The relationship of work stress and job insecurity with workplace safety compliance, job satisfaction and commitment in a mine

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COMMENTS

The reader is reminded of the following:

- The editorial style as well as the references referred to in this mini-dissertation follow the format prescribed by the Publication Manual (5th edition) of the American Psychological Association (APA). This practice is in line with the Policy of the Programme in Industrial Psychology of the North-West University (Potchefstroom campus) to use APA style in all scientific documents as from January 1999.

- This mini-dissertation is submitted in the form of a research article.

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ABSTRACT

TITLE: The relationship of work stress and job insecurity with workplace safety compliance, job satisfaction and commitment in a mine

KEYWORDS: work stress, job insecurity, job satisfaction, organisational commitment, workplace accidents, workplace safety compliance, occupational safety.

The reduction of workplace accidents and improvement of workplace safety is a concern for most mining houses. Pressure from the labour movement and legislative requirements do not make the burden any lighter. There are circumstances directly and indirectly relating to accidents and therefore a need to obtain an in-depth analysis of underlying causes of accidents in order to draw relevant conclusions exists. There are workplace environmental matters as well as individual attitudinal issues that need to be addressed.

The objective of this study is to investigate the relationship of work stress and job insecurity with safety compliance, job satisfaction and commitment in a mine. A cross-sectional survey design was used with an availability sample (n=158). A survey booklet including a biographical questionnaire, scales on job insecurity, job satisfaction, affective organisational commitment, workplace accidents and safety compliance as well as a work stress measure comprising dimensions of role clarity, conflict and overload was administered. The results indicated that when miners experience work stress and job insecurity, their safety compliance is low. Job satisfaction was found to be a positive predictor of safety compliance among miners.

OPSOMMING

ONDERWERP: Die verwantskap van werkstres en werksonsekerheid met die voldoening van veiligheid in die werksplek, werkstevredenheid en toewyding in die myn

SLEUTELWOORDE: Werkstres, werksonsekerheid, werkstevredenheid, organisasie toewyding, werksplek ongelukke, werksplek veiligheid voldoening, bedryfsveiligheid

Die vermindering van ongelukke in die werksplek en die bevordering van veiligheid in die werksplek is ‘n bron van kommer vir die meeste myne. Druk van die beidsbewegings en wetlike vereistes maak die las nie veel ligter nie. Daar is omstandighede wat direk en indirek lei tot ongelukke en daarvoor bestaan die noodsaaklikheid om ‘n in-diepte ondersoek en analisering te doen van die onderliggende redes van ongelukke ten einde ‘n relevante en bruikbare konklusie te bereik. Daar is werksplek omgewings sowel as individuele verstandhoudings wat geadresseer sal moet word.

Die doelwit van hierdie studie was om ondersoek in te stel na die verhoudings tussen werkstres, werksonsekerheid, die gehoor gee aan veiligheidsmaatreels, werkstevredenheid en verbintenis in ‘n myn. A kruis-snit opname ontwerp is ingespan met ‘n geriefliheidsteekproef (n=158). ‘n Opname boekie het ‘n biografiese vraelys ingesluit, sowel as skale vir werksonsekerheid, werkstevredenheid, affektiewe organisatoriese verbintenis, werksplek ongelukke en voldoening aan veiligheidsmaatreels en werkstres, wat weer dimensies van rolduidelikheid, konflik en oorlading gedek het. Die resultate het aangetoodat wanneer mynwerkers stres en onsekerheid beleef, hul minder gehoor gee aan veiligheidsmaatreels. Werkstevredenheid is gevind om ‘n statisties beduidende voorspeller te wees van voldoening aan veiligheidsmaatreels.

CHAPTER 1

1. INTRODUCTION

This mini-dissertation focuses on the relationship between work stress, job insecurity, job satisfaction and organisational commitment on the one hand, and workplace safety compliance on the other, in a mining environment. Chapter 1 outlines the problem statement, giving insight into the motivation for the current research and contains a review of work previously completed regarding these constructs. The objectives of the study and the basis from which the research is conducted are also discussed. Details on the research method, participants, measuring battery and statistical analysis are discussed. Chapter 2 consists of the research article and Chapter 3 sums up the conclusions drawn from the findings, acknowledges limitations and draws recommendations.

2. PROBLEM STATEMENT

2.1. Overview of the problem

Gardner (1998) indicated that the unacceptable safety record on South Africa's gold mines has placed tremendous strain on the industry. Even before then, the high incidence of accidents in the South African mining industry has been noted as a matter of concern (Bezuidenhout, 1992), and the problem is no better in the platinum mines. For example, Anglo Platinum experienced 17 fatal injuries by the end of 2008, and two fatal injuries by 9 February 2009 (Anglo Platinum, 2009; South Africa, 2009). The National Union of Mine Workers of South Africa (NUM) has even staged strikes as a result of issues of health and safety in the mines, focusing on the number of workplace accidents and fatalities (The Star, 2007). This involvement of unions led to the signing of a safety *Isivumelwano* (a Zulu word, meaning "agreement"). The Isivumelwano is a blueprint

regarding compliance with safety legislation. All mining crews involved in zero-injury production (ZIP) qualify for a ZIP bonus (Anglo Platinum, 2008). The Mine Health and Safety Act, No. 29 of 1996 (South Africa, 1996) states that employers in the mining industry must provide a safe and healthy working environment for all employees, including contractors. McEndor (2007) believe that companies should focus on doing what is right rather than being compliant to minimum legal requirements. With the high rate of workplace accidents, workplace safety has become a contentious moral issue in this industry.

Ferguson (2000) believes that the workplace environment and the relationship between the individual and the mining organisation need urgent attention. This was later confirmed by Badenhorst (2006). This challenging environment creates unsafe behaviour, while the relationship has a direct impact on a person's behaviour and attitude. Companies are striving to improve production, and in the process employees are neglecting safety procedures while attempting to reach performance targets. Fourie (1974) is of the opinion that the accident process can be described in terms of human behaviour. This opinion is supported by Moller (2003) in his study of behaviour-based safety interventions in a mining company. Ferguson (2000) suggests a shift from the management of the lost-time injury-frequency rate, to creating a sense of commitment to improve occupational safety. Within the mining industry, safety is of paramount importance. Consequently, this study focuses on the socio-organisational factors influencing safety performance. Specifically, it considers the role of job insecurity and work stress as factors influencing work-related attitudes, and ultimately safety compliance.

Stress is formally defined as "…an adaptive response, mediated by individual characteristics and/or psychological processes that is a consequence of any external action, situation, or event that places special physical and/or psychological demands upon a person" (Kreitner & Kinicki, 2004, p. 692). According to Holroyd and Lazarus (1982), psychological stress is a personal judgement where environmental and/or internal demands exceed the individual's resources to manage the demands. Rice (1992) is of the

opinion that when work demands, specifically, exceed the worker's coping ability, work stress is experienced. Research has shown the concepts of role conflict, role overload and role ambiguity combined as an indicator of work stress (DeFrank & Ivancevich, 1998; Nelson & Burke, 2000; Newstorm & Davies, 2002; Rothmann & Malan, 2006; Schaufeli & Brubaker, 2002; Van Zyl, 2005).

Role conflict is where the different role setters have inconsistent and conflicting expectations of the focal person (Travers & Cooper, 1996). Individuals in role conflicting situations might fail to comply with role demands. Role overload is defined as the degree to which performance is affected by inadequate time, training and resources (Jones & Jones, 1979). When the role senders' expectations exceed the focal person's ability, the focal person might experience stress (De Jager, 2003; Kreitner & Kinicki, 2004). Role ambiguity occurs when the role setters' expectations are unknown and the focal person does not have information needed to perform the role. Prolonged role ambiguity can foster work stress and job dissatisfaction (Khan & Cooper, 1993; Kreitner & Kinicki, 2004).

The high emphasis on production has been found to decrease the safety level of operating in different workplaces (Janssens, Brett & Smith, 1995). Owing to performance pressure and time constraints, many workers tend to engage in unsafe behaviours. This includes the adoption of short-cut methods, which compromise safety compliance and can cause accidents (Dawson, 1991; Hoffman, Jacobs & Landy, 1995; Hoffman & Stetzer, 1996). Job-related stress has a negative effect on professional work and personal welfare. This includes low organisational commitment, low job satisfaction and a higher prevalence of workplace accidents (Gyekye & Salmien, 2006; Gillespie et al., 2001; Kendonlin, 1993; Monk & Folkard, 1985). These findings generally show that safety compliance decreases in proportion to increasing work stress.

A number of researchers described job insecurity as a classic work stressor (Ashford, Lee, & Bobko, 1989; Lim, 1996, Greenhalgh & Rosenblatt, 1984; Mattesson & Ivancevich, 1987). Job insecurity is subjective uncertainty about the future and is to do

with doubts about the continuation of employment (Hellgren, Sverke, & Isaksson, 1999). Research has shown that job insecurity has a negative effect on job satisfaction and organisational commitment (Probst & Brubaker, 2001; Ramakau, 2006; Rani, 2005; Tshabalala, 2004). If mining employees are experiencing high levels of insecurity, it is envisaged that they will in turn experience a low level of job satisfaction and organisational commitment. When employees ignore safety regulations, this could have serious consequences for both the individual and the company. The mining industry is a demanding environment characterised by an authoritarian management style and a strong focus on production efficiency, rather than human factors. The strong and increasing focus on production, deadlines for reaching targets and workplace accidents contribute to a significant amount of dismissals/job losses. This has fuelled a considerable amount of fear among low-level employees that they will lose their jobs (Gardner, 1998; Le Roux, 2005; Marx, 1996; Odendaal, 1996; Smith, 1993). Therefore, job insecurity is seen as a major concern in the mining industry.

Probst and Brubaker (2001) conducted cross-sectional and longitudinal explorations of the effects of job insecurity on employee safety outcomes. There is scientific evidence indicating that job-related factors influence the exposure of mine employees to safety hazards (Badenhorst, 2006; Moller, 2003; Probst & Brubaker, 2001). This study aims to further the theoretical underpinnings proposed by Probst and Brubaker (2001) in a theory-building mode in the South African mining industry. The Probst and Brubaker model links job insecurity to safety motivation, safety compliance, and workplace injuries and accidents. Building on their model, this study aims to explore the impact of work stress and job insecurity on workplace safety compliance, through the mediation of job satisfaction and organisational commitment. Figure 1 below is a structural representation indicating the relationship between the concepts that this study aims to explore.

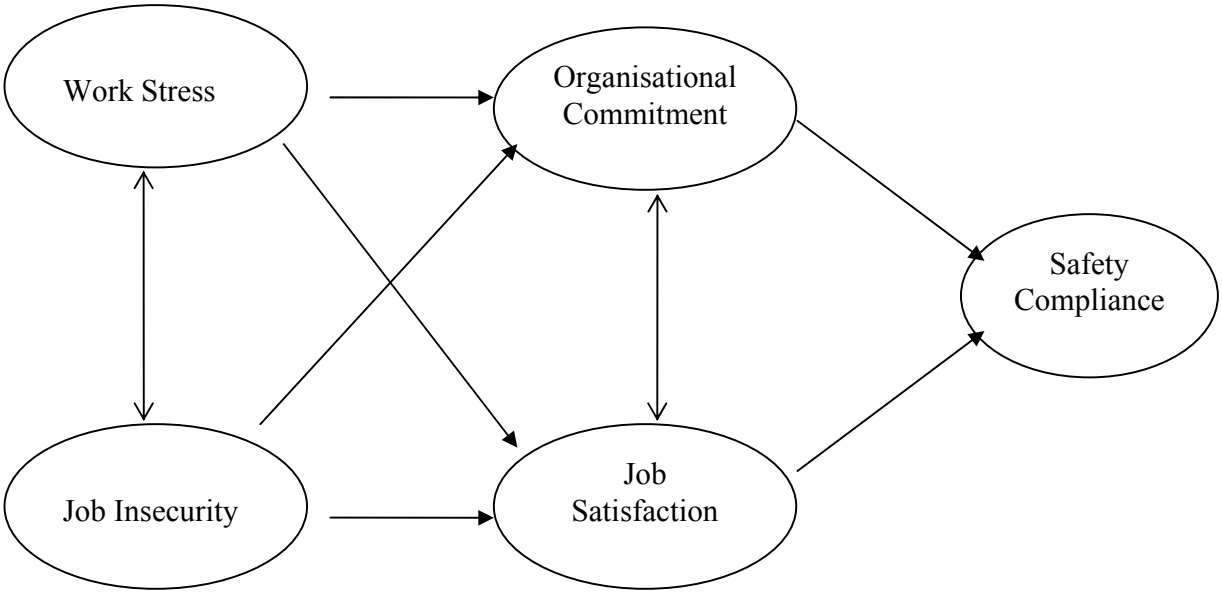

Figure 1. A Theoretical Model of the Relationship of Work Stress and Job Insecurity to Workplace Safety Compliance, Job Satisfaction and Commitment.

2.2. Literature review

Safety compliance is defined as the extent to which employees adhere to safety standards and procedures (Neal, Griffin, & Hart, 2000). Adherence in turn implies that the minimum amount of legal obligations and requirements (in this case, the Mine Health and Safety Act) are met (Stanton, Kielblock, Schoeman & Johnston, 2007), and that there is an absence of accidents in the workplace (Adams, du Plessis, Gumbie, & Willis, 2007). Research shows that accidents are influenced by larger organisational factors that might encourage unsafe acts (Hoffman et al., 1995; Kletz, 1985; Popoola, 2007; Zohar, 1980). When individuals have high job security, they remove their focus from self-regulatory activities, leaving more time and resources available to maintain safety compliance (Probst & Brubaker, 2001). On the other hand, work stress caused by a one-sided focus on production reduces safety compliance (Dawson, 1991; Dollard, Winefield, and Winefield, 1993; Rice, 1992; Schaufeli & Bakker, 2002). Therefore, when an organisation emphasises production, safety may be jeopardised.

Research shows that between 80% and 95% of all workplace accidents are triggered by unsafe behaviour (Cooper, 1999a; Moller, 2003). In response, Geller (1996) encourages companies to adopt a safety culture wherein safety will not be a priority, but a value that is not compromised. Probst and Brubaker (2001) in turn believe that job insecurity causes reduced job satisfaction, which may result in a reduction in adherence to safety policies.

Job insecurity refers to a "sense of powerlessness to maintain desired continuity in a threatened job situation" (Greenhalgh & Rosenblatt, 1984, p. 438). According to Probst (2003), job insecurity is the perceived stability and continuance of one's job, as formally known. Van Vuuren, Klandermans, Jacobson and Hartley (1991) define job insecurity as the discrepancy between the security employees want their jobs to provide, and the level of security provided at any given moment. There is agreement that job insecurity: a) is subjective, and therefore individuals will react differently even though they are exposed to similar situations, b) implies uncertainty about the future, and c) comprises doubts about the continuation of employment (Hellgren et al., 1999). Advancement in the job insecurity concept includes the introduction of multidimensional definitions. Hellgren et al. (1999) used the term *quantitative* job insecurity to refer to concerns about the future existence of the present job, and *qualitative* job insecurity to refer to perceived threats of impaired quality in the employment relationship. De Witte (2000), however, views job insecurity as consisting of an affective and cognitive component. Cognitive job insecurity refers to the perceived likelihood of job loss, while affective job insecurity refers to fear of job loss. For the purpose of this investigation, the qualitative/quantitative distinction of job insecurity is employed (Hellgren et al., 1999).

Research suggests that job insecurity relates negatively to employee work attitudes, including decreased job satisfaction and higher turnover intentions, as well as lowered levels of employee well-being. The experience of job insecurity over time has been found to predict impaired job and organisational attitudes as well as deteriorating psychological health (Dekker & Schaufeli, 1995; Hellgren et al., 1999; Tshabalala, 2004). Job insecurity has also been associated with a reduced level of *job satisfaction* (Ashford, Lee, & Bobko, 1989; Thinane, 2005; Tshabalala, 2004). De Witte (2000) related job insecurity

to satisfaction with workplace opportunities. Probst and Brubaker (2001) found job insecurity to be associated with decreased levels of both extrinsic and intrinsic job satisfaction. According to De Witte (1999), job insecurity reduces the levels of job satisfaction and organisational commitment.

Literally thousands of studies have examined the relationship between job satisfaction and other organisational variables. Mullins (1999) is of the opinion that job satisfaction is more of an attitude, an internal state that could be associated with a personal feeling of achievement, either quantitative or qualitative. According to Ivancevich and Mattesson (1996), job satisfaction results from individuals' perception of their jobs and the degree to which there is a good fit between themselves and the organisation. Job satisfaction is defined as a positive emotional state resulting from the appraisal of one's job experience (Hirschfield, 2000; Luthans, 1995; Robbins, Odendaal & Roodt, 2003). Hellgren, Sjöberg and Sverke (1997), based on Brayfield and Rothe (1951) define job satisfaction as a positive emotional state reflecting affective reactions to the perceived content and characteristics of specific facets of the job situation. This is also the definition employed here.

Employee satisfaction is believed to increase profits, lower grievances, and decrease safety incident rates (Ramakau, 2004; Rossouw & Bews, 2002). According to Weiss et al. (1967), employees will experience satisfaction if their individual professional make-up can be utilised in the work environment, and the environment offers them career-related advancement in return. Robbins (1998) believes that one of the ways of expressing dissatisfaction could be to allow conditions to worsen, including reduced effort and increased error rate (naturally associated with increased safety incident rates). Dunbar (1993) found that job insecurity and dissatisfaction were negatively related to the use of personal protective equipment.

Mowday, Porter and Steers (1992) define *organisational commitment* as the willingness to exert effort on the part of the organisation and a strong desire to maintain membership to the organisation. According to Kreitner and Kinicki (2004), organisational

commitment is the extent to which employees identify with an organisation and commit to its goals. It is the psychological link between the employee and his/her organisation that makes it less likely that the employee will leave the organisation voluntarily (Allen & Meyer, 1996). Meyer and Allen (1984; 1991) identified three dimensions of organisational commitment, namely, affective commitment (emotional attachment, identification and involvement with the organisation), continuance commitment (costs associated with leaving the organisation) and normative commitment (obligation to remain with the organisation). Affective organisational commitment has been found to be more relevant and to hold profitable outcomes for the organisation (Allen & Meyer, 1996; Buitendach & De Witte, 2005; Coleman, Irving, & Cooper, 1999; Ramakau, 2006).

In a study conducted among teachers in the Sedibeng district, Van Zyl (2003) discovered that committed employees comply with the organisation's policies. It could be hypothesised that committed employees will likewise comply with the organisation's safety requirements. Therefore, organisational commitment has to do with the effort an employee exerts in an attempt to identify with the organisation. Research shows that work stress has a negative effect on job satisfaction and organisational commitment, while job satisfaction is positively linked to organisational commitment (Kotze, 2005; Van Zyl, 2003). The Job Demand-Control Support Model (Karasek & Theorell, 1990) indicates that the organisational structure work demands, and not necessarily the demands of the work itself, have the most consistent role in the development of negative stress-related consequences. The strongest strain reactions (in this study represented by a lack of safety compliance), occur when jobs are high in demand (in this study represented by work stress), low in decision latitude (in this study represented by job insecurity), and low in workplace support (in this study represented by job satisfaction and organisational commitment).

The following research questions can be formulated based on the above-mentioned description of the research problem:

- How are work stress, job insecurity, job satisfaction, organisational commitment and safety compliance conceptualised in literature?
- What is the relationship between work stress, job insecurity, job satisfaction, organisational commitment and safety compliance according to the literature?
- What is the relationship of work stress and job insecurity with workplace safety compliance, job satisfaction and commitment in a mine?
- Can work stress, job insecurity, job satisfaction and organisational commitment be used to distinguish between employees that comply with safety and those that do not?
- What recommendations can be made to manage safety compliance in the mining industry through the respective job and work characteristics examined?

In order to answer the above research questions, the following research objectives are set.

3. RESEARCH OBJECTIVES

The research objectives are divided into general and specific objectives.

3.1. General Objective

The general objective of this research is to explore whether work stress and job insecurity affect safety compliance through the mediation of organisational commitment and job satisfaction in a mining company.

3.2. Specific Objectives

The specific objectives of this research are to:

- Conceptualise work stress, job insecurity, job satisfaction, organisational commitment and safety compliance from the literature.

- Determine the relationship between work stress, job insecurity, job satisfaction, organisational commitment and safety compliance according to literature.
- Determine the relationship of work stress and job insecurity with workplace safety compliance, job satisfaction and commitment.
- Determine whether employees' experiences of work stress, job insecurity job satisfaction and organisational commitment can be used to describe their safety compliance in a mining company.
- Make recommendations that can be used to manage safety compliance through job and work characteristics examined in the mining industry.

4. PARADIGM PERSPECTIVE OF THE RESEARCH

According to Mouton and Marais (1992), the paradigm perspective refers to the variety of meta-theoretical, theoretical and methodological convictions that form the definitive context of a study. The paradigm that an individual researcher subscribes to has a direct influence on the researcher's choices regarding theory and methodology. The researcher is bound by specific theories, methodologies and research techniques as prescribed by that paradigm. The researcher adheres to certain meta-theoretical assumptions on which the paradigm is based (Mouton & Marais, 1992).

Based on the integrated model of Mouton and Marais (1992), the research process in the social sciences consists of four sub-systems that are in interaction with each other and with the research domain. These include the intellectual climate, the discipline, the meta-theoretical assumptions and the market of intellectual resources.

4.1. Intellectual Climate

Mouton and Marais (1992) describe the intellectual climate as the variety of convictions in a specific discipline at a particular time. This would include beliefs about human

beings in general, society and culture. The intellectual climate takes on the form of presuppositions.

4.2. Discipline

This research falls within the boundaries of the behavioural sciences and, more specifically, Industrial Psychology. McCormick and Ilgen (1981) define Industrial Psychology as the scientific study of human behaviour and psychological conditions in a work-related context and the utilisation of knowledge gained to minimise problems that might arise. Psychological principles, theory and research are applied to the work setting (Landy & Conte, 2004). Variables that influence work behaviour – such as industrial safety, training, job evaluation, organisational psychology, performance management and morale and motivation of personnel are included within the discipline (Plug, Louw, Gouws, & Meyer, 1997).

The sub-disciplines of Industrial Psychology that are focused on in this research are organisational psychology and psychometrics. Organisational psychology is the study of organisations, and the factors that influence their effective functioning (McCormick & Ilgen, 1981; Robbins et al., 2003). Mining team supervisors are an important part of a mining crew. Through the provision of resources and a supportive environment, mining team supervisors can improve the overall work performance, motivate their crews, and help increase the rate of workplace safety compliance. In this study, workplace safety compliance – as it may be affected by the experiences of work stress, job insecurity, job satisfaction and organisational commitment – will be investigated.

Psychometrics is the study of psychological measurement, including the development and standardisation of psychometric tests (Plug et al., 1977). This study aims to measure human behaviour (safety compliance) through the information gathered from mining team supervisors through questionnaires. The questionnaires are scored and interpreted to answer the research questions. The reliability of the measuring instruments will also be

investigated. Most of the scales are taken from international literature, and have not been investigated in terms of their reliability in the South African context.

4.3. Meta-theoretical Assumptions

Numerous paradigms are relevant to this research. The literature review was performed within the Positive Psychology Framework, focusing on the Job Demand-Control Support Model (Karasek & Theorell, 1990). The empirical study entails the positivistic and functionalist frameworks.

4.3.1. Literature Review

Positive Psychology emphasises human strengths and optimal functioning, instead of weakness (Snyder & Lopez, 2004). The basic assumption of this approach is prevention. Instead of merely fixing what is wrong, more energy and focus is given to using the strengths and resources, within individuals, to build on the correct aspects. This study aims to determine the individual attitudes (satisfaction and commitment) influencing workplace safety compliance.

4.3.2. Empirical Study

The empirical study is performed within the positivistic and functionalist frameworks. Basic assumptions of the positivistic framework are that knowledge can be obtained through the study of observable phenomena and through the objective empirical operational method (Lundin, 1996).

According to Plug et al. (1997), the basic assumption of the functionalist framework is that comprehensive, meaningful units of psychological phenomena can be classified in relationship with their purpose to explain relevance for human adaptation and survival. In

this study, the variables will be measured quantitatively and the relationships between variables will be investigated statistically to clarify the relationships between the nature of work as well as concomitant job satisfaction and commitment.

4.4. Market of Intellectual Resources

The market of intellectual resources refers to the collection of beliefs that have a direct bearing on the epistemic status of knowledge suppositions (Mouton & Marais, 1990).

4.4.1. Theoretical Beliefs

Theoretical beliefs can be described as testable statements about human behaviour and include statements that form part of the hypotheses.

A. Conceptual Definitions

The relevant conceptual definitions are given below:

Work stress consists of role conflict, role overload and role ambiguity (DeFrank & Ivancevich, 1998; Nelson & Burke, 2000; Newstorm & Davies, 2002; Rothmann & Malan, 2006; Schaufeli & Brubaker, 2002; Van Zyl, 2005). Role overload is the degree to which inadequate time, training and resources affect performance. Role conflict is the inconsistent and conflicting expectations of a person within an uncertain role. Role ambiguity is the undisclosed or unknown expectations of a person within a certain role.

Job insecurity is the concern felt by a person for continued existence of his/her job. It refers to the discrepancies that exist between the preferred and the experienced levels of job security (Dekker & Schaufeli, 1995; De Witte, 1997). Q*uantitative* job insecurity refers to concerns about the future existence of the present job, and *qualitative* job

insecurity refers to perceived threats of impaired quality in the employment relationship (Hellgren et al., 1999).

Safety compliance is the extent to which employees adhere to safety procedures and carry out work in a safe manner, without experiencing workplace incidents or accidents (Neal et al., 2000, in Probst & Brubaker, 2001).

Job satisfaction is a positive emotional state reflecting affective reactions to the perceived content and characteristics of specific facets of the job situation (Hellgren, Sjöberg, & Sverke, 1997, based on Brayfield & Rothe, 1951).

Organisational commitment is a psychological state (a combination of both attitudinal and behavioural approaches) (Hellgren, Sjöberg, & Sverke, 1997, based on Brayfield & Rothe, 1951) that characterise the employee's relationship with the organisation. It affects the employees' decision to remain with the organisation (Meyer & Allen, 1997). Affective commitment specifically refers to an employee's emotional attachment to, identification with, and involvement in the organisation, based on positive feelings towards the organisation (Allen & Meyer, 1996).

B. Models and Theories

According to Neuwman (1991), a theory is a system of interconnected ideas that organise knowledge about the social world. Kerlinger and Lee (2000) define a model as an abstract outline specifying hypothesised relations in a set of data. A model is used to suggest new areas of research when certain relationships and dimensions are emphasised to an unusual degree.

This research is governed by the Job Demand-Control Support Model (Karasek & Theorell, 1990). The central hypothesis of this model involves job strain as a result of interaction between job-demands control and social support. This model suggests that the strongest strain reactions occur when jobs are high in demand, low in decision latitude

and low in workplace social support. In this research, these models are represented by the relationship between work stress, job insecurity and safety compliance, through the mediation of organisational commitment and job satisfaction.

Most importantly, this research seeks to further the empirical model proposed by Probst and Brubaker (2001), providing evidence that job-related factors influence the exposure of mine employees to safety hazards (Moller, 2003; Probst & Brubaker, 2001). This model links job insecurity to safety motivation, safety compliance and workplace injuries and accidents. No South African investigation of this model could be found in the literature.

4.4.2. Methodological Beliefs

Methodological beliefs concern the nature of social science and scientific research (Mouton & Marais, 1992). A quantitative methodology is applied in this research, which rests on functionalistic and positivist assumptions (see 1.3.3.2).

5. RESEARCH METHODOLOGY

This research, pertaining to the specific objectives, consists of two phases, namely a literature review and an empirical study.

5.1. Phase 1: Literature Review

A literature review on work stress, job insecurity, organisational commitment, job satisfaction and workplace safety compliance will be conducted. The sources consulted will include:

- Library catalogues
- South African as well as international journals

- Internet sites
- Electronic databases.

5.2. Phase 2: Empirical Study

The empirical study consists of the research design, participants, measuring battery, and statistical analysis.

5.2.1. Research Design

A research design is the plan and structure of an investigation. The aim of the design is to structure the research project in a manner that maximises validity and control for variance (Mouton & Marais, 1990). Kerlinger and Lee (2000) define a plan as the overall programme of the research, whereas the structure is defined as the framework of interrelated elements.

The research can be classified as descriptive and explorative. Descriptive studies describe what is in existence as accurately and clearly as possible. Explorative studies investigate relationships between variables. The main purpose is to gather information, formulate hypotheses and investigate relationships through a literature review, previous research and empirical investigation.

The specific design that is used is a cross-sectional design. According to Shaughnessy and Zechmeister (1997), cross-sectional designs assess interrelationship among variables within a population observed at a specific point in time. This design is well suited to addressing the descriptive and predictive functions associated with correlational research.

5.2.2. Participants

Consent to conduct research will be requested from mine management. Appointments will be made with the mine overseers and questionnaires distributed to prospective participants. A letter requesting participation will also be included in the survey booklets, as well as an explanation of the ethical aspects and a motivation regarding the importance of the research. Questionnaires will be distributed during safety meetings. Respondents boxes will be made available at each change house at the shaft, and the researcher will personally collect them. All employees in the mining field from Miner to Production Manager level (n=300) will be requested to participate. Miners are the first level of management responsible for team performance, which means that these individuals are responsible for safety. Consequently, these supervisory levels are the best people to target in exploring the influencing factors of safety compliance in the workplace.

5.2.3. Measuring Battery

All the proposed scales are taken from the *Experiences in the Modern World of Work* survey, developed in a collaborative research project between the North-West University of South Africa and Stockholm University of Sweden. Reliability information for the different scales in Sweden appears in Näswall, Baraldi, Richter, Hellgren, and Sverke (2006).

The **Job Insecurity s**cales of Hellgren, Sverke and Isaksson (1999) will be used to measure qualitative and quantitative job insecurity. The questionnaire consists of seven items (three qualitative and four quantitative), on a five-point scale, ranging from one (strongly disagree) to five (strongly agree). A typical item measuring qualitative job insecurity is: “I think my future prospects within this company are good”, while a typical item for quantitative job insecurity is presented by: “I am afraid I might lose my job.”

The reliability of the scale, indicated by Chronbach alpha coefficients as reflected in test-retest correlations was found to range from 0,51 to 0,68 (Hellgren et al., 1999).

The **Job Satisfaction** questionnaire of Hellgren, Sjöberg and Sverke (1997, based on Brayfield & Rothe, 1951) consists of three items measured on a five-point scale, ranging from one (strongly disagree) to five (strongly agree). A typical item measuring job satisfaction would be: "I am satisfied with my job." Chronbach alpha coefficients were found to range from 0,87 to 0,95 (Brayfield & Rothe, 1951; Ramakau, 2006), which is an indication of the reliability of the scale.

The **Affective Organisational Commitment Questionnaire** by Allen and Meyer (1990, short-form version) will be used to measure affective organisational commitment. The questionnaire consists of 4 items on a 5 point scale ranging from 1 (strongly disagree) to 5 (strongly agree). An example of an item in this questionnaire is "I often feel like the organisation's problems are the same as my own problems." The reliability of this scale is indicated by Chronbach alpha coefficients for the total score, which were found to be above 0,70 (Allen & Meyer, 1990; Heymans, 2002; Ramakau, 2006).

The **Workplace Accidents and Safety Compliance Questionnaire** by Probst and Brubaker (2001) used to measure safety compliance. The questionnaire consists of four questions, where one question is on a five-point scale ranging from one (never) to five (always). The other three items are open-ended questions requiring an amount to be completed. For the purposes of this study, a single item is selected (from the questionnaire) wherein respondents are asked to indicate the frequency of ignoring safety rules and regulations at work (i.e. "never" to "always"). The reliability of this scale is indicated by a Chronbach alpha coefficient ranging from 0,57 to 0,92 (Probst & Brubaker, 2001).

Work stress consists of role clarity, role conflict and role overload. Role clarity has four items that are a combination of items from Rizzo, House and Lirtzman (1970), and Caplan (1971). The items are measured on a five-point scale ranging from one (strongly

disagree) to five (strongly agree). A typical item measuring role clarity would be: “I know what my responsibilities are.” The reliability of this scale is indicated by a Chronbach alpha coefficient ranging from 0,78 to 0,81 (Rizzo, House & Lirtzman, 1970).

Role conflict is measured through five items developed by Rizzo, House and Lirtzman (1970). The items are on a five-point scale ranging from one (strongly disagree) to five (strongly agree). An example of an item on this scale would be: “I have to buck a rule or policy in order to carry out a work assignment.” Rizzo, House and Lirtzman (1970) found Chronbach alpha coefficient to be above 0,80: which is an indication of the reliability of this scale.

The Quantitative role overload scale (Beehr, Walsh, & Taber, 1976) has three items measured on a five-point scale, ranging from one (strongly disagree) to five (strongly agree). A typical item on this questionnaire is: “I often have too much to do in my job.” Chronbach alpha coefficient for this scale has been found to range between 0,74 and 0,81 (Beehr et al., 1976, Näswall et al., 2006), indicating the reliability of the scale.

The Qualitative role overload scale (Sverke, Hellgren, & Öhrming, 1999) has four items measured on a five-point scale, ranging from one (strongly disagree) to five (strongly agree). A typical item to measure qualitative role overload is: “I feel unreasonable demands in my work.” The reliability of this scale is indicated by a Chronbach’alpha coefficient ranging from 0,74 to 0,79 (Sverke et al., 1999).

The survey also gathers basic biographical information, including participants’ age, gender, level of education, home language, tenure and union membership status.

5.2.4. Statistical Analysis

The SPSS programme (SPSS, 2007) will be used to conduct the statistical analysis. The reliability of the measuring instruments is determined through exploratory factor analysis

and Chronbach alpha coefficients. Data is analysed through descriptive and inferential statistics. Pearson Product-Moment Correlation Coefficients specify the relationship between variables. According to Cohen (1988), a cut-off point of 0,30 represents a medium effect and is set for the practical significance of correlation coefficients. Stepwise logistic regression will be conducted in order to clarify the contribution of work related attitudes and experiences (work stress, job insecurity, job satisfaction and commitment) to participants' adherence to safety regulation. This stepwise procedure can pick a subset that provides the best predictive power from a group of potential predictors. The central mathematical concept underlying logical regression is the *logit* – natural logarithm of odd ratios (Peng, Lee & Ingersol, 2002). Logistic regression assesses the "goodness of fit" and provides an indication of the adequacy of a research model (set of predictor variables). This allows the researcher to assess how well the set of predictor variables predict the dependant variable (Pallant, 2007).

6. OVERVIEW OF CHAPTERS

Chapter 2 deals with the relationship of work stress and job insecurity with workplace safety compliance, job satisfaction and commitment in a mine, in the form of a research article. Chapter 3 concludes the research, discusses limitations and outlines recommendations for future research as well as recommendations for managing safety compliance.

7. CHAPTER SUMMARY

This chapter provided a discussion of the problem statement and research objectives. The measuring instruments and research method used in this study were explained, followed by a brief overview of the chapters to follow.

REFERENCES

Adams, D., du Plessis, A. G., Gumbie, A., & Willis, R. P. H. (2007). *Introduction to safety practice in South African Mines.* Braamfontein: Creda Communications.

Allen, N. J. & Meyer, J. P. (1990). The measurement and antecedents of affective, continuance and normative commitment to the organisation. *Journal of Occupational Psychology, 63*, 1 – 8.

Anglo Platinum PLC. (2009). *Anglo Platinum Quarterly review and production report for period 1 January 2009 to 31 March 2009*. Anglo Platinum, Marshalltown

Ashford, S., Lee, C., & Bobko, P. (1989). Content, causes and consequences of job insecurity: A theory-based measure and substantive test. *Academy of Management Journal, 32*, 803 – 829.

Badenhorst, C. J. (2006). *Occupational health risk assessment: overview, model and guide for South African mining industry towards a holistic solution*. Unpublished Doctoral thesis. North-West University, Potchefstroom.

Bakker, A. B., Kilmer, C. H., Siegriest, J., & Scheufeli, W. B. (2000). Effort-reward imbalance and burnout among nurses. *Journal of Advanced Nursing, 31*, 884 – 891.

Behr, T. A., Walsh, J. T., & Taber, T. D. (1976). Relationship of stress to individually and organisationally valued states: Higher order needs as a moderator. *Journal of Applied Psychology, 61*, 41 – 47.

Brayfield, A. H., & Rothe, H. F. (1951). An index of job satisfaction. *Journal of Applied Psychology, 86*, 386 – 400.

Bezuidenhout, A. A. (1992). *Die invloed van enkele organisasie-effektiwiteitsdimensies op beroepsveiligheid.* [*The influence of some organisational effectiveness dimensions on workplace safety*]. Unpublished Masters dissertation, University of South Africa (UNISA).

Buitendach, J. H., & De Witte, I I (2005). Job insecurity, extrinsic and intrinsic job satisfaction and affective organisational commitment of maintenance workers in a parastatal. *South African Journal of Business Management, 36*(2), 27 – 37.

Cranny, C. J., Smith, P. C., & Stone, E. F. (1992). *Job satisfaction: How people feel about their jobs and how it affects their performance.* New York: Lexington Books.

Cohen, J. (1988). *Statistical power analysis of the behavioural sciences* (Rev. ed.). Orlando, FL: Academic Press.

Coleman, D. F., Irving, G. P., & Cooper, C. L. (1999). Another look at the locus of control – organisational commitment relationship: It depends on the form of commitment. *Journal of Organisational Behavior, 20*, 995 – 1001.

Cooper, C. (1999). *What is behaviour safety?* Retrieved on 22 October 2007 from: www.behaviouralsafety.com.

De Jager, H. (2003). *Burnout, engagement and stress of medical practitioners.* Unpublished Masters dissertation, Potchefstroom University for Christian Higher Education, Potchefstroom.

Dawson, S. (1991, 6 – 8 February). *Managing safety offshore. Offshore Operations Post Piper Alpha. Paper 13.* London: Marine Management (Holdings) Ltd.

DeFrank, S. R. & Ivancevich, J. M. (1988). Stress on the job: An executive update. *Academy of Management Executive 12*(3), 55 – 66.

Dekker, S. W., & Schaufeli, W. B. (1995). The effects of job insecurity on psychological health and withdrawal: A longitudinal study. *Australian Psychology, 30*(1), 57 – 103.

De Witte, H. (2000). Arbeidsethos en jobonzekerheid: Meting en gevolgen voor welzijn, tevredenheid en inzet op het werk (Workethic and job insecurity: Assessment and consequences for well-being, satisfaction and performance at work). In R. Bouwen, K. De Witte, H. De Witte, & T. Taillieu (Eds.), *Van Groep tot gemeenskap,* pp. 325 – 350. (From group to community). Leuven: Garant.

Dollard, M. F., Winefield, A. H., & Winefield, H. R. (2003). *Occupational stress in the service professions.* New York: Taylor & Francis.

Dunbar, E. (1993). The role of psychological stress and prior experience in the use of personal protective equipment. *Journal of Safety Research, 24*, 181 – 187.

Ferguson, J. (2000). *Strategies to improve occupational safety at Rietspruit Mine*. Unpublished Masters dissertation, Milpark Business School.

Fourie, J. S. (1974). *Prevention of accidents and the development of a safety programme for open mining and iron ore recasting*. Unpublished Masters dissertation, University of South Africa (UNISA).

Gardner, J. W. (1998). *Can change management be successfully implemented at a gold mine to improve safety and productivity?* Unpublished Masters dissertation, University of Cape Town.

Geller, E. S. (1996). *Working safe: How to help people actively care for health and safety.* Boca Raton: CRC Press LLC.

Gillespie, N. A., Walsh, M., Winefield, A. H., Dua, J. & Stough, C. (2001). Occupational stress in universities: Staff perceptions of the causes, consequences and moderators of stress. *Work and Stress*, *15*(1), 53 – 72.

Greenhalgh, L., & Rosenblatt, Z. (1984). Job insecurity: Towards conceptual clarity. *Academy of Management Review, 9*, 438 – 448.

Hellgren, J., Sjöberg, A., & Sverke, M. (1997). Intention to quit: Effects of job satisfaction and job perceptions, in F. Avallone, J. Arnold, & K. de Witte (Eds.). *Feelings work in Europe* (pp.415 – 423). Milano: Guerini.

Hellgren, J., Sverke, M., & Isaksson, K. (1999). A two-dimensional approach to job insecurity: Consequences for employee attitudes and well-being. *European Journal of Work and Organizational Psychology, 8*, 179 – 195.

Heymans, D. R. (2000). *Job Insecurity, job satisfaction and organisational commitment*. Unpublished Masters dissertation, Potchefstroom University for Christian Higher Education, Potchefstroom.

Hirschfield, R. R. (2000). Validity studies. Does revising the intrinsic and extrinsic subscales of Minnesota Satisfaction Questionnaire Short Form make a difference? *Educational Psychology Measurement, 60*, 255 – 270.

Hofmann, D. A., Jacobs, R., & Landy, F. (1995). High reliability process industries: Individual, micro, and macro organisational influences on safety performance. *Journal of Safety Research, 26*, 131 – 149.

Hofmann, D. A., & Stetzer, A. (1998). The role of safety climate and communication in accident interpretation: Implication from negative events. *Academy of Management Journal, 41*, 644 – 657.

Holroyd, K. A., & Lazarus, R. S. (1982). Stress, coping and somatic adaptation. In L. Goldberger & S. Breznitiz (Eds.), *Handbook of stress* (pp. 21 – 35). New York: Free Press.

Ivancevich, J. M., & Mattesson, M. T. (1996). *Organisational Behavior and Management* (4th ed.). Boston, MA: Irwin McGraw-Hill.

Janssens, M. J., Brett, J. M., & Smith, F. J. (1995). Confirmatory cross-cultural research: Testing the viability of a corporation-wide safety policy. *Academy of Management Journal, 38*, 364 – 382.

Jones, E. E. (1979). The rocky road from acts to dispositions. *American Psychologist, 34*, 107 –117.

Karasek, R. A., & Theorell, T. (1990). *Healthy work: Stress, productivity and reconstruction of working life*. New York: Basic Books.

Kerlinger, F. N., & Lee, H. B. (2000). *Foundations of behavioural research* (4th ed.) Fort Worth, TX: Harcourt College Publishers.

Kendonlin, I., (1993). Burnout of female and male nurses in shift work. *Ergonomics, 36*, 141 – 147.

Khan, H. & Cooper, C. L. (1993). *Stress in the dealing room.* London: Routledge.

Kletz, T. A. (1985). *An engineer's view of human error*. Warwickshire. England: The Institution of Chemical Engineers.

Kotze, C. G. P. (2005). *Occupational stress, organisational commitment and ill health of employees at a University of Technology.* Unpublished Masters dissertation, Potchefstroom University for Christian Higher Education, Potchefstroom.

Kreitner, R. & Kinicki, A. (2004). *Organizational behaviour (6th ed)*. Boston, MA: Irwin McGraw-Hill.

Lam, T., Baum, T., & Pine, R. (1998). Study of managerial job satisfaction in Hong Kong's Chinese restaurants. *International Journal of Contemporary Hospitality Management, 13*, 1 – 10.

Landy, F. J., & Conte, J. M. (2004). *Work in the 21st century*. New York: Blackwell.

Le Roux, A. (2005). *Job demands, job resources, and work related flow of employees in the mining industry in South Africa.* Unpublished Masters dissertation. North-West University, Potchefstroom.

Lim, V. K. G. (1997). Moderating effects of work-based support on the relationship between job insecurity and its consequences. *Work and Stress, 11*, 251 – 266.

Lundin, R. W. (1996). *Theories and systems of Psychology (5th ed.)*. Lexington, MA: Heath.

Luthans, F. (1995). *Organisational behaviour* (7th ed.). Singapore: McGraw-Hill.

Marx, C. (1996). *An activity-based costing approach to fall of ground accidents in a South African gold mine*. Unpublished Masters dissertation, Potchefstroom University for Christian Higher Education, Potchefstroom.

McCormick, N. E., & Ilgen, D. (1981). *Industrial Psychology.* Englewood Cliffs, NJ: Prentice Hall.

McEndoo, J. 2007. From NOSA to OHSAS – a change for the group. Retrieved on 01 September 2010 from www.anglogoldashanti.co.za.

Meyer, J. P., Allen, N. J., & Smith, C. (1993). Commitment to organisations and occupations: Extensions and test of a three-component conceptualization. *Journal of Applied Psychology, 87*, 538 – 551.

Moller, G. P. (2003). *The implementation and evaluation of behaviour based safety interventions at Sishen Iron Ore Mine.* Unpublished Doctoral thesis, Potchefstroom University for Christian Higher Education, Potchefstroom.

Monk, T., & Folkard, S. (1985). Shift work and performance. In S. Folkard, T., Monk (Eds.), *Hours of work* (pp. 239 – 252). Chichester, UK: Wiley.

Mouton, J. & Marais, H. C. (1990). *Basic concepts in the methodology of social sciences.* Pretoria: Human Sciences Research Council.

Mowday, R. T., Porter, L. W., & Steers, R. M. (1982). *Employee-organisational linkages*. New York: Academic Press.

Mullins, L. J. (1999). *Management and Organisational Behaviour* (5th ed.). China: Pitman Publishing.

Näswall, K., Baraldi, S., Richter, A., Hellgren, J., & Sverke, M. (2006). *The salaried employee in the modern working life: Threats and challenges. Technical report on the sample, data collection, and measurement properties of the instruments*. Stockholm, Sweden: SALTSA Joint programme for working life research in Europe.

Neal, A., Griffin, M. A., & Hart, P. M. (2000). The impact of organizational climate on safety climate and individual behaviour. *Safety Science, 34*, 99 – 109.

Neuwman, W. L. (1997). *Social research methods: Qualitative and quantitative approaches* (3rd ed.). Boston, MA: Allyn & Bacon.

Newstrom, J. W., & Davis, K. (2002). *Organisational behaviour: Human behaviour at work*. (11th ed.). New York: Mc Graw-Hill.

Odendaal, E. P. S. (1996). *The consequences of poor illumination on underground mine workers and the subsequent effects on productivity and safety*. Unpublished Doctoral thesis, University of the Witwatersrand.

Pallant, J. (2007). *SPSS Survival Manual* (3rd. ed.). Berkshire, England: Open University Press.

Peng, C. J., Lee, K. L. & Ingersoll, G. M. (2002). An introduction to logistic regression analysis and reporting. *Journal of Educational Research*, *9*(1), 2 – 13

Plug, C., Louw, D. A., Gouws, L. A., & Meyer, W. F. (1997). *Verklarende en vertalende sielkundewoordeboek* [*Explanatory and translated Psychology Dictionary*]. Johannesburg: Heinemann.

Popoola, M. O. (2007). *Benchmarking of process safety management elements in the South African process industry*. Unpublished Masters dissertation, North-West University, Potchefstroom

Probst, T. M., & Brubaker, T. L., (2001). The effects of job insecurity on employee safety outcomes: Cross-sectional and longitudinal explorations. *Journal of Occupational Health Psychology, 6*(2), 139 – 159.

Ramakau, J. L. (2006). *The relationship between job insecurity, job satisfaction, affective organisational commitment and work locus of control*. Unpublished Masters dissertation, North-West University, Vanderbijlpark.

Rani, F. N. (2005). *Job insecurity, work-based support, job satisfaction, organisational commitment and general health of human resources professionals in a chemical industry*. Unpublished Masters dissertation, North-West University, Vanderbijlpark.

Rizzo, J. R., House, R. J., & Lirtzman, S. I. (1970). Role conflict and ambiguity in complex organizations. *Administrative Science Quarterly, 15*, 150 –163.

Robbins, S. P., Odendaal, A., & Roodt, G. (2003). *Organisational behaviour: global and Southern African perspectives*. Pinelands: Pearson Education South Africa.

Rothman, S., & Malan, M. M. (2006). Occupational stress of engineers in South Africa. *Southern African Business Review, 10* (2), 1 – 16.

Seccombe, A. (2007). *SA mine safety strike to halt output*. Retrieved on 31 October 2008 from: www.miningmx.com.

Shaughnessy, J. J., & Zechmeister, E. B. (1997). *Research methods in psychology* (4th ed.). New York: McGraw-Hill.

Smith, M. J. (1993). *Working in the grave: The development of a health and safety system on the Witwatersrand gold mines, 1900 – 1939.* Unpublished Masters dissertation, Rhodes University.

SPSS Inc. (2007). *SPSS 12.0 for Windows.* Chicago, IL: SPSS Incorporated.

Sverke, M., Hellgren, J., & Öhrming, J. (1999). Organizational restructuring and health care work: A quasi-experimental study. In P. M. le Blanc, M. C. W. Peeters, A. Bussing, & W. B. Schaufeli (Eds.), *Organisational Psychology and health care: European contributions* (pp. 15-32). Munchen: Rainer Hampp Verlag.

South Africa, Department of Mineral Resources. (2009). *Mine Health and Safety Inspectorate Annual Report.* Pretoria: Government press

South Africa. (1996). *Mine Health and Safety Act, no. 26*. Pretoria: Government Press.

Tladinyane, R. T. (2006). *The relationship between organisational commitment and career anchors*. Unpublished Masters dissertation, University of South Africa (UNISA).

Travers, C. J. & Cooper, C. L. (1996). *Teachers under pressure: Stress in the teaching profession.* London: Routledge.

Tshabalala, M. E. (2004). *Job insecurity, organisational commitment and job satisfaction of engineers in a parastatal.* Unpublished Masters dissertation, Potchefstroom University for Christian Higher Education, Potchefstroom.

The Star (2007, December 5). *Mine Safety is a human right.* Retrieved on 6 December 2008 from: www.thestar.co.za.

Van Zyl, Y. (2003). *Occupational stress, burnout, job satisfaction, work engagement, and organisational commitment of educators on senior level in the Sedibeng West District.* Unpublished Masters dissertation, Potchefstroom University for Christian Higher Education, Vanderbijlpark.

Van Vuuren, T., Klandermans, B., Jacobson, D., & Hartley, J. (1991). Predicting employees' perceptions of job insecurity. In J. Hartley, D. Jacobson, B. Klandermans, & T. van Vuuren. *Job insecurity: Coping with jobs at risk* (pp.65-78). London: Sage Publications.

Weiss, D. J., Dawis, R. V., England, G. W. & Lofquist, L. H. (1967). *Manual for the Minnesota Satisfaction Questionnaire.* Minneapolis, MN: University of Minnesota.

Zohar, D. (1980). Safety climate in industrial organizations: Theoretical and applied implications. *Journal of Applied Psychology, 65*, 96 – 102.

CHAPTER 2

RESEARCH ARTICLE

The relationship of work stress and job insecurity with workplace safety compliance, job satisfaction and commitment in a mine

U. Masia

ABSTRACT

The objective of this study was to investigate the relationship of work stress and job insecurity with safety compliance, job satisfaction and commitment in a mine. A cross-sectional survey design was used and use was made of an availability sample (*n*=158). A survey booklet including a biographical questionnaire, scales on job insecurity, job satisfaction, affective organisational commitment, workplace accidents and safety compliance, as well as a work stress measure comprising dimensions of role clarity, conflict and overload was administered. The results indicated that when miners experience work stress and job insecurity, their safety compliance is low. Job satisfaction was found to be a positive predictor of safety compliance among miners.

OPSOMMING

Die doelwit van hierdie studie was om ondersoek in te stel na die verhoudings tussen werkstres, werksonsekerheid, die gehoor gee aan veiligheidsmaatreels, werkstevredenheid en organisatoriese verbintenis in ‘n myn. A kruissnit opname-ontwerp is ingespan met ‘n geriefliheidsteekproef (*n*=158). ‘n Opnameboekie het ‘n biografiese vraelys ingesluit, sowel as skale vir werksonsekerheid, werkstevredenheid, affektiewe organisatoriese verbintenis, werksplekongelukke en voldoening aan veiligheidsmaatreels en werkstres, wat weer dimensies van rolduidelikheid, konflik en oorlading gedek het. Die resultate het aangetoodat wanneer mynwerkers stres en onsekerheid beleef, hul minder gehoor gee aan veiligheidsmaatreels. Werkstevredenheid is gevind om ‘n statisties beduidende voorspeller te wees van voldoening aan veiligheidsmaatreels.

The mining industry has been an important source of employment in South Africa since the early 1900's. Many men who left their homes in search of employment in the mining industry never returned, and many women whose husbands moved to mining towns – seeking employment – became widowed as a result of mine accidents and fatal injuries. In the Witwatersrand Gold mines 15 000 black men were killed in work related accidents between 1901 and 1939 (Smith, 1993). The industry has experienced a slight improvement in the fatality rate per annum; however, safety in the mines remains a concern. In 2003, 43 people lost their lives in the line of duty at Anglogold, while 27 people died at Anglo Platinum operations. In 2008, however, 34 people died in Anglogold operations as compared to the 29 that died in Anglo Platinum operations (South Africa, 2004; 2008). South Africa is the largest producer of Platinum, with a GDP contribution of 6.5% (Swanepoel, 2008). However, mining in South Africa is still considered one of the toughest and most hazardous occupations (Le Roux, 2005; Paul & Maiti, 2005).

The mining industry is characterised by a strong focus on production. These high performance pressures and time constraints are found to decrease the safety level of operations. Employees have strict targets to meet within specified timelines, which might encourage them to take shortcuts and thereby jeopardise safety compliance. This has created problems for many employers within the mining industry, who are legally obliged to create and provide a safe working environment for all employees (Ashworth & Peake, 1994; Janssens, Brett & Smith, 1995; Le Roux, 2005; Probst & Brubaker, 2001; South Africa, 1996).

In response to the tension created between production and safety compliance, on 2 November 2007, the National Union of Mine workers (NUM) declared a 1 day strike in protest against "death in the line of duty" within the mines (Star, 2007). This is in alignment with the requirements of the Mine Health and Safety Act, nr. 29 of 1996, which places an obligation on employers to provide a safe and healthy working environment for all employees, including contractors. The safety record of mines in South Africa was found to be unacceptable by most researchers (AnglogoldAshanti,

2009; Anglo Platinum, 2009; Ashworth & Peake, 1994; Bezuidenhout, 1992; Ferguson, 2000; Fourie, 1974; Gardner, 1998; Moller, 2003; Smith, 1993; South Africa, 2006; The Star, 2007; Van Wyk & De Villiers, 2008).

Most researchers believe that there are circumstances indirectly relating to accidents and therefore there is a need for an in-depth analysis of underlying causes of accidents from which relevant and important conclusions can be drawn. Simpson and Widdas (1992) are of the opinion that certain features inherent in the mining system predispose slips, lapses, mistakes or violations that result in serious consequences, mostly in the form of accidents. This was later confirmed by Badenhorst (2006). Most accidents are blamed on immediate human failing or human error (Hoffman, Jacobs & Landy, 1995; Lawrence 1974; Raath, 1993). Some researchers suggest that this dominance of human error as causal factor in mining accidents in South Africa could be exacerbated by the harsh physical conditions experienced in the mining industry (Ashworth & Peake, 1994; Le Roux, 2005).

Companies are striving to improve production, and in the process, employees are neglecting safety procedures while attempting to reach performance targets (Fourie, 1974; Moller, 2003; Probst & Brubaker, 2001). Ferguson (2000) suggests that the relationship between the individual and the mining industry needs further exploration. This is also emphasized by Ashworth and Peake (1994), who believe that an overload of an employee's responsibility, impracticality of job requirements and a lapse of concentration should be recorded and considered during accident investigations.

The authoritarian management style and a "no care" attitude that mine workers are subjected to, from their managers, coupled with the high focus on production have also been found to contribute to employee job insecurity (Ashworth & Peake, 1994; Moller, 2003; Paul & Maiti, 2005). These inherent mining characteristics are found to draw the employees' focus off the safety requirements thereby contributing to workplace accidents and incidents (Ashworth & Peake, 1994; Janssens, Bret & Smith, 1995; Moller, 2003; Paul & Maiti, 2005; Probst & Brubaker, 2001; Smith, 1993).

Work stress

Stress is "…an adaptive response, mediated by individual characteristics and/or psychological processes, that is a consequence of any external action, situation, or event that places special physical and/or psychological demands upon a person" (Kreitner & Kinicki, 2004, p. 692). Work stress is indicated by a combination of concepts role conflict, role overload and role ambiguity combined (DeFrank & Ivancevich, 1998; Nelson & Burke, 2000; Newstorm & Davies, 2002; Rothmann & Malan, 2006; Schaufeli & Brubaker, 2002; Van Zyl, 2005).

Role conflict occurs when the different role setters have inconsistent and conflicting expectations of the focal person. Individuals in role conflicting situations might fail to comply with role demands (Travers & Cooper, 1996). Role overload is the degree to which performance is affected by inadequate time, training and resources. When the role sender's expectations exceed the focal person's ability, the focal person might experience stress (De Jager, 2003; Jones, 1979; Kreitner & Kinicki, 2004). Role ambiguity (also known as ((lack of) role clarity) occurs when the role setters' expectations are unknown and the focal person does not have information needed to perform the role. Prolonged role ambiguity can foster work stress and job dissatisfaction (Khan & Cooper, 1993; Kreitner & Kinicki, 2004).

The high emphasis on production has been found to decrease the level of safety in different workplaces. Due to performance pressure and time constraints, many workers tend to engage in unsafe behaviour. This includes the adoption of short-cut methods which compromise safety compliance and can cause accidents. These findings generally indicate that safety compliance decreases in proportion to increasing work stress (Dawson, 1991; Hofmann, Jacobs & Landy, 1995; Hofmann & Stetzer, 1998; Janssens, Bret & Smith, 1995; Kotze, 2005; Van Zyl, 2003).

Job related stress has a negative effect on professional work and personal welfare. This includes low organisational commitment, low job satisfaction and a higher prevalence of workplace accidents (Ashworth & Peake, 1994; Gillespie et al., 2001; Hofman & Stetzer, 1998; Kendonlin, 1993; Kotze, 2005; Monk & Folkard, 1985; Paul & Maiti, 2005 Van Zyl, 2003).

Job insecurity

Job insecurity is described as a) subjective, and therefore individuals will react differently even though they are exposed to similar situations, b) implying uncertainty about the future, and c) comprising doubts concerning the continuation of employment (Hellgren, Sverke & Isakson, 1999). Hellgren et al. (1999) used the term *quantitative* job insecurity to refer to concerns about the future existence of the present job, and *qualitative* job insecurity to refer to perceived threats of impaired quality in the employment relationship (relating to aspects such as career progression and salary increases).

Job insecurity has been found to relate negatively to employee work attitudes and employee wellbeing (Ashford, Lee, & Bobko, 1989; Dekker & Schaufeli, 1995; De Witte, 1999; Hellgren et al., 1999; Probst & Brubaker, 2001). Over a period of time, the psychological health of employees who experience job insecurity was found to deteriorate (Dekker & Schaufeli, 1995; Hellgren et al., 1999; Thinane, 2005). The experience of job insecurity over time has also been found to predict and produce impaired job and organisational attitudes. Organisational attitudes in this case include (but are not limited to) intentions to quit, organisational commitment and job satisfaction (Hellgren, Sjöberg & Sverke, 1997; Probst & Brubaker, 2001; Ramakau, 2006; Thinane, 2005). Most researchers found job insecurity to be associated with a reduced level of both intrinsic and extrinsic job satisfaction, and especially with workplace opportunities for growth and promotion (Ashford et al., 1989; Dekker & Schaufeli, 1995; De Witte, 1999; Hellgren et al., 1999; Probst & Brubaker, 2001; Thinane, 2005).

Job satisfaction

Hellgren et al., 1997, based on Brayfield & Rothe, 1951, define job satisfaction as a positive emotional state reflecting affective reactions to the perceived content and characteristics of specific facets of the job situation. It is influenced by both organisational and dispositional factors. Job satisfaction can often be relied upon as an indicator of organisational effectiveness (Hirschfield, 2000; Kreitner & Kinicki, 1998; Ramakau, 2006; Spector, 1997).

Job insecurity and work stress were found to have a negative impact on job satisfaction. Meanwhile, employees with a high level of job satisfaction were found to also experience and exhibit high levels of organisational commitment (Kotze, 2005; Paul & Maiti, 2005; Probst & Brubaker, 2003; Ramakau, 2006; Van Zyl, 2003, Weiss, Dawis, England & Lofquist, 1967).

A negative consequence of employee job dissatisfaction could be to allow conditions to worsen – including reduced effort and increased error rate – thereby naturally leading to increased safety incident rates (Probst & Brubaker, 2003). Job insecurity and dissatisfaction were also found to negatively relate to the use of personal protective equipment (Dunbar, 1993). This would in turn have a negative impact on employee safety compliance, thereby increasing the number of workplace accidents and incidences. Employee satisfaction is believed to increase profits, lower grievances, and decrease safety incident rates (Dunbar, 1993; Probst & Brubaker, 2003; Ramakau, 2004; Robbins, 1998; Rossouw & Bews, 2002).

Organisational commitment

Organisational commitment is defined as the psychological link between the employee and his/her organisation that makes it less likely that the employee will leave the

organisation voluntarily (Allen & Meyer, 1996). This is the relative strength of the employees' identification and interaction with the organisation.

Affective organisational commitment has been found to be more relevant and to hold profitable outcomes for the organisational functioning when compared to continuance commitment (costs associated with leaving the organisation) and normative commitment (obligation to remain with the organisation) (Allen & Meyer, 1996; Buitendach & De Witte, 2005; Coleman, Irving, & Cooper, 1999; Ramakau, 2006).

Commitment has been found to impact positively on compliance to the company's roles, regulations and policies, which also implies a positive impact on safety compliance. Committed employees were found to identify with the organisation and commit to its goals (Ramakau, 2006; Van Zyl, 2006). Employees experiencing job insecurity and high workplace stress levels are however found to experience lower levels of organisational commitment (Paul & Maiti, 2005; Probst & Brubaker). Meanwhile, employees who are highly satisfied with their jobs were found to have high levels of organisational commitment (Kotze, 2005; Paul & Maiti, 2005; Probst & Brubaker; Ramakau, 2006; Van Zyl, 2006; Weiss et al., 1967).

Safety compliance

Safety compliance has been defined as the extent to which employees adhere to safety standards, procedures, legal obligations and requirements, coupled with an absence of accidents and incidents in the workplace (Adams, du Plessis, Gumbie & Willis, 2007; Neal, Griffin, & Hart, 2000; Stanton, Kielblock, Schoeman, & Johnston, 2007). There are larger organisational factors encouraging unsafe acts and thereby leading to workplace accidents, and these include amongst others the harsh conditions of the mining industry (Ashworth & Peake, 1994; Hoffman et al., 1995; Kletz, 1985; Zohar, 1980).

Between 80% and 95% of all workplace accidents are triggered by unsafe behaviour and are often blamed on human error (Ashworth & Peake, 1994; Paul & Maiti, 2005). This

suggests that addressing the relationship between the workplace environment and the employee as an individual will increase safety compliance (Ashworth & Peake, 1994; Cooper, 1999a; Ferguson, 2000; Lawrence, 1974; Le Roux, 2005; Moller, 2003). Certain concepts, like job insecurity and work stress, were found to impact negatively on employee safety compliance (Ashford et al., 1989; Ashworth & Peake, 1994; Dawson, 1991; Dollard, Winefield & Winefield, 1993; Hofmann & Stetzer, 1998; Paul & Maiti, 2005; Probst & Brubaker, 2006; Moller, 2003), whereas concepts like organisational commitment and job satisfaction were found to have a positive impact on employee safety compliance (Ashworth & Peake, 1994; Paul & Maiti, 2005; Probst & Brubaker; Ramakau, 2006; Van Zyl, 2003).

The interaction of work stress, job insecurity, organisational commitment, job satisfaction and safety compliance

The interrelationship between work stress, job insecurity, organisational commitment, job satisfaction and organisational commitment evidenced in the literature can be best described using the following diagram.

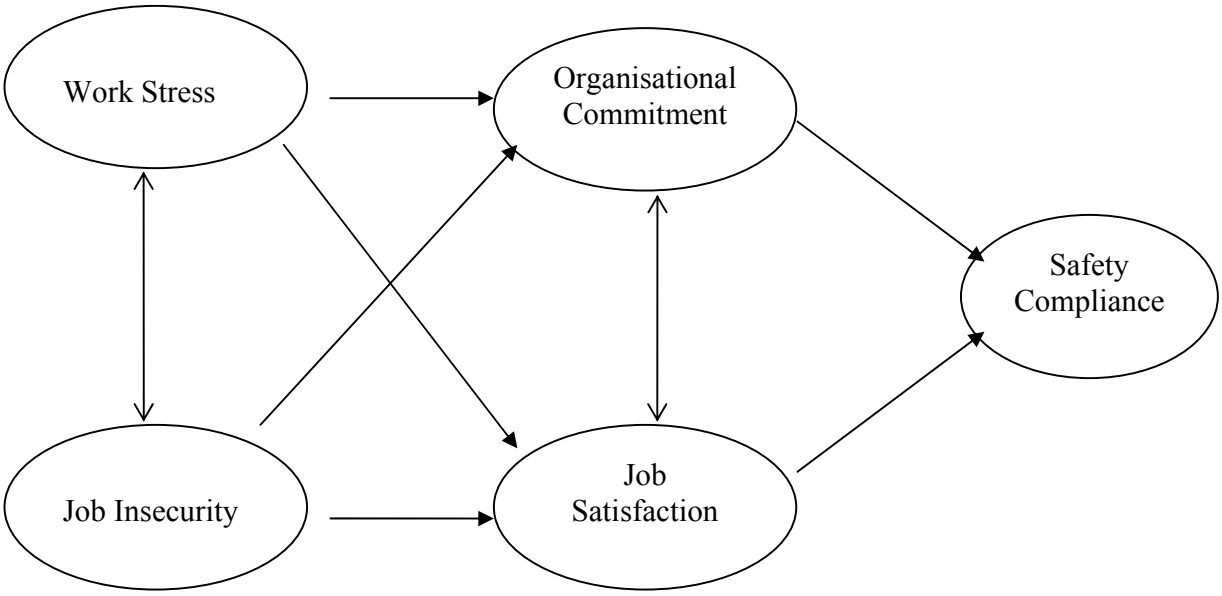

Figure 1. A theoretical model of the relationship of work stress and job insecurity with workplace safety compliance, job satisfaction and commitment.

The objective of this study is to investigate the relationship of work stress, job insecurity, organisational commitment, job satisfaction and safety compliance in a mine and to determine whether work-related variables and attitudes can be described to predict safety compliance of employees.

METHODOLOGY

Research design

A cross-sectional research design was used, during which a sample was drawn from the population of shift supervisors in a mining organisation during June – August 2009. According to Shaughnessy and Zechmeister (1997), cross-sectional designs assess interrelationship among variables within a population observed at a specific point in time. This design is well suited for addressing the descriptive and predictive functions associated with correlational research.

Participants and procedure

Consent to conduct research was requested from mine management. Appointments were made with the production managers in order to access their staff and questionnaires were distributed to prospective participants. A letter requesting participation was included in the test books, as well as an explanation of the ethical aspects (informed consent, free participation and withdrawal) and a motivation regarding the importance of the research. Questionnaires were handed out during safety meetings. Respondents' boxes were put in each change house at the shaft and personally collected by the researcher. Some participants preferred to hand-deliver completed questionnaires. Employees from Miner to Production Manager (n=300) were requested to participate. A total of 158 questionnaires were returned, representing a response rate of 52,67%. Each team was given 4 weeks in which to complete the questionnaire and return it. Table 1 provides an indication of the characteristics of the participants in this study.

Table 1

Demographic Characteristics of Participants (n=158)

Item	Category	Frequency	Percentage*
Gender	Female	4	2,5
	Male	151	95,6
Living with children under 12	No	55	34,8
	Yes	102	64,6
Household	Single	13	8,2
	Married/living with partner	142	89,9
	Living with parents	1	0,6
Education	Primary	3	1,9
	Secondary	44	27,8
	Matric (Grade 12)	73	46,2
	College	11	7,0
	National diploma	6	3,8
	University degree	8	5,1
	Other	13	8,2
Employment	Miner	64	40,5
	Shift supervisor	80	50,6
	Mine overseer	9	5,7
	Section manager	1	0,6
	Production manager	2	1,3
Union membership	Yes	132	83,5
	No	25	15,8

* Where percentages do not sum to 100, this is due to the missing values

The majority (95,6%) of participants were male with 64,6% of participants living with children under the age of 12 years in the same household. Only 0,6% of respondents live with their parents, while 89,9 % are married or living with partners. The majority (46,2%) of participants are in possession of a Grade 12 qualification, 3,8% hold a national diploma, and 8,2% are in possession of a blasting certificate. The majority (50,6%) of participants are shift supervisors. The second largest group (40,5%) are miners, while only 0,6% are Section Managers. All participants are permanent, full time employees and 83,5% of participants are union members. The average number of years in their occupation is 8,47 years.

Measuring battery

All the scales were taken from the *Experiences in the Modern World of Work* survey, developed in a collaborative research project between North-West University in South Africa and Stockholm University in Sweden. Reliability information for the different scales in Sweden appears in Näswall, Baraldi, Richter, Hellgren, and Sverke (2006).

The **Job Insecurity** scales of Hellgren, Sverke and Isaksson (1999) were used to measure qualitative and quantitative job insecurity. The questionnaire consists of 7 items (3 qualitative and 4 quantitative), on a 5 point scale, ranging from 1 (strongly disagree) to 5 (strongly agree). A typical item measuring qualitative job insecurity is "I think my future prospects within this company are good", while a typical item for quantitative job insecurity is presented by "I am afraid I might loose my job". The reliability of the scale, indicated by Chronbach's alpha coefficients as reflected in test-retest correlations were found to range from 0,51 to 0,68 (Hellgren et al., 1999). Previous South African research (Pienaar et al., 2007) has shown this scale to be reliable locally, with a reliability for Total Insecurity in excess of 0,90.

The **Job Satisfaction** questionnaire of Hellgren, Sjöberg and Sverke (1997, based on Brayfield & Rothe, 1951) consists of 3 items measured on a 5 point scale ranging from 1 (strongly disagree) to 5 (strongly agree). A typical item measuring job satisfaction is "I am satisfied with my job". Chronbach's alpha coefficients were found to range from 0,80 to 0,95 (Brayfield & Rothe, 1951; Pienaar et al., 2007; Ramakau, 2006) which is an indication of the reliability of the scale.

The **Affective Organisational Commitment Questionnaire** by Allen and Meyer (1990, short-form version) was used to measure affective organisational commitment. The questionnaire consists of 4 items on a 5 point scale ranging from 1 (strongly disagree) to 5 (strongly agree). An example of an item in this questionnaire is "I often feel like the organisation's problems are the same as my own problems". The reliability of this scale

is indicated by Chronbach's alpha coefficients for the total score which were found to be above 0,70 (Allen & Meyer, 1990; Heymans, 2002; Ramakau, 2006).

The **Workplace Accidents and Safety Compliance** questionnaire by Probst and Brubaker (2001) was used to measure safety compliance. The questionnaire consists of 4 questions, wherein 1 question is on a 5 point scale ranging from 1 (never) to 5 (always). The other 3 items are open ended questions requiring an amount to be completed. An example of an item in this questionnaire is "How many work related accidents have you reported in the past 12 months?"

On the single selected item respondents were asked to indicate the frequency of ignoring safety rules and regulations at work (i.e. "never" to "always"). It is important to note that the Safety Compliance scale is scored in the opposite direction to the others – a high score on this scale indicates a lack of the measured variable (i.e. a high score on Safety Compliance indicates no compliance). For the purposes of interpretation scores on the scale were reversed, to ease interpretation. Thus, a high score on Safety Compliance in the Results indicates that high levels of safety compliance are present.

Work stress consists of role clarity, role conflict and role overload. Role clarity has 4 items which are a combination of items from Rizzo, House and Lirtzman (1970), and Caplan (1971). The items are measured on a 5 point scale ranging from 1 (strongly disagree) to 5 (strongly agree). A typical item measuring role clarity is "I know what my responsibilities are". The reliability of this scale is indicated by a Chronbach's alpha coefficients ranging from 0,78 to 0,81 (Rizzo et al., 1970). Role conflict was measured with 5 items from the Rizzo et al. (1970) scale. The items are on a 5 point scale ranging from 1 (strongly disagree) to 5 (strongly agree). An example of an item on this scale is "I have to buck a rule or policy in order to carry out a work assignment". Rizzo, et al. (1970) found Chronbach's alpha coefficients ranging above 0,80, which is an indication of the reliability of this scale. Quantitative role overload (Beehr et al., 1976) has 3 items measured on a 5 point scale ranging from 1 (strongly disagree) to 5 (strongly agree). A

typical item on this questionnaire is “I often have too much to do in my job”. Chronbach’s alpha for this scale were found to range between 0,56 and 0,81 (Beerh et al., 1976; Pienaar et al., 2007; Näswall et al., 2006), indicating the reliability of the scale. Qualitative role overload (Sverke et al., 1999) has 4 items measured on a 5 point scale ranging from 1 (strongly disagree) to 5 (strongly agree). A typical item to measure qualitative role overload is “I feel unreasonable demands in my work”. The reliability of this scale is indicated by a Chronbach’s alpha coefficients ranging from 0,74 to 0,79 (Pienaar et al., 2007; Sverke, Hellgren, & Öhrming,1999).

Statistical analysis

The SPSS programme (SPSS, 2007) was used to conduct statistical analysis. The construct validity of the measuring instruments was determined through exploratory factor analysis. Chronbach alpha coefficients were used to determine reliability. Pearson product moment correlation coefficients were used to specify the relationship between variables. A 95% confidence internal level ($p \leq 0,05$) was set for statistical significance. A cut-off point of 0,30 was set for the practical significance of correlation coefficients (Cohen, 1988).

Stepwise logistic regression was conducted in order to clarify the contribution of work related attitudes and experiences (work stress, job insecurity, job satisfaction and commitment) to participants’ adherence to safety regulation. This stepwise procedure can pick a subset that provides the best predictive power from a group of potential predictors. Logistic regression assesses the “goodness of fit” and provides an indication of the adequacy of a research model (set of predictor variables). This allows the researcher to assess how well the set of predictor variables predict the dependant variable (Pallant, 2007).

RESULTS

Descriptive statistics of the different variables are given in Table 2 below.

The *work stress* variable comprises of items for Role Clarity, Role Overload and Role Conflict. A Chronbach alpha coefficient of 0,70 was found for role conflict, 0,70 for qualitative role overload and 0,30 for quantitative role overload. Qualitative and quantitative role overload were subsequently combined to create a Total Role Overload variable. The Chronbach alpha coefficient for the collapsed scale was then found to be 0,72. In investigating the reliability of the role clarity scale however, it was seen to yield only a Chronbach alpha coefficient of 0,58. The third item on the scale was deleted to improve the Chronbach alpha coefficient to 0,73. Finally it was decided to combine all items to create a total *work stress* measure, wherein the Chronbach alpha was found to be 0,71

The Chronbach alpha coefficients for *job satisfaction* was found to be 0,75 and *affective organisational commitment* was found to be 0,60. The first item on the scale was deleted to improve the Chronbach alpha coefficients to 0,70. The Chronbach alpha coefficients for qualitative job insecurity was found to be 0,40; and 0,78 for quantitative job insecurity. Qualitative and quantitative job insecurity were combined to form total *job insecurity*, and another item was deleted (from the quantitative scale) to improve the Chronbach alpha coefficient to 0,70.

Table 2.

Descriptive Statistics and Chronbach Alpha Coefficients of the Measuring Instruments.

Item	Mean	*SD*	Skewness	Kurtosis	α
Total Work Stress	2,97	0,84	-0,06	-0,16	0,71
Total Job Insecurity	3,11	0,97	-0,42	-0,52	0,70
Safety Compliance	1,90	1,31	1,39*	0,66	
Job Satisfaction	3,99	0,90	-0,80	0,23	0,75
Affective Commitment	3,79	0,79	-0,74	0,70	0,70

*High skewness

Table 2 above indicates that all the measuring instruments have acceptable levels of internal consistency. All the alpha coefficients were found to be equal or greater than 0,70 (Nunally & Bernstein, 1994). Safety Compliance is indicated by a single item and therefore no reliability information is available. All scales also present with normal distribution (as indicated by skewness and kurtosis), except for Safety Compliance, which is positively skewed (i.e. most respondents indicate themselves as "compliant").

Table 3 below shows the correlations between the different variables. Pearson product-moment correlation coefficients were used to specify the relationship between all variables. Since Safety Compliance is only assessed with a single item, Spearman-rank correlations were computed for it, as this is a more restrictive procedure than Pearson's.

Table 3.

Correlation Coefficients between Work Stress, Job Insecurity, Job satisfaction, affective commitment and Safety compliance

		1	2	3	4	5
1	Total Work Stress	-				
2	Total Job Insecurity	0,55**	-			
3	Safety Compliance	-0,22**	-0,21*	-		
4	Job Satisfaction	-0,14	-0,04	-0,03	-	
5	Affective Commitment	0,13	0,05	-0,11	0,52**	-

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

*. Correlation is significant at the 0.05 level (2-tailed)

It can be seen in Table 3 that Total Work Stress is statistically significantly and positively related to Total Job Insecurity (practically significant, large effect) and negatively to Safety Compliance (Statistically and practically significant, small effect). Total Job Insecurity relates statistically significantly and negatively to Safety compliance. Job Satisfaction relates positively to Affective Commitment (practically significant with large effect).

In the next phase of the analysis, a stepwise logistic regression was performed in order to clarify the contribution of work-related attitudes and experiences (work stress, job insecurity, job satisfaction and commitment) to participants' indication of whether they adhere to safety regulations or not. In logistic regression, the dependent variable (in this case, Safety compliance) is transformed to a dichotomous variable (i.e. "safety compliant" vs. "non-compliant") in order to classify cases that do and do not exhibit the variable of interest. Results of this regression are presented in Table 4 below.

Table 4

Logistic Regression Predicting Likelihood of Safety Compliance

							95% C.I.for Odds Ratio	
	B	S.E.	Wald	Df	*p*	Odds Ratio	Lower	Upper
Age	-.033	.027	1.510	1	.219	.967	.918	1.020
Level of Education	.216	.147	2.151	1	.142	1.241	.930	1.657
Type of Employment	.222	.302	.543	1	.461	1.249	.691	2.256
Total Job Insecurity	-.105	.264	.160	1	.689	.900	.537	1.509
Total Work Stress	-.708	.481	2.166	1	.141	.493	.192	1.265
Job Satisfaction	.806	.308	6.835	1	.009	2.239	1.224	4.097
Affective Commitment	-.176	.359	.239	1	.625	.839	.415	1.697
Constant	.771	1.827	.178	1	.673	2.163		

The baseline model indicated that 59,2% of the sample could be classified. In other words, it is estimated that 59,2% of the sample would indicate that they are safety compliant, but only because a higher percentage of respondents indicated that they indeed

are. Testing of the model with the first set of independent variables (Age, Level of Education, Type of Employment) included proved to be only statistically significant at the $p \leq 0{,}10$ level ($\chi^2=6{,}16$; $df=3$). The Hosmer-Lemeshow Test indicated a non-significant value ($\chi^2=10{,}10$; $p=0.26$), which indicates support for the model. By examining the Cox and Snell R^2 and the Nagelkerke R^2 (referred to as "pseudo R^2 statistics"; Pallant, 2007, p. 174), it was seen that the model unfortunately only explains between 5% and 6,7% of the variance, which is of course rather low. This model actually correctly classified only 57,5% of cases correctly.

In the second step of the regression, the work-related variables of stress, job insecurity, job satisfaction and commitment were added, and this model proved statistically significant ($p=0{,}01$). The Cox and Snell R^2 and the Nagelkerke R^2 now indicated that the model explained significantly more variance (i.e. between 14,5 and 19,6% of the variance). The Hosmer-Lemeshow Test indicated a non-significant value ($\chi^2=6{,}14$; $p=0{,}63$), which still indicates support for the model. For this model, the percentage accuracy in classification rose to 64,2%, which is somewhat better than the baseline model (64,2% *vs*. 59,2%)

Inspection of Table 4 indicates that of all the independent variables, only Job satisfaction made a statistically significant contribution to the prediction of Safety Compliance. Examining the odds ratio does however indicate that if someone is satisfied with their job, they are 2,24 times more likely to be safety compliant than someone who is not satisfied with their job.

DISCUSSION

The main aim of this research was to investigate the relationships between work stress, job insecurity, job satisfaction, organisational commitment and workplace safety compliance. Since many of these scales have not been used in the South African context previously or limited evidence for their reliability in the South African context exists, the first focus was on an investigation into the reliability of the different scales.

Results indicate that Chronbach alpha coefficients obtained for the measuring instruments of job satisfaction were acceptable. However work stress, job insecurity and affective organisational commitment were adjusted to improve reliability. After correcting and collapsing scales, a solution was found where all indicators of the variables of interest showed acceptable reliability for the current sample. The components of work stress, role clarity and role conflict showed acceptable reliability for the current sample whereas the dimensions of qualitative and quantitative role overload had to be corrected and collapsed in order to reach an acceptable level of reliability. Quantitative and qualitative job insecurity measuring instruments were combined to form total job insecurity. In previous South African and international research, (Hellgren et al., 1999; Pienaar et al., 2007) these sub-scales were, however, found to be reliable. Most of these scales have proven reliable in previous international research (Näswall et al., 2006), and findings in this study might indicate that the scales need further refinement and contextualization in a South African research domain.

When the investigation focused on the relationships between experienced work stress, job insecurity and safety compliance, it was seen that stress and insecurity were strongly and positively related, which can be linked to the work of some researchers who found job insecurity to be a classic work stressor, meaning that job insecurity is a type of stress mainly related to doubts about the continuation of employment (Ashford, Lee, & Bobko, 1989; Lim, 1996, Greenhalgh & Rosenblatt, 1984; Mattesson & Ivancevich, 1987). Both stress and insecurity were negatively related to safety compliance. Thus, if you have more stress and more insecurity, you may be less safety compliant. This confirms what most researchers (Dawson, 1991; Hofmann, Jacobs & Landy, 1995; Hofmann & Stetzer, 1998; Janssens, Bret & Smith, 1995; Kotze, 2005; Van Zyl, 2003) found in their studies. It was also seen that satisfaction and commitment are strongly related, which is in line with previous research (Kotze, 2005; Paul & Maiti, 2005; Probst & Brubaker; Ramakau, 2006; Van Zyl, 2006; Weiss et al., 1967). On the contrary, Van Rooyen (2006) found no significant relationship between job satisfaction and organisational commitment. Job insecurity was found to relate positively with affective organisational commitment,

although the relationship is not significant. On the same relationship Cooks (2007) found job insecurity to relate practically, significantly and negatively to affective organisational commitment. Job satisfaction was found to relate negatively to work stress and job insecurity confirming previous findings (Paul & Maiti, 2005; Probst & Brubaker), however, the correlation is not significant. In contradiction with what previous researchers (Dunbar, 1993; Probst & Brubaker, 2003; Ramakau, 2004; Robbins, 1998; Rossouw & Bews, 2002) found, however, both satisfaction and commitment did not have significant correlational relationships with safety compliance. It is interesting to note here that it is the work-related experiences of insecurity and stress that relate to safety compliance, while none of the attitudinal variables (satisfaction and commitment) showed a statistically significant relation to safety compliance.

As a final step, a logistic regression was performed in order to clarify the contribution of work-related attitudes and experiences (work stress, job insecurity, job satisfaction and commitment) to participants' indication of whether they adhered to safety regulations or not. The findings indicate that job satisfaction is the best predictor of safety compliance. This suggests that employees who are satisfied with their jobs are more likely to be safety compliant. Concomitantly, it can thus be argued that an increase in job satisfaction may bring about an increase in safety compliance. This confirms what has been found in earlier studies (Ashworth & Peake, 1994; Paul & Maiti, 2005; Probst & Brubaker; Van Zyl, 2003).The findings of this research indicate that the relationships of age, insecurity, stress and commitment with safety compliance are all negative (B-values). This suggests that an increase in work stress will decrease the probability of a case recording, in this case indicating low safety compliance. This confirms what other researchers (Ashford et al., 1989; Ashworth & Peake, 1994; Paul & Maiti, 2005; Probst & Brubaker, 2006) found in their studies. The same negative relationship was found to exist between job insecurity and safety compliance, also suggesting that an increase in job security will decrease the probability of safety compliance, and confirming previous research (Ashford et al., 1989; Ashworth & Peake, 1994; Paul & Maiti, 2005; Probst & Brubaker, 2006). This means employees experiencing high work stress and/or job insecurity will exhibit low safety compliance.

Contrary to what other researchers (Ashworth & Peake, 1994; Paul & Maiti, 2005; Probst & Brubaker; Van Zyl, 2003) found in their studies, this study found the relationship of affective commitment and safety compliance to be a negative one, albeit non-significant. This suggests that an increase in affective commitment will decrease the frequency of ignoring safety rules, in this case indicating low safety compliance. Therefore employees experiencing affective commitment to the organisation will not necessarily be safety compliant. According to Kreitner and Kinicki (2004), when employees move beyond organisational commitment towards organisational identification, they see the organisation as an extension of themselves. This suggests that some committed employees might choose not to report safety accidents because they might see accidents as a failure of the organisation, which is in turn, reflects poorly on them. It is recommended that this psychological dynamic be investigated further.

LIMITATIONS

The data used in this investigation was collected during a time of great uncertainty in the mining industry. One of the operations was, for example, divided into two separate entities, which had a direct impact on the job insecurity of employees. This was later coupled with the worldwide economic downturn where everybody was guarding their jobs with everything they had. This had a direct impact on employees' work stress and job insecurity.

Furthermore, the sample did not represent the entire organisation, and is based on a convenience sample. Systematic sampling error may have played a role in the sense that it was precisely those employees who are safety compliant that consider it important to also participate in the survey. The role of social desirability can also not be discounted; safety is an important issue in mining, and it is expected that all employees should be aware of safety issues and comply with safety requirements.

The cross-sectional nature of the research had its own limitations. A longitudinal design or mixed method approach could have demonstrated stronger causal relations and conclusions. A combination of interview, observations and repeated surveys over an extended period of time could have enhanced our understanding of these complex relationships. Safety compliance is also only indicated by a single item. Although the use of single-item measures is not an uncommon practice in Psychology, future investigations may look at a broader, multi-item scale to investigate safety compliance.

REFERENCES

Adams, D., du Plessis, A. G., Gumbie, A., & Willis, R. P. H. (2007). *Introduction to safety practice in South African Mines*. Braamfontein: Creda Communications

Allen, N. J. & Meyer, J. P. (1990). The measurements and antecedents of affective, continuance and normative commitment to the organisation. *Journal of Occupational Psychology, 63*, 1 – 8.

Ashford, S., Lee, C., & Bobko, P. (1989). Content, causes and consequences of job insecurity: A theory-based measure and substantive test. *Academy of Management Journal, 32*, 803 – 829.

Ashworth, S. G. E. & Peake, A. V. (1994). *Assessment of the dominant circumstances and factors giving rise to accidents in the gold and Platinum Mining Industries*. Pretoria: SIMRAC

Badenhorst, C. J. (2006). Occupational health risk assessment: overview, model and guide for South African mining industry towards a holistic solution. Unpublished Doctoral thesis. North-West University, Potchefstroom

Beehr, T. A., Walsh, J. T., & Taber, T. D. (1976). Relationship of stress to individually and organisationally valued states: Higher order needs as a moderator. *Journal of Applied Psychology, 61*, 41 – 47.

Brayfield, A. H., & Rothe, H. F. (1951). An index of job satisfaction. *Journal of Applied Psychology, 86*, 386 – 400.

Bezuidenhout, A. A. (1992). *Die invloed van enkele organisasie-effektiwiteitsdimensies op beroepsveiligheid.* [*The influence of some organisational effectiveness dimensions on workplace safety*]. Unpublished Masters dissertation, University of South Africa (UNISA).

Buitendach, J. H., & De Witte, H. (2005). Job insecurity, extrinsic and intrinsic job satisfaction and affective organisational commitment of maintenance workers in a parastatal. *South African Journal of Business Management, 36*(2), 27 – 37.

Cohen, J. (1988). *Statistical power analysis of the behavioural sciences* (Rev. ed.). Orlando, FL: Academic Press.

Coleman, D. F., Irving, G. P., & Cooper, C. L. (1999). Another look at the locus of control – organisational commitment relationship: It depends on the form of commitment. *Journal of Organisational Behavior, 20*, 995 – 1001.

Cooks, M. A. J. (2007). Job insecurity, affective organisational commitment and general health: the role of work locus of control. Unpublished Masters dissertation, North-West University, Vanderbijlpark

Cooper, C. (1999). *What is behaviour safety?* Retrieved on 22 October 2007 from: www.behaviouralsafety.com.

De Jager, H. (2003). *Burnout, engagement of stress of medical practitioners.* Unpublished Masters dissertation, Potchefstroom University for Christian Higher Education, Potchefstroom.

Dawson, S. (1991, 6 – 8 February). *Managing safety offshore. Offshore Operations Post Piper Alpha. Paper 13.* London: Marine Management (Holdings) Ltd.

DeFrank, S. R. & Ivancevich, J. M. (1988). Stress on the job: An executive update. *Academy of Management Executive, 12*(3), 55 – 66.

Dekker, S. W., & Schaufeli, W. B. (1995). The effects of job insecurity on psychological health and withdrawal: A longitudinal study. *Australian Psychology, 30*(1), 57 – 103.

De Witte, H. (2000). Arbeidsethos en jobonzekerheid: Meting en gevolgen voor welzijn, tevredenheid en inzet op het werk (Work ethics and job insecurity: Assessment and consequences for well-being, satisfaction and performance at work). In R. Bouwen, K. De Witte, H. De Witte, & T. Tailllieu (Eds.), *Van Groep tot gemeenskap* (From group to community). Leuven: Garant, pp. 325 – 350.

Dollard, M. F., Winefield, A. H., & Winefield, H. R. (2003). *Occupational stress in the service professions.* New York: Taylor & Francis.

Dunbar, E. (1993). The role of psychological stress and prior experience in the use of personal protective equipment. *Journal of Safety Research, 24*, 181 – 187.

Ferguson, J. (2000). *Strategies to improve occupational safety at Rietspruit mine*. Unpublished Masters dissertation, Milpark Business School.

Fourie, J. S. (1974). *Prevention of accidents and the development of a safety programme for open mining and iron ore recasting*. Unpublished Masters dissertation, University of South Africa (UNISA).

Gardner, J. W. (1998). *Can change management be successfully implemented at a gold mine to improve safety and productivity?* Unpublished Masters dissertation, University of Cape Town.

Geller, E. S. (1996). *Working safe: How to help people actively care for health and safety.* Boca Raton: CRC Press LLC.

Greenhalgh, L., & Rosenblatt, Z. (1984). Job insecurity: Towards conceptual clarity. *Academy of Management Review, 9*, 438 – 448.

Hellgren, J., Sjöberg, A., & Sverke, M. (1997). Intention to quit: Effects of job satisfaction and job perceptions, in F. Avallone, J. Arnold,& K. de Witte (Eds.). *Feelings work in Europe* (pp. 415 – 423). Milano: Guerini.

Hellgren, J., Sverke, M., & Isaksson, K. (1999). A two-dimensional approach to job insecurity: Consequences for employee attitudes and well-being. *European Journal of Work and Organizational Psychology, 8*, 179 – 195.

Heymans, D. R. (2000). *Job Insecurity, job satisfaction and organisational commitment*. Unpublished Masters dissertation, Potchefstroom University for Christian Higher Education, Potchefstroom.

Hofmann, D. A., Jacobs, R., & Landy, F. (1995). High reliability process industries: Individual, micro, and macro organisational influences on safety performance. *Journal of Safety Research, 26*, 131 – 149.

Hofmann, D. A., & Stetzer, A. (1998). The role of safety climate and communication in accident interpretation: Implication from negative events. *Academy of Management Journal, 41*, 644 – 657.

Ivancevich, J. M. & Mattesson, M. T. (1996). *Organisational Behavior and Management* (4th. ed.). Boston, MA: Irwin McGraw-Hill

Janssens, M. J., Brett, J. M., & Smith, F. J. (1995). Confirmatory cross-cultural research: Testing the viability of a corporation-wide safety policy. *Academy of Management Journal, 38*, 364 – 382.

Jones, E. E. (1979). The rocky road from acts to dispositions. *American Psychologist, 34*, 107 – 117.

Karasek, R. A., & Theorell, T. (1990). *Healthy work: Stress, productivity and reconstruction of working life*. New York: Basic Books.

Kendonlin, I., (1993). Burnout of female and male nurses in shift work. *Ergonomics, 36*, 141 – 147.

Khan, H. & Cooper, C. L. (1993). *Stress in the dealing room.* London: Routledge.

Kletz, T. A. (1985). *An engineer's view of human error*. Warwickshire. England: The Institution of Chemical Engineers.

Kotze, C. G. P. (2005). *Occupational stress, organisational commitment and ill health of employees at a University of Technology.* Unpublished Masters dissertation, North-West University, Potchefstroom.

Kreitner, R. & Kinicki, A. (2004). *Organizational behaviour (6th ed)*. Boston, MA: Irwin McGraw-Hill.

Landy, F. J., & Conte, J. M. (2004). *Work in the 21st century*. New York: Blackwell.

Lawrence, A. C. (1974). Human error as a cause of accidents in gold mining. *Journal of Safety Research, 6*(2)*,* 76 – 88

Le Roux, A. (2005). Job demands, job resources, and work related flow of employees in the mining industry in South Africa. Unpublished Masters dissertation. North-West University, Potchefstroom.

Meyer, J. P., Allen, N. J., & Smith, C. (1993). Commitment to organisations and occupations: Extensions and test of a three-component conceptualization. *Journal of Applied Psychology, 87*, 538 – 551.

Moller, G. P. (2003). *The implementation and evaluation of behaviour based safety interventions at Sishen Iron Ore Mine.* Unpublished Doctoral thesis: Potchefstroom University for Christian Higher Education, Potchefstroom .

Monk, T., & Folkard, S. (1985). Shift work and performance. In S. Folkard, T., Monk (Eds). *Hours of work* (pp. 239 – 252). Chichester: Wiley

Mouton, J. & Marais, H. C. (1990). *Basic concepts in the methodology of social sciences.* Pretoria: Human Sciences Research Council.

Näswall, K., Baraldi, S., Richter, A., Hellgren, J., & Sverke, M. (2006). *The salaried employee in the modern working life: Threats and challenges. Technical report on the sample, data collection, and measurement properties of the instruments*. Stockholm, Sweden: SALTSA Joint programme for working life research in Europe.

Neal, A., Griffin, M. A., & Hart, P. M. (2000). The impact of organizational climate on safety climate and individual behaviour. *Safety Science, 34*, 99 – 109.

Newstrom, J.W., & Davis, K. (2002). *Organisational behaviour: human behaviour at work*. (11th ed.). New York: Mc Graw-Hill.

Nunnally, J. C. & Bernstein, I. H. (1994). *Psychometric theory* (3rd ed.). New York: McGraw-Hill.

Odendaal, E. P. S. (1996). *The consequences of poor illumination on underground mine workers and the subsequent effects on productivity and safety*. Unpublished Doctoral thesis, University of the Witwatersrand.

Pallant, J. (2007). SPSS Survival Manual (3rd. ed.). Berkshire, England: Open University Press.

Paul, P. S. & Maiti, J. (2005). Development and test of a sociotechnical model for accident/injury occurrences in underground coal mines. *Journal of South African institute of Mining and Metallurgy*. *105*(1), 43 – 55.

Peng, C. J., Lee, K. L. & Ingersoll, G. M. (2002). An introduction to Logistic Regression analysis and reporting. *Journal of Educational Research*, *9*(1), 2 – 13

Pienaar, J., Sieberhagen, C. J. & Mostert, K. (2007). Investigating turnover intentions by role overload, job satisfaction and social support moderation. *South African Journal of Industrial Psychology, 33*(2), 62 – 67

Probst, T. M., & Brubaker, T. L., (2001). The effects of job insecurity on employee safety outcomes: Cross-sectional and longitudinal explorations. *Journal of occupational Health Psychology, 6*(2), 139 – 159.

Raath, J. B. (1993). Meeting the safety challenges facing mine managers in a changing South Africa. *Leon Commission Report 1*(1), 106 – 112.

Ramakau, J. L. (2006). *The relationship between job insecurity, job satisfaction, affective organisational commitment and work locus of control*. Unpublished Masters dissertation, North-West University ,Vanderbijlpark.

Rizzo, J. R., House, R. J., & Lirtzman, S. I. (1970). Role Conflict and Ambiguity in Complex organizations. *Administrative Science Quarterly, 15*, 150-163

Robbins, S. P., Odendaal, A., & Roodt, G. (2003). *Organisational Behaviour: Global and Southern African Perspective*. Pinelands: Pearson Education South Africa

Rothmann, S., & Malan, M. M. (2006). Occupational stress of engineers in South Africa. *Southern African Business Review*, *10* (2), 1 – 16

Rossouw, D., & Bews, N. (2002). The importance of trust in a changing business environment. *Management Today*, *18*(2), 26-27.

Seccombe, A. (2007). SA mine safety strike to halt output. Retrieved on 31 October 2008 from: www.miningmx.com.

Shaughnessy, J. J., & Zechmeister, E. B. (1997). *Research methods in psychology* (4th ed.). New York: McGraw-Hill.

Simpson, G. C. & Widdas, M. (1992). Reducing the major incident/accident risk. *The Mining Engineer. 12* (3), 259 – 265.

Smith, M. J. (1993). *Working in the grave: the development of a health and safety system on the Witwatersrand gold mines, 1900 – 1939.* Unpublished Masters dissertation, Rhodes University.

South Africa, Department of Minerals and Energy. (2004). *Mine Health and Safety Inspectorate Annual Report*. Pretoria: Government press.

South Africa, Department of Minerals and Energy. (2008). *Mine Health and Safety Inspectorate Annual Report.* Pretoria: Government press.

Spector, P. E. (1997). *Job satisfaction: Application, assessment, causes, and consequences.* London: Sage

SPSS Inc. (2007). *SPSS 12.0 for Windows.* Chicago, IL: Author.

Sverke, M., Hellgren, J., & Öhrming, J. (1999). Organizational restructuring and health care work: A quasi-experimental study. In le Blanc, P. M., Peeters, M. C. W., Bussing, A., & Schaufeli, W. B. (Eds.), *Organisational Psychology and health care: European contributions* (pp. 15-32). Munchen: Rainer Hampp Verlag

South African Government. (1996). *Mine Health and Safety Act, 26*. Pretoria: GCIS

Travers, C. J. & Cooper, C. L. (1996). *Teachers under pressure. Stress in the teaching profession.* London: Routledge.

Thinane, G. (2005). *Job insecurity, job satisfaction, organisational commitment, burnout and work engagement of personnel after an incorporation of tertiary educational institution.* Unpublished Master's dissertation, North-West University, Vanderbijlpark.

Tshabalala, M. E. (2004). *Job insecurity, organisational commitment and job satisfaction of engineers in a parastatal.* Unpublished Masters dissertation, North-West University, Potchefstroom.

The Star (2007, December.5). *Mine Safety is a human right.* Retrieved on 6 December 2008 from: www.thestar.co.za.

Van Rooyen, B. (2006). Employees' work outcomes associated with psychological contract within private training institutions. Unpublished Masters dissertation, North-West University, Potchefstroom.

Van Vuuren, T., Klandermans, B., Jacobson, D., & Hartley, J. (1991). Predicting employees' perceptions of job insecurity. In J. Hartley, D. Jacobson, B. Klandermans, & T. van Vuuren. *Job insecurity: Coping with jobs at risk* (pp.65-78). London: Sage Publications.

Van Zyl, Y. (2003). *Occupational stress, burnout, job satisfaction, work engagement, and organisational commitment of educators on senior level in the Sedibeng West District.* Unpublished Masters dissertation: Potchefstroom University for Christian Higher Education, Vanderbijlpark.

Weiss, D. J., Dawis, R. V., England, G. W. & Lofquist, L. H. (1967). *Manual for the Minnesota Satisfaction Questionnaire.* Minneapolis, MN: University of Minnesota.

Zohar, D. (1980). Safety climate in industrial organizations: Theoretical and applied implications. *Journal of Applied Psychology, 65*, 96 – 102.

CHAPTER 3

CONCLUSIONS, LIMITATIONS AND RECOMMENDATIONS

The purpose of this chapter is to provide an analysis of the literature and empirical results of the study. Conclusions with regard to the research questions posed in the first chapter will be drawn. The limitations of the current study will be pointed out and recommendations for the organisation as well as for future research will be made.

3.1 CONCLUSIONS

3.1.1 Conclusions from literature

The following conclusions are made with regards to the components of work stress (role overload, role clarity and role conflict), job insecurity, affective organisational commitment, job satisfaction and safety compliance. These conclusions address the first specific objective regarding the conceptualization of these constructs set out for this study.

Work stress was conceptualised as consisting of role conflict, role overload and role clarity (DeFrank & Ivancevich, 1998; Nelson & Burke, 2000; Newstorm & Davies, 2002; Rothmann & Malan, 2006; Schaufeli & Brubaker, 2002; Van Zyl, 2005). Role overload is the degree to which inadequate time, training and resources affect performance. Role conflict is the inconsistent and conflicting expectations of a person within an uncertain role, and role ambiguity is undisclosed or unknown expectations of a person within a certain role, also known as lack of role clarity. A reduction in work stress was found to give employees enough time and focus to address safety compliance matters in their workplaces (Ashworth & Peake, 1994; Paul & Maiti, 2005), thereby resulting in fewer workplace accidents.

Job insecurity was conceptualised as the concern felt by a person for the continued existence of his/her job. It refers to the discrepancies that exist between the preferred and the experienced levels of job security (Dekker & Schaufeli, 1995; De Witte, 1997). Q*uantitative* job insecurity refers to concerns about the future existence of the present job, and *qualitative* job insecurity refers to perceived threats of impaired quality (advancement, remuneration, benefits) in the employment relationship (Hellgren et al., 1999). Job insecurity has been associated with increased work stress, reduced job satisfaction, commitment and compliance (Hellgren et.al, 1999; Probst & Brubaker, 2001; Thinane, 2005).

Safety compliance was conceptualised as the extent to which employees adhere to safety procedures and carry out work in a safe manner, without experiencing workplace incidents or accidents (Neal et al., 2000). Workplace accidents (indicating a lack of safety compliance) are triggered by human and organisational factors. Previous research found job insecurity and work stress to have a negative impact on safety compliance, whereas job satisfaction and commitment were found to have a positive impact on safety compliance (Ashworth & Peake, 1994; Probst & Brubaker, 2001; Ramakau, 2006; Van Zyl, 2003).

Job satisfaction was conceptualised as a positive emotional state reflecting affective reactions to the perceived content and characteristics of specific facets of the job situation (Hellgren et al., 1997, based on Brayfield & Rothe, 1951). Employee satisfaction was found to increase safety compliance and decrease workplace accidents (Probst & Brubaker, 2001; Ramakau, 2006).

Organisational commitment was conceptualised as a psychological state (a combination of both attitudinal and behavioural approaches) (Hellgren et al., 1997, based on Brayfield & Rothe, 1951) that characterise the employee's relationship with the organisation. It affects the employees' decision to remain with the organisation (Meyer & Allen, 1997). Affective commitment specifically refers to an employee's emotional attachment to, identification with, and involvement in the organisation based on positive feelings

towards the organisation (Allen & Meyer, 1996). Commitment was found to impact positively on acceptance of company rules, regulations and policies (Ramakau, 2006; Van Zyl, 2003), which also implies a positive impact on safety compliance (Paul & Maiti, 2005).

3.1.2 Conclusions in terms of the empirical objectives

- *The first empirical objective was to determine the relationship of work stress and job insecurity with workplace safety compliance, job satisfaction and organisational commitment in a mine.*

The correlation coefficients reveal that work stress has a negative and significant relationship with safety compliance. This suggests that an increase in work stress will produce a reduction in safety compliance and therefore an increase in proneness to workplace accidents. This confirms what most researchers (Ashworth & Peake, 1994; Gillespie et al., 2001; Hofmann & Stetzer, 1998; Kendonlin, 1993; Kotze, 2005; Monk & Folkard, 1985; Paul & Maiti, 2005 Van Zyl, 2003) found; that job related stress has a negative effect on professional work, including a higher prevalence of workplace accidents.

Some researchers (Gillespie et al., 2001; Hofmann & Stetzer, 1998; Kotze, 2005; Paul & Maiti, 2005 Van Zyl, 2003) found job related stress to have a negative effect on the experience of work and personal welfare. This includes low organisational commitment, low job satisfaction and a higher prevalence of workplace accidents. Contrary to what these researchers found about the relationship of safety compliance with job satisfaction and affective commitment, the correlation coefficients of this study indicate that the relationship between workplace accidents and affective commitment is not significant, implying that an increase in affective commitment might not necessarily bring about an increase in safety compliance.

The correlation coefficients of this study indicate that the relationship between safety compliance and job satisfaction is not significant, implying that an increase in job satisfaction might not necessarily bring about a corresponding increase in safety compliance. This is contrary to some researchers who suggest that employee satisfaction increases profits, lowers grievances, and decreases safety incident rates (Dunbar, 1993; Probst & Brubaker, 2003; Ramakau, 2004; Robbins, 1998; Rossouw & Bews, 2002).

The relationship of work stress and job insecurity is significant, confirming job insecurity as an important contributor to the experience of work-related distress (Ashford, Lee, & Bobko, 1989; Lim, 1996, Greenhalgh & Rosenblatt, 1984; Mattesson & Ivancevich, 1987). The relationship of work stress and job insecurity with affective commitment was found to be insignificant, contrary to Paul and Maiti (2005) and Probst and Brubaker (2001), who showed these experiences to be related to lower levels of organisational commitment. Job satisfaction and affective commitment have a positive and significant relationship. This confirms that employees with a high level of job satisfaction also experience and exhibit high levels of organisational commitment (Kotze, 2005; Paul & Maiti, 2005; Probst & Brubaker, 2003; Ramakau, 2006; Van Zyl, 2003, Weiss et al., 1967).

- *The second empirical objective was to determine whether, employees' experiences of work stress, job insecurity, job satisfaction and organisational commitment can be used to describe their safety compliance in a mining company.*

The findings of this research indicate that the relationships of job insecurity, stress and commitment with safety compliance are all negative suggesting that an increase in work stress will decrease the probability of a case recording, in this case indicating low safety compliance. The same negative relationship was found to exist between job insecurity and safety compliance, also suggesting that an increase in job security will decrease the probability of safety compliance. This indicates that employees experiencing high work stress and /or job insecurity will exhibit low safety compliance. The results of the logistical regression also indicate that organisational commitment relates negatively to

safety compliance, suggesting that more committed employees may be more prone to workplace accidents and made the only statistically significant contribution to the prediction of Safety Compliance. This indicates that employees' experienced job satisfaction can be used to describe their safety compliance in a mining company.

3.2 LIMITATIONS

During the data collection period, the mining industry was undergoing major restructuring, which lead to a split in one of the operations into two separate entities. This was later coupled with the world wide economic downturn. These circumstances had a direct impact on the work stress and job insecurity of employees. The cross-sectional nature of the data may therefore reflect these idiosyncrasies of the time the data was collected, in reflecting higher than normal levels of job insecurity.

A convenience sample was used and it might be that employees who are especially safety compliant are the ones who considered their participation in the survey important. Systematic sampling error might have therefore played a role

The cross-sectional nature of the research could not demonstrate the causal relations and stronger conclusions that a longitudinal design or mixed method could have yielded. Our understanding of these complex relationships could have been enhanced through a combination of interview, observations and repeated surveys over an extended period of time. Although the use of single-item measures is not an uncommon practice in Psychology, future investigations may look at a broader, multi-item scale to investigate safety compliance.

The use of logistic regression had its own limitations. According to Peng and Ingersoll (2002), large sample sizes are required for logistic regression to provide sufficient numbers in both categories of the response variable, especially where there are more explanatory variables. With small sample sizes, the Hosmer–Lemeshow test has low power and is unlikely to detect subtle deviations from the logistic model.

3.3 RECOMMENDATIONS

In answering the final empirical objective of this study, recommendations are made for future research and for improving safety compliance in this organisation.

3.3.1 Recommendations for managing safety compliance

The results indicate that miners experiencing job insecurity are more likely to err with safety regulations and thereby be involved in workplace accidents. It is hereby recommended that for employee safety compliance to increase, thereby decreasing workplace accidents, the mine should consider increasing employee job security. It is recommended that where possible, mining companies dedicate resources to address the root of job insecurity among their employees.

The findings of this study confirmed that when employees experience work stress (consisting of role clarity, role overload and role conflict), they are most likely going to give attention to the source of their stress and disregard safety compliance, and therefore be involved in workplace accidents (Fourie, 1974; Moller, 2003; Probst & Brubaker, 2001). It is therefore recommended that miners be clarified on their roles (addressing both role clarity and role conflict) before they are expected to perform their jobs. This might be in the form of an on-the-job induction and performance management system designed to address their specific needs. Also, clear reporting lines may decrease role conflict. Where miners are experiencing role overload, their safety compliance also decreases and they may be more prone to workplace accidents. It is recommended that the workload per miner is addressed through work design and job grading. These will address the work stress problem and therefore increase safety compliance. Companies can consider other mechanisms of managing work stress including the implementation of an Employee Assistance Programmes (EAP).

Job insecurity was found to have a negative relationship with safety compliance. The harsh working conditions in the mines contribute to job insecurity (Ashworth & Peake,

1994; Le Roux, 2005; Paul & Maiti, 2005). It is recommended that supervisors undergo interpersonal skills, people and stress management skills training to help reduce the harshness of the working environment. The company could also consider establishing a work-life balance management unit that will support and educate people on leading a balanced lifestyle to ensure that social stress is not projected in the workplace and perceived as work stress.

The findings of this study indicate that only job satisfaction significantly predicted safety compliance. It is recommended that mining companies investigate mechanisms of enhancing employee job satisfaction and reducing dissatisfaction as a way of increasing safety compliance in the workplace. Kreitner and Kinicki (2004) suggest that job satisfaction can be enhanced by ensuring that the characteristics of a job allow an individual to fulfill his or her needs (need fulfillment), meeting employee expectations (such as good pay and promotional opportunities) and treating employees with fairness and equity.

3.3.2 Recommendations for future research

Future research should continue to address ways of improving miner safety compliance and accident reduction. More specifically, future research should focus on finding ways of reducing work stress and improving job security as well as job satisfaction for miners.

Future research should continue to investigate predictors of workplace accidents and safety compliance. Once that is established it will be easier for mining companies to design strategies that will address the occurrence of workplace accidents and foster safety compliance.

Future research should also focus on designing mechanisms that increase job satisfaction, which was found to make a statistically significant contribution to the prediction of

Safety Compliance. This will increase safety compliance in the workplace and reduce workplace accidents.

Future investigations may look at a broader, multi-item scale to investigate safety compliance as a build-up on the single-item measure that was used in this study. There is also a need to look into the job insecurity and work stress (comprising of role overload, role ambiguity and role conflict) measuring instruments to strengthen the reliability of the scales. For the purpose of this study some items had to be collapsed in order to improve the reliability of the scales.

3.4 CHAPTER SUMMARY

In this chapter conclusions regarding the theoretical and empirical objectives of the study were drawn. The limitations of the research were discussed and recommendations for the organisation as well as for future studies were pointed out. All theoretical and empirical objectives formulated for this research have been deduced.

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REFERENCES

Allen, N. J. & Meyer, J. P. (1990). The measurements and antecedents of affective, continuance and normative commitment to the organisation. *Journal of Occupational Psychology, 63*, 1 – 8.

Ashford, S., Lee, C., & Bobko, P. (1989). Content, causes and consequences of job insecurity: A theory-based measure and substantive test. *Academy of Management Journal, 32*, 803 – 829.

Ashworth, S. G. E. & Peake, A. V. (1994). *Assessment of the dominant circumstances and factors giving rise to accidents in the gold and Platinum Mining Industries*. Pretoria: SIMRAC

Brayfield, A. H., & Rothe, H. F. (1951). An index of job satisfaction. *Journal of Applied Psychology, 86*, 386 – 400.

Buitendach, J. H., & De Witte, H. (2005). Job insecurity, extrinsic and intrinsic job satisfaction and affective organisational commitment of maintenance workers in a parastatal. *South African Journal of Business Management, 36*(2), 27 – 37.

DeFrank, S. R., & Ivancevich, J. M. (1988). Stress on the job: An executive update. *Academy of Management Executive, 12*(3), 55 – 66.

Dekker, S. W., & Schaufeli, W. B. (1995). The effects of job insecurity on psychological health and withdrawal: A longitudinal study. *Australian Psychology, 30*(1), 57 – 103.

De Witte, H. (2000). Arbeidsethos en jobonzekerheid: Meting en gevolgen voor welzijn, tevredenheid en inzet op het werk (Work ethics and job insecurity: Assessment and consequences for well-being, satisfaction and performance at work). In R. Bouwen, K. De Witte, H. De Witte, & T. Tailllieu (Eds.), *Van Groep tot gemeenskap* (From group to community). Leuven: Garant, pp. 325 – 350.

Dunbar, E. (1993). The role of psychological stress and prior experience in the use of personal protective equipment. *Journal of Safety Research, 24*, 181 – 187.

Fourie, J. S. (1974). *Prevention of accidents and the development of a safety programme for open mining and iron ore recasting*. Unpublished Masters dissertation, University of South Africa (UNISA).

Greenhalgh, L., & Rosenblatt, Z. (1984). Job insecurity: Towards conceptual clarity. *Academy of Management Review, 9*, 438 – 448.

Hellgren, J., Sjöberg, A., & Sverke, M. (1997). Intention to quit: Effects of job satisfaction and job perceptions, in F. Avallone, J. Arnold,& K. de Witte (Eds.). *Feelings work in Europe* (pp. 415 – 423). Milano: Guerini.

Hellgren, J., Sverke, M., & Isaksson, K. (1999). A two-dimensional approach to job insecurity: Consequences for employee attitudes and well-being. *European Journal of Work and Organizational Psychology, 8*, 179 – 195.

Hofmann, D. A., Jacobs, R., & Landy, F. (1995). High reliability process industries: Individual, micro, and macro organisational influences on safety performance. *Journal of Safety Research, 26*, 131 – 149.

Hofmann, D. A., & Stetzer, A. (1998). The role of safety climate and communication in accident interpretation: Implication from negative events. *Academy of Management Journal, 41*, 644 – 657.

Ivancevich, J. M., & Mattesson, M. T. (1996). *Organisational Behavior and Management* (4th. ed.). Boston, MA: Irwin McGraw-Hill

Kendonlin, I., (1993). Burnout of female and male nurses in shift work. *Ergonomics, 36*, 141 – 147.

Kreitner, R. & Kinicki, A. (2004). *Organizational behaviour (6th ed)*. Boston, MA: Irwin McGraw-Hill.

Lawrence, A. C. (1974). Human error as a cause of accidents in gold mining. *Journal of Safety Research, 6*(2)*,* 76 - 88

Meyer, J. P., Allen, N. J., & Smith, C. (1993). Commitment to organisations and occupations: Extensions and test of a three-component conceptualization. *Journal of Applied Psychology, 87*, 538 – 551.

Moller, G. P. (2003). *The implementation and evaluation of behaviour based safety interventions at Sishen Iron Ore Mine.* Unpublished Doctoral Thesis: Potchefstroom University for Christian Higher Education, Potchefstroom .

Monk, T., & Folkard, S. (1985). Shift work and performance. In S. Folkard, T., Monk (Eds). *Hours of work* (pp. 239 – 252). Chichester: Wiley

Mouton, J. & Marais, H. C. (1990). *Basic concepts in the methodology of social sciences.* Pretoria: Human Sciences Research Council.

Näswall, K., Baraldi, S., Richter, A., Hellgren, J., & Sverke, M. (2006). *The salaried employee in the modern working life: Threats and challenges. Technical report on the sample, data collection, and measurement properties of the instruments*. Stockholm, Sweden: SALTSA Joint programme for working life research in Europe.

Neal, A., Griffin, M. A., & Hart, P. M. (2000). The impact of organizational climate on safety climate and individual behaviour. *Safety Science, 34*, 99 – 109.

Newstrom, J.W., & Davis, K. (2002). *Organisational behaviour: human behaviour at work*. (11th ed.). New York: Mc Graw-Hill.

Nunnally, J. C. & Bernstein, I. H. (1994). *Psychometric theory* (3rd ed.). New York: McGraw-Hill.

Pallant, J. (2007). SPSS Survival Manual (3rd. ed.). Berkshire, England: Open University Press.

Paul, P. S. & Maiti, J. (2005). Development and test of a sociotechnical model for accident/injury occurrences in underground coal mines. *Journal of South African institute of Mining and Metallurgy*. *105*(1), 43 – 55.

Peng, C. J., Lee, K. L. & Ingersoll, G. M. (2002). An introduction to Logistic Regression analysis and reporting. *Journal of Educational Research*, *96*(1), 2 – 13

Pienaar, J., Sieberhagen, C. J. & Mostert, K. (2007). Investigating turnover intentions by role overload, job satisfaction and social support moderation. *South African Journal of Industrial Psychology, 33*(2), 62 – 67

Probst, T. M., & Brubaker, T. L., (2001). The effects of job insecurity on employee safety outcomes: Cross-sectional and longitudinal explorations. *Journal of occupational Health Psychology, 6*(2), 139 – 159.

Ramakau, J. L. (2006). *The relationship between job insecurity, job satisfaction, affective organisational commitment and work locus of control*. Unpublished Masters dissertation, North-West University ,Vanderbijlpark.

Rizzo, J. R., House, R. J., & Lirtzman, S. I. (1970). Role Conflict and Ambiguity in Complex organizations. *Administrative Science Quarterly, 15*, 150-163

Robbins, S. P., Odendaal, A., & Roodt, G. (2003). *Organisational Behaviour: Global and Southern African Perspective*. Pinelands: Pearson Education South Africa

Rothman, S., & Malan, M. M. (2006). Occupational stress of engineers in South Africa. *Southern African Business Review*, *10* (2), 1 – 16

Rossouw, D. & Bews, N. (2002). The importance of trust in a changing business environment. *Management Today*, *18*(2), 26-27.

Shaughnessy, J. J., & Zechmeister, E. B. (1997). *Research methods in psychology* (4th ed.). New York: McGraw-Hill.

SPSS Inc. (2007). *SPSS 12.0 for Windows.* Chicago, IL: Author.

Sverke, M., Hellgren, J., & Öhrming, J. (1999). Organizational restructuring and health care work: A quasi-experimental study. In le Blanc, P. M., Peeters, M. C. W., Bussing, A., & Schaufeli, W. B. (Eds.), *Organisational Psychology and health care: European contributions* (pp. 15-32). Munchen: Rainer Hampp Verlag

Thinane, G. (2005). *Job insecurity, job satisfaction, organisational commitment, burnout and work engagement of personnel after an incorporation of tertiary educational institution.* Unpublished Master's dissertation, North-West University, Vanderbijlpark.

Tshabalala, M. E. (2004). *Job insecurity, organisational commitment and job satisfaction of engineers in a parastatal.* Unpublished Masters dissertation, North-West University, Potchefstroom.

Van Zyl, Y. (2003). *Occupational stress, burnout, job satisfaction, work engagement, and organisational commitment of educators on senior level in the Sedibeng West District.* Unpublished Masters dissertation: Potchefstroom University for Christian Higher Education, Vanderbijlpark.

Van Vuuren, T., Klandermans, B., Jacobson, D., & Hartley, J. (1991). Predicting employees' perceptions of job insecurity. In J. Hartley, D. Jacobson, B. Klandermans, & T. van Vuuren. *Job insecurity: Coping with jobs at risk* (pp.65-78). London: Sage Publications.

Weiss, D. J., Dawis, R. V., England, G. W. & Lofquist, L. H. (1967). *Manual for the Minnesota Satisfaction Questionnaire.* Minneapolis, MN: University of Minnesota.

Zohar, D. (1980). Safety climate in industrial organizations: Theoretical and applied implications. *Journal of Applied Psychology, 65*, 96 – 102.