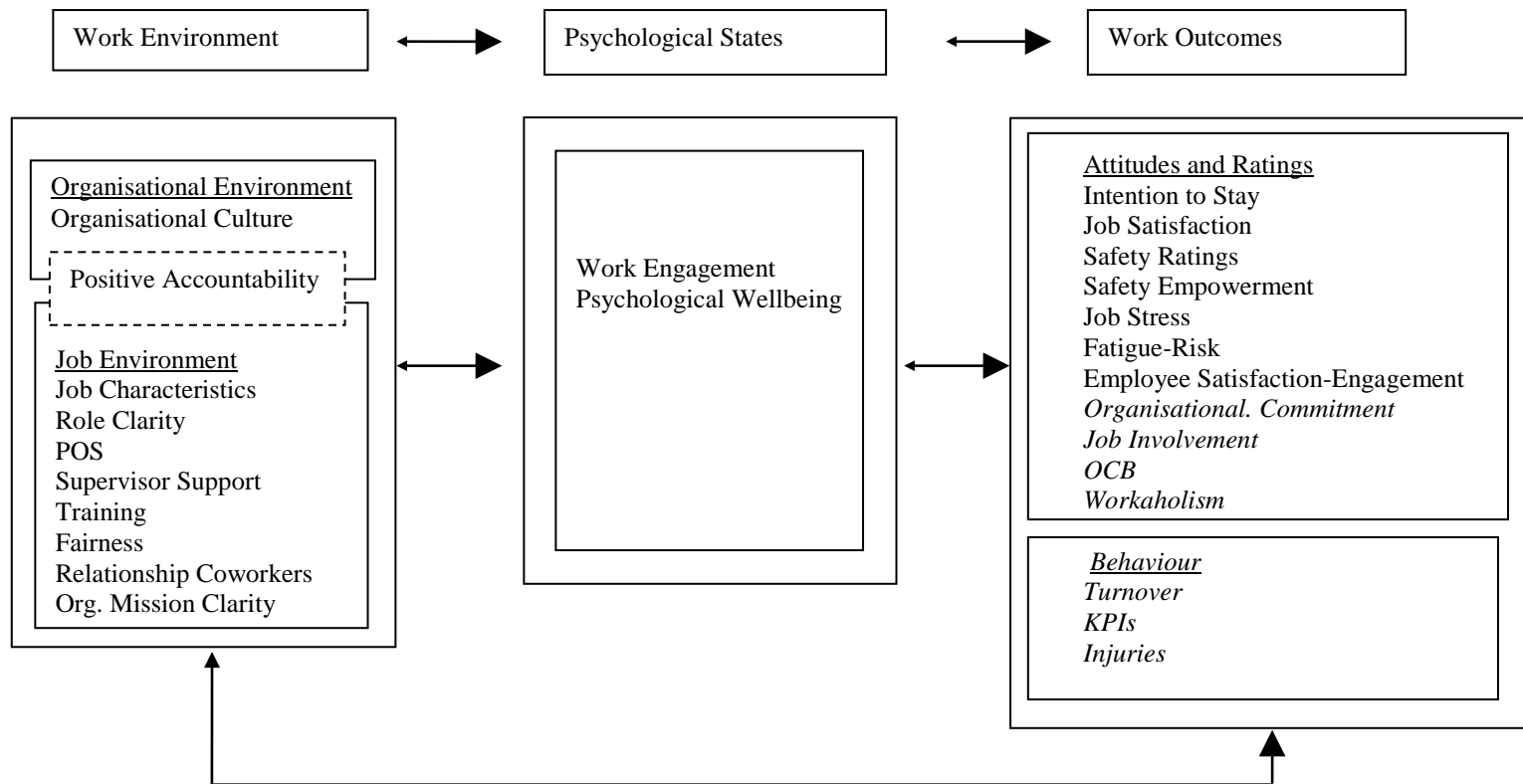


Figure 8.4. Integrative framework for organising the results of the research. Variables in italics were not measured but are included to demonstrate the utility of the framework for integrating this research with previous studies and the wider organisational literature, and to illustrate how other approaches to understanding and measuring engagement sit in relation to this research. The large arrow heads indicate that research generally supports relationships in the direction shown, but the small arrow heads are included as recognition that the directions are not definitive and that the interrelationships among the variables shown are inherently complex.

Within this framework work engagement is conceptualised a motivational (psychological) state. This is consistent with the more recent scientific studies of work engagement (e.g., Bakker et al., 2008; Bakker et al., 2011; see also Bakker & Leiter's 2010 book "Work Engagement: A handbook of essential theory and research, 2010") that also place work engagement within the domain of work motivation and thereby differentiate it from work outcomes (e.g., Harter et al., 2002). The results of this research provided additional strong support for considering and operationalising work engagement as a motivational construct.

One of the advantages of this framework is that it allows us to conceptualise how other approaches to understanding and measuring engagement sit in relation to the position adopted by this research and that of others. Most importantly, it brings academic and practitioner approaches together into a single framework that adds clarity to earlier theoretical and conceptual arguments about the nature of work engagement.

Within this framework the E12 (and Gallup Q12) measures engagement indirectly as a work outcome measure that largely uses ratings of satisfaction with the work environment (i.e., employee satisfaction-engagement). The Corporate Leadership Council (CLC) definition and measure of engagement is also a work outcome of engagement. The CLC definition of engagement is: 'the extent of employees' commitment, work effort, and desire to stay in an organization'. Commitment and desire to stay are attitudinal work outcomes within the integrated framework. Indeed, most of the constructs that work engagement is confused with (e.g., job involvement, organisational commitment, job satisfaction, OCB, and

workaholism) are also placed as work outcomes under this framework. They are also indirect indicators of work engagement when it is placed as a motivational state.

Whilst this research measured work outcomes via attitudes and ratings, the integrative framework assumes that these are indicative of, or at least related to, actual behavioural outcomes. For example, intention to stay is a commonly used proxy measure for actual turnover (see Zimmerman & Darnold, 2007) and the job satisfaction-performance link has been the subject of extensive research (see Judge, Thoresen, Bono & Patton, 2001). Behavioural outcomes are included in the framework for illustrative purposes and future research is needed to confirm the relationships.

Studies of work engagement have drawn on the JD-R model more than another model and, therefore, it is useful to comment on how the JD-R model of work engagement fits with this framework. The JD-R is grounded in balance theories of work stress (e.g., the demands-control model; Karasek, 1979) and classifies the work environment into two categories: resources and demands (see Figure 2.1). It includes a health impairment process that leads to burnout and negative health related outcomes and a motivational process that leads to positive. The JD-R is compatible with the integrated framework, but there are points of difference too.

The integrative framework presented in this research is less prescriptive than the JD-R; it does not classify the work environment into demands and resources. Rather, the framework accepts that for different individuals working in different contexts the same work environment attribute may be appraised differently (e.g., as a challenge or as a hindrance; Crawford et al., 2010) To illustrate, the work

environment variables that best predicted work engagement in this research varied between occupational groups. Finally, it is important to note that work engagement, whilst typically reported as leading to positive outcomes, may lead to negative outcomes in specific circumstances (particularly negative outcomes outside of work; see George, 2011; Haslsein, 2011).

Because the integrative framework is less prescriptive than the JD-R it opens up work engagement and exposes it to a wider theoretical network. For example, in his summary of current research and formulation of key questions for future research, Bakker (2011, p. 13) asked “can leaders influence follower engagement?” arguing that the role of leadership in fostering work engagement has received only limited attention. But, by characterising work engagement as a motivational state it links to the wider theoretical framework where, as Parker and Griffin (2011, p. 64) point out, the role of leaders in motivating employees has been the subject of much research for almost a century.

In much the same way as this framework acts as a platform from which to consider work engagement in terms of a larger theoretical network, it also offers a foundation from which to build accountability theory and research. This is critical because accountability as a relational attribute of the work environment has lacked grounding in established theories of work.

This research conceptualised positive accountability as a work environment construct embedded in the social and relational structures of work. It is clearly differentiated from more functional approaches to accountability that arose from studies of decision making and control systems (Lerner & Tetlock, 1999; Siegel-

Jacobs & Yates, 1996). Positive work accountability, on the other hand, focuses on the work conditions that support accountability and has particular importance in today's work environment where job and role boundaries have greater flexibility (Grant et al., 2011). The integrative framework places positive accountability within a conceptual space that lies across the overlap of organisational culture and the characteristics of the immediate job environment. This well reflects the greater flexibility of work in the modern workplace. It also opens conceptual links between positive accountability and a range of well researched constructs (e.g., organisational culture and leadership). Indeed, this research was able to illustrate substantial relationships between positive accountability and organisational culture. These links have the potential to offer new insights and fertile ground for future research.

Whilst the integrated framework brings together the results of this research so that they can be more clearly understood in terms of established theories of work, it is important to recognise that it is a theoretical framework and not a structural model. It is underpinned by an understanding of work and organisation as complex dynamic phenomena in which work environment, psychological states and work outcomes interact. Whilst the broad sweep of work research enables a dominant linear interaction (i.e., work environment leading to work motivation and to work outcomes) it also highlights the conceptual and methodological limitations of treating this integrative framework as more than an heuristic aid to achieving greater conceptual clarity. Nonetheless, such a framework is necessary in order to establish the conceptual validity of both work engagement and positive accountability and

also to relate and differentiate the measures developed in this research to earlier measures and constructs.

8.4 Practical Implications

This research contributed new knowledge and insights towards two challenges that organisations face: how to guide employee behaviour towards organisational goals in a world of more flexible boundaries and how to motivate employees to give their full capabilities to their work.

8.4.1 Using the WES and PAS. As already discussed, this research found strong support for the reliability and validity of the WES and PAS. Whilst it is essential that measures have appropriate reliability and validity, ultimately, their applied value comes from their practical utility. Both measures are relatively short (the WES is 6 items⁴ and the PAS is 11 items) and this facilitates their inclusion in organisational surveys. In addition, the current research has shown that both measures are appropriate for use with occupational groups working at different professional and semi-professional levels and they can be used in different organisations. Importantly, the research also supports the use of the WES as an alternative measure to the widely used UWES.

The results of this research suggest that the WES is best used as a total scale score that reflects an underlying motivational state. The practical utility of breaking down this state into its constituent parts is not supported by this, or other research (see Schaufeli & Bakker, 2010). In industry work engagement is generally seen as an

⁴ In the two independent (7B and Appendix J) studies the WES was modified to include 8 items.

outcome variable (Welfand & Downey, 2009) and in some cases engagement is used as the main indicator of organisational development efforts. Whilst work engagement is associated with positive work outcomes (e.g., employee retention and performance) it does not equate to these outcomes. Hence, it is the recommendation of this research that the WES is treated as a measure of a psychological (motivational) state, and not confused with work outcomes. Work outcomes (e.g., employee retention and performance) can be measured using purpose built measures.

A particular strength of the PAS lies in the use of its subscales as diagnostic tools. Each of the subscales, on its own, represents a meaningful and actionable aspect the work environment. For example, in this research the blue and white collar employees from the main study sample rated positive feedback lowest of the PAS subscales whilst the independent NSW sample rated discipline lowest. This data has been used to direct the participating organisations towards potential areas for change or organisational development efforts.

For the most part this research has approached work engagement and positive accountability separately. However, using the WES and PAS in combination offers a greater depth of understanding of the work situation. For example, whilst work engagement and positive accountability are correlated, a highly engaged employee may or may not be working in an environment that directs that motivation towards achieving organisational goals. Similarly, a highly accountable employee (i.e., working in an environment that supports positive accountability) may not be motivated to bring all of their capabilities to their work. Ideally organisations want employees who are highly motivated in what they do but motivated to perform in a

work system that is sufficiently flexible, whilst not achieving flexibility by being laissez- faire.

The WES and PAS were designed as short survey instruments that are useful in their own right but, in practice, are best used as part of a larger survey package. For example, in this research the measures were included in surveys of organisational culture and of fatigue and safety. The ability to explore how the measures related to other variables gives clearer insight into work engagement and positive accountability as well as a broader understanding of organisational functioning.

8.4.2 Establishing the practical utility of the measures. The research evidence is generally supportive of work engagements practical importance. In this research work engagement was linked to job satisfaction (blue collar $r = .31, p < .01$ and white collar $r = .32, p < .01$), safety empowerment (NSW study $r = .24, p < .01$) and employee wellbeing (NSW study $r = -.18, p < .05$). Nonetheless, the strength of the relationships with other variables measured in this research highlights the complexity of the workplace and cautions against over-simplified understanding..

As was discussed in Section 8.2.8, this research brings much needed empirical support to the assumption that accountability is integral to organisational functioning. Not only do the results make a strong case for the practical significance of work environment design that supports accountability, they also offer guidance as to which aspects of the work environment should be addressed through the use of the PAS.

8.4.3 Generating work engagement and positive accountability. The

results of this research offer direction for organisations and practitioners who want to actively generate work engagement and accountability. Job design characteristics and perceived organisational support were particularly important predictors of work engagement, but, as the research showed, the work variables that enable work engagement are different for different groups of employees. For example, fairness and supervisor support predicted work engagement for blue collar employees, while for white collar employees role clarity was an important predictor. The implication for practitioners is that blanket approaches to generating work engagement, such as implementing incentive systems, training programs or improved job design, will not necessarily be effective in all cases. Nonetheless, the results support an approach to generating work engagement that addresses both the importance of the relational aspects (e.g., supervisor support) of work and the more functional (e.g., job design and role clarity) aspects.

Traditional approaches to generating accountability have focussed on the design and implementation of control systems and the standardisation of work. However, as this research has shown, understanding of positive accountability is well aligned with a world of work that is less reliant on formal accountability mechanisms in a more fluid system. The four dimensions of positive accountability presented in this research are directly “actionable”, but typically this action requires consideration of more than one factor. For example, discipline is implicitly tied to organisational hierarchy, standards for performance and disciplinary procedures and

expectations as much as work relationships (e.g., supervisor-subordinate) and organisational culture.

Most importantly, this research has outlined a clear measurement framework and developed useable, reliable and valid measures of work engagement and positive accountability to support and monitor the effectiveness of organisational development initiatives.

8.5 Limitations

The limitations of the methodology and threats to validity of the research were discussed in detail in Section 3.1.6. Whilst the generalisability of the research findings is limited to the Australian mining industry, the research was conducted across a large number of mining employees, across a broad range of occupational groups within the mining industry, and across several organisations and operations. Further research in other organisations will enhance the generalisability of the results to other industries and occupational groups.

In order to access groups for study and useful data sets the research was constrained to make use of the available item banks. In particular, this restricted the research to the study of work-related variables and largely excluded consideration of outside of work variables (e.g., family support). It also restricted the opportunity to add purpose built or chosen scales and required reliance on scales constructed from the available item bank (e.g., the use of the E12 as a quasi-Q12 scale).

Developing a measure of accountability as a positive construct was limited by the dearth of earlier research. It was therefore necessary to develop a measure by drawing on a diverse range of research, including, for example, job characteristics

research, that is not directly linked to accountability. Fortunately, this research did find support for understanding positive accountability as a feature of the work environment, linking it to established work theories (i.e., job design and organisational culture). Additional research is needed to further develop the model of positive accountability, and to further elaborate its grounding in theory.

The research, like much work research, relied on self-report measures. Common method variance (CMV) is therefore a limitation. Nonetheless, whilst this is a weakness, replication of key results using independent samples drawn from independent organisations is a strength that demonstrates that the results are not an artefact of a particular organisational context. Research access limited the design to a series of cross-sectional studies. This necessarily limits causal inferences. Whilst the direction of relationships can be inferred based on previous research and an intuitive understanding of the work experience, the establishment of causal relationships requires future research using appropriate research designs. Cross-sectional research is also not able to study how variables and their interrelationships change over time and therefore the research is limited by the absence of longitudinal research designs.

Further research that uses different methodologies, particularly incorporating longitudinal designs, and a broader range of variables (particularly the inclusion of more direct behavioural measurement and measurement of non-work variables) is needed to build further on the understanding of work engagement and positive accountability presented in this thesis.

8.6 Future Research Directions

The future of research into work engagement and positive accountability holds considerable promise.

8.6.1 Research in a wider range of populations and occupational groups.

This research was conducted with data from employees from Australian mine sites. The measures, and indeed the constructs, may function differently in populations outside of mining, particularly considering that this research suggests that they are both complex and context dependent constructs. For example, this research was conducted within a Western organisational context and framed in terms of theories of work that emerged from the study of Western organisations. It is well established that organisations in Eastern cultures function very differently to Western organisations (see Hofstede, Hofstede & Minkov, 2010; Tsui, Hang & Zin, 2006). For example, Eastern cultures are typically more collectivist. The meaning of individual work engagement and/or positive accountability may well be different in a more collectivist culture and future studies might consider exploring whether this is the case. A key consideration in these studies would be shifts in meaning that would require review and adaptation of measurement scale items in order to align with the underlying constructs.

8.6.2 Interventions. As with most organisational research a key challenge is to ensure that the knowledge gained is utilised by organisations. For organisations the goal is to be able to generate a work environment characterised by accountability and employees who are engaged with their work. Therefore, research on the design, implementation and evaluation of interventions is required. Interventions provide a

way to evaluate theory (i.e., causal relationships) that is not possible via cross sectional studies and to explore the practicalities of developing a work environment that supports positive accountability and work engagement.

The integrative framework offers a useful guide for future interventions whereby changing the work environment affects employee psychological states which, in turn, affects work outcomes. Just as importantly, the WES and PAS offer relevant and useful measures that can be used together within a single intervention. A potential intervention can identify areas for change using the PAS in combination with other measures. The WES can be utilised as an indicator of the effectiveness of the intervention alongside outcome variables. The opportunity to enhance understanding of the dimensions of the work environment that support both positive accountability and work engagement within a single intervention study is particularly advantageous.

8.6.3 Theoretical and other considerations. This research established conceptual boundaries around work engagement and positive accountability by considering work engagement a motivational construct and positive accountability a work environment construct. This allowed the research to draw on well established theories of work, to better understand the constructs and to bring them together under an integrative theoretical framework. However, further theoretical consideration is warranted if we are to move beyond frameworks to a deeper understanding of the constructs. Four areas for further consideration are briefly discussed here, namely: the theoretical structure of the constructs, the role of the individual, non-work considerations, and temporal considerations.

Firstly, the theoretical structure of both constructs is far from clear. For example, whilst most authors agree that vigor, dedication and absorption characterise work engagement, the empirical evidence is mixed as to whether they are distinct dimensions of engagement. Indeed, this research found mixed support for three distinct dimensions using the WES. Furthermore, it is unclear whether the experience of engagement requires the simultaneous experience of vigor, dedication and absorption or whether there might be other key experiences that characterise work engagement.

This research made a case for considering four specific environmental supports for positive accountability. However, there are likely to be other features of the work environment that support positive accountability. For example, the role of leadership in supporting is yet to be examined. Leadership is implicitly tied to accountability (Erdogan et al., 2004; Wood & Winston, 2007) and is also a highly researched area in the organisational sciences. The organisational culture results of this research hint at the types of leadership culture that might support accountability (e.g., a leadership culture that emphasises concern for people and their personal growth as well as the importance of personal responsibility and integrity) as it is leaders that transmit, transform and manage organisational culture (Den Hartog, Muijen & Koopman, 1996). At the individual level, understanding how different leadership styles support accountability is also worth consideration.

The role of the individual in work engagement and positive accountability has only received limited attention. However, there is growing evidence that individual characteristics such as optimism, self-efficacy and organisational-based

self-esteem predict work engagement (Xanthooulou, Bakker, Demerouti & Schaufeli, 2007; 2009). The wider work motivation research has also demonstrated that personality traits such as neuroticism, extraversion and conscientiousness are associated with work motivation (Hart, Stasson, Mahoney & Story, 2007; Judge & Iles, 2002).

Positive accountability is embedded within the social structures of work therefore it is difficult to imagine that individual characteristics such as personality, optimism or self-efficacy do not also influence positive accountability. Indeed, in this research the nature of the social structures and work environment characteristics, and work engagement and positive accountability were all perceived, or subjectively determined. Therefore the nature of the individual (i.e., perceiver) is likely to be important and practically relevant, and requires further consideration and testing. For example, organisations are increasingly testing personality as part of the recruitment process. An understanding of the personality types that are more likely to be more receptive to positive accountability and to engage at work can inform the selection process.

In an era of increasing work pressures and work hours it is also important to consider how work constructs link to the world outside of work. For example, several authors have questioned whether an employee can be “over-engaged” whereby they take work home leading to work-life interference or have less time and energies for pursuits outside of work (e.g., Halbesleben, 2011; Halbesleben et al., 2009; Sonnetag, 2011). Indeed, a study by Sonnetag, Mojza, Binnewies, and Scholl (2008) demonstrated that employees’ capacity to disengage from work when away

from work is particularly important to their affective states when work engagement is high.

How positive accountability interacts with the interface of work and non-work is also warrants further attention. The results of this research suggest that positive accountability is linked to psychological wellbeing. However, how positive accountability transfers to other aspects of life outside of work is worth considering. In particular, the alignment of expectations and accountabilities outside of work (e.g., family, cultural or religious) with work accountabilities also offers a direction for future research.

The predominant use of cross-sectional research designs has limited our understanding of how work engagement and positive accountability develop and change over time. Sonnetag, Dormann and Demerouti (2010) make a case for state work engagement citing diary studies (see Bakker & Bal, 2010; Sonnetag, 2003) that demonstrated that work engagement can fluctuate from day to day and week to week. It is also likely that positive accountability fluctuates because the characteristics of the work environmental that support accountability are themselves highly fluid. For example, expectations can change from day to day or even task to task. Moreover, because positive accountability is embedded in the social structures of work it can be assumed that it is sensitive to interpersonal relationships and interactions.

An understanding of how and why work engagement and positive accountability change, the rate of change, and the more proximal situational variables that are relevant to creating a setting that supports both constructs will lead

to more comprehensive understanding. However this requires longitudinal research with appropriate intervals of sampling.

8.7 Final Conclusions

Both work engagement and positive accountability are concepts that seem to resonate with business leaders. However, confusion surrounds both constructs in terms of their meaning, their theoretical underpinnings, their measurement and the roles they play in individual and organisational functioning. This research relied on four cross-sectional survey studies of Australian mining employees to advance the understanding of the constructs and provide organisations with direction for generating work engagement and positive accountability.

The research drew on established theories of work for the development of the WES and PAS. It addresses the need for additional measures of work engagement, as recommended by Parker and Griffin (2011). The WES taps an underlying psychological (motivational) state that is characterised by vigor, dedication and absorption. The PAS measures four key features of the work environment that support positive accountability, namely: expectations, feedback, discipline and salience. Both measures were found to have appropriate psychometric properties and the results supported their use across different organisations and occupational groups within the Australian mining industry.

The results of the thesis were brought together under an integrative framework that offers a useful (and empirically supported) heuristic for conceptualising work engagement and positive accountability. In particular, as a unique motivational state, work engagement is differentiated from related constructs

with which it is often confused (e.g., job satisfaction). Positive accountability is understood in terms of features of the work environment (from the immediate job to the wider organisational environment) that influence employee psychological states and work outcomes.

Most importantly, the indications of the research are that in order to generate work engagement and positive accountability organisations need to focus on optimising the work environment. However, doing this requires a whole-of-organisation approach that recognises the importance of the work itself, support and relationships, and the wider culture of the organisation.

References

- Aaronson, L., Teel, C., Cassmeyer, V., Neuberger, G., Pallikkathayil, L., Pierce, J...
Wingate, A. (1999). Defining and measuring fatigue. *Journal of Nursing Scholarship*, 31(1), 45-50.
- Aleamoni, L. M. (1976). The relation of sample size to the number of variables in using factor analysis techniques. *Educational and Psychological Measurement*, 36, 879-883.
- Ammeter, A., Douglas, C., Ferris, G., & Goka, H. (2004). A social relationship conceptualization of trust and accountability in organizations. *Human Resource Management Review*, 14, 47-65.
- Austin, J. T., Boyle, K. A., & Lualhati, J. C. (1998). Statistical conclusion validity for organizational science researchers: A review. *Organizational Research Methods*, 1, 164-208.
- Australian Bureau of Statistics (2010). Australian Industry (Report 8155.0). Sydney: ABS.
- Bajpayee, T., Rehak, T., Mowrey, G., & Ingram, D. (2004). Blasting injuries in surface mining with emphasis on flyrock and blast area security. *Journal of Safety Research*, 35, 47-57.
- Bakker, A. B., Albrecht, S. L., & Leiter, M. P. (2010). Key questions regarding work engagement. *European Journal of Work and Organizational Psychology*, 20(1), 4-28.

- Bakker, A. B., Albrecht, S. L., & Leiter, M. P. (2010b). Work engagement: Further reflections on the state of play. *European Journal of Work and Organizational Psychology*, 20(1), 74-88.
- Bakker, A. B., & Bal, P. (2010). Weekly work engagement and performance: A study among starting teachers. *Journal of Occupational and Organizational Psychology*, 83(1), 189-206.
- Bakker, A. B., Demerouti, E. & Verbeke, W. (2004). Using the Job Demands-Resources model to predict burnout and performance. *Human Resource Management*, 43, 83-104.
- Bakker, A., & Demerouti, E. (2008). Towards a model of work engagement. *Career Development International*, 13(3), 209-223.
- Bakker, A., Hakanen, J., Demerouti, E., & Xanthopoulou, D. (2007). Job resources boost work engagement, particularly when job demands are high. *Journal of Educational Psychology*, 99(2), 274-284.
- Bakker, A., & Leiter, M. (2010). *Work Engagement: A Handbook of Essential Theory and Research*. New York: Psychology Press.
- Bakker, A. B., & Schaufeli, W. B. (2008). Positive organizational behavior: Engaged employees in flourishing organizations. *Journal of Organizational Behavior*, 29, 147-154.
- Balthazard, P., Cooke, R., & Potter, R. (2006). Dysfunctional culture, dysfunctional organization: Capturing the behavioral norms that form organizational culture and drive performance. *Journal of Managerial Psychology*, 21(8), 709-732.

- Barrett, P. T., & Kline, P. (1981). The observation to variable ratio in factor analysis. *Personality Study and Group Behavior*, 1, 23-33.
- Bass, B. M. (1999). Two decades of research and development in transformational leadership. *European Journal of Work and Organizational Psychology*, 8(1), 9-32.
- Batt, R. (2002). Managing customer services: Human resource practices, quit rates, and sales growth. *Academy of Management Journal*, 45, 587-597.
- Beck, A., & Beck, R. (1972). Screening depressed patients in family practice. A rapid technic. *Postgraduate Medicine*, 52, 81-85.
- Becker, B., & Huselid, M. (1998). High performance work systems and firm performance: A synthesis of research and managerial implications. In G. R. Ferris (Ed.), *Research in personnel and human resources management* (Vol. 16, pp. 53-101). Stamford, CT: JAI Press.
- Bliese, P., & Castro, C. (2000). Role clarity, work overload and organizational support: multilevel evidence of the importance of support. *Work & Stress*, 14(1), 65-73.
- Bogart, W. T. (1995). Accountability in nonprofit organizations: An economic perspective. *Nonprofit Management and Leadership*, 6(2), 157-170.
- Breaux, D., Munyon, T., Hochwarter, W. & Ferris, G. (2009). Politics as a moderator of the accountability-job satisfaction relationship: Evidence across three studies. *Journal of Management*, 35(2), 307-326.
- Brown, P. (1996). A meta-analysis and review of organizational research on job involvement. *Psychological Bulletin*, 120(2), 235-255.

- Buckley, M., Cote, J., & Comstock, M. (1990). Measurement errors in the behavioral sciences: The case of personality/attitude research. *Educational and Psychological Measurement*, 50, 447-474.
- Buchwald, A., & Rudick-David, D. (1993). The symptoms of major depression. *Journal of Abnormal Psychology*, 102, 197-205.
- Carroll, S. J., & Schneider, C. E. (1982). *Performance appraisal and review systems: The identification, measurement and development of performance in organizations*. Glenview, IL: Scott, Foresman.
- Cascio, W. (1995). Whither industrial and organizational psychology in a changing world of work. *American Psychologist*, 50(11), 928-939.
- Cathebras, P., Robbin, J., Kirmayer, L., & Hayton, B. (1992). Fatigue in primary care: prevalence, psychiatric comorbidity, illness behaviour and outcome. *Journal of General Internal Medicine*, 7, 276-286.
- Chan, A., & Cheung, H. (2008). Common cultural relationships in corporate governance across developed and emerging financial markets. *Applied Psychology: An International Review*, 57(2), 225-245.
- Christensen, L. (2003). *Experimental Methodology*. London: Allyn and Bacon.
- Christian, M., Bradley, J., Wallace, C., & Burke, M. (2009). Workplace safety: A meta-analysis of the roles of person and situation factors. *Journal of Applied Psychology*, 94(5), 1103-1127.
- Cohen, A. (1992). Antecedents of organizational commitment across occupational groups: A meta-analysis. . *Journal of Organizational Behavior* 13(6), 539-558.

- Combs, J., Liu, Y., Hall, A., & Ketchen, D. (2006). How much do high performance work practices matter? A meta-analysis of their effects on organisational performance *Personnel Psychology*, 59, 501-528.
- Comfrey, A. L., & Lee, H. B. (1992). *A First Course in Factor Analysis*. Hillsdale, NJ: Lawrence Erlbaum Associates.
- Conger, J., & Kanungo, R. (1988). The empowerment process: Integrating theory and practice. *Academy of Management Review*, 13(3), 471-482.
- Cooke, R., & Lafferty, J. (1987). *Organizational Culture Inventory (Form III)*. Plymouth, MI.: Human Synergistics.
- Cooke, R., & Szurnal, J. (1993). Measuring normative beliefs and shared behavioral expectations in organizations: the reliability and validity of the organizational culture inventory. *Psychological Reports*, 72, 1299-1330.
- Cooper, M. (2000). Towards a model of safety culture. *Safety Science*, 36, 111-136.
- Corporate Leadership Council. (2004). *Driving Employee Performance and Retention through Engagement: A Quantitative Analysis of the Effectiveness of Employee Engagement Strategies* Washington, CLC. Retrieved from <http://www.lloydmorgan.com/PDF/Driving%20Performance%20and%20Retention%20Through%20Employee%20Engagement.pdf>
- Crawford, E., LePine, J., & Rich, B. (2010). Linking job demands and resources to employee engagement and burnout: A theoretical extension and meta-analytic test. *Journal of Applied Psychology*, 95(5), 834-848.

- Crook, R., Todd, S., Combs, J., Woehr, D., & Ketchen, D. (2010). Does human capital matter? A meta-analysis of the relationship between human capital and firm performance. *Journal of Applied Psychology*, 96(3), 443-456.
- Cummings, L. L., & Anton, R.J. (1990). The logical and appreciative dimensions of accountability. In S. Srivastva, D. Cooperrider and associates (Eds.), *Appreciative management and leadership*. San Francisco: Jossey-Bass.
- Davis, J. H., Schoorman, D., & Donaldson, L. (1997). Toward a stewardship theory of management. *Academy of Management Review*, 22, 20-47.
- Deal, T., & Kennedy A. (1982). *Corporate culture* Reading, MA.: Addison-Wesley.
- Deci, E., & Ryan, R. (1985). *Intrinsic motivation and self-determination in human behavior*. New York: Plenum.
- de Jonge, J., Dollard, M., Dormann, C., Le Blane, P., & Houtman, I. (2000). The demand-control model: specific demands, specific control, and well-defined groups. *International Journal of Stress Management*, 7(4), 269-287.
- de Lange, A., De Witte, H., & Notelaers, G. (2008). Should I stay or should I go? Examining longitudinal relations among job resources and work engagement for stayers versus movers. *Work & Stress*, 22(3), 201-223.
- Deloitte. (2010). *Tracking the Trends 2011: The top 10 issues mining companies will face in the coming year*: Deloitte. Retrieved from https://www.deloitte.com/assets/Dcom-Australia/Local%20Assets/Documents/Industries/Energy%20and%20resources/Tracking_the_trends_2011.pdf

- Demerouti, E., Bakker, A.B., De Jonge, J., Janssen, P.P.M., & Schaufeli, W.B. (2001). Burnout and engagement at work as a function of demands and control. *Scandinavian Journal of Work, Environment and Health*, 27, 279-286.
- Demerouti, E., Mostert, K., & Bakker, A. (2010). Burnout and work engagement: a thorough investigation of the independency of both constructs. *Journal of Occupational Health Psychology*, 15(3), 209-222.
- Den Hartog, D., Van Muijen, J., & Koopman, P. (1996). Linking transformational leadership and organizational culture. *Journal of Leadership & Organizational Studies*, 3(4), 68-83.
- Denison, D. R. (1990). *Corporate culture and organizational effectiveness*. New York: Wiley.
- Devine, D. J., Clayton, L. D., Philips, J. L., Dunford, B. B., & Melner, S. B. (1999). Teams in organizations-Prevalence, characteristics, and effectiveness. *Small Group Research*, 30, 678-711.
- Diener, E., Suh, E., Lucas, R., & Smith, H. (1999). Subjective well-being: Three decades of progress. *Psychological Bulletin*, 125(2), 276-302.
- Dijkers, J., Jansen, P., de Lange, A., Vinkenbergh, C., & Kooij, D. (2009). Proactivity, job characteristics, and engagement: a longitudinal study. *Career Development International*, 15(1), 59-77.
- Dittner, A., Wessely, S., & Brown, R. (2004). The assessment of fatigue: A practical guide for clinicians and researchers. *Journal of Psychosomatic Research*, 56, 157-170.

- Dotty, D., & Glick, W. (1998). Common methods bias: Does common methods variance really bias results? *Organizational Research Methods*, 1(4), 374-406.
- Edwards, J., & Bagozzi, R. (2000). On the nature and direction of relationships between constructs and measures. *Psychological Methods*, 5(2), 155-174.
- Erdogan, B., Sparrowe, R., Liden, R., & Dunegan, K. (2004). Implications of organizational exchanges for accountability theory. *Human Resource Management Review*, 14, 19-45.
- Farh, J., Podsakoff, P., & Organ, D. (1990). Accounting for organizational citizenship behavior: Leader fairness and task scope versus satisfaction. *Journal of Management*, 16, 705-721.
- Ferris, G., Dulebohn, J., Frink, D., George-Falvy, J., Mitchell, T., & Mathews, L. (2009). Job and Organizational Characteristics, Accountability, and Employee Influence. *Journal of Managerial Issues*, 21(4), 518-533.
- Ferris, G. R., Mitchell, T.R., Canavan, P.J., Frink, D.D., & Hopper, H. (1995). Accountability in human resource systems. In G.R. Ferris, S.D. Rosen, & D.T. Barnum (Eds.), *Handbook of human resource management* (pp. 175-196). Oxford, U.K: Blackwell Publishers.
- Fletcher, C. (1995). New Directions for Performance Appraisal: Some Findings and Observations. *International Journal of Selection and Assessment*, 3(3), 191-196.

- Fredericksen, P. J., & Levin, D. (2004). Accountability and the use of volunteer officers in public safety organizations. *Public Performance & Management Review*, 27(4), 118-143.
- Frese, M., & Fay, D. (2001). Personal initiative: An active performance concept for work in the 21st century. In B. M. Staw, & R. I. Sutton (Eds.), *Research in organizational behavior* (Vol. 23, pp. 133-187). San Diego, CA, US: Elsevier Academic Press.
- Fried, Y., Levi, A. S., & Laurence, G. (2008). Motivation and job design in the new world of work. . In C. Cooper & C. Cartwright (Eds.), *The Oxford handbook of personnel psychology* Oxford, England Oxford University Press.
- Frink, D. D., & Klimoski, R. J. (1998). Toward a theory of accountability in organizations and human resources management. In G. R. Ferris (Ed.), *Research in Personnel and Human Resources Management* (Vol. 16, pp. 1–51). Greenwich, CT: JAI Press.
- Frink, D., & Klimoski, R. (2004). Advancing accountability theory and practice: Introduction to the human resource management review special edition. *Human Resource Management Review*, 14, 1–17.
- Fry, R. E. (1995). Accountability in organizational life: Problem or opportunity for nonprofits? *Nonprofit Management and Leadership*, 6(2), 181-195.
- Gallup. (2008). *Employee Engagement: What's Your Ratio?* : Gallup. Retrieved from http://www.gallup.com/file/consulting/121535/Employee_Engagement_Overview_Brochure.pdf

- George, J. (2011). The wider context, costs, and benefits of work engagement. *European Journal of Work and Organizational Psychology*, 20(1), 53-59.
- Gorusch, R. L. (1983). *Factor Analysis* (2nd ed.). Hillsdale, NJ: Lawrence Erlbaum Associates.
- Grant, A. M., Fried, Y., & Juillerat, T. (2010). Work matters: Job design in classic and contemporary perspectives. In S. Zedeck (Ed.), *APA handbook of industrial and organizational psychology* (Vol. 1, pp. 417-453). Washington, DC: American Psychological Association.
- Grant, A. M., & Parker, S. K. (2009). Redesigning work design theories: The rise of relational and proactive perspectives. *Academy of Management Annals*, 3, 273-331.
- Grech, M., Neal, A., Yeo, G., Humphreys, M., & Smith, S. (2009). An examination of the relationship between workload and fatigue within and across consecutive days of work: is the relationship static or dynamic? *Journal of Occupational Health Psychology*, 14(3), 231-242.
- Green, M. C., Visser, P. S., & Tetlock, P. E. (2000). Coping with accountability cross-pressures: Low-effort evasive tactics and high effort quests for complex compromises. *Personality and Social Psychology Bulletin*, 26, 1380-1391.
- Gregory, B., Harris, S., Armenakis, A., & Shook, C. (2009). Organizational culture and effectiveness: A study of values, attitudes, and organizational outcomes. *Journal of Business Research*, 62, 673-679.
- Gruman, J., & Saks, A. (2011). Performance management and employee engagement. *Human Resource Management Review*, 21, 123-136.

- Guest, D. (2004). Flexible employment contracts, the psychological contract and employee outcomes: an analysis and review of the evidence. *International Journal of Management Reviews*, 5-6(1), 1-19.
- Gulick, L. (1937). Notes on the theory of organization. In L. Gulick, & L. Urwick (Eds.), *Papers on the science of administration* (pp. 191-195). New York: Institute of Public Administration, Columbia University.
- Guttman, H. (2009). The new high-performance, horizontal organization. In F. Hesselbein and M. Goldsmith (Eds.), *The organization of the future 2: Visions, strategies, and insights on managing in a new era* (pp. 268-281). San Francisco, CA: Jossey-Bass.
- Hackman, J. R., and Oldham, G. R. (1976). Motivation through the design of work: Test of a theory. *Organizational Behavior and Human Performance*, 16, 250-279.
- Hackman, J., & Oldham, G. (1980). *Work Redesign*. Reading, MA: Addison-Wesley.
- Hakanen, J., Bakker, A., & Schaufeli, W. (2006). Burnout and work engagement among teachers. *Journal of School Psychology*, 43, 495-513.
- Hakanen, J., & Roodt, G. (2010). Using the job demands-resources model to predict engagement: Analysing a conceptual model. In A. Bakker and M. Leiter (Eds.), *Work Engagement: A Handbook of Essential Theory and Research* (pp. 85-101). New York: Psychology Press.
- Hakanen, J., Schaufeli, W., & Ahola, K. (2008). The Job Demands-Resources model: A three-year cross-lagged study of burnout, depression, commitment, and work engagement. *Work & Stress*, 22(3), 224-241.

- Halbesleben, J. (2010). A meta-analysis of work engagement: Relationships with burnout, demands, resources, and consequences. In a. P. L. A. Bakker (Ed.), *Work Engagement: A Handbook of Essential Theory and Research* (pp. 102-117). New York: Psychology Press.
- Halbesleben, J. (2011). The consequences of engagement: The good, the bad, and the ugly. *European Journal of Work and Organizational Psychology*, 20(1), 68-73.
- Halbesleben, J., Harvey, J. B., & Bolino, M. C. (2009). Too engaged? A conservation of resources view of the relationship between work engagement and work interference with family. *Journal of Applied Psychology*, 94, 1452-1465.
- Halbesleben, J., & Wheeler, A. (2008). The relative roles of engagement and embeddedness in predicting job performance and intention to leave. *Work & Stress*, 22(3), 242-256.
- Hall, A., Bowen, M., Ferris, G., Todd Royle, M., & Fitzgibbons, D. (2007). The accountability lens: A new way to view management issues. *Business Horizons*, 50, 405-413.
- Hall, A. T., Hochwarter, W.A., & Ferris, G.R. (2003). *Accountability x job efficacy on citizenship and politics*. Paper presented at the Paper presented at the annual meeting of the Society of Industrial and Organizational Psychology, Orlando, FL.
- Hall, A., Todd Royle, M., Brymer, R., Perrewé, P., Ferris, G., & Hochwarter, W. (2006). Relationships between felt accountability as a stressor and strain

- reactions: The neutralizing role of autonomy across two studies. *Journal of Occupational Health Psychology*, 11(1), 87–99.
- Hallberg, U., & Schaufeli, W. (2006). Same Same” but different? Can work engagement be discriminated from job involvement and organizational commitment? *European Psychologist*, 11, 119–127.
- Hansez, I., & Chmiel, N. (2010). Safety Behavior: Job Demands, Job Resources, and Perceived Management Commitment to Safety. *Journal of Occupational Health Psychology*, 15(3), 267-278.
- Harris, K., Wheeler, A., & Kacmar, K. (2009). Leader–member exchange and empowerment: Direct and interactive effects on job satisfaction, turnover intentions, and performance. *The Leadership Quarterly*, 20, 371-382.
- Harrison, D., & Humphrey, S. (2010). Designing for diversity or diversity for design? Tasks, interdependence, and within-unit differences at work. *Journal of Organizational Behavior*, 31, 328-337.
- Harter, J., Schmidt, F., Killham, E., & Asplund, J. (2006). *Q12 Meta-Analysis: Gallup*. Retrieved from http://www.gallup.com/file/consulting/126806/MetaAnalysis_Q12_WhitePaper_2009.pdf
- Harter, J. K., Schmidt, F.L., & Hayes, T.L. (2002). Business-unit level relationship between employee satisfaction, employee engagement, and business outcomes: a meta-analysis. *Journal of Applied Psychology*, 87, 268-279.

- Hart, J., Stasson, M., Mahoney, J., & Story, P. (2007). The big five and achievement motivation: Exploring the relationship between personality and a two-factor model of motivation. *Individual Differences Research*, 5(4), 267-274.
- Haslam, C., Atkinson, S., Brown, S., & Haslam, R. (2005). Anxiety and depression in the workplace: Effects on the individual and organisation (a focus group investigation). *Journal of Affective Disorders*, 88, 209-215.
- Herzberg, F., Mausner, B., & Snyderman, B. (1959). *The motivation to work*. New York: Wiley & Sons.
- Herzberg, F. (1966). *Work and the Nature of Man*. Oxford, UK: World Publishing.
- Hewitt Associates LLC. (2001). *Employee Engagement*: Hewitt Associates LLC.
- Retrieved from
- http://was4.hewitt.com/hewitt/services/talent/subtalent/ee_engagement.htm
- Hilton, M., Scuffham, P., Vecchio, N., & Whiteford, H. (2010). Using the interaction of mental health symptoms and treatment status to estimate lost employee productivity. *Australian and New Zealand Journal of Psychiatry*, 44(2), 151-161.
- Hochwarter, W., Perrewé, P., Ferris, G., & Brymer, R. (1999). Complexity of the job satisfaction-performance relationship: The moderating effects of value attainment and affective disposition. *Journal of Vocational Behavior*, 54, 296-313.
- Hochwarter, W., Kacmar, C., & Ferris, G. (2003). *Accountability at work: An examination of antecedents and consequences*. Paper presented at the Paper

presented at the annual meeting of the Society of Industrial and Organizational Psychology, Orlando, FL.

Hochwarter, W., Perrewe, P., Hall, A., & Ferris, G. (2005). Negative affectivity as a moderator of the form and magnitude of the relationship between felt accountability and job tension. *Journal of Organizational Behavior*, 26, 517-534.

Hochwarter, W., Ferris, G., Gavin, M., Perrewe, P., Hall, A., & Frink, D. (2007). Political skill as neutralizer of felt accountability—job tension effects on job performance ratings: A longitudinal investigation *Organizational Behavior and Human Decision Processes*, 102, 226-239.

Hofmann, D., & Morgeson, F. (1999). Safety-related behaviour as a social exchange: the role of perceived organisational support and leader-member exchange. *Journal of Applied Psychology*, 84(2), 286-296.

Hofstede, G., Bond, M.H., & Luk, C. (1993). Individual perceptions of organizational cultures: a methodological treatise on levels of analysis. *Organization Studies*, 14(4), 483-503.

Hofstede, G., Hofstede, G., & Minkov, M. (2004). *Cultures and Organizations: Software for the Mind*. New York: McGraw-Hill.

Houseman, S. (2001). Why Employers Use Flexible Staffing Arrangements: Evidence from an Establishment Survey. *Industrial and labor relations review*, 55(1), 149-170.

House, R., & Aditya, R. (1997). The social scientific study of leadership: Quo Vadis? *Journal of Management*, 23(3), 409-473.

Human Synergistics. (2001). Reliability and Validity of the OEI. Plymouth, MI:

Human Synergistics. Retrieved from

<http://www.humansynergistics.com/news/documents/OEIReliabilityReport.pdf>

Humphrey, S., Nahrgang, J., & Morgeson, F. (2007). Integrating motivational, social, and contextual work design features: A meta-analytic summary and theoretical extension of the work design literature. *Journal of Applied Psychology*, 92(5), 1332-1356.

Hu, X., Kaplan, S., & Dalal, R. (2009). An examination of blue- versus white-collar workers' conceptualizations of job satisfaction facets. *Journal of Vocational Behavior*, 76, 317-325.

Hurley, A., Scandura, T., Schriesheim, C., Brannick, M., Seers, A., Vandenberg, R., & Williams, L. (1997). Exploratory and confirmatory factor analysis guidelines, issues and alternatives. *Journal of Organizational Behavior*, 18, 667-683.

Jackson, P. R., Wall, T. D., Martin, R., & Davids, K. (1993). New measures of job control, cognitive demand, and production responsibility *Journal of Applied Psychology* 78, 753-762.

Jawahar, I. (2006). An investigation of potential consequences of satisfaction with appraisal feedback. *Journal of Leadership and Organizational Studies*, 13(2), 14-28.

Judge, T., & Ilies, R. (2002). Relationship of personality to performance motivation: A meta-analytic review. *Journal of Applied Psychology*, 87(4), 797-807.

- Judge, T., Thorenson, C., Bono, J., & Patton, G. (2001). The job satisfaction-job performance relationship: A qualitative and quantitative review. *Psychological Bulletin*, 127(3), 376-407.
- Kahn, R. L., Wolfe, D. M., Quinn, R. P., Snoek, J. D., & Rosenthal, R. A. (1964). *Organizational stress: Studies in role ambiguity*. New York: Wiley.
- Katz, D., & Kahn, R. L. (1978). *The social psychology of organizations (2nd ed.)*. New York: Wiley.
- Kahn, W. A. (1990). Psychological conditions of personal engagement and disengagement at work. *Academy of Management Journal*, 33, 692-724.
- Kahn, W. A. (1992). To be fully there: psychological presence at work. *Human Relations*, 45, 321-349.
- Kaminski, M. (2001). Unintended consequences: organizational practices and their impact on workplace safety and productivity. *Journal of Occupational Health Psychology*, 6(2), 127-138.
- Karasek, R. (1979). Job demands, job decision latitude, and mental strain: Implications for job redesign. *Administrative Science Quarterly*, 24, 285-307.
- Karasek, R. (1998). Demand/control model: A social, emotional, and physiological approach to stress risk and active behaviour development. In J. M. Stellman (Ed.), *Encyclopaedia of occupational health and safety* (pp. 34.36-34.14). Geneva: ILO.
- Kearns, K. P. (1996). *Managing for accountability: Preserving the public trust in public and nonprofit organizations*. San Francisco: Jossey-Bass.

- Kelloway, E. (1995). Structural equation modelling in perspective. *Journal of Organizational Behavior*, 16, 215-224.
- Kline, R. (2004). *Beyond significance testing: Reforming data analysis methods in behavioral research*. Washington, DC, US: American Psychological Association.
- Kline, R. (2005). *Principles and practice of structural equation modelling*. New York: Guilford Press.
- Kolk, A. (2008). Sustainability, accountability and corporate governance: Exploring multinationals' reporting practices. *Business Strategy and the Environment*, 18, 1-15.
- Konovsky, M. A., & Pugh, S. D. (1994). Citizenship behavior and social exchange. *Academy of Management Journal*, 37, 656-669.
- Kuipers, B., & Stoker, J. (2009). Development and performance of self-managing work teams: a theoretical and empirical examination. *The International Journal of Human Resource Management*, 20(2), 399-419.
- Laird, M., Perryman, A., Hochwarter, W., Ferris, G. & Zinko, R. (2009). The moderating effects of personal reputation on accountability-strain relationships. *Journal of Occupational Health Psychology*, 14(1), 70-83.
- Lal, S., & Craig, A. (2001). A critical review of the psychological determinants of driver fatigue. *Biological Psychology*, 55, 173-194.
- Latham, G., & Pinder, C. (2005). Work Motivation theory and research at the dawn of the twenty-first century. *Annual Review of Psychology*, 56, 485-516.

- Leiter, A., & Schaufeli, W. (1996). Consistency of the burnout construct across occupations. *Anxiety, Stress & Coping*, 9, 229-243.
- Lerner, J. S., & Tetlock, P.E. (1999). Accounting for the effects of accountability. *Psychological Bulletin*, 125, 255-275.
- Llorens, S., Bakker, A., Schaufeli, W., & Salanova, M. (2007). Testing the robustness of the job demands-resources model. *International Journal of Stress Management*, 13(3), 378-391.
- Locke, E. A. (1976). The nature and causes of job satisfaction. In M. D. Dunnette (Ed.), *Handbook of industrial and organizational psychology*. Chicago: Rand McNally.
- Locke, E., & Latham, G. (2004). What should we do about motivation theory? Six recommendations for the twenty-first century. *Academy of Management Review*, 29(3), 388-403.
- Lodahl, T. M., & Kejner, M. (1965). The definition and measurement of job involvement. *Journal of Applied Psychology*, 49, 24-33.
- Logan, M., & Ganster, D. (2007). The effects of empowerment on attitudes and performance: The role of social support and empowerment beliefs. *Journal of Management Studies*, 44(8), 1523-1550.
- London, M., Smither, J., & Adsit, D. (1997). Accountability: The achilles' heel of multisource feedback. *Group & Organization Management*, 22(2), 162-184.
- MacCallum, R. C., Widaman, K. F., Zhang, S., & Hong, S. (1999). Sample size in factor analysis. *Psychological Methods*, 4, 84-99.

- Macey, W. H., & Schneider, B. (2008). The meaning of employee engagement. *Industrial and Organizational Psychology, 1*, 3-30.
- Macik-Frey, M., Quick, J., & Nelson, D. (2007). Advances in occupational health: from a stressful beginning to a positive future. *Journal of Management, 3*(6), 809-840.
- Martin-Rios, C. (2006). *Establishing accountability systems in collaborative knowledge-work*. Unpublished Dissertation, Rutgers The State University of New Jersey, New Brunswick. Retrieved from <http://search.proquest.com.ezproxy.cqu.edu.au/pqdtft/docview/305291761/fulltextPDF/131734F9441235C8BAE/1?accountid=10016>
- Maslach, C., & Leiter, M. (1997). *The Truth About Burnout*. San Francisco: Josey-Bass.
- Maslach, C., & Leiter, M. (2008). Early predictors of job burnout and engagement. *Journal of Applied Psychology, 93*(3), 498-512.
- Maslach, C., Schaufeli, W. B., & Leiter, M. P. (2001). Job Burnout. *Annual Review of Psychology, 52*, 397-422.
- Maslach, C., & Leiter, M. (2008). Early predictors of job burnout and engagement. *Journal of Applied Psychology, 93*(3), 498-512.
- Mauno, S., Kinnunen, U., Ruokolainen, M. (2007). Job demands and resources as antecedents of work engagement: A longitudinal study. *Journal of Vocational Behavior, 70*, 149-171.
- May, D., Gilson, R., & Harter, L. (2004). The psychological conditions of meaningfulness, safety and availability and the engagement of the human

- spirit at work. *Journal of Occupational & Organizational Psychology*, 77, 11-37.
- Meier, K., & Bohte, J. (2000). Ode to Luther Gulick: Span of Control and Organizational Performance. *Administration and Society*, 32(2), 115-137.
- Meyer, J., & Herscovitch L. (2001). Commitment in the workplace: Toward a general model. *Human Resource Management Review*, 11, 299-326.
- Mintzberg, H. (1983). *Power in and around organizations*. Englewood Cliffs, New Jersey: Prentice-Hall.
- Moorman, R. H. (1991). Relationship between organizational justice and organizational citizenship behaviors: Do fairness perceptions influence employee citizenship? *Journal of Applied Psychology*, 76, 845-855.
- Morgeson, F. P., & Humphrey, S. E. (2006). The work design questionnaire (WDQ): Developing and validating a comprehensive measure for assessing job design and the nature of work *Journal of Applied Psychology* 91, 1321-1339.
- Mowday, R. T., Steers, R. M., & Porter, L. W. (1979). The measurement of organizational commitment. *Journal of Vocational Behavior*, 14, 224-227.
- Mulgan, R. (2000). Accountability: an ever-expanding concept? *Public Administration*, 78(3), 555-573.
- Neal, A., Griffin, M. A., & Hart, P. M. (2000). The impact of organizational climate on safety climate and individual behavior. *Safety Science*, 34, 99-109.
- Nerstad, C., & Richardsen, A., & Martinussen, M. (2010). Factorial validity of the Utrecht Work Engagement Scale (UWES) across occupational groups in Norway. *Scandinavian Journal of Psychology*, 51, 326-333.

- Nowakowska, M. (1977). Methodological problems of measurement of fuzzy concepts in the social sciences. *Behavioral Science*, 22(2), 107-115.
- O'Driscoll, M., & Beehr, T. (2000). Moderating effects of perceived control and need for clarity on the relationship between role stressors and employee affective reactions. *The Journal of Social Psychology*, 140(2), 151-159.
- Oldham, G., & Hackman, R. (2010). Not what it was and not what it will be: The future of job design research. *Journal of Organizational Behavior*, 31, 463-479.
- Organ, D. (1997). Organizational citizenship behavior: it's construct clean up time. *Human Performance*, 10(2), 85-97.
- Ouchi, W. G. (1979). A conceptual framework for the design of organizational control mechanisms. . *Management Science* 25(9), 833-848.
- Pallant, J. (2007). *SPSS survival manual: A Step by Step Guide to Data Analysis Using SPSS for Windows Version 15* (3rd ed.). Milton Keynes, UK, USA: Open University Press
- Parker, S., & Griffin, M. (2011). Understanding active psychological states: Embedding engagement in a wider nomological net and closer attention to performance. *European Journal of Work and Organizational Psychology*, 20(1), 60-67.
- Parker, S. K., Wall, T.D., & Cordery, J.L. (2001). Future work design research and practice: Towards an elaborated model of work design. *Journal of Occupational and Organizational Psychology*, 74, 413-440.

- Patrick, A., & Laschinger, H. (2006). The effect of structural empowerment and perceived organizational support on middle level nurse managers' role satisfaction. *Journal of Nursing Management, 14*, 13-22.
- Payne, S., Finch, J., & Tremble, T. (2003). Validating surrogate measures of psychological constructs: The application of construct equivalence to archival data. *Organizational Research Methods, 6*, 363-382.
- Peretti-Watel, P., Legleye, S., Baumann, M., Choquet, M., Faslissard, B., & Chau, N. (2009). Fatigue, insomnia and nervousness: gender disparities and roles of individual characteristics and lifestyle factors among economically active people. *Social Psychiatry and Psychiatric Epidemiology, 44*, 703-709.
- Peterson, R. (1994). A meta-analysis of Cronbach's coefficient alpha. *Journal of Consumer Research, 21*, 381-391.
- Podsakoff, P., Bommer, W., Podsakoff, N., & MacKenzie, S. (2006). Relationships between leader reward and punishment behavior and subordinate attitudes, perceptions, and behaviors: A meta-analytic review of existing and new research. *Organizational Behavior and Human Decision Processes, 99*, 113-142.
- Podsakoff, P., MacKenzie, S., Lee, J., & Podsakoff, N. (2003). Common method bias in behavioral research: A critical review of the literature and recommended remedies. *Journal of Applied Psychology, 88*(5), 879-903.
- Podsakoff, P. M., Todor, W.D., Skov, R. (1982). Effect of leader contingent and non-contingent reward and punishment behaviors on subordinate performance and satisfaction. *Academy of Management Journal, 25*, 810-821.

- Poplin, G., Miller, H., Ranger-Moore, J., Bofinger, C., Kurzuiz-Spencer, M., Harris, R., & Burgess, J. (2008). International evaluation of injury rates in coal mining: A comparison of risk and compliance-based regulatory approaches. *Safety Science*, 46, 1196-1204.
- Porter, L. (2008). Organizational psychology: a look backward, outward, and forward. *Journal of Organizational Behavior*, 29, 519-526.
- Pousette, A., & Hanse, J. (2002). Job characteristics as predictors of ill-health and sickness absenteeism in different occupational types - a multigroup structural equation modelling approach. *Work & Stress*, 16(3), 229-250.
- Preacher, K. J., & Hayes, A.F. (2008). Asymptotic and resampling strategies for assessing and comparing indirect effects in multiple mediator models. *Behaviour Research Methods*, 40(3), 879-891.
- Quinn, R., & Rohrbaugh, J. (1983). A spatial model of effectiveness criteria: towards a competing values approach to organizational analysis. *Management Science*, 29, 363-377.
- Quinn, A., & Schlenker, B. (2002). Can accountability produce independence? Goals as determinants of the impact of accountability on conformity. *Social Psychology Bulletin*, 23, 472-478.
- Radloff, L. S. (1977). The CES-D Scale: A self-report depression scale for research in general population. *Applied Psychological Measurement*, 1(385-401).
- Radloff, L. S. (1991). The use of the Center for Epidemiological Studies Depression Scale in adolescents and young adults. *Journal of Youth and Adolescence*, 20, 149-166.

- Radloff, L., & Locke, B. (1986). The community mental health assessment survey and CES-D scale. In M. M. Weissman, & Myers, J.K., (Eds.), *Community surveys of psychiatric disorders*. New Brunswick, NJ: Rutgers University Press.
- Reed, M. (2005). Reflections on the "Realist Turn" in organization and management studies. *Journal of Management Studies*, 42(8), 1621-1644.
- Reichers, A., & Schneider, B. (1990). Climate and culture: an evolution of constructs. In B. Schneider (Ed.), *Organizational Climate and Culture*. San Francisco, CA: Jossey-Bass.
- Rich, B., Lepine, J., & Crawford, E. (2010). Job engagement: Antecedents and effects on job performance. *Academy of Management Journal*, 53(3), 617-635.
- Riketta, M., & Landerer, A. (2002). Organizational commitment, accountability, and work behavior: A correlational study. *Social Behavior and Personality*, 30, 653-660.
- Roch, S., & McNall, L. (2007). An investigation of factors influencing accountability and performance ratings. *The Journal of Psychology*, 141(5), 499-523.
- Rosnow, R., & Rosenthal, R. (2003). Effect sizes for experimenting psychologists. *Canadian Journal of Experimental Psychology*, 57(3), 221-237.
- Rothbard, N. P. (2001). Enriching or depleting? The dynamics of engagement in work and family roles. *Administrative Science Quarterly*, 46, 655-684.

- Rousseau, D. M. (2005). *I-deals: Idiosyncratic deals employees bargain for themselves*. New York: M. E. Sharpe.
- Saks, A. (2006). Antecedents and consequences of employee engagement. *Journal of Managerial Psychology*, 21(7), 600-619.
- Salanova, M., & Schaufeli, W. (2008). A cross-national study of work engagement as a mediator between job resources and proactive behaviour. *The International Journal of Human Resource Management*, 19(1), 116-131.
- Salanova, M., Schaufeli, W., Xanthopoulou, D., & Bakker, A. (2010). The gain spiral of resources and work engagement: Sustaining a positive worklife. In A. Bakker and M. Leiter (Eds.), *Work Engagement: A Handbook of Essential Theory and Research* New York: Psychology Press.
- Schaufeli, W., & Bakker, A. B. (2004). Job demands, job resources, and their relationship with burnout and engagement. *Journal of Organizational Behavior*, 25, 293–315.
- Schaufeli, W., & Bakker, A. (2010). Defining and measuring work engagement: Brining clarity to the concept. In A. Bakker and M. Leiter (Eds.), *Work Engagement: A Handbook of Essential Theory and Research*. New York: Psychology Press.
- Schaufeli, W., Leiter, M. P., Maslach, C., & Jackson, S. E. (1996). *Maslach Burnout Inventory—General Survey* (3rd ed.). Palo Alto, CA: Consulting Psychologists Press.

- Schaufeli, W. B., Salanova, M., González-Romá, V., & Bakker, A.B. (2002). The measurement of engagement and burnout: A confirmatory factor analytic approach. *Journal of Happiness Studies*, 3, 71-92.
- Schaufeli, W., & Salanova, M. (2011). Work engagement: On how to better catch a slippery concept. *European Journal of Work and Organizational Psychology*, 20(1), 39-46.
- Schaufeli, W., Taris, T., & Rhenen, W. (2008). Workaholism, burnout, and work engagement: Three of a kind or three different kinds of employee well-being? *Applied Psychology: An International Review*, 57(2), 173-203.
- Schein, E. H. (1992). *Organizational Culture and Leadership: A Dynamic View* (2nd ed.). San Francisco: Jossey-Bass.
- Schein, E. H. (1996). Culture: the missing concept in organization studies. *Administrative Science Quarterly*, 41, 229-240.
- Schlenker, B. R., Britt, T. W., Pennington, J., Murphy, R., & Doherty, K. (1994). The triangle model of responsibility. *Psychological Review*, 101, 632-652.
- Schlenker, B. R., & Weigold, M. F. (1989). Self-identification and accountability. In R. A. Giacalone & P. Rosenfeld (Eds.), *Impression management in the organization* (pp. 21-43). Hillsdale, NJ: Erlbaum.
- Schmitt, N. (1996). Uses and abuses of coefficient alpha. *Psychological Assessment*, 8, 350-353.
- Schmitt, T. (2011). Current methodological considerations in exploratory and confirmatory factor analysis. *Journal of Psychoeducational Assessment*, 29(4), 304-321.

- Schutte, N., Toppinnen, S., Kalimo, R., & Schaufeli, W. B. (2000). The factorial validity of the Maslach Burnout Inventory–General Survey across occupational groups and nations. *Journal of Occupational and Organizational Psychology*, 73, 53-66.
- Seigel-Jacobs, K., & Yates, J. (1996). Effects of procedural and outcome accountability on judgment quality. *Organizational Behavior and Human Decision Processes*, 65(1), 1-17.
- Shafritz, J. M., & Russell, E. W. (2003). *Introducing public administration* (3rd ed.). New York: Longman.
- Sharma, M., & Kaur, G. (2008). Employee empowerment: A conceptual analysis. *The Journal of Global Business Issues*, 2(2), 7-12.
- Shimazu, A., Schaufeli, W., Miyanaka, D., & Iwata, N. (2011). Why Japanese workers show low work engagement: An item response theory analysis of the Utrecht Work Engagement scale. *BioPsychoSocial Medicine*, 4(17), 1-6.
- Skinner, B. F. (1938). *The behavior of organisms: An experimental analysis*. New York: Appleton-Century-Crofts.
- Skinner, B. F. (1953). *Science and human behavior*. New York: Macmillan.
- Skogstad, A., Einarsen, S., Torsheim, T., Schanke, M., & Hetland, H. (2007). The destructiveness of laissez-faire leadership behavior. *Journal of Occupational Health Psychology*, 12(1), 80-92.
- Smith, P., Kendall, L., & Hulin, C. (1969). *The measurement of satisfaction in work and retirement*. Chicago: Rand McNally.

- Smith, P. (1979). Shiftwork: balancing sleep, fatigue and wakefulness. *Archives of Industrial Hygiene and Toxicology*, 30, 1385-1393.
- Smtih, P., Garrett, C., & Calvert, D. (2006). *A five factor measure of safety culture*. Paper presented at the Queensland Mining, Health and Safety Conference, Townsville.
- Sonnentag, S. (2003). Recovery, work engagement, and proactive behavior: A new look at the interface between non-work and work. *Journal of Applied Psychology*, 88, 518-528.
- Sonnentag, S., Doormann, C., & Demerouti, E. (2010). Not all days are created equal: The concept of state work engagement. In A. Bakker & M. Leiter (Eds.), *Work Engagement: A Handbook of Essential Theory and Research* (pp. 25-38). New York: Psychology Press.
- Sonnentag, S., Mojza, E.J., Binnewies, C., & Scholl, A. (2008). Being engaged at work and detached at home: A week-level study on work engagement, psychological detachment and affect. *Work & Stress*, 22, 257-276.
- Sonnentag, S., & Zijlstra, F. (2006). Job characteristics and off-job activities as predictors of need for recovery, well-being, and fatigue. *Journal of Applied Psychology*, 91, 330-350.
- Sonnentag, S. (2011). Research on work engagement is well and alive. *European Journal of Work and Organizational Psychology*, 20(1), 29-38.
- Spreitzer, G. (1995). Psychological empowerment in the workplace: Dimensions, measurement and validation. *Academy of Management Journal*, 38(5), 1442-1465.

- Stewart, W., Ricci, J., Chee, E., Hahn, S., & Morganstein, D. (2003). Cost of lost productive time among US workers with depression. *Journal of the American Medical Association*, 290(16), 3135-3144.
- Szumal, J. (2001). Reliability and validity of the OEI. Human Synergistics.
Retrieved from
<http://www.humansynergistics.com/news/documents/OEIReliabilityReport.pdf>
- Tabachnick, B. G., & Fidell, L. S. (2001). *Using multivariate statistics (4th ed.)*. Needham Heights: Allyn & Bacon.
- Terluin, B. (1998). The Four-Dimensional Symptom Questionnaire (4DSQ) in general practice. *De Psycholoog*, 33, 18-24.
- Tetlock, P. (1985). Accountability: The neglected social context of judgment and choice. In L.L. Cummings & B.M. Staw (Eds.), *Research in organizational behavior* (Vol. 7, pp. 297-332). Greenwich, CT: JAI Press.
- Tetlock, P. (1992). The impact of accountability on judgment and choice. Toward a social contingency model. In M. Zanna (Ed.), *Advances in experimental social psychology* (pp. 331-337). New York: Academic Press.
- Tetlock, P., & Kim, J. (1987). Accountability and judgment processes in a personality prediction task. *Journal of Personality and Social Psychology*, 52, 700-709.
- Tetrick, L. E. (2002). Individual and organizational health. In D. Ganster and P. Perrewe (Eds.), *Research in organizational stress and well-being* (Vol. 3, pp. 107-141). Greenwich: JAI Press.

- Thackray. (2001). *Feedback for Real*: The Gallup Organization. Retrieved from <http://gmj.gallup.com/content/811/feedback-real.aspx>
- Thiffault, P., & Bergeron, J. (2003). Fatigue and individual differences in monotonous simulated driving. *Personality and Individual Differences*, 34(1), 159-176.
- Thoms, P., Dose, J., & Scott, K. (2002). Relationships between accountability, job satisfaction, and trust. *Human Resource Development Quarterly*, 13(3), 307-323.
- Tierney, P., & Farmer, S. (2002). Creative self-efficacy: its potential antecedents and relationship to creative performance. *Academy of Management Journal*, 45(6), 1137-1148.
- Towers-Perrin. (2003). *Working Today: Understanding What Drives Employee Engagement*: Towers-Perrin. Retrieved from http://www.towersperrin.com/tp/getwebcachedoc?webc=hrs/usa/2003/200309/talent_2003.pdf
- Tsui, A., & Wu, B. (2005). The new employment relationship versus the mutual investment approach: Implications for human resource management. *Human Resource Management*, 44(2), 115-121.
- Tuuli, M., & Rowlinson, S. (2009). Performance consequences of psychological empowerment. *Journal of Construction Engineering and Management*, 135(12), 1334-1347.
- Urwick, L. F. (1956). The manager's span of control. *Harvard Business Review*, May-June, 39-47.

- Van den Broek, A., Vansteenkiste, M., De Witt, H., & Lens, W. (2008). Explaining the relationships between job characteristics, burnout, and engagement: The role of basic psychological need satisfaction. *Work & Stress*, 22(3), 277-294.
- Warr, P. (1994). A conceptual framework for the study of work and mental health. *Work and Stress*, 8(2), 84-97.
- Welfand, A., & Downey, R. (2009). Job engagement in organizations: fad, fashion, or folderol? *Journal of Organizational Behavior*, 30, 141-145.
- Wiliam, D. (2010). Standardized testing and school accountability. *Educational Psychologist*, 45(2), 107-122.
- Wooden, M. (1999). Individual agreement-making in Australian workplaces: Incidence, trends and features. *The Journal of Industrial Relations*, 41(3), 417-445.
- Wood, J., & Winston, B. (2005). Toward a new understanding of leader accountability: defining a critical construct. *Journal of Leadership and Organizational Studies*, 11, 84-94.
- Wrzesniewski, A., & Dutton, J. E. (2001). Crafting a job: Revisioning employees as active crafters of their work. *Academy of Management Review*, 26, 179-201.
- Xanthopoulou, D., Bakker, A. B., Demerouti, E., & Schaufeli, W. B. (2007). The role of personal resources in the job demands-resources model. *International Journal of Stress Management*, 14, 121-141.
- Xanthopoulou, D., Bakker, A. B., Demerouti, E., & Schaufeli, W. B. (2009). Reciprocal relationships between job resources, personal resources, and work engagement. *Journal of Vocational Behavior*, 74, 234-244.

- Zimmerman, R., & Darnold, T. (2007). The impact of job performance on employee turnover intentions and the voluntary turnover process: A meta-analysis and path model. *Personnel Review*, 38(2), 142-158.
- Zohar, D., Tzischinski, R., & Epstein, R. (2003). Effects of energy availability on immediate and delayed emotional reactions to work events. *Journal of Applied Psychology*, 88, 1082-1093.

Appendix A. Details of the OCI, OEI and Chapter 4 Scales

This research utilised items from the Organisational Effectiveness Inventory (OEI) and Organisational Culture Inventory (OCI) in Chapter 4, 5 and 6. The OCI and OEI are measures designed and used by the consultancy firm Human Synergistics (see Balthazard, Cooke & Potter, 2006; Cooke & Lafferty, 1987; Cooke & Szumal 1993; Szumal, 2001).

The OEI includes 126 items designed to measure a range of attitudinal and behavioural indicators of organisational effectiveness. Table A1 lists the 43 indicators of organisational effectiveness included in the OEI (see also Szumal, 2001).

Table A1

Indicators of Effectiveness Included in the OEI

Intra-Unit Team work and Cooperation	Downward Communication	Consideration
Inter-Unit Coordination	Upward Communication	Personal Bases of Power
External Adaptability	Communication for Learning	Organizational Bases of Power
Organizational Level Quality	Selection/Placement	Autonomy
Department Level Quality	Training/Development	Variety
Role Conflict	Respect for Members	Feedback
Stress	Empowerment	Identity
Role Clarity	Fairness of Appraisals	Significance
Motivation	Use of Rewards	Interdependence
Satisfaction	Use of Punishment	Goal Clarity
Intention to Stay	Total Influence	Goal Difficulty
Job Insecurity	Distribution of Influence	Participative Goal Setting
Organizational Mission	Interaction Facilitation	Goal Acceptance
Employee Involvement	Task Facilitation	
Customer Service	Goal Emphasis	
Orientation		

The OCI includes 96 items relating to organisational culture. The OCI is designed to measure the broad cultural styles that are driven by 12 more specific cultural styles. These are:

- (1) Constructive. Members interact and approach tasks in ways that help them meet higher order satisfaction needs. This cultural style includes achievement, self-actualising, humanistic-encouraging and affiliative cultural styles.
- (2) Passive/Defensive. Members take a defensive position with others that does not threaten their own security. This cultural style includes approval, conventional, dependent and avoidance cultural styles.
- (3) Aggressive/Defensive. Members approach tasks forcefully to protect status and security. The four cultural styles that make up this style are labelled, oppositional, power, competitive and perfectionistic.

The item content of the three general and 12 more specific cultural styles is presented in Table A2 along with the Cronbach's alpha statistics for the 12 cultural styles that were found in this research.

In addition, the item content of the accountability and safety rating scale are presented below.

Accountability

You clearly know what's required of you to "fit in" as a member of your department. (clear expectations)

You know exactly what is expected of you. (clear expectations)

I have the authority and influence needed to carry out my responsibilities. (personal control)

A lot of people can be affected by how well I do my work. (accountability salience)

If you perform poorly...

c. you will be punished in some other way?

a. your supervisor(s) will openly criticise you?

b. you will be given less desirable tasks to do? (consequences)

If you perform well...

a. your supervisor(s) will notice good work?

b. you will get a bigger raise or bonus?

c. you will be praised? (reward)

Safety Rating

In general, there's a good safety attitude in my work group.

The safety rules in my workplace make sense.

Our safety committees are very effective.

In general my working conditions enable me to do my job safely.

Compliance with safety rules is always very high.

Equipment is generally well designed to support safety.

I would recommend ##### as a safe place to work.

Table A2

OCI Items Organised by the Three General Cultural Styles and 12 Specific Cultural Styles

Constructive Styles	<i>Dependent</i> (Cronbach's Alpha = .73/.79)
<i>Achievement</i> (Cronbach's alpha = .85/.83)	Accept goals without questioning them
Work to achieve self set goals	Never challenge superiors
Explore alternatives before acting	Do what is expected
Take on challenging tasks	Be a good follower
Set moderately difficult goals	Please those in positions of authority
Pursue a standard of Excellence	Follow orders even when they are wrong
Work for the sense of accomplishment	Check decisions with superiors
Think ahead and plan	Willingly obey orders
Take moderate risks	Be predictable
Openly show enthusiasm	Ask everybody what they think before acting
Know the business	<i>Avoidance</i> (Cronbach's alpha = .85/.89)
<i>Self-Actualizing</i> (Cronbach's alpha = .83/.80)	Be non-committal
Emphasize quality over quantity	Make popular rather than necessary decisions
Be concerned about their own growth	Take few chances
Resist conformity	Lay low when things get tough
Be Spontaneous	Never be the one blamed for problems
Be open about self	Not get involved
Maintain their personal integrity	Wait for others to act first
Enjoy their work	Push decisions upward
Think in unique and independent ways	Shift responsibilities to others
Do even simple tasks well	Put things off
Communicate ideas	Aggressive/Defensive
<i>Humanistic-Encouraging</i> (Cronbach's alpha = .92/.92)	<i>Oppositional</i> (Cronbach's alpha = .72/.76)
Show concern for the needs of others	Point out flaws
Involve others (BMA used subordinates to replace others) in decisions affecting them	Oppose new ideas
Resolve conflicts constructively	Be hard to impress
Be supportive of others	Look for mistakes
Help others to grow and develop	Oppose things directly
Give positive rewards to others	Question decisions made by others
Encourage others	Remain aloof from the situation
Help others think for themselves	Refuse to accept criticism
Be a good listener	Stay detached and perfectly objective
Take time with people	Play the role of the loyal opposition
<i>Affiliative</i> (Cronbach's alpha = .92/.91)	<i>Power</i> (Cronbach's alpha = .85/.89)
Cooperate with others	Use the authority of their position
Deal with others in a friendly, pleasant way	Stay on the offensive
Think in terms of the groups satisfaction	Build up their power base
Use good human relations skills	Personally run everything
Treat people as more important than things	Act forceful
Motivate others with warm friendliness	Play politics to gain influence
Be open, warm	Be hard, tough

Be tactful	Maintain personal authority
Show concern for people	Never relinquish control
Share feelings and thoughts	Demand loyalty
Passive/Defensive	<i>Competitive</i> (Cronbach's alpha = .89/.91)
<i>Approval</i> (Cronbach's alpha = .83/.86)	Win against others
Do things for the approval of others	Be seen and noticed
Go along with others	Compete rather than cooperate
Agree with everyone	Never appear to lose
Stay conscious of fashion	Out-perform their peers
Make sure they are accepted by others	Be a winner
Back up those with most authority	Maintain an image of superiority
Switch priorities to please others	Turn the job into a contest
Be liked by everyone	Always try to be right
Stay on people's good side	Be the center of attention
Be a nice guy	<i>Perfectionist</i> (Cronbach's alpha = .80/.84)
<i>Conventional</i> (Cronbach's alpha = .80/.84)	Personally take care of every detail
Not rock the boat	Never make a mistake
Avoid confrontations	Set unrealistically high goals
Make a good impression	Be precise. . even when it is unnecessary
Conform	Keep on top of everything
Treat rules as more important than ideas	Do things perfectly
Always follow policies and practices	
Cast aside solutions that seem difficult or risky	Appear competent and independent
Fit into the mould	Persist and endure
Tell people different things to avoid conflict	View work as more important than anything else
Accept the status quo	Work long, hard hours

Note. Cronbach's alphas statistics are presented as blue collar/white collar. Styles in bold are the three general styles of culture and those in italics are the 12 more specific types.

Table A3

Matched Gallup Q12 and E12 Items

Gallup Q12	E12
Do you know what is expected of you at work?	You know exactly what is expected of you (<i>concerning your job and workgroup</i>)
Do you have the materials and equipment you need to do your work right?	I am expected to do things without the necessary resources (such as equipment, information and/or assistance)
At work, do you have the opportunity to do what you do best every day?	There is a good match here between the requirements of jobs and the skills/interests of the people assigned to them
In the last seven days, have you received recognition or praise for doing good work?	In your department, when you do your job particularly well, how likely is it that you will be praised?
Does your supervisor, or someone at work, seem to care about you as a person?	(<i>Your supervisor</i>) - willingly listens to your problems
At work, do your opinions seem to count?	(<i>Your supervisor</i>) - pays attention to your opinions
Does the mission/purpose of your company make you feel your job is important?	Management holds a widely-shared philosophy that provides employees with a real understanding of what this organisation stands for
Are your associates (fellow employees) committed to doing quality work?	Employees here are actively involved in improving the organisation and increasing its productivity
Do you have a best friend at work?	You can count on your co-workers when teamwork is needed
In the last six months, has someone at work talked to you about your progress?	When people do not perform up to their potential, action is taken to help them improve
In the last year, have you had opportunities at work to learn and grow?	This organisation shows very little interest in the professional growth and development of its people
Is there someone at work who encourages your development?	From the time people begin working here, they receive the orientation and training they need to do their best

Appendix B. Multiple Mediation SPSS Output

Run MATRIX procedure:

Preacher And Hayes (2008) SPSS Macro For Multiple Mediation
 Written by Andrew F. Hayes, The Ohio State University
<http://www.comm.ohio-state.edu/ahayes/>
 For details, see Preacher, K. J., & Hayes, A. F. (2008). Asymptotic
 and resampling strategies For assessing And comparing indirecct effects
 in multiple mediator models. Behavior Research Methods, 40, 879-891

Dependent, Independent, and Proposed Mediator Variables:

DV = SAFEPER

IV = supENG

MEDS = orgENG

jobENG

Sample size

516

IV to Mediators (a paths)

	Coeff	se	t	p
orgENG	.5081	.0307	16.5319	.0000
jobENG	.3744	.0341	10.9676	.0000

Direct Effects of Mediators on DV (b paths)

	Coeff	se	t	p
orgENG	.2818	.0431	6.5393	.0000
jobENG	.2091	.0388	5.3906	.0000

Total Effect of IV on DV (c path)

	Coeff	se	t	p
supENG	.2713	.0314	8.6484	.0000

Direct Effect of IV on DV (c-prime path)

	Coeff	se	t	p
supENG	.0498	.0365	1.3660	.1725

Model Summary for DV Model

R-sq	Adj R-sq	F	df1	df2	p
.2706	.2664	63.3253	3.0000	512.0000	.0000

NORMAL THEORY TESTS FOR INDIRECT EFFECTS

Indirect Effects of IV on DV through Proposed Mediators (ab paths)

Effect	se	Z	p
--------	----	---	---

TOTAL	.2215	.0258	8.5934	.0000
orgENG	.1432	.0235	6.0970	.0000
jobENG	.0783	.0161	4.8502	.0000
C1	.0649	.0310	2.0928	.0364

BOOTSTRAP RESULTS FOR INDIRECT EFFECTS

Indirect Effects of IV on DV through Proposed Mediators (ab paths)

	Data	boot	Bias	SE
TOTAL	.2215	.2211	-.0003	.0262
orgENG	.1432	.1434	.0003	.0236
jobENG	.0783	.0777	-.0006	.0169
C1	.0649	.0657	.0009	.0315

Bias Corrected and Accelerated Confidence Intervals

	Lower	Upper
TOTAL	.1621	.2721
orgENG	.0904	.1854
jobENG	.0502	.1194
C1	-.0022	.1233

Level of Confidence for Confidence Intervals:

95

Number of Bootstrap Resamples:

1000

INDIRECT EFFECT contrast DEFINITIONS: Ind_Eff1 MINUS Ind_Eff2

contrast IndEff_1 IndEff_2

C1 orgENG jobENG

----- END MATRIX -----

Appendix C. CQU Survey

Safety at work

Please rate to what extent you agree or disagree with the following statements as honestly as possible.

	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
1. My supervisors help me do a safe job	1	2	3	4	5
2. My supervisors help me grow and develop on the job	1	2	3	4	5
3. I know and understand #####'s safety goals	1	2	3	4	5
4. ##### considers safety is not just about work, it's about family too	1	2	3	4	5
5. Management considers our safety suggestions	1	2	3	4	5
6. We are encouraged to suggest safer ways to do things	1	2	3	4	5
7. The safety feedback I receive from my supervisor is useful	1	2	3	4	5
8. It is simple to report breaches in safety practices	1	2	3	4	5
9. Our safety procedures are too over the top	1	2	3	4	5
10. My supervisor handles safety discipline constructively	1	2	3	4	5
11. Safety training is well done at ###	1	2	3	4	5
12. Working safely here means we are ready to accept new ways of doing things more safely	1	2	3	4	5
13. Working safely here means that I get more say in how things are done	1	2	3	4	5
14. In general my working conditions enable me to do my job safely	1	2	3	4	5
15. Compliance with safety rules is always very high	1	2	3	4	5
16. Management gives a consistent message about safety	1	2	3	4	5
17. Equipment is generally well designed to support safety	1	2	3	4	5
18. In general, there's a good safety attitude in my work group	1	2	3	4	5
19. The safety rules in my workplace make sense	1	2	3	4	5
20. My supervisors structure things so that their goals and my goals can be safely achieved	1	2	3	4	5
21. My supervisors make clear how the company's safety goals apply to me	1	2	3	4	5
22. BMA is a family friendly employer	1	2	3	4	5
23. There is good support for reporting breaches in safety practices	1	2	3	4	5
24. There is an effective process for participating in safety improvements	1	2	3	4	5
25. Our safety procedures are too complex to be understood	1	2	3	4	5
26. #####'s safety disciplinary process on-site is fair and reasonable	1	2	3	4	5
27. #####'s safety training explains both the how and why of safety rules	1	2	3	4	5
28. Working safely here gives me the chance to learn and use new skills	1	2	3	4	5
29. I am satisfied with the recognition I get for doing my job safely	1	2	3	4	5
30. Our safety committees are very effective	1	2	3	4	5
31. I would recommend ##### as a safe place to work	1	2	3	4	5

Engagement and Accountability at work

For question 32 please refer to the following definition of engagement:

People who are engaged are enthusiastic about the thing they are engaged with – not indifferent to or disconnected from it.

32. How strongly do you feel engaged with:		Not at all				Strongly
a.	#####	1	2	3	4	5
b.	Your mine/port/office site	1	2	3	4	5
c.	work area	1	2	3	4	5
d.	Your supervisor(s)	1	2	3	4	5
e.	Your work team	1	2	3	4	5
f.	Your job	1	2	3	4	5
33. How accountable do you feel for the quantity, quality and timeliness of your work output?		1	2	3	4	5
34. How strongly do you feel accountable to:						
a.	#####	1	2	3	4	5
b.	Your mine/port/office site	1	2	3	4	5
c.	Your work area	1	2	3	4	5
d.	Your supervisor (s)	1	2	3	4	5
e.	Your work team	1	2	3	4	5
f.	Yourself	1	2	3	4	5

Demographics**35. Work history.**

Approximately how long have you worked:

- a. In the mining industry ----- years & ----- months
- b. With ##### ----- years & ----- months
- c. With your current supervisor ----- years & ----- months
- d. At your current mine/port/office site ----- years & ----- months
- e. In your current work area ----- years & ----- months
- f. With your current work team ----- years & ----- months
- g. In your current job ----- years & ----- months

Involvement with work

Please rate to what extent you agree or disagree with the following statements as honestly as possible.

	Disagree	Slightly Disagree	Neither	Slightly Agree	Agree
36. Time seems to fly when I'm working	1	2	3	4	5
37. I can get so into my work that I forget everything else	1	2	3	4	5
38. I put my heart into my job	1	2	3	4	5
39. I'm proud of the work I do	1	2	3	4	5
40. I avoid working too hard at work	1	2	3	4	5
41. I get a buzz out of my work	1	2	3	4	5
42. I have good relationships with my co-workers	1	2	3	4	5
43. I trust my co-workers	1	2	3	4	5
44. My supervisor values my work	1	2	3	4	5
45. My supervisor takes a genuine interest in my wellbeing	1	2	3	4	5
46. The organisation takes a genuine interest in my wellbeing	1	2	3	4	5
47. The organisation values my work	1	2	3	4	5
48. I have enough time to get my job done	1	2	3	4	5
49. My workload is too heavy	1	2	3	4	5
50. Rules and standards at work are clear and unambiguous	1	2	3	4	5
51. What I'm accountable for at work is appropriate to my job	1	2	3	4	5
52. I can achieve what I'm accountable for at work	1	2	3	4	5
53. I face negative consequences if I don't achieve what I'm accountable for at work	1	2	3	4	5
54. I am rewarded if I achieve what I'm accountable for at work	1	2	3	4	5
55. Officially there are consequences for poor performance but in reality not much happens	1	2	3	4	5
56. I am rarely held accountable for my actions at work	1	2	3	4	5
57. Discipline is talked about but rarely acted on	1	2	3	4	5
58. I get regular feedback about my performance	1	2	3	4	5

Linking data

In order to link the survey data to information about health and safety and organizational performance the researchers need to group the survey data not just by location but also by crew etc.

59. Please write in the space provided your:

- a. Department -----
- b. Function -----
- c. Section -----
- d. Work Area -----

- e. Roster -----
 f. Job title -----
 g. Supervisors Name -----

Appendix D. Chapter 5 Scales

Work Engagement

I avoid working too hard at work
 I get a buzz out of my work
 I put my heart into my job
 I'm proud of the work I do
 Time seems to fly when I'm working
 I can get so into my work that I forget everything else

Reward Recognition

This organisation frequently holds ceremonies, informal get-togethers and meetings to celebrate outstanding work by employees, special accomplishments and similar achievements

In your department, when you do your job particularly well, how likely is it that

- (a) . . . your supervisor(s) will notice good work? ^a
- (b) . . . you will get a bigger raise or bonus? ^a
- (c) . . . you will be praised? ^a

Relationships with Coworkers

Within this organisation, there is excellent cooperation between work groups and departments whose tasks are interdependent ^a

The people you work with are helpful to you in getting the job done ^a

The people you work with compete (rather than cooperate) with one another ^a

You can count on your coworkers when teamwork is needed ^a

I have good relationships with my coworkers

I trust my coworkers

Supervisor support

Your supervisor helps you plan your work ^a

Your supervisor willingly listens to your problems ^a

Your supervisor is friendly and easy to approach

Your supervisor is the kind of person whose approval I value ^a

My supervisor values my work

My supervisor takes a genuine interest in my wellbeing

POS

Decisions are made and explained in a manner that respects the rights of individual members ^a

All members of the organisation are treated with respect and dignity ^a

Management is interested in employees' suggestions for making this organisation more effective and a better place to work ^a

The organisation takes a genuine interest in my wellbeing

The organisation values my work

Fairness

When people like yourself are evaluated for possible raises, promotions, or better assignments, how likely is it that . . .

- (a) . . . they will be evaluated fairly (without regard to race, sex, or age)? ^a
- (b) . . . the evaluations will be based on real measures of performance? ^a
- (c) . . . decisions will be based on performance rather than favouritism? ^a

When a position needs to be filled in this organisation, the best person for the job is the one who gets it ^a

Job Characteristics

Autonomy ($\alpha = .54$ blue and $.46$ white)

It is basically my responsibility to decide how my job gets done ^a
I am allowed to plan how my work is carried out ^a

Task Identity ($\alpha = .57$ blue and $.57$ white)

My job involves producing an entire product or performing a complete service ^a
My job allows me to do a whole piece of work ^a
My job limits me to some small fragment of a larger task (r) ^a

Variety ($\alpha = .74$ blue and $.66$ white)

I get a lot of different things to do in my job ^a
My job requires that I use a lot of different skills ^a

Task Significance ($\alpha = .58$ blue and $.66$ white)

My job has a substantial impact on the work or lives of other people ^a
A lot of people can be affected by how well I do my work ^a
Poor performance on my part would have little or no influence on others (r) ^a

Feedback ($\alpha = .49$ blue and $.54$ white)

Just doing the work required by my job gives me the opportunity to figure out how well I'm doing ^a
I can see how well im doing even if no one tells me ^a
The design of my job makes it difficult to monitor my performance (r) ^a

Training & Development

From the time people begin working here, they receive the orientation and training they need to do their best ^a
When people do not perform up to their potential, action is taken to help them improve ^a
This organisation shows very little interest in the professional growth and development of its people ^a
Opportunities for training and advancement are fair and equitable ^a
Safety training is done well at this organisation

Role Clarity

You know exactly what is expected of you ^a

You are uncertain as to how you're supposed to "act" on your job ^a

You clearly know what's required of you to "fit in" as a member of your department^a

Organisational Mission Clarity

The objectives and priorities of this organisation are clear and well understood by all members ^a

People throughout the organisation have a clear understanding of its mission and its role in the large community/society ^a

Management holds a widely-shared philosophy that provides employees with a real understanding of what this organisation stand for ^a

There are members of this organisation (past or present) who are well known to employees and whose actions illustrate its philosophy and priorities ^a

^a – OEI item

Table D1

Individual Job Characteristics Scales and Their Reliability Coefficients as Reported by Szumal (2001)

Scale	α
<i>Autonomy</i>	.67
It is basically my responsibility to decide how my job gets done	
I am allowed to plan how my work is carried out	
<i>Variety</i>	.70
I get a lot of different things to do in my job	
My job requires that I use a variety of different skills	
<i>Feedback</i>	.65
Just doing the work required by my job gives me the opportunity to figure out how well I'm doing	
I can see how well I'm doing even if no one tells me	
The design of my job makes it difficult for me to monitor and evaluate my performance	
<i>Task Identity</i>	.62
My job involves producing an entire product or performing a complete service	
My job allows me to do a "whole" piece of work from beginning to end	
My job limits me to a small fragment of some larger task	
<i>Significance</i>	.65
A lot of people can be affected by how well I do my work	
My job has a substantial impact on the work or lives of other people	
Poor performance on my part would have little or no impact on others (either within or outside the organisation)	

Appendix E. Blue and White Collar Between Group Differences

Table E1

T-Tests of Differences Between Means for Blue Collar and White Collar Employees on the Study Variables

		Levene's Test		Test of equality of means			
		F	Sig.	t	df	Sig. (2-tailed)	Hedges's g
Reward/Recognition	A	5.53	.02	-12.45	1007	.00	0.78
	B			-12.50	1006.63	.00	
Relationship Coworkers	A	0.67	.41	-2.72	1007	.01	0.17
	B			-2.71	994.33	.01	
Supervisor Support	A	0.19	.66	-1.86	1007	.06	0.13
	B			-1.86	996.83	.06	
POS	A	3.66	.06	-8.93	1007	.00	0.56
	B			-8.90	981.92	.00	
Job Characteristics	A	17.87	.00	-9.61	1007	.00	0.61
	B			-9.54	940.19	.00	
Fairness	A	0.45	.50	-14.47	1007	.00	0.91
	B			-14.46	998.42	.00	
Training	A	1.53	.22	-7.12	1007	.00	0.43
	B			-7.13	1005.46	.00	
Role Clarity	A	0.10	.76	-2.63	1007	.01	0.17
	B			-2.63	999.65	.01	
Organisational Mission Clarity	A	1.16	.28	-6.25	1006	.00	0.39
	B			-6.23	990.02	.00	
WES	A	7.83	.01	-6.97	1007	.00	0.48
	B			-6.93	956.95	.00	
Engaged with Org.	A	0.00	.99	-9.02	1007	.00	0.57
	B			-9.00	986.29	.00	
Engaged with Supervisor	A	1.55	.21	-4.44	1007	.00	0.28
	B			-4.44	1002.78	.00	
Engaged with Team	A	0.24	.62	-2.42	1007	.02	0.15
	B			-2.40	964.78	.02	
Engaged with Job	A	0.63	.43	-2.01	1007	.04	0.13
	B			-2.01	996.62	.05	
Job Satisfaction	A	0.00	.97	-2.21	1007	.03	0.14
	B			-2.21	1004.43	.03	
E12	A	3.42	.07	-7.57	1007	.00	0.48
	B			-7.59	1006.75	.00	

Note. A = Equal variances assumed. B = Equal variances not assumed.

Appendix F. Chapter 6 Scales

PAS

What I'm accountable at work is appropriate to my job
I can achieve what I'm accountable for at work
Rules and standards at work are clear and unambiguous
Discipline is talked about but rarely acted on
Officially there are consequences for poor performance but in reality not much happens
I am rarely held accountable for my actions at work
A lot of people can be affected by how well I do my work ^a
My job has a substantial impact on the work or lives of other people ^a
Poor performance on my part would have little or no impact on others (either within or outside the organisation) ^a
I am rewarded if I achieve what I'm accountable for at work
I get regular feedback about my performance

Job Stress

You feel relaxed (not tense and under pressure) at work ^a
Your job situation tends to be frustrating ^a
You feel good when you're on the job ^a
You find your job stressful ^a

Intention to Stay

You will probably look for a new job in the next year? ^a
Do you expect to be with this organisation two years from now? ^a

Job Satisfaction

You are satisfied with your present situation in your department ^a
In general you like working here ^a
Are you satisfied being a member of this organisation? ^a
Would you recommend this organisation to someone like yourself as a good place to work? ^a

Safety Performance

In general, there's a good safety attitude in my work group.
The safety rules in my workplace make sense.
Our safety committees are very effective.
In general my working conditions enable me to do my job safely.
Compliance with safety rules is always very high.
Equipment is generally well designed to support safety.
I would recommend ### as a safe place to work.

^a – OEI item

Appendix G. Fatigue Survey 1

The following survey is designed to assist in the understanding of fatigue issues that may affect employees of ##### Coal. Please complete this survey as honestly as you can. **Do NOT write your name on the form.**

1. Are you? (Circle the number that applies)
 1 = ##### employee 2 = Contractor (Name employer): _____
2. Where do you work: (Circle the number that applies)
 1 = Mine Production operator 4 = Maint on shift 7 = Staff
 2 = Mine Production specialist 5 = Maint staff 8 = Other _____
 3 = Staff - shift worker 6 = Maint perm day
3. Do you ever get so tired at work that it affects your ability to work safely?
 (Circle the number that applies)

1	2	3	4
Never	Rarely	Sometimes	Consistently
4. How many shifts during your last week of work were you so tired that it threatened your ability to work safely? _____ shifts
5. Over the last month of your work, have you personally had a "near miss" which you believe was caused by fatigue?
 (Near miss=an undesired event that, under slightly different circumstances, could have resulted in personal harm, property damage, or other loss). ☐ Yes ☐ No
 - 5.1 If YES, how many? _____ near misses
 - 5.2 If YES, did you report this near miss? ☐ Yes ☐ No
6. When at work, do you live in: (tick one box only)

<input type="checkbox"/> Own home in Springsure	<input type="checkbox"/> Caravan Park
<input type="checkbox"/> Company provided housing in Springsure	<input type="checkbox"/> Own home in Rolleston
<input type="checkbox"/> On site Accommodation Village	<input type="checkbox"/> Other (please describe) _____
7. During your work roster cycle, how do you travel to work:
☐ Company provided bus ☐ Company car ☐ Private car ☐ Other (please specify)
8. How long does it take you to travel to work from where you sleep during your roster cycle? _____ minutes
9. Work related travel. While working at##### in the previous 24 months, have you ever had a...?
 - 9.1. Car accident when driving home to your family (tick one box only) ☐ Yes ☐ No
 - 9.2. Near miss when driving home to your family (tick one box only) ☐ Yes ☐ No
 - 9.3. Car accident when driving to ##### from your family home (tick one box only)
☐ Yes ☐ No
 - 9.4. Near miss when driving to ##### l from your family home (tick one box only)
☐ Yes ☐ No
10. What is the approximate distance (in Kilometres) from your family home to the##### Village?
 _____ Km's
11. How often do you travel to and from your place of permanent residence to work in a month: _____ times
12. When travelling back to your place of permanent residence (Family home) following your last shift, do you:
 - 12.1. Have a sleep at the village before driving? (tick one box only) ☐ Yes ☐ No
 - 12.2. Car pool? (tick one box only) ☐ Yes ☐ NO
 - 12.3. Drive straight home taking a break or short nap when I feel I need it (tick one box only)
☐ Yes ☐ No
 - 12.4. Drive straight home without a break (tick one box only) ☐ Yes ☐ No

Time

13. What roster system do you work? (Circle the number)
 1 = 7/7 4 = 4/3
 2 = 10/4 5 = Other (please specify) _____
 3 = 5/2
14. Over the last month, what has been the longest shift you have worked, ie. consecutive hours on site? _____ hours
15. On average, how many hours from when you wake up until you return to your accommodation after a day shift? _____ hours

16. On average, how many hours from when you wake up until you return to your accommodation after a night shift? _____ hours
17. On average, how many extra hours (ie. beyond your rostered hours) do you work in a roster cycle? _____ hours
18. How long does it take you to travel from your home to the Village? ie. total travel time ____ hours ____ minutes
19. Do you make the trip from your home to the Village just before the start of your first shift?
☐ Yes ☐ No
20. Do you plan your schedule so you can get some sleep/bed rest just before your first night shift? ☐ Yes ☐ No
21. If you answered **No** to Question 20, could you describe what you do to cope with the first night shift of your roster cycle?

22. Do you have adequate breaks (ie. to control fatigue risk) during your shift? ☐ Yes ☐ No
23. If **No**, what changes to breaks on shift would you make to your shift schedule?

24. All things considered, how satisfied are you with your current roster system - in terms of fatigue management?

1 = very dissatisfied 3 = somewhat satisfied
 2 = a little dissatisfied 4 = very satisfied

25. What time do you normally wake to prepare for work?

25.1 Day Shift _____ am

24.2 Night Shift _____ pm

25. What are your preferred shift start/finish times? (*Circle the number*)

1 = 5.00 - 5.00 2 = 5.30 - 5.30 3 = 5.45 - 5.45 4 = 6.00-6.00 5 = 6.15-6.15 6 = 6.30-6.30
 7 = 6.45-6.45 8 = 7.00-7.00 9 = Other _____

Beliefs

Please respond to the following statements in terms of how much you **AGREE** or **DISAGREE** with

1	2	3	4
Strongly	Slightly	Slightly	Strongly

each item. Circle the number to the right of each statement that best represents your view, using the scale below.

26. Fatigue is a significant contributor to accidents/injuries where I work..... 1 2 3 4
27. I think most of the injuries people have at work are because of bad luck..... 1 2 3 4
28. Any injury I've had at work, was because I was not being careful enough at the time..... 1 2 3 4
29. I find coping with fatigue very difficult..... 1 2 3 4
30. If I'm safe at work it's because I make sure of it..... 1 2 3 4
31. Each person is ultimately responsible for their own safety..... 1 2 3 4
32. Staying safe at work has almost nothing to do with luck, it's about how I think and act..... 1 2 3 4
33. Lately, it's only been good fortune that has kept me from being hurt at work..... 1 2 3 4
34. It is sheer chance when someone gets hurt at work..... 1 2 3 4
35. It doesn't matter how careful I am, if I am going to get hurt, I will..... 1 2 3 4
36. People get injured at work, because management don't care about safety..... 1 2 3 4
37. What I think about safe work practice doesn't have any influence where I work..... 1 2 3 4
38. I have little influence on how things are done at work, even though these things affect my safety..... 1 2 3 4
39. I can't do anything to change procedures at my place of work..... 1 2 3 4
40. At work, I refuse to do things if I think they are not safe..... 1 2 3 4

Practices

41. Do you use task rotation as a way of managing fatigue at work? (*Circle the number*)

1 = never (not allowed/not required) 2 = rarely 3 = sometimes 4 = consistently

42. How helpful do you think task rotation is for managing fatigue at work?

1 = worse than useless 2 = useless 3 = helpful at times 4 = very helpful

43. Imagine you were working and so fatigued that you were a serious risk to yourself and others. Would you notify your supervisor that you felt so fatigued you were not able to go on with your work safely?

(circle one only) ☐ Yes ☐ No

44. If No, why would you not advise your supervisor of your fatigue risk? (*circle one only*)
- | | |
|-------------------------------------|--|
| 1 = he/she would not understand | 4 = it would be recorded on my performance appraisal |
| 2 = he/she would hold it against me | 5 = pressure from other team members |
| 3 = it would place my job at risk | 6 = there is no procedure for reporting fatigue |
| | 7 = Other _____ |

45. Have you received appropriate support from your supervisor in relation to any fatigue you might have experienced?

☐ Yes ☐ No

46. Please list the jobs in your work area that you believe put you at fatigue risk?

47. Rate how much each of the following descriptions of coping with fatigue are typical of how you function. Enter your rating 1-7 in the space next to each description.

Not at all like me	1	2	3	4	5	6	7	Exactly like me
--------------------	---	---	---	---	---	---	---	-----------------

- ___ 47.1 I make sure I get enough sleep. I limit alcohol and socialising on work-days, and make sure I take time to relax properly on days off. Basically, I plan and organise my time carefully so I don't get too tired when I'm at work.
- ___ 47.2 I drink coffee (or other caffeinated drinks) at work to stay awake, and use different strategies to stay awake during shift – like keeping fresh air in my face, washing my face with water, or walking around to stay invigorated.
- ___ 47.3 I don't really do anything about managing fatigue.

Contributing factors

48. Please rate each of the potential causes of fatigue-risk listed below, in terms of how much each contributes to **your** fatigue when you are at work. (*Circle the number*)

1	2	3	4
Doesn't Contribute	Minor Contributor	Strong Contributor	Major Contributor

- | | | | | | |
|-------|---|---|---|---|---|
| 48.1 | The number of hours I work per week / roster cycle | 1 | 2 | 3 | 4 |
| 48.2 | The length of my shifts..... | 1 | 2 | 3 | 4 |
| 48.3 | The roster I work | 1 | 2 | 3 | 4 |
| 48.4 | The physical effort required to perform my work..... | 1 | 2 | 3 | 4 |
| 48.5 | The noise or dust in my working environment | 1 | 2 | 3 | 4 |
| 48.6 | Working night shifts..... | 1 | 2 | 3 | 4 |
| 48.7 | The weather or other environmental conditions I work in..... | 1 | 2 | 3 | 4 |
| 48.8 | The repetitive nature of my work | 1 | 2 | 3 | 4 |
| 48.9 | Length of breaks | 1 | 2 | 3 | 4 |
| 48.10 | Length of time worked before a break..... | 1 | 2 | 3 | 4 |
| 48.11 | Not enough hours of sleep | 1 | 2 | 3 | 4 |
| 48.12 | Poor quality sleep | 1 | 2 | 3 | 4 |
| 48.13 | Worry/stress about personal and/or family issues..... | 1 | 2 | 3 | 4 |
| 48.14 | Not enough rest on days-off | 1 | 2 | 3 | 4 |
| 48.15 | Difficulties with my supervisor | 1 | 2 | 3 | 4 |
| 48.16 | Other work commitments (ie. other than mine work)..... | 1 | 2 | 3 | 4 |
| 48.17 | Difficulties with other people at work | 1 | 2 | 3 | 4 |
| 48.18 | Being on-call and/or relief..... | 1 | 2 | 3 | 4 |
| 48.19 | Worrying about work issues in my time off | 1 | 2 | 3 | 4 |
| 48.20 | Working in stressful and/or dangerous conditions..... | 1 | 2 | 3 | 4 |
| 48.21 | Noise in the village while I'm trying to sleep during the night | 1 | 2 | 3 | 4 |
| 48.22 | Noise in the village while I'm trying to sleep during the day..... | 1 | 2 | 3 | 4 |
| 48.23 | Time spent in travelling to and from home to the Village / Site | 1 | 2 | 3 | 4 |
| 48.24 | Absence from family members during roster cycle | 1 | 2 | 3 | 4 |
| 48.25 | Quality of village accommodation..... | 1 | 2 | 3 | 4 |

About you

49. Your age? (Circle the appropriate number)

1 = < 20 years

2 = 20 – 29 years

3 = 30 – 39 years

4 = 40 – 49 years

5 = 50 – 59 years

6 = 60+ years

50. How long have you been working shiftwork? (Circle the appropriate number)

1 = < 1 year

2 = 1 – 2 years

3 = 2 – 5 years

4 = 5 – 10 years

5 = 10 + years

6 = I work day shift

51. How long have you worked at ##### ? (Circle the appropriate number)

1 = < 1 year

2 = 1 – 2 years

3 = 2 – 5 years

4 = 5 – 10 years

5 = 10 + years

52. How would you rate your diet? 1 = poor 2 = average 3 = good 4 = excellent

53. Do you make a point of exercising regularly?

☐ Yes

☐ No

54. On average, how much alcohol do you consume on **rostered days**?

___ standard drinks/day (after working **day shift**)

___ standard drinks/day (before working **night shift**)

55. On average, how much alcohol do you consume on **days off**? ___ standard drinks/day

56. On average, how many **hours of sleep** do you get after working your normal shifts, and then at home? (fill in the blanks)

56.1 After working **day shift** = _____ hours of sleep

56.2 After working **night shift** = _____ hours of sleep

56.3 On your **days off** at home = _____ hours of sleep

57. To what extent does your immediate family support you and understand your work? (Circle the number)

1 = they don't understand the pressures of the job at all

2 = they have some idea but make no allowances for me

3 = they support me but don't really appreciate the demands of work

4 = they understand my job and support me

58. What impact does your working a drive-in drive-out arrangement have on your family and family life?

(Circle the number)

1 = No impact at all

2 = Perhaps just a small impact on family life

3 = Some impact on family life

4 = Considerable impact, please describe _____

59. If you think your work arrangements have an impact on your family, what do you do to minimise that impact?

60. Rate each of the following statements about sleep in terms of how often this is true of your typical sleep? (Circle the number)

1	2	3	4
Never	Occasionally	Often	Consistently

- | | | | | | |
|------|--|---|---|---|---|
| 60.1 | I feel sleepy during the day | 1 | 2 | 3 | 4 |
| 60.2 | I wake up with muscle soreness | 1 | 2 | 3 | 4 |
| 60.3 | I take a long time to fall asleep | 1 | 2 | 3 | 4 |
| 60.4 | Others tell me I snore or gasp when I'm asleep | 1 | 2 | 3 | 4 |
| 60.5 | I wake up after only a short period of sleep and find difficulty in going back to sleep..... | 1 | 2 | 3 | 4 |
| 60.6 | I wake up feeling tired | 1 | 2 | 3 | 4 |
| 60.7 | I feel tired and find it hard to concentrate during the day | 1 | 2 | 3 | 4 |
| 60.8 | I find myself falling asleep at odd times | 1 | 2 | 3 | 4 |

61. How likely are you to doze off, or fall to asleep in the following situations, in contrast to feeling just tired? This refers to your usual way of life in recent times. Even

- | |
|---|
| 1 = would never doze
2 = slight chance of dozing
3 = moderate chance of dozing
4 = high chance of dozing |
|---|

if you have not been in these situations recently, try to work out how they would have affected you. Use this scale to choose the most appropriate number for each situation.

61.1	Sitting and reading.....	1	2	3	4
61.2	Watching TV	1	2	3	4
61.3	Sitting, inactive in a public place (eg. a theatre or a meeting)	1	2	3	4
61.4	As a passenger in a car for an hour without a break.....	1	2	3	4
61.5	Lying down to rest in the afternoon when circumstances permit.....	1	2	3	4
61.6	Sitting and talking to someone.....	1	2	3	4
61.7	Sitting quietly after lunch without alcohol.....	1	2	3	4
61.8	In a car, while stopped for a few minutes in traffic.....	1	2	3	4

62.

Circle the number for each statement that best describes how often you felt or behaved this way - DURING THE PAST WEEK.		Rarely or None of the Time (less than 1 day)	Some or a little of the Time (1-2 days)	Occasionally or a moderate amount of time (3-4 days)	Most or all of the Time (5-7 days)
62.1	I was bothered by things that usually don't bother me	1	2	3	4
62.2	I did not feel like eating; my appetite was poor	1	2	3	4
62.3	I felt that I could not shake off the blues even with the help from my family or	1	2	3	4
62.4	I felt that I was just as good as other people	1	2	3	4
62.5	I had trouble keeping my mind on what I was doing	1	2	3	4
62.6	I felt depressed	1	2	3	4
62.7	I felt that everything I did was an effort	1	2	3	4
62.8	I felt hopeful about the future	1	2	3	4
62.9	I thought my life had been a failure	1	2	3	4
62.10	I felt fearful	1	2	3	4
62.11	My sleep was restless	1	2	3	4
62.12	I was happy	1	2	3	4
62.13	I talked less than usual	1	2	3	4
62.14	I felt lonely	1	2	3	4
62.15	People were unfriendly	1	2	3	4
62.16	I enjoyed life	1	2	3	4
62.17	I had crying spells	1	2	3	4
62.18	I felt sad	1	2	3	4
62.19	I felt that people disliked me	1	2	3	4
62.20	I could not get "going"	1	2	3	4

63. Please rate each of the following items in terms of how much you agree or disagree with each statement. The statements apply to your recent (within the last 12 months) experience at #####.

1	2	3	4	5
Disagree	Slightly disagree	Neither	Slightly agree	Agree

63.1.	Rules and standards at work are clear and unambiguous	1	2	3	4	5
63.2.	I get regular feedback about my performance.....	1	2	3	4	5
63.3.	I enjoy my work.....	1	2	3	4	5
63.4.	What I'm accountable for at work is appropriate to my job	1	2	3	4	5
63.5.	Discipline is talked about but rarely acted on	1	2	3	4	5
63.6.	There are real consequences for poor performance	1	2	3	4	5
63.7.	I avoid working too hard at work	1	2	3	4	5
63.8.	I can achieve what I'm accountable for at work	1	2	3	4	5

- 63.9. You know exactly what is expected of you – *concerning your job & workgroup* 1 2 3 4 5
- 63.10. I can get so involved in my work that I forget everything else 1 2 3 4 5
- 63.11. A lot of people can be affected by how well I do my work 1 2 3 4 5
- 63.12. Time seems to fly when I'm working 1 2 3 4 5
- 63.13. I am rewarded if I achieve what I'm accountable for at work 1 2 3 4 5
- 63.14. I'm proud of the work I do 1 2 3 4 5
- 63.15. My job has a substantial impact on the work or lives of other people 1 2 3 4 5
- 63.16. I face negative consequences if I don't achieve what I'm accountable for at work 1 2 3 4 5
- 63.17. I am rarely held accountable for my actions at work 1 2 3 4 5
- 63.18. I put my heart into my job 1 2 3 4 5
- 63.19. Officially there are consequences for poor performance,
but in reality not much happens 1 2 3 4 5
64. Any further comment about fatigue or safety issues at your place of work?
-

THANK YOU FOR YOUR TIME AND EFFORT

Appendix H. Fatigue Survey 2

The following survey is designed to assist in the understanding of fatigue issues that may affect employees of #####. Please complete this survey as honestly as you can. **Do NOT write your name on the form.**

1. Are you? (Circle the number that applies)
1 = Directly Employed by #####
2 = Employee of ##### Contractor (Name employer): _____
 2. Where do you work?: (Circle the number that applies)
1 = Production operator supervisor
2 = Outbye support (Supplies, roads) or Engineer)
3 = Production Supervisor (Deputy)
4 = Outbye Supervisor (Deputy)
5 = Panel trades person
6 = Outbye maintenance (trade)
7 = Engineering shift
8 = Process owner (UM)
9 = Other
 3. Do you ever get so tired at work that it affects your ability to work safely?
(Circle the number that applies)

1 Never	2 Rarely	3 Sometimes	4 Consistently
------------	-------------	----------------	-------------------
 4. How many shifts during your last week of work were you so tired that it threatened your ability to work safely? _____ shifts
 5. Over the last month of your work, have you personally had a "near miss" which you believe was caused by fatigue?
(Near miss=an undesired event that, under slightly different circumstances, could have resulted in personal harm, property damage, or other loss).
☐ Yes ☐ No
 - 5.1 If YES, how many? _____ near misses
 - 5.2 If YES, did you report this near miss? ☐ Yes ☐ No
 6. How long does it take you to travel to work from where you sleep during your roster cycle? _____ minutes
 7. While working at ##### in the previous 24 months, have you ever had a...? (tick one box in each row)
 - 7.1. Car accident when driving from work to your family residence ☐ Yes ☐ No
 - 7.2. Near miss when driving from work to your family residence ☐ Yes ☐ No
 - 7.3. Car accident when driving to ##### from your family residence ☐ Yes ☐ No
 - 7.4. Near miss when driving to ##### from your family residence ☐ Yes ☐ No
 8. What is the approximate distance (in Kilometres) from your family residence to #####? _____ Km's
- Time**
9. What roster system do you work? (Circle the number)
1 = Weekday day shift
2 = Weekday afternoon shift
3 = Weekday night shift
4 = Weekend night shift
5 = Other (please specify)
 10. Over the last month, what has been the longest single shift you have worked, ie. consecutive hours on site? _____ hours
 11. On average, how many hours from when you wake up before shift until you return home after shift? _____ hours
 12. On average, how many extra hours (ie. beyond your rostered hours) do you work in a roster cycle? _____ hours
 13. Do you plan your schedule so you can get some sleep/bed rest just before your first night shift?
☐ Yes ☐ No
 14. If you answered **No** to Question 13, could you describe what you do to cope with the first night shift of your roster cycle?
 15. Do you have adequate breaks (ie. to control fatigue risk) during your shift? ☐ Yes ☐ No
 16. If **No**, what changes to breaks on shift would you make to your shift schedule?

17. All things considered, how satisfied are you with your current roster system - in terms of fatigue management?

1 = very dissatisfied
2 = a little dissatisfied

3 = somewhat satisfied
4 = very satisfied

Beliefs

Please respond to the following statements in terms of how much you AGREE or DISAGREE with each item. Circle the number to the right of each statement that best represents your

1	2	3	4
Strongly Disagree	Slightly Disagree	Slightly Agree	Strongly Agree

view, using the scale below.

18. Fatigue is a significant contributor to accidents/injuries where I work.....123 4
19. I think most of the injuries people have at work are because of bad luck.....123 4
20. Any injury I've had at work, was because I was not being careful enough at the time.....123 4
21. I find coping with fatigue very difficult123 4
22. If I'm safe at work it's because I make sure of it.....123 4
23. Each person is ultimately responsible for their own safety.....123 4
24. Staying safe at work has almost nothing to do with luck, it's about how I think and act.....123 4
25. Lately, it's only been good fortune that has kept me from being hurt at work.....123 4
26. It is sheer chance when someone gets hurt at work123 4
27. It doesn't matter how careful I am, if I am going to get hurt, I will.....123 4
28. People get injured at work, because management don't care about safety.....123 4
29. What I think about safe work practice doesn't have any influence where I work123 4
30. I have little influence on how things are done at work, even though these things affect my safety123 4
31. I can't do anything to change procedures at my place of work.....123 4
32. At work, I refuse to do things if I think they are not safe123 4

Practices

33. Do you use naps (ie. at crib time or when travelling to the panel) as a way of managing fatigue at work?

(Circle the number)

1 = never 2 = rarely 3 = sometimes 4 = consistently

34. Do you use task rotation as a way of managing fatigue at work? (Circle the number)

1 = never 2 = rarely 3 = sometimes 4 = consistently

35. How helpful do you think task rotation is for managing fatigue at work?

1 = worse than useless 2 = useless 3 = helpful at times 4 = very helpful

36. Imagine you were working and so fatigued that you were a serious risk to yourself and others. Would you notify your supervisor that you felt so fatigued you were not able to go on with your work safely?

(circle one only) ☐ Yes ☐ No

37. If No, why would you not advise your supervisor of your fatigue risk? (circle one only)

1 = he/she would not understand 4 = it would be recorded on my performance appraisal
2 = he/she would hold it against me 5 = pressure from other team members
3 = it would place my job at risk 6 = there is no procedure for reporting fatigue
7 = Other

38. Have you received appropriate support from your supervisor in relation to any fatigue you might have experienced?

☐ Yes ☐ No

39. Please list the jobs in your work area that you believe put you at fatigue risk?

40. Rate how much each of the following descriptions of coping with fatigue are typical of how you function. Enter your rating 1-7 in the space next to each description.

Not at all like me	1	2	3	4	5	6	7	Exactly like me
--------------------	---	---	---	---	---	---	---	-----------------

40.1____ I make sure I get enough sleep. I limit alcohol and socialising on work-days, and make sure I take time to relax properly on days off. Basically, I plan and organise my time carefully so I don't get too tired when I'm at work.

40.2____ I drink coffee (or other caffeinated drinks) at work to stay awake, and use different strategies to stay awake during shift – like keeping fresh air in my face, washing my face with water, or walking around to stay invigorated.

40.3____ I don't really do anything about managing fatigue.

Contributing factors

41. Please rate each of the potential causes of fatigue-risk listed below, in terms of how much each

1 Doesn't Contribute	2 Minor Contributor	3 Strong Contributor	4 Major Contributor
----------------------------	---------------------------	----------------------------	---------------------------

contributes to your fatigue when you are at work. (Circle the number)

- | | | |
|--------|---|---------------------|
| 41.1. | The number of hours I work per week / roster cycle | 1.....2.....3.....4 |
| 41.2. | The length of my shifts..... | 1.....2.....3.....4 |
| 41.3. | The shift or roster I work..... | 1.....2.....3.....4 |
| 41.4. | The physical effort required to perform my work | 1.....2.....3.....4 |
| 41.5. | The noise or dust in my working environment | 1.....2.....3.....4 |
| 41.6. | The weather or other environmental conditions I work in..... | 1.....2.....3.....4 |
| 41.7. | The repetitive nature of my work | 1.....2.....3.....4 |
| 41.8. | Length of breaks | 1.....2.....3.....4 |
| 41.9. | Length of time worked before a break..... | 1.....2.....3.....4 |
| 41.10. | Not enough hours of sleep..... | 1.....2.....3.....4 |
| 41.11. | Poor quality sleep..... | 1.....2.....3.....4 |
| 41.12. | Worry/stress about personal and/or family issues | 1.....2.....3.....4 |
| 41.13. | Not enough rest on days-off | 1.....2.....3.....4 |
| 41.14. | Difficulties with my supervisor | 1.....2.....3.....4 |
| 41.15. | Other work commitments (ie. other than mine work)..... | 1.....2.....3.....4 |
| 41.16. | Difficulties with other people at work | 1.....2.....3.....4 |
| 41.17. | Being on-call and/or relief..... | 1.....2.....3.....4 |
| 41.18. | Worrying about work issues in my time off | 1.....2.....3.....4 |
| 41.19. | Working in stressful and/or dangerous conditions..... | 1.....2.....3.....4 |
| 41.20. | Time spent in travelling to and from home/accommodation | 1.....2.....3.....4 |
| 41.21. | Personal health | 1.....2.....3.....4 |

About you

42. Your age? (Circle the appropriate number)

1 = < 20 years	3 = 30 – 39 years	5 = 50 – 59 years
2 = 20 – 29 years	4 = 40 – 49 years	6 = 60+ years

43. How long have you been working shiftwork? (Circle the appropriate number)

1 = < 1 year	3 = 2 – 5 years	5 = 10 + years
2 = 1 – 2 years only	4 = 5 – 10 years	6 = I work day shift

44. How long have you worked at #####? (Circle the appropriate number)

1 = < 1 year	3 = 2 – 5 years	5 = 10 + years
2 = 1 – 2 years	4 = 5 – 10 years	

45. How would you rate your diet? 1 = poor 2 = average 3 = good 4 = excellent

46. Do you make a point of exercising regularly? ☐ Yes ☐ No

47. On average, how much alcohol do you consume on **rostered days**? ____ standard drinks/day
48. On average, how much alcohol do you consume on **days off**? ____ standard drinks/day
49. On average, how many **hours of sleep** do you get after working your normal shifts, and then at home? (*fill in the blanks*)
- 49.1. After working a **regular shift** = _____ hours of sleep
- 49.2. On your **days off** at home = _____ hours of sleep
50. To what extent does your immediate family support you and understand your work? (*Circle the number*)
- 1 = they don't understand the pressures of the job at all
- 2 = they have some idea but make no allowances for me
- 3 = they support me but don't really appreciate the demands of work
- 4 = they understand my job and support me
51. What impact does your work and roster arrangements have on your family and family life? (*Circle the number*)
- 1 = No impact at all
- 2 = Perhaps just a small impact on family life
- 3 = Some impact on family life
- 4 = Considerable impact, please describe _____
52. If you think your work arrangements have an impact on your family, what do you do to minimise that impact?
- _____
- _____
- _____

53. Rate each of the following statements about sleep in terms of how often this is true of your typical sleep? (*Circle the number*)

1	2	3	4
Never	Occasionally	Often	Consistently

- 59.1 I feel sleepy during the day 1 ... 2 ... 3 4
- 59.2 I wake up with muscle soreness 1 ... 2 ... 3 4
- 59.3 I take a long time to fall asleep 1 ... 2 ... 3 4
- 59.4 Others tell me I snore or gasp when I'm asleep 1 ... 2 ... 3 4
- 59.5 I wake up after only a short period of sleep and find difficulty in going back to sleep..... 1 ... 2 ... 3 4
- 59.6 I wake up feeling tired 1 ... 2 ... 3 4
- 59.7 I feel tired and find it hard to concentrate during the day 1 ... 2 ... 3 4
- 59.8 I find myself falling asleep at odd times 1 ... 2 ... 3 4

54. How likely are you to doze off, or fall to asleep in the following situations, in contrast to feeling just tired? This refers to your usual way of life in recent times. Even if you have not been in these situations recently, try to work out how they would have affected you. Use this scale to choose the most appropriate number for each situation.

1 = would never doze
2 = slight chance of dozing
3 = moderate chance of dozing
4 = high chance of dozing

- 54.1. Sitting and reading 1 ... 2 ... 3 4
- 54.2. Watching TV 1 ... 2 ... 3 4
- 54.3. Sitting, inactive in a public place (eg. a theatre or a meeting) 1 ... 2 ... 3 4
- 54.4. As a passenger in a car for an hour without a break 1 ... 2 ... 3 4
- 54.5. Lying down to rest in the afternoon when circumstances permit 1 ... 2 ... 3 4
- 54.6. Sitting and talking to someone 1 ... 2 ... 3 4
- 54.7. Sitting quietly after lunch without alcohol 1 ... 2 ... 3 4
- 54.8. In a car, while stopped for a few minutes in traffic 1 ... 2 ... 3 4

55.

Circle the number for each statement that best describes how often you felt or behaved this way - DURING THE PAST WEEK.		Rarely or None of the Time (less than 1 day)	Some or a little of the Time (1-2 days)	Occasionally or a moderate amount of time (3-4 days)	Most or all of the Time (5-7 days)
55.1	I was bothered by things that usually don't bother me	1	2	3	4
55.2	I did not feel like eating; my appetite was poor	1	2	3	4
55.3	I felt that I could not shake off the blues even with the help from my family or	1	2	3	4
55.4	I felt that I was just as good as other people	1	2	3	4
55.5	I had trouble keeping my mind on what I was doing	1	2	3	4
55.6	I felt depressed	1	2	3	4
55.7	I felt that everything I did was an effort	1	2	3	4
55.8	I felt hopeful about the future	1	2	3	4
55.9	I thought my life had been a failure	1	2	3	4
55.10	I felt fearful	1	2	3	4
55.11	My sleep was restless	1	2	3	4
55.12	I was happy	1	2	3	4
55.13	I talked less than usual	1	2	3	4
55.14	I felt lonely	1	2	3	4
55.15	People were unfriendly	1	2	3	4
55.16	I enjoyed life	1	2	3	4
55.17	I had crying spells	1	2	3	4
55.18	I felt sad	1	2	3	4
55.19	I felt that people disliked me	1	2	3	4
55.20	I could not get "going"	1	2	3	4

56. Please rate each of the following items in terms of how much you agree or disagree with each statement. The statements apply to your recent (within the last 12 months) experience at #####.

1	2	3	4	5
Disagree	Slightly disagree	Neither agree	Slightly agree	Agree

56.1	Rules and standards at work are clear and unambiguous.....	1	2	3	4	5
56.2	I get regular feedback about my performance	1	2	3	4	5
56.3	I put in extra effort at work if the job needs it	1	2	3	4	5
56.4	What I'm accountable for at work is appropriate to my job	1	2	3	4	5
56.5	Discipline is talked about but rarely acted on	1	2	3	4	5
56.6	I enjoy my work	1	2	3	4	5
56.7	There are real consequences for poor performance	1	2	3	4	5
56.8	I work harder than I have to	1	2	3	4	5
56.9	I can achieve what I'm accountable for at work	1	2	3	4	5
56.10	You know exactly what is expected of you – <i>concerning your job & workgroup</i>	1	2	3	4	5
56.11	I get so focussed on my work that I lose track of time.....	1	2	3	4	5
56.12	A lot of people can be affected by how well I do my work	1	2	3	4	5
56.13	I go the extra mile at work.....	1	2	3	4	5
56.14	Time seems to fly when I'm working	1	2	3	4	5
56.15	I am rewarded if I achieve what I'm accountable for at work	1	2	3	4	5
56.16	I'm proud of the work I do	1	2	3	4	5
56.17	My supervisor lets me know if I'm performing below expectations.....	1	2	3	4	5
56.18	My job has a substantial impact on the work or lives of other people	1	2	3	4	5
56.19	I face negative consequences if I don't achieve what I'm accountable for at work	1	2	3	4	5
56.20	I am rarely held accountable for my actions at work	1	2	3	4	5
56.21	I put my heart into my job	1	2	3	4	5
56.22	Officially there are consequences for poor performance, but in reality not much happens	1	2	3	4	5
56.23	My supervisor lets me know if I'm performing well	1	2	3	4	5

57. Any further comment about fatigue or safety issues at your place of work?

THANK YOU FOR YOUR TIME AND EFFORT

Appendix I. Principle Components Analyses of the WES and PAS for Different Occupational Groups

Principal Components Analysis of the WES:

Principal components factor analysis with varimax rotation was used to test the factor structure of the WES in order to remain consistent with the previous studies in this thesis.

Leaders. The *KMO* measure of sampling adequacy indicated the data was suitable for factor analysis ($KMO = .77$), and Bartlett's test of sphericity indicated appropriate collinearity among the items $\chi^2 (15) = 230.67, p < .01$. The three factor solution cumulatively explained 75.41% of the variance.

Table II

Results of Principal Components Analysis of the WES in the Leaders Sample

	Component		
	1 (Dedication)	2 (Absorption)	3 (Vigor)
Eigen value	2.72	0.97	0.83
Variance explained	45.33%	16.19%	13.89%
I get a buzz out of my work	.81		
I'm proud of the work I do	.75	.41	
I put my heart into my job	.72	.44	
I can get so into my work that I forget everything else		.88	
Time seems to fly when I'm working	.45	.65	
I avoid working too hard at work (r)			.99

Professionals. The *KMO* measure of sampling adequacy indicated the data was suitable for factor analysis ($KMO = .76$), and Bartlett's test of sphericity indicated appropriate collinearity among the items $\chi^2 (15) = 158.69, p < .01$. The three factor solution cumulatively explained 77.13% of the variance.

Table I2

Results of Principal Components Analysis of the WES in the Professionals Sample

	Component		
	1 (Dedication)	2 (Absorption)	3 (Vigor)
Eigen value	2.80	1.07	0.76
Variance explained	46.71%	17.76%	12.66%
I get a buzz out of my work	.81		
I put my heart into my job	.76		
I'm proud of the work I do	.68		.45
Time seems to fly when I'm working		.88	
I can get so into my work that I forget everything else	.37	.79	
I avoid working too hard at work (r)			.93

Supervisors. The *KMO* measure of sampling adequacy indicated the data was suitable for factor analysis ($KMO = .81$), and Bartlett's test of sphericity indicated appropriate collinearity among the items $\chi^2(15) = 219.27, p < .01$. The three factor solution cumulatively explained 81.69% of the variance.

Table I3

Results of Principal Components Analysis of the WES in the Supervisors Sample

	Component		
	1 (Dedication)	2 (Absorption)	3 (Vigor)
Eigen value	3.22	0.97	0.71
Variance explained	53.77%	16.15%	11.77%
I'm proud of the work I do	.91		
I get a buzz out of my work	.80		
I put my heart into my job	.77		.35
Time seems to fly when I'm working	.70	.34	
I can get so into my work that I forget everything else		.97	
I avoid working too hard at work (r)			.96

Tradesman. The *KMO* measure of sampling adequacy indicated the data was suitable for factor analysis ($KMO = .75$), and Bartlett's test of sphericity indicated appropriate collinearity among the items $\chi^2(15) = 240.09, p < .01$. The three factor solution cumulatively explained 73.84% of the variance.

Table I4

Results of Principal Components Analysis of the WES in the Tradesman Sample

	Component		
	1 (Dedication)	2 (Absorption)	3 (Vigor)
Eigen value	2.63	1.00	0.80
Variance explained	43.83%	16.66%	13.35%
I'm proud of the work I do	.86		
I put my heart into my job	.75	.37	
Time seems to fly when I'm working	.63		
I can get so into my work that I forget everything else		.90	
I get a buzz out of my work	.48	.62	
I avoid working too hard at work (r)			.98

Operators. The *KMO* measure of sampling adequacy indicated the data was suitable for factor analysis ($KMO = .78$), and Bartlett's test of sphericity indicated appropriate collinearity among the items $\chi^2(15) = 543.80, p < .01$. The three factor solution cumulatively explained 75.83% of the variance.

Table I5

Results of Principal Components Analysis of the WES in the Operator Sample

	Component		
	1 (Dedication)	2 (Vigor)	3 (Absorption)
Eigen value	2.78	1.08	.70
Variance explained	46.32%	17.92%	11.60%
I put my heart into my job	.79		
I get a buzz out of my work	.75		
I'm proud of the work I do	.73	.43	
Time seems to fly when I'm working	.69		.39
I avoid working too hard at work (R)		.96	
I can get so into my work that I forget everything else			.94

Principal Components Analysis of the PAS

Principal components factor analysis with varimax rotation was used to test the factor structure of the PAS, consistent with the previous studies in this thesis.

Leaders. The *KMO* measure of sampling adequacy indicated the data was suitable for factor analysis ($KMO = .71$), and Bartlett's test of sphericity indicated appropriate collinearity among the items $\chi^2(55) = 338.78, p < .01$. The four factor solution cumulatively explained 63.78% of the variance.

Table I6
Results of Principal Components Analysis of the PAS in the Leaders Sample

	Component			
	1	2	3	4
Eigen value	3.01	1.59	1.48	0.94
Variance explained	27.38%	14.46%	13.43%	8.51%
I can achieve what I'm accountable for at work	.74			
What I'm accountable for at work is appropriate to my job	.73			
I am rewarded if I achieve what I'm accountable for at work	.67			
I get regular feedback about my performance	.50	.49		.34
Officially there are consequences for poor performance, but in reality not much happens		.76		
Discipline is talked about but rarely acted on		.71		
I am rarely held accountable for my actions at work		.70		
My job has a substantial impact on the work or lives of other people			.86	
A lot of people can be affected by how well I do my work			.83	
Poor performance on my part would have little or no impact on others	.34		.60	-.50
Rules and standards at work are clear and unambiguous	.42			.74

Note. Component 1 = Expectations/Feedback 1; Component 2 = Discipline; Component 3 = Salience; Component 4 = Expectations/Feedback 2.

Professionals. The *KMO* measure of sampling adequacy indicated the data was suitable for factor analysis ($KMO = .75$), and Bartlett's test of sphericity indicated appropriate collinearity among the items $\chi^2(55) = 328.57, p < .01$. The four factor solution cumulatively explained 69.29% of the variance.

Table I7

Results of Principal Components Analysis of the PAS in the Professionals Sample

	Component			
	1	2	3	4
Eigen value	3.43	1.86	1.50	0.83
Variance explained	31.17%	16.91%	13.63%	7.60%
I get regular feedback about my performance	.89			
I am rewarded if I achieve what I'm accountable for at work	.76			
What I'm accountable for at work is appropriate to my job	.68			.52
Officially there are consequences for poor performance, but in reality not much happens		.84		
Discipline is talked about but rarely acted on		.77		.40
I am rarely held accountable for my actions at work		.73		
A lot of people can be affected by how well I do my work			.83	
My job has a substantial impact on the work or lives of other people			.79	
Poor performance on my part would have little or no impact on others			.70	
Rules and standards at work are clear and unambiguous				.79
I can achieve what I'm accountable for at work	.34			.71

Note. Component 1 = Feedback; Component 2 = Discipline; Component 3 = Salience; Component 4 = Expectations.

Supervisors. The *KMO* measure of sampling adequacy indicated the data was suitable for factor analysis ($KMO = .66$), and Bartlett's test of sphericity indicated appropriate collinearity among the items $\chi^2(55) = 243.05, p < .01$. The four factor solution cumulatively explained 64.19% of the variance.

Table I8

Results of Principal Components Analysis of the PAS in the Supervisors Sample

	Component			
	1	2	3	4

Eigen value	3.09	1.47	1.37	1.14
Variance explained	28.07%	13.32%	12.41%	10.39%
What I'm accountable for at work is appropriate to my job	.78			
I can achieve what I'm accountable for at work	.72			-.35
A lot of people can be affected by how well I do my work	.71			
Rules and standards at work are clear and unambiguous	.58			
Officially there are consequences for poor performance, but in reality not much happens		.84		
I am rarely held accountable for my actions at work		.76		
Discipline is talked about but rarely acted on		.66		
I get regular feedback about my performance			.77	
I am rewarded if I achieve what I'm accountable for at work			.73	
Poor performance on my part would have little or no impact on others				.78
My job has a substantial impact on the work or lives of other people	.38		-.50	.51

Note. Component 1 = Expectations; Component 2 = Discipline; Component 3 = Feedback; Component 4 =Salience.

Tradesmen. The *KMO* measure of sampling adequacy indicated the data was suitable for factor analysis (*KMO* = .63), and Bartlett's test of sphericity indicated appropriate collinearity among the items $\chi^2(55) = 414.44, p < .01$. The four factor solution cumulatively explained 64.22% of the variance.

Table I9
Results of Principal Components Analysis of the PAS in the Tradesmen Sample

	Component			
	1	2	3	4
Eigen value	2.49	1.91	1.63	1.04
Variance explained	22.67%	17.32%	14.80%	9.43%
What I'm accountable for at work is	.79			

appropriate to my job		
I can achieve what I'm accountable for at work	.79	
Rules and standards at work are clear and unambiguous	.78	
Officially there are consequences for poor performance, but in reality not much happens		.82
Discipline is talked about but rarely acted on		.82
I am rarely held accountable for my actions at work	.67	
A lot of people can be affected by how well I do my work		.78
Poor performance on my part would have little or no impact on others		.71
My job has a substantial impact on the work or lives of other people		.69
I get regular feedback about my performance		.85
I am rewarded if I achieve what I'm accountable for at work		.75

Note. Component 1 = Expectations; Component 2 = Discipline; Component 3 = Salience; Component 4 = Feedback.

Operators. The *KMO* measure of sampling adequacy indicated the data was suitable for factor analysis ($KMO = .67$), and Bartlett's test of sphericity indicated appropriate collinearity among the items $\chi^2(55) = 763.20, p < .01$. The four factor solution cumulatively explained 62.25% of the variance.

Table I10
Results of Principal Components Analysis of the PAS in the Operators Sample

	Component			
	1	2	3	4
Eigen value	2.75	1.65	1.35	1.10
Variance explained	24.96%	15.00%	12.29%	10.00%
What I'm accountable for at work is appropriate to my job	.89			
I can achieve what I'm accountable for at work	.83			

Rules and standards at work are clear and unambiguous	.62	
Discipline is talked about but rarely acted on	.79	
Officially there are consequences for poor performance, but in reality not much happens	.74	
I am rarely held accountable for my actions at work	.72	
I am rewarded if I achieve what I'm accountable for at work		.83
I get regular feedback about my performance		.78
A lot of people can be affected by how well I do my work		.76
My job has a substantial impact on the work or lives of other people		.72
Poor performance on my part would have little or no impact on others		.59
<i>Note.</i> Component 1 = Expectations; Component 2 = Discipline; Component 3 = Feedback; Component 4 =Salience.		

Appendix J. CFA of the PAS, WES and UWES in Independent Samples.

Chapters 4, 5, 6 and 7 described the WES and PAS and how they relate to other constructs with the aim of enhancing understanding of work engagement and positive accountability. Because neither construct is well understood nor defined EFA was the method chosen to analyse the structure of the measures (Section 3.1.5) describes the rationale for the methodological approach). However, more sophisticated methods are available (i.e., CFA) when researchers are more confident of the underlying theory and latent structure of constructs.

The consistency of the underlying structures of the WES and PAS with the proposed theoretical models of work engagement and positive accountability in earlier chapters supports the use of confirmatory analysis of the measures in this chapter.

The study aims to:

- (1) Confirm the structure of the PAS and WES using CFA in independent samples.
- (2) Provide further validation support for the WES by exploring its relationship with the widely used UWES.

The chapter is divided into two sections: Section A and B. Section A presents a CFA of the PAS using data from the organisational culture survey described in previous chapters. Section B presents a CFA analysis of the WES using data from a completely independent sample of employees specifically recruited to enable this analysis. It also examines the relationship between the WES and UWES measures of work engagement.

Section A: CFA of the PAS

The results presented in previous chapters have supported the proposed four-dimensional conceptualisation of positive accountability through EFA. In this chapter the structure of the PAS will be confirmed using CFA.

Method

Sample. This study utilised unused data from the organisational culture survey described in previous chapters. A total of 712 cases had not been used in previous analysis and therefore constitute an independent sample of mining

employees. Employee worked in a range of different roles (see Table 1) with almost 40% working as tradesmen or operators, although over 20% did not indicate their role.

Table 1

Employee roles

	<i>N</i>	Percent of Sample
Para-professional	66	9.3
Administration	48	6.7
Trades	127	17.8
Operator	152	21.3
Trainee	33	4.6
Apprentice	58	8.1
Other	69	9.7
No response	159	22.3
Total	712	100

Most (over 65%) of the sample was between 20 and 49 years of age with 8.3% under 20 years and 16.2% over 50 years. Almost 1 in 5 (19.7%) had worked for the organisation for more than 15years or less than 1 year (19.5%), while 32.1% reported working for the organisation for between 2 and 6 years.

Measures. Details of item content and psychometric properties of the PAS were presented in Chapters 6 and 7C. Minor modifications to the item content of the PAS in Chapters 7A and 7B did not improve the reliability of the measure hence the version described in Chapter 6 was used in this study.

Data analysis. Structural equation modeling as implemented by AMOS (v.19) was used for data analysis. Maximum likelihood estimation was the method used because the data were univariately and multivariately normally distributed as assessed by skew and kurtosis, histograms, bi-variate scatter plots and mahalanobis

distance statistics. The sample size was appropriate for the analysis according to Ho (2006; p. 290) who recommends at least 10 items per parameter (i.e., sample size of 712 for only 28 parameters).

Results

Descriptive statistics and correlations. Table 2 shows the means, standard deviations and intercorrelations of the PAS items. Items from within each subscale were significantly interrelated however, only some of the relationships between items from different subscales were statistically significant.

Table 2
PAS Item Means, Standard Deviations and Correlations

	<i>M</i>	<i>SD</i>	Exp1	Exp2	Exp3	Dis1	Dis2	Dis3	Sal1	Sal2	Sal3	Fee1	Fee2
Exp1	3.68	1.04	1										
Exp2	3.93	0.94	.43**	1									
Exp3	3.97	0.93	.39**	.58**	1								
Dis1	2.79	1.13	.07	.07	.07	1							
Dis2	3.64	1.10	.12**	.17**	.10**	.28**	1						
Dis3	3.17	1.22	.10**	.15**	.13**	.42**	.40**	1					
Sal1	4.00	1.05	.12**	.20**	.16**	.07	.21**	.09*	1				
Sal2	3.49	1.20	.17**	.19**	.09*	.05	.13**	.08*	.44**	1			
Sal3	3.93	1.21	.11**	.13**	.12**	.08*	.26**	.14**	.36**	.25**	1		
Fee1	2.67	1.21	.22**	.26**	.19**	.01	.09*	.10*	.07	.10**	.05	1	
Fee2	2.83	1.28	.20**	.19**	.19**	.09*	.07	.06	.07*	.09*	.05	.44**	1

Note. Exp1 = “Rules and standards at work are clear and unambiguous”, Exp2 = “What I’m accountable at work is appropriate to my job”, Exp3 = “I can achieve what I’m accountable for at work”, Dis1 = “Officially there are consequences for poor performance but in reality not much happens”, Dis2 = “I am rarely held accountable for my actions at work”, Dis3 = “Discipline is talked about but rarely acted on”, Sal1 = “A lot of people can be affected by how well I do my work”, Sal2 = “My job has a substantial impact on the work or lives of other people”, Sal3 = “Poor performance on my part would have little or no impact on others”, Fee1 = “I am rewarded if I achieve what I’m accountable for at work”, Fee2 = “I get regular feedback about my performance”

CFA results. The input covariance matrix generated from the model's 11 measurement variables contained 66 sample moments. For the measurement model there were seven regression weights, six covariances, and 15 variances, for a total of 28 parameters estimated. Therefore the model had 38 degrees of freedom (66 – 28). The chi-square goodness of fit statistic was $\chi^2 (N = 712, df = 38) = 75.11, p < .001$ and did not support the fit of the model. However, the root mean square error of approximation (RMSEA) statistic was .04 suggesting acceptable fit of the model according to the criteria set forth by Ho (2006, p. 285) and the Goodness-of-Fit Index (GFI) was .98 suggesting that the model was better than no model at all.

The baseline comparisons fit indices of NFI, RFI, IFI, TLI and CFI ranged from .92 to .97 (see Table 3) and are above the recommended cut-off of 0.9 (Ho, 2006) and indicate possible improvement in fit for the model (range: .08 to .03) is so small as to be of little practical significance. The unstandardized regression weights were all significant by the critical ratio test ($> + 1.96, p < .05$) as can be seen in Table 4. The standardised regression weights ranged from .40 to .87 (see Table 5). These values indicate that the 11 measurement variables are significantly represented by their respective latent constructs.

Table 3

Incremental Fit Indices

Model	Baseline Comparisons				
	NFI Delta1	RFI rho1	IFI Delta2	TLI rho2	CFI
Default model	.95	.92	.97	.96	.97

Table 4

Unstandardised Regression Weights

			Estimate	S.E.	C.R.	P
Dis2	<---	Discipline	1.007	.110	9.192	***
Dis3	<---	Discipline	1.472	.167	8.800	***
Exp2	<---	Expectations	1.000			
Exp1	<---	Expectations	.756	.063	12.087	***
Exp3	<---	Expectations	.853	.062	13.706	***
Sal2	<---	Salience	1.173	.133	8.835	***
Sal3	<---	Salience	1.000			
Sal1	<---	Salience	1.322	.156	8.451	***
Fee1	<---	Feedback	1.151	.181	6.343	***
Fee2	<---	Feedback	1.000			
Dis1	<---	Discipline	1.000			

Note. *** $p < .001$. Exp1 = "Rules and standards at work are clear and unambiguous", Exp2 = "What I'm accountable at work is appropriate to my job", Exp3 = "I can achieve what I'm accountable for at work", Dis1 = "Officially there are consequences for poor performance but in reality not much happens", Dis2 = "I am rarely held accountable for my actions at work", Dis3 = "Discipline is talked about but rarely acted on", Sal1 = "A lot of people can be affected by how well I do my work", Sal2 = "My job has a substantial impact on the work or lives of other people", Sal3 = "Poor performance on my part would have little or no impact on others", Fee1 = "I am rewarded if I achieve what I'm accountable for at work", Fee2 = "I get regular feedback about my performance".

Table 5

Standardised Regression Weights

			Estimate
Dis2	<---	Discipline	.554
Dis3	<---	Discipline	.733
Exp2	<---	Expectations	.808
Exp1	<---	Expectations	.552
Exp3	<---	Expectations	.705
Sal2	<---	Salience	.574
Sal3	<---	Salience	.486
Sal1	<---	Salience	.742
Fee1	<---	Feedback	.730
Fee2	<---	Feedback	.602
Dis1	<---	Discipline	.540

Note. Exp1 = "Rules and standards at work are clear and unambiguous", Exp2 = "What I'm accountable at work is appropriate to my job", Exp3 = "I can achieve what I'm accountable for at work", Dis1 = "Officially there are consequences for poor performance but in reality not much happens", Dis2 = "I am rarely held accountable for my actions at work", Dis3 = "Discipline is talked about but rarely acted on", Sal1 = "A lot of people can be affected by how well I do my work", Sal2 = "My job has a substantial impact on the work or lives of other people", Sal3 = "Poor performance on my part would have little or no impact on others", Fee1 = "I am rewarded if I achieve what I'm accountable for at work", Fee2 = "I get regular feedback about my performance".

The explained variances for the 11 measurement variables are represented by their squared multiple correlations (Table 6). The percentage of variance explained ranged from .24 or 24% (item: “Poor performance on my part would have little or no impact on others”) to .65 or 65% (item: “What I’m accountable for is appropriate to my job”). Thus for the 11 measurement variables, the residual variances ranged from 35% to 76%.

Table 6

Squared Multiple Correlations

	Estimate
Fee2	.362
Fee1	.533
Sal3	.236
Sal2	.330
Sal1	.550
Exp3	.497
Exp1	.305
Exp2	.652
Dis1	.291
Dis2	.307
Dis3	.538

Note. Exp1 = “Rules and standards at work are clear and unambiguous”, Exp2 = “What I’m accountable at work is appropriate to my job”, Exp3 = “I can achieve what I’m accountable for at work”, Dis1 = “Officially there are consequences for poor performance but in reality not much happens”, Dis2 = “I am rarely held accountable for my actions at work”, Dis3 = “Discipline is talked about but rarely acted on”, Sal1 = “A lot of people can be affected by how well I do my work”, Sal2 = “My job has a substantial impact on the work or lives of other people”, Sal3 = “Poor performance on my part would have little or no impact on others”, Fee1 = “I am rewarded if I achieve what I’m accountable for at work”, Fee2 = “I get regular feedback about my performance”.

Discussion/Conclusion

As anticipated, the results of the CFA suggest appropriate fit of the four-dimensional model of positive accountability and are consistent with the EFA results presented in Chapters 6 and 7. Importantly, the results also provide further support for use of the PAS in terms of its subscales.

Section B: Validation Support and CFA of the WES and UWES

The results presented in the thesis have generally supported the proposed three-dimensional conceptualisation of work engagement through EFA of the WES, although some manipulation of the analysis was required to obtain this structure. In this study the structure of the WES will be confirmed using CFA. In addition, the WES will be directly compared with the UWES in order to evaluate its concurrent validity.

Method

Because the primary focus is on the psychometric properties of the measures it was not necessary to collect data from mining employees. The web-based survey company Survey Monkey was contracted to recruit employees from their database of members to take part in an online survey that included the WES and UWES.

Sample. Data was obtained from a total of 345 employees. Male employees in the 18 – 65 year old age bracket were selected in order to retain some sample homogeneity with other studies in this thesis. Almost half (44.6%) of the sample were between 45 and 60 years of age and approximately a third (34.5%) were between 30 and 44. Even proportions of employees were between 18 and 29 years (10.7%) and 60-65 years (10.1%)

Measures.

WES. SEM was not appropriate for use with the 6-item version of WES that was described in Chapters 6 and 7C due to the limited number of items per dimension (e.g. vigor was represented by a single item). The minimum number of items to represent a dimension/construct is two, with the recommended minimum three, and five to seven the preferred number (see Ho, 2006). As such, the longer 8-item version of the WES that was described in Chapter 7B was included in this study (Table 7 below provides the content of the items and the dimensions they represent). Only two items each were used to measure the vigor and dedication dimensions of work engagement and whilst this was below the

recommended minimum of three, it was sufficient to be able to conduct the analysis. The 8-item scale was internally consistent ($\alpha = .82$).

Table 7

Item Content and Dimensions of the WES

Item	Dimension
I work harder than I have to	Vigor
I go the extra mile at work	Vigor
I put my heart into my job	Dedication
I'm proud of the work I do	Dedication
I enjoy my work	Dedication
I put in extra effort if the job needs it	Dedication
Time seems to fly when I'm working	Absorption
I can get so into my work that I forget everything else	Absorption

UWES. The UWES was described in detail in Section 2.1.4. Briefly, the UWES assesses work engagement as an independent construct that is constituted by vigor, dedication and absorption but there is mixed evidence regarding the underlying structure of the measure. The 9-item version was used over the 17-item version in this study as it has been argued to provide a better fit to the three-dimensional model of work engagement (see Nerstad et al., 2010) and because it contains a similar number of items to the WES. The items and the dimensions they represent are presented in Table 8 below. The 9-item scale was internally consistent ($\alpha = .94$).

Table 8

Item Content and Dimensions of the UWES

Item	Dimension
At my job, I feel strong and vigorous	Vigor
When I get up in the morning, I feel like going to work	Vigor
At my work, I feel bursting with energy	Vigor
My job inspires me	Dedication
I am enthusiastic about my job	Dedication
I am proud of the work that I do	Dedication
I get carried away when I am working	Absorption
I am immersed in my work	Absorption
I feel happy when I am working intensely	Absorption

Data analysis. Structural equation modeling as implemented by AMOS (v.19) was used for data analysis. Maximum likelihood estimation was the method used because the data were univariately and multivariately normally distributed as assessed by skew and kurtosis, histograms, bi-variate scatter plots and mahalanobis distance statistics. The sample size was appropriate for the analysis according to Ho (2006; p. 290) who recommends at least 10 items per parameter. There were 19 parameters to be estimated in the WES analysis and 21 in the UWES analysis.

Results

Descriptive statistics and correlations. Table 9 shows the means, standard deviations and inter correlations of the WES items. All WES items shared statistically significant correlations and participants were generally positive in their responses, with most means above 4 (on a 5-point scale). Frequency histograms and skewness and kurtosis statistics showed all of the WES items were negatively skewed. However, three of the items (“I put my heart into my job”, “I’m proud of the work I do” and “I put in extra effort if the job needs it”) showed marked negative skew and were reversed and log transformed to improve normality as per the recommendations of Tabachnick & Fidel (2001).

Table 9
Means, Standard Deviations and Correlations of the WES items

	<i>M</i>	<i>SD</i>	1	2	3	4	5	6	7	8
1. WES Vig1	4.03	1.02	1							
2. WES Vig2	4.51	0.74	.52**	1						
3. WES Ded1	4.54	0.79	.44**	.55**	1					
4. WES Ded2	4.68	0.68	.31**	.50**	.77**	1				
5. WES Ded3	4.31	0.95	.26**	.37**	.58**	.63**	1			
6. WES Ded4	4.68	0.62	.28**	.59**	.31**	.33**	.25**	1		
7. WES Ab1	4.17	0.98	.32**	.33**	.53**	.50**	.53**	.24**	1	
8. WES Ab2	3.60	1.22	.36**	.32**	.34**	.25**	.37**	.20**	.38**	1

Note. Vig1 = “I work harder than I have to”, Vig2 = “I go the extra mile at work”, Ded1 = “I put my heart into my job”, Ded2 = “I’m proud of the work I do”, Ded3 = “I enjoy my work”, Ded4 = “I put in extra effort if the job needs it”, Ab1 = “Time seems to fly when I’m working”, Ab2 = “I can get so into my work that I forget everything else”.

Table 10 shows the means, standard deviations and inter correlations of the UWES items. All UWES items shared statistically significant correlations that were generally higher than those of the WES items and whilst people were generally positive about their engagement at work the items were more normally distributed than those of the WES.

Table 10

Means, Standard Deviations and Correlations of the UWES items

	<i>M</i>	<i>SD</i>	1	2	3	4	5	6	7	8	9
1. UWES Vig1	5.16	1.41	1								
2. UWES Vig2	5.04	1.61	.67**	1							
3. UWES Vig3	4.61	1.52	.76**	.73**	1						
4. UWES Ded1	4.90	1.48	.68**	.69**	.67**	1					
5. UWES Ded2	5.87	1.24	.71**	.60**	.61**	.69**	1				
6. UWES Ded3	5.53	1.53	.80**	.73**	.72**	.77**	.82**	1			
7. UWES Ab1	5.50	1.31	.63**	.64**	.60**	.61**	.64**	.68**	1		
8. UWES Ab2	4.86	1.45	.53**	.66**	.67**	.55**	.49**	.56**	.59**	1	
9. UWES Ab3	5.26	1.41	.61**	.67**	.70**	.60**	.56**	.64**	.56**	.63**	1

Note. Vig1 = “At my job, I feel strong and vigorous”, Vig2 = “When I get up in the morning, I feel like going to work”, Vig3 = “At my work, I feel bursting with energy”,

Ded1 = “My job inspires me”, Ded2 = “I am proud of the work that I do”, Ded3 = “I am enthusiastic about my job”, Ab1 = “I am immersed in my work”, Ab2 = “I get carried away when I am working”, Ab3 = “I feel happy when I am working intensely”.

Correlation between the WES and UWES. The WES and UWES purport to measure the same construct hence they should be strongly related. The correlation between the two was $r = .82, p < .001$ indicating that they are closely related.

WES CFA results. The input covariance matrix generated from the model's eight measurement variables contained 36 sample moments. For the measurement model there were five regression weights, three covariances, and 11 variances, for a total of 19 parameters estimated. Therefore the model had 17 degrees of freedom ($36 - 19$). The chi-square goodness of fit statistic was $\chi^2 (N = 345, df = 17) = 152.86, p < .001$ and did not support the fit of the model. In addition, RMSEA statistic was .15 suggesting poor fit of the model according to the criteria set forth by Ho (2006, p. 285). However, the GFI was .91 suggesting that the model was better than no model at all.

The baseline comparisons fit indices of NFI, RFI, IFI, TLI and CFI ranged from .78 to .88 (see Table 11) and are below the recommended cut-off of .9 (Ho, 2006). Given the range of the computed baseline comparisons fit indices the remaining possible improvement in fit for the model ranged from .12 to .22. The unstandardized regression weights were all significant by the critical ratio test ($> + 1.96, p < .05$) as can be seen in Table 12. The standardised regression weights ranged from .46 to .86 (see Table 13). These values indicate that the 8 measurement variables were significantly represented by their respective latent constructs.

Table 11

Incremental Fit Indices

Model	Baseline Comparisons				
	NFI	RFI	IFI	TLI	CFI
	Delta1	rho1	Delta2	rho2	
Default model	.87	.78	.88	.80	.88

Table 12

Unstandardised Regression Weights

Item		Dimension	Estimate	S.E.	C.R.	P
WESVig2	<---	Vigor	.956	.105	9.135	***
WESVig1	<---	Vigor	1.000			
WESDed3	<---	Dedication	1.000			
WESDed2	<---	Dedication	.204	.014	14.153	***
WESDed1	<---	Dedication	.235	.016	14.275	***
WESAb2	<---	Absorption	1.000			
WESAb1	<---	Absorption	1.224	.169	7.259	***
WESDed4	<---	Dedication	.108	.014	7.966	***

Note. *** $p < .001$. Vig1 = "I work harder than I have to", Vig2 = "I go the extra mile at work", Ded1 = "I put my heart into my job", Ded2 = "I'm proud of the work I do", Ded3 = "I enjoy my work", Ded4 = "I put in extra effort if the job needs it", Ab1 = "Time seems to fly when I'm working", Ab2 = "I can get so into my work that I forget everything else".

Table 13

Standardised Regression Weights

Item		Dimension	Estimate
WESVig2	<---	Vigor	.826
WESVig1	<---	Vigor	.624
WESDed3	<---	Dedication	.703
WESDed2	<---	Dedication	.847
WESDed1	<---	Dedication	.858
WESAb2	<---	Absorption	.499
WESAb1	<---	Absorption	.763
WESDed4	<---	Dedication	.460

Note. Vig1 = "I work harder than I have to", Vig2 = "I go the extra mile at work", Ded1 = "I put my heart into my job", Ded2 = "I'm proud of the work I do", Ded3 = "I enjoy my work", Ded4 = "I put in extra effort if the job needs it", Ab1 = "Time seems to fly when I'm working", Ab2 = "I can get so into my work that I forget everything else".

The explained variances for the eight measurement variables are represented by their squared multiple correlations (Table 14). The percentage of variance explained ranged from .21 or 21% (item: “I put in extra effort if the job needs it”) to .74 or 74% (item: “I put my heart into my job”). Thus for the 8 measurement variables the residual variances ranged from 26% to 79%.

Table 14

Squared Multiple Correlations

Item	Estimate
WESDed4	.212
WESAb1	.583
WESAb2	.249
WESDed1	.736
WESDed2	.718
WESDed3	.494
WESVig1	.390
WESVig2	.683

Note. Vig1 = “I work harder than I have to”, Vig2 = “I go the extra mile at work”, Ded1 = “I put my heart into my job”, Ded2 = “I’m proud of the work I do”, Ded3 = “I enjoy my work”, Ded4 = “I put in extra effort if the job needs it”, Ab1 = “Time seems to fly when I’m working”, Ab2 = “I can get so into my work that I forget everything else”.

The results of the CFA also indicated that the UWES dimensions were strongly related with correlations of $r = .80$ between dedication and absorption, $r = .75$ between vigor and dedication, and $r = .62$ between vigor and absorption.

UWES CFA results. The input covariance matrix generated from the model’s nine measurement variables contained 45 sample moments. For the measurement model there were six regression weights, three covariances, and 12 variances, for a total of 21 parameters estimated. Therefore the model had 24 degrees of freedom (45 – 21). The chi-square goodness of fit statistic was χ^2 ($N = 345$, $df =$

24) = 142.94, $p < .001$ and did not support the fit of the model. In addition, the RMSEA statistic was .12 suggesting poor fit of the model according to the criteria set forth by Ho (2006, p. 285). However, the GFI was .91 suggesting that the model was better than no model at all.

The baseline comparisons fit indices of NFI, RFI, IFI, TLI and CFI ranged from .92 to .95 (see Table 15) and are above the recommended cut-off of .9 (Ho, 2006). Given the range of the computed baseline comparisons fit indices the remaining possible improvement in fit for the model (range: .08 to .03) is so small as to be of little practical significance. The unstandardized regression weights were all significant by the critical ratio test ($> + 1.96$, $p < .05$) as can be seen in Table 16. The standardised regression weights ranged from .75 to .95 (see Table 17). These values indicate that the nine measurement variables were significantly represented by their respective latent constructs.

Table 15

Incremental Fit Indices

Model	Baseline Comparisons				
	NFI Delta1	RFI rho1	IFI Delta2	TLI rho2	CFI
Default model	.95	.92	.95	.93	.95

Table 16

Unstandardised Regression Weights

Item		Dimension	Estimate	S.E.	C.R.	P
UWESVig3	<---	Vigor	1.000			
UWESVig2	<---	Vigor	1.032	.051	20.239	***
UWESVig1	<---	Vigor	.914	.044	20.749	***
UWESDed3	<---	Dedication	1.000			
UWESDed2	<---	Dedication	.822	.034	24.481	***
UWESDed1	<---	Dedication	.949	.042	22.544	***
UWESAb3	<---	Absorption	1.000			
UWESAb2	<---	Absorption	.980	.066	14.920	***
UWESAb1	<---	Absorption	.887	.059	15.030	***

Note. *** $p < .001$. Vig1 = "At my job, I feel strong and vigorous", Vig2 = "When I get up in the morning, I feel like going to work", Vig3 = "At my work, I feel bursting with energy", Ded1 = "My job inspires me", Ded2 = "I am proud of the work that I do", Ded3 = "I am enthusiastic about my job", Ab1 = "I am immersed in my work", Ab2 = "I get carried away when I am working", Ab3 = "I feel happy when I am working intensely".

Table 17

Standardised Regression Weights

Item		Dimension	Estimate
UWESVig3	<---	Vigor	.862
UWESVig2	<---	Vigor	.838
UWESVig1	<---	Vigor	.850
UWESDed3	<---	Dedication	.950
UWESDed2	<---	Dedication	.849
UWESDed1	<---	Dedication	.820
UWESAb3	<---	Absorption	.792
UWESAb2	<---	Absorption	.754
UWESAb1	<---	Absorption	.758

Note. *** $p < .001$. Vig1 = "At my job, I feel strong and vigorous", Vig2 = "When I get up in the morning, I feel like going to work", Vig3 = "At my work, I feel bursting with energy", Ded1 = "My job inspires me", Ded2 = "I am proud of the work that I do", Ded3 = "I am enthusiastic about my job", Ab1 = "I am immersed in my work", Ab2 = "I get carried away when I am working", Ab3 = "I feel happy when I am working intensely".

The explained variances for the nine measurement variables are represented by their squared multiple correlations (Table 18). The percentage of variance explained ranged from .57 or 57% (item: "I get carried away when I'm working") to

.90 or 90% (item: “I am enthusiastic about my job”). Thus for the nine measurement variables the residual variances ranged from 10% to 43%.

Table 18

Squared Multiple Correlations

Item	Estimate
UWESAb1	.575
UWESAb2	.568
UWESAb3	.627
UWESDed1	.673
UWESDed2	.722
UWESDed3	.902
UWESVig1	.722
UWESVig2	.702
UWESVig3	.743

Note. *** $p < .001$. Vig1 = “At my job, I feel strong and vigorous”, Vig2 = “When I get up in the morning, I feel like going to work”, Vig3 = “At my work, I feel bursting with energy”, Ded1 = “My job inspires me”, Ded2 = “I am proud of the work that I do”, Ded3 = “I am enthusiastic about my job”, Ab1 = “I am immersed in my work”, Ab2 = “I get carried away when I am working”, Ab3 = “I feel happy when I am working intensely”.

The results of the CFA also indicated that the UWES dimensions were strongly related with correlations of $r = .87$ between dedication and absorption, $r = .93$ between vigor and dedication, and $r = .97$ between vigor and absorption.

Discussion

In this study further support was found for the validity of the WES via its strong ($r = .82$) correlation with the UWES. However, CFA of both measures did not support a 3-dimensional model of work engagement. As total scales both the WES and UWES show high internal consistency.

The WES was sufficiently internally consistent ($\alpha = .82$) and the statistically significant regression weights (see Table 12) suggest that each item was representative of the underlying dimension of work engagement. Nonetheless, the three-dimensional model did not fit the data well. It is possible that the use of two items to measure the vigor and absorption dimensions (when the recommended minimum is three) contributed to poor fit of the model and that additional items would better capture the underlying dimensions.

The UWES was highly internally consistent ($\alpha = .94$) with strong correlations between individual items ($r = .53$ to $.82$) and highly correlated dimensions ($r = .87$ to $.97$). It is not surprising that with such strong interrelationships among the items a three-dimensional model did not fit the data well.

The results for both the WES and UWES support the conclusion that, whilst engagement can be conceptualised in terms of three dimensions, operational definitions of each dimension do not transfer clearly to scale items. Indeed, the results support the argument made in this thesis and by others (e.g. Schaufeli & Bakker, 2010; Sonnentag, 2003) that it is useful to conceptualise work engagement in terms of three distinct psychological states but that it is best measured with a total

scale with items reflecting each of the three conceptual dimensions that define work engagement.

Importantly, the results support the use of the WES as a measure of work engagement that provides a necessary alternative to the UEWS. The WES, therefore, is an important contribution to research into engagement as it enables research into work engagement to be based on more than one measure: a requirement flagged by Parker and Griffin (2011).

Conclusion. The similar structural properties shared by the WES and UWES and high correlation with each other support the use of the WES as a valid alternative measure of work engagement.