

Role-specific stress, physical and psychological health and social support in a mining training academy

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Mini-dissertation submitted in partial fulfilment of the requirements for the degree Magister
Commerci in Industrial Psychology at the North-West University, Potchefstroom Campus

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November 2011

Potchefstroom

FOR THE READER'S ATTENTION

The reader is reminded of the following:

- All the references in and the style of this mini-dissertation are according to the prescribed *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.
- The mini-dissertation is submitted in the form of a research article and the APA guidelines were followed in constructing tables.
- The first chapter in this mini-dissertation presents the research proposal. The first chapter is therefore in a different voice than subsequent chapters.

ACKNOWLEDGEMENTS

I would like to thank my Heavenly Father for being there every step of the way and for giving me the strength to complete this research.

I would also like to express my sincere gratitude to the following people, without your help and support this dissertation would have been impossible. May God bless you!

- Prof Jaco Pienaar, thank you for all your help, guidance, time and patience. You are truly the best study leader anyone can ask for. I always knew that I could count on you for guiding me in the right direction when I got a bit lost and giving me excellent advice.
- Nelma Erasmus for the language editing. The professional level of your work is outstanding. Thank you for all your help and effort with this dissertation.
- To the company the study was compiled in. Thank you for your time, effort and willingness to complete the survey.
- My parents, Las and Manda. You had faith in me when I didn't believe in myself, you picked me up when I was down and you cared and understood in the most difficult times. I love you both so much and appreciate all your support and understanding more than you will ever know. Thank you for always being there for me. I am extremely blessed to have you in my life.
- All my friends and family for your unselfish support and for being there every step of the way.

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SUMMARY

Title: Role-specific stress, physical and psychological health and social support in a mining training academy

Key words: Work stress, stress, role conflict, role ambiguity, role overload, depression, quality of sleep, medication, social support.

The mining industry in South Africa plays a significant role in the economy of the country. South Africa is rated as one of the world's largest producers of key reserves – gold, manganese ore and platinum- and the high level of industrial and production skills in the mines also contributes to the country's success. Although the gold mining industry's contribution is of the utmost importance, it is also under pressure to remain competitive and cost-efficient. Old shafts, worsening health of employees, ore bodies that are not always in their prime phase, the radical increase in the annual electricity tariffs and the possibility of decreased gold prices contribute to the decline in the gold mining industry's success.

The objective of this study was to investigate the relationship between role-specific stress and physical and psychological health, and to determine whether social support has a moderating effect in this relationship for employees in a mining training academy. A cross-sectional survey design was used and a convenience sample ($n=437$) was taken from a South African gold mining company, where the only criterium for inclusion was to be employed by the organisation at the time the research took place.

Descriptive statistics and inferential statistics were used to analyse the data. The measuring instruments used in this study were proven to be reliable. The results indicate that role stressors and physical and psychological health problems are positively related. It also shows that social support can decrease role-specific stress and that social support - especially from colleagues and supervisors - can help to reduce depression and improve the quality of sleep. Furthermore, logistic regression analyses were used to determine whether role stress and social support hold any predictive value regarding physical and psychological health. It was found that if participants' experience role-specific stress and they receive support - especially from supervisors - it can predict their quality of sleep and the use of medication (physical

health). The findings also indicate that role stress can predict the experience of depression with regards to psychological health. However, the moderating effect of social support between role stress and depression was not supported in this research.

To conclude, recommendations for the organisation and future research are made.

OPSOMMING

Titel: Rolspesifieke stres, fisiese en psigologiese gesondheid en sosiale ondersteuning in 'n mynopleidingsakademie.

Sleutelwoorde: Werkstres, stres, rolkonflik, rolonduidelikheid, roloorlading, depressie, kwaliteit van slaap, medikasie, sosiale ondersteuning.

Die mynbedryf in Suid-Afrika speel 'n belangrike rol in die ekonomie van die land. Suid-Afrika word beskou as een van die wêreld se grootse produseerders van sleutelreserwes – goud, mangaanerts en platinummetale – en die hoë vlak industriële en produksievaardighede in die mynwese dra ook by tot die land se sukses. Alhoewel die goudmynbedryf se bydrae van uiterse belang is, is dit ook onder druk om kompetender en koste-effektief te wees. Ou skagte, die verslegtende gesondheid van werknemers, ertsliggame wat nie in hul mees produktiewe fase is nie, die radikale verhoging in die jaarlikse elektrisiteitstarief asook die moontlikheid van 'n verlaging in die goudprys dra by tot die afname in die sukses van die goudmynbedryf.

Die doelwit van hierdie studie is om die verhouding tussen rolspesifieke stressors en fisiese en psigologiese gesondheid te ondersoek, en om te bepaal of sosiale ondersteuning 'n modererende effek op dié verhouding vir werknemers in 'n mynopleidingsakademie het. 'n Dwarsdeursnee-ontwerp is gebruik en 'n gerieflikheidsteekproef ($n=437$) van 'n Suid-Afrikaanse goudmynorganisasie is geneem. Die enigste kriterium vir insluiting was om tydens die steekproef by die organisasie werksaam te wees.

Beskrywende en inferensieële statistiek is gebruik om die data te analiseer. Die meetinstrumente wat gebruik is in die studie se betroubaarheid is bewys. Die resulte toon dat rolstressors en fisiese en psigologiese gesondheidsprobleme positief verband hou met mekaar. Dit toon verder dat sosiale ondersteuning rolspesifieke stres kan verminder en dat sosiale ondersteuning, veral van kolleegas en toesighouers, kan help om depressie te verminder en die kwaliteit van slaap te verbeter. Verder is logistiese regressie-analises gebruik om te bepaal of rolstres en sosiale ondersteuning enige voorspelbaarheidswaarde het ten opsigte van fisiese en psigologiese gesondheid. Die bevinding is dat, indien deelnemers

rolspesifieke stres ervaar en hulle ondersteuning ontvang, veral van toesighouers, dit hulle kwaliteit van slaap en die gebruik van medikasie kan voorspel (fisiese gesondheid). Die bevindings toon verder aan dat rolstres die ervaring van depressie ten opsigte van psigologiese gesondheid kan voorspel. Die modererende effek van sosiale ondersteuning tussen rolstres en depressie is egter nie in hierdie navorsing ondersteun nie.

Ter afsluiting word aanbevelings vir die organisasie en toekomstige navorsing aan die hand gedoen.

CHAPTER 1

INTRODUCTION

This mini-dissertation focuses on the moderating effect of social support on the relation between role-specific stress and physical and psychological health.

The problem statement is discussed in this chapter, whereupon the research objectives are set out. Following this, the research method is discussed and the division of chapters is given.

1.1 PROBLEM STATEMENT

1.1.1 Overview of the problem

Exhaustion, tiredness, weariness and low energy of employees are increasing daily and play a significant role in occupational health and safety aspects, especially in industries such as mining, which are characterised by hard physical work (www.anglogoldashanti.com). Depression is likewise increasing in organisations and employers must start giving considerable attention to the health of employees as it will affect their work performance and the productivity of the organisation (Lerner & Henke, 2008). Depression can affect a person's ability to learn and to make effective decisions, memory, and psychomotor speed (Boone et al., 1994; Palmer, Boone, Lesser, & Wohl, 1996; Steffens et al., 2006). Kessler, Blazer and McGonagle (1994) found that 8% to 18% of a population is likely to experience a major depressive episode at least once in their lives. Depression is also a disorder which can reoccur. Various researchers found that over 80% of people that have experienced depression before are likely to experience it more than once, and 50% of recovered depressed people are likely to relapse within two years (Belsher & Costello, 1988; Keller, Lavori, & Mueller, 1992).

South Africa is known worldwide as a country which is rich in natural resources such as platinum, manganese, chrome, vanadium and gold (www.dme.gov.za). These minerals play a critical role in the economy of South Africa and the mining industry, therefore contributing significantly to the wealth of South Africa. The mining industry put a significant amount of

focus on their employees and business partners, as can be seen in some mining organisations' values and missions (www.anglogoldashanti.com). The organisation that forms the focus of this mini-dissertation believes that if it treats its employees equally and respect each employee's unique contribution towards the organisation, they will perform to the best of their abilities. They also emphasise the importance of valuing each employee for who he or she is (www.anglogoldashanti.com). One of their - and other mining organisations' - core values and business principles is to provide a safe and healthy working environment, including a commitment to ensure that occupational injuries and illnesses will be kept to the minimum (www.anglogoldashanti.com; www.miningweekly.co.za). Depression, as an illness, is an extremely important aspect in organisations and needs a lot of consideration when focusing on the wellness of employees (Anderson, 2008).

The gold mining industry upon which this research is focused is constantly affected by the supply of and demand for gold, the price of gold and macro-economic aspects like inflation, interest and exchange rates and other economic variables (www.anglogoldashanti.com; www.businessday.co.za). This fluctuation in the price of gold can put enormous pressure on mining organisations to perform better; if the demand for gold decreases, production decreases and layoffs become a possibility. All of these can place stress on employees to perform better. The current economic recession also adds further stress. Previous research has shown that constant stress can have extremely harmful effects on employees' physical and psychological health, which can impact on job performance and employee turnover, which in turn influences organisational outcomes (Kahn & Byosier, 1992; Viator, 2001).

Social support has been shown to reduce work-related stress (Oginska-Bulik, 2005), as well as the occurrence of depressive and anxiety disorders (Plaisier et al., 2007). In other words, social support can be seen as a buffer against stressors in the workplace (Cooper, 1998) and can shield the harmful effects of these stressors on physical and psychological well-being (Cohen & Wills, 1985; Sarason, Sarason, & Gurung, 2001). Various researchers have also shown that low levels of social support can increase the risks of health problems (Paterniti, Niedhammer, Lang, & Consoli, 2002; Stansfeld, Fuhrer, Shipley, & Marmot, 1999). Confirming the classic findings of Cobb (1976), as well as Leff and Vaughn (1985), who found that social support can help people stay mentally and physically healthy in stressful

situations and can protect them from various pathological states by reducing the stress response and subjective distress. It is even said that low levels of social support can enhance the risk of death (Takizawa et al., 2006).

In conclusion, employees today are under a lot of pressure to perform better, work faster and be more efficient. Employers have high expectations of their workforce and this can create anxiety, stress and depression which can affect the employees' work performance. It is therefore important that organisations focus on the health of employees in order to create a safe and healthy working environment. This mini-dissertation will make a significant contribution as it will establish the amount of work stress currently experienced by employees in a mining organisation and how it influences the wellness of employees. It will also determine how social support moderates the effect on the relationship between work stress and health.

1.1.2 Literature review

Work-related stress is common in any society and can lead to various health problems. While it is not a disease itself, ongoing stress can lead to both physical and psychological problems such as depression and sleeplessness (Plotkin, 2009).

The economic cost, as well as the cost for employers regarding the impact of health problems on work performance, is significantly high all over the world (Lam, Michalak, & Yatham, 2009; Conti & Burton, 1994). Wang (2007) found that these cost can include the cost of lost work productivity, replacing employees, absenteeism, workday interruptions and unpaid leave. This study will focus on the relationship between work stress (specifically role-related stress) and physical and psychological health, and the influence of social support as a "moderator".

Stress can be defined, according to Seyle (1974), as a non-specific reaction of the body to any demand made upon it. Newell (2002) contributes to this by stating that stress refers to a situation in which an individual feels threatened and unable to deal effectively with the threat. Robbins (1993) further adds that stress can be seen as a situation where the person is

confronted by an opportunity, a constraint (forces that prevent a person from doing what he/she desires), a demand (the loss of something that he/she desires) and in situations where the outcome is perceived to be uncertain and important. Most of these definitions include the term ‘demands’; it becomes clear that stress is associated with demands and constraints made upon a person. Stress is also seen as a process rather than an end state; it varies from relational to environmental causes and is also differently defined by each and every person (Goldsmith, 2007). According to Robbins, people tend to overlook the fact that stress is an “additive phenomenon”; stress builds up in a person as each new stressor adds to the current level of stress.

Work can also be seen as a stressor, seeing that most people spend more time at work than anywhere else (Baron, 2001). There are several definitions of the term work stress in literature. It can be defined as the extent to which job duties are difficult to fulfil (Chu, Lee, & Hsu, 2006). Goldsmith (2005, p. 290), also define work stress as “the harmful physical and emotional responses that occur when the requirements of the job do not match the capabilities, resources, or needs of the worker”. Bergh and Theron (2006) confirm this by stating that work stress has an influence on the physical and psychological well-being of employees if their resources are exceeded.

It is important to note that the sources of stress can be internal (e.g. worrying about something) and external (e.g. an irrational boss or organisational change) (Goldsmith, 2007). Robbins (1993) also identifies sources of stress and classifies them into environmental, organisational and individual sources. Environmental sources include economic, political and technological uncertainty; organisational sources include task demands, role and interpersonal demands, and individual sources include family problems, economic problems and personality. It is possible to integrate these sources of stress with the above-mentioned internal and external sources by grouping environmental and organisational sources under external sources and individual sources under internal sources.

This study will focus on work stress within the role context; the focus therefore will be on the organisational category (external sources of stress), as explained above. Every person plays a number of roles in his life, often simultaneously. These can include the role of employee,

partner, child, friend and club member. With each of these roles comes a set of expected behaviour patterns which define how a person should behave in a given role (Newell, 2002; Robbins, 1993). Role demands are a source of stress and Robbins (p. 640) states that “role demands relate to pressures placed on a person as a function of the particular role he or she plays in the organization”. Role demands include many role-related aspects, such as role conflict, role ambiguity or clarity, or role overload and role underload. Role conflict, role ambiguity and role overload are the most common sources of work stress, as founded by Hang-yue, Foley and Loi (2005). This mini-dissertation will only focus on these three role related determinants of work stress.

Firstly, role conflict is experienced when a person in a given role is confronted with conflicting demands or expectations from different people (Baron, 2001). This happens when the expectations of a role- or roles - clash. Most role conflict situations are temporary, but some are more permanent, for example a foreman who is frequently caught in the middle between demands from supervisors and demands from subordinates, which often differ (Rizzo, House, & Lirtzman, 1970). Conflicting demands are very common in the work situation, and different types of role conflict can be identified. These types include person-role conflict (conflict between a person’s attitudes or values and demands from a role), intra-sender conflict (conflicting messages from one person), intra-role conflict (conflicting expectations from different people) and inter-role conflict (conflict between different roles held by one person) (Newell, 2002). The classic findings of Rizzo et al. (1970) adequately indicated the impact of role conflict on a person; it is related to experienced difficulty in making effective decisions, decreased satisfaction, poor coping behaviour and experiences of stress and anxiety.

Secondly, role ambiguity (also sometimes termed “lack of role clarity”) is when role expectations are not clearly understood and an employee is not sure what he or she must do (Robbins, 1993). It refers to a lack of clarity about expectations or unclear job requirements (Newell, 2002; Rizzo et al., 1970). The seminal findings of Kahn, Wolfe, Quinn, Snoek and Rosenthal (1964) indicated that role ambiguity can be the result from changes in technology, personnel, the environment and also from organisational size and rapid organisational growth. Role ambiguity, similar to role conflict, can have a negative impact on the employee

and his or her performance, which in turn has undesirable consequences for the organisation (Tremblay & Roger, 2004).

Lastly, role overload is experienced when the person fulfilling a given role is expected to do more than time allows and when role demands are overwhelming (Kahn et al., 1964; Robbins, 1993; Shaw, Fields, Thacker, & Fisher, 1993). Role overload can be divided into two categories: (1) quantitative role overload, where too much work is required for the time given, and (2) qualitative role overload, where a person does not have, or believe that he or she doesn't have, the abilities and skills necessary to perform the job (Beehr, Walsh & Taber, 1976; Sverke, Hellgren & Öhrming, 1999).

Hang-yue et al. (2005) found that role conflict, role ambiguity and role overload are the most important sources of work stress and that they can have a negative impact on the organisation as well as on the employee's well-being. Robbins (1993) emphasises the undesirable consequences of work stress on the organisation by focusing on the cost associated with stress-related health problems. These can include lost time, increased accidents, higher insurance premiums and lower productivity. Organisations cannot ignore the impact of stress and must actively seek to do something about it.

The negative impact that stress can have on an employee's health can be subsumed under three general categories namely physical, psychological and behavioural symptoms (Robbins, 1993). Physical symptoms refer to any change in the person's health and can include changes in metabolism, increased heart rate, increased blood pressure, headaches, loss of sleep and increased chances of a heart attack (Robbins, 1993). Psychological symptoms can be seen in cases where stress cause changes in the person's attitude and disposition. The most common psychological effect of work stress is job dissatisfaction. Stress can present itself in other psychological states like anxiety, tension, depression, boredom and irritability (Robbins, 1993). Behavioural symptoms include any changes in the person's behaviour like changes in their productivity, turnover and absence (Robbins, 1993). The focus of this study will be on the physical and psychological symptoms of stress.

The quality of sleep and the use of medication, as physical indicators of the effects of stress, will be the main focus of this study. Stress is associated with sleep problems and impaired functioning, which in turn are associated with workplace and traffic accidents. Lack of sleep has become an important health problem which needs considerable attention (Leger, Guilleminault, Dreyfus, Delahaye, & Paillard, 2000; Nevid, Rathus, & Greene, 2006; Ohayon, 1996). The use of medication, on the other hand, has also been found to be a physical effect of stress. When in distress people sometimes tend to use medication to help with pain, worrying, sleeping, as well as indigestion problems (Doi, Minowa, Okawa, & Uchiyama, 2000). Sleep problems and medication usage are therefore good indicators of firstly the presence of stress, and secondly the visible, physical manifestation thereof.

Depression, a psychological symptom, can also be seen as a health-related problem created by work stress. A considerable body of research over the past few decades has found a relationship between work-related stress and depression. These researchers who were involved with this research have come to the conclusion that work stress and strains are strongly associated with depressed mood or major depression (Aneshensel, 1986; Kessler, 1997; Makosky, 1982). Anderson (2008) also supports this statement by emphasising that stress is one of the strongest risk factors for developing depression.

Depression can be defined as a mood disorder where extreme unhappiness or sadness, lack of energy, diminished interest or pleasure in things that used to be interesting or create pleasure, is experienced by individuals (Baron, 2001; Ebersole, Hess, Touhy, & Jett, 2005). Anderson (2008) noted that depression is a systemic disease that can have extremely harmful effects in a person's life.

The typical work force - the biggest part of the population - suffers from depression and if depression is experienced, it is likely that a person's work performance will be influenced by the physical and cognitive symptoms associated with depression (Lam et al., 2009). Previous research has found that depression can result in job loss, increased absenteeism/working time loss and presenteeism/reduced work performance/work-cutbacks, increased conflict, early retirement, increased accidents, on-the-job functional limitations, unemployment and even lower morale (Lerner & Henke, 2008; Lim, Sanderson, & Andrews, 2000; Pflanz, & Ogle,

2006). Contributing to this, Lam et al. (2009), found that the higher the level of depression present, the higher the possibility that less work and poorer quality of work gets done and more mistakes occur.

When considering the above, it is clear that quality of sleep, the use of medication and depression are extremely serious consequences of work-related stress and that both work-related stress and health problems can have a major impact on the organisation. According to Bergh and Theron (2006), however, numerous moderators can be applied to reduce these stressors and their impact on a person and prevent health problems or at least minimise their occurrence.

The moderating role of social support

Social support is a multifaceted phenomenon for which there is no single definition, but has been defined in various ways. Some define it as the information or provision of aid that the individual receives from others that makes him feel loved, well-regarded or increases his self-esteem (Lee et al., 2006; Revenson & Gibofsky, 1995). Others define social support as: (1) feelings about being supported, perceived availability of support or actual support received (Schwarzer & Knoll, 2007), (2) the existence or availability of others who want to help enhance well-being or protect one from adverse life events (Sarason, Levine, & Basham, 1983; Sorensen, 2008), or (3) the exchange of resources or any resource provided by others, including emotional support, intimacy and positive interactions (House, 1981; Schwarzer, Knoll, & Rieckmann, 2004; Shumanker, & Brownell, 1984). Although several definitions of social support exist in literature, as seen above, a conclusion can be made that social support refers to the resources or actual help (information, material aid, emotional relief) provided by others.

Why is social support then an important construct for organisational research? There is a wide variety of reasons for this; Goldsmith (2007) found that when a person experiences stress he tends to become focused on coping mechanisms, which can include social support. Social support has been shown to reduce the levels of job-related stress and has positive effects on health (House, 1981; Price, 2001). It can be seen as a moderator against stressors in

the work environment, reducing the effects of stress (Beehr, 1995). Cohen and Wills (1985) and Beehr (1995) found that social support has main effects and moderating effects when stress is experienced. The main effect model, also known as direct effect, suggests that an effective social support network promotes better health regardless of an individual's exposure to stressors. On the other hand, the stress-buffering model suggests that social support protects an individual against the negative effects of stress. Although previous research has found that the main effects are relatively constant, it has also been found that the moderating effects of social support are not as consistent and that they may have reverse buffering effects that can worsen the effects of stress and have a negative impact on health (Beehr, 1995). In other words, social support can have a positive or negative impact on health and well-being in times of distress. Both models have previously been researched by numerous researchers, especially the buffering model (Bloom, 1990; Dalgard, Bjork, & Tambs, 1995; Dean, 1986; Wilcox, 1981).

There are four well-known sources of social support, namely support from supervisors, co-workers, partners and other family members and friends. Stress is an inseparable part of organisational life and can no longer be ignored (Ashkanasy, Hartel, & Zerbe, 2000). It is therefore important that organisations begin to focus on the support they can provide to their employees. Support from supervisors and co-workers has been found to reduce role stressors, time demands, work-family-conflict and even depression (Carlson & Perrewe, 1999). Co-workers can for example cover for one another in the work situation and supervisors can provide time off. Support at work can thus diminish work overload and work distress. Support from partners or family members, on the other hand, can include comforting each other, help taking care of children or doing house work, as well as providing valuable feedback (Goldsmith, 2007; Maestas et al., 2008). Similar to supervisor and co-worker support, partner and family support is also associated with low levels of depression (Vanfossen, 1981).

The influential work of Payne and Fletcher (1983) established that when an organisation provides social support to employees, it is likely that employees will cope better with high job demands and work stress in general. Several other researchers who explored the moderating effect of social support found that when work stress is experienced and low levels

of social support are provided, it can have a negative effect on job satisfaction, work performance and levels of employee adjustment (Landsbergis, Schnall, Deitz, Friedman, & Pickering, 1992; Watson & Pennebaker, 1989).

Various researchers have found a positive relationship between social support and health, stating that social support can promote healthy behaviour and reduce health-compromising behaviour like poor diet, lack of exercise, sleep problems and the abuse of alcohol (Cohen, Underwood, & Gottlieb, 2000; Geertsen, 1997; Taylor, 2002). Social support can also improve psychological well-being (Bogossian, 2007; Power, Stansfeld, Matthews, Manor, & Hope, 2002). Several studies indicate that social support plays an important role in mental and emotional health and is associated with lowered levels of depression (Aneshensel, 1986; Paykel, 1994; Pearlin, Lieberman, Menaghan, & Mullan, 1981). Although research linking social support, stress and depression has not uniformly been consistent, most studies come to the conclusion that when work stress is experienced, it can be worsened by low levels of social support which can contribute to the occurrence of depression. This study will contribute to previous findings and will determine the relationship between stress and physical and psychological health, and the role of social support in the mining industry.

Furthermore, when focusing on depression, work-related stress and social support it is also important to consider certain biographic determinants, because the occurrence of these constructs can differ in certain groups. Previous studies have found that women are more likely to suffer from depression than men, unmarried people have a greater chance of experiencing depression than married people, employed persons report less depression than the unemployed and workers with middle school education have a higher incidence of depression compared to those with a Master's degree (Anderson, 2008; Aneshensel, Frerichs, & Clark, 1981; Cairney, Thorpe, Rietschlin, & Avison, 1999; Goldsmith, 2007; Kessler et al., 1994; Plaisier et al., 2007; Yu, Yao, Ding, Ma, Yang, & Wang, 2006).

The Job-Demand-Control model of Robert Karasek is an extremely important and influential model that provides a theoretical basis in stress research and conceptualises the three constructs, namely work stress, social support and health which are covered in this study. The basic principle of the model is that work stress or strain is produced by high levels of job

demands and low levels of job control (Karasek, 1979). Leisa and Deborah (2000) stated that these are the two most important elements of the work environment that have an impact on the individual's well-being and working life. The model also includes a significant third variable or moderator - social support - which must be taken into consideration to prevent inconsistent findings (Newell, 2002). This model will be used to guide this study; the focus will be on work stress and to encourage healthier work environments through social support.

The objective of this research is thus to determine the relationship between health and work stress and the effect of social support. It is clear that not all research on these constructs has been consistent and these constructs, particularly social support, demand further research. The aim of this research study is then to further understand the moderating effect of social support and the role of the different sources of support on the relationship between health and work stress.

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

- What is, according to the literature, the variables and the relationship between work stress (role conflict, ambiguity and overload), physical and psychological health and social support?
- What is the relationship between work stress, physical and psychological health and social support in a sample of employees in a mining organisation?
- Can work stress and social support be used to predict employees' experience of physical and psychological health?
- Does social support play a moderating role between work stress and physical and psychological health?
- What recommendations can be made to the organisation regarding the variables studied, as well as for future research?

In order to answer the research questions above, the following research objectives have been set:

1.2 RESEARCH OBJECTIVES

The research objectives are divided into general and specific objectives.

1.2.1 General objective

The general objective of this research is to determine the relationship between role-specific stress and physical and psychological health and the effect of social support in a mining training academy.

1.2.2 Specific objectives

The specific objectives of this research are:

- To conceptualise, according to the literature, the variables and the relationship between work stress (role conflict, ambiguity and overload), physical and psychological health and social support.
- To determine the relationship between work stress, physical and psychological health and social support in a sample of employees in a mining organisation.
- To establish whether work stress and social support can be used to predict employees' experience of physical and psychological health.
- To establish if social support plays a moderating role between work stress and physical and psychological health.
- To provide recommendations to the organisations regarding the variables studied, as well as for future research.

1.3 PARADIGM PERSPECTIVE OF THE RESEARCH

A certain paradigm perspective - that includes the intellectual climate and the market of intellectual resources - directs the research (Lundin, 1996; Mouton & Marais, 1992). A paradigm is a set of assumptions, attitudes, concepts, values, procedures and techniques that form a theoretical framework within the general perspective of a discipline (APA, 2007).

Researchers from different disciplines have different preferential research models or paradigms which guide them in their research (Bergh & Theron, 2006). The researchers are therefore bound to direct their research within the framework of these theories, methodologies and research techniques as prescribed by the paradigm. It includes the intellectual climate, discipline, meta-theoretical assumptions and market of intellectual resources.

1.3.1 Intellectual climate

Intellectual climate refers to a set of beliefs, values and assumptions that are accepted as suitable within a discipline at a certain time (Mouton & Marais, 1992). The intellectual climate will direct the research since it is based on meta-theoretical beliefs and values of Industrial Psychology.

1.3.2 Discipline

This research falls within the boundaries of the behavioural sciences and more specifically Industrial Psychology. Industrial Psychology can, according to Muchinsky, Kriek and Schreuder (2005, p. 2), be defined as “the scientific study of people within their work environment and it implies: scientific observation, evaluation, optimal utilisation and influencing of normal and, to a lesser degree, deviant behaviour in interaction with the environment (physical, psychological, social and organisational) as manifested in the world of work. Broadly speaking, the industrial psychologist is concerned with behaviour in the work situation”. Psychology, on the other hand, refers to the scientific study of thinking and behaviour of people in general. Thus, Industrial Psychology is a sub-division or specialist area of Psychology which applies psychological principles, research and theories in the workplace.

A number of areas of specialisation or sub-disciplines can also be distinguished within the Industrial Psychology discipline, namely personnel psychology, organisation psychology, ergonomics, vocational and career counselling, organisation development, consumer behaviour, employment relations and cross-cultural industrial psychology (Muchinsky et al.,

2005). The sub-disciplines of Industrial Psychology that are focused on in this research are personnel psychology and organisational psychology.

Personnel psychology attempts to understand and measure human behaviour. It focuses on the differences between individual behaviour and job performance. This study will describe in detail to what extent individuals experience stress in their work environment and what the impact of their stress is on their work performance. Organisational psychology focuses on the influence that organisations can have on the attitudes and behaviours of employees. It focuses on factors such as role-related behaviour, personal feelings of commitment, social influences and communication within the organisation. Organisational psychology is more concerned about social and group influences. This research attempts to understand the influence of the organisation on an individual's behaviour and health.

1.3.3 Meta-theoretical assumptions

Two paradigms are relevant to this research. Firstly, the literature review is done within the positivistic paradigm and within Karasek's demand control support theory, and secondly the empirical study is done within the positivistic and functionalistic paradigms.

1.3.3.1 Literature review

According to Struwig and Stead (2001, p. 5) the positivist paradigm is a school of thought that "combines a deductive approach with precise measurement of quantitative data so researchers can discover and confirm causal laws that will permit predictions about human behaviour". The positivistic approach is leading the quantitative research. Struwig and Stead (2001, p. 9) further expanded on this by stating that "context-free laws of behaviour are assumed to exist. In addition, the object being researched is assumed to be independent from the investigators, i.e. the researcher can investigate a phenomenon without influencing it or being influenced by it. Such a philosophy leads to reductionism, in which phenomena can best be understood by examining their fundamental or basic aspects, and determinism that subscribes to the belief that all events have causes". This approach should therefore guide the researcher to be neutral and objective in his or her methodology. This research will

emphasise the participants' perception of work stress and illustrate their behaviour in such situations.

1.3.3.2 Empirical study

The positivistic paradigm holds the assumptions that have been discussed above. It emphasises the underlying principles of human beings and that assumes that there is no particular precision which can be revealed by research (May, 1998). Only “facts” can be observed and measured by scientists according to the seminal work of Johnsen (1975). During this research role ambiguity, role overload, role conflict, quality of sleep, use of medication, depression and social support are variables that can be neutrally defined and measured.

The functionalistic paradigm (quantitative research) emphasises the psychological process of a person (Lundin, 1996). It is concerned with understanding human beings in a society in such a way that it produces useful and empirical knowledge (Anon, 2003). Functionalism emphasises the roots and outcomes of human behaviour, the application of problems and the improvement of human life (Van Niekerk, 1996). Making use of the functionalistic paradigm the effects of role-related stress on health will be emphasised.

1.3.4 Market of intellectual resources

The market of intellectual resources refers to a set of beliefs that are directly related to the epistemological status of scientific statements. There are two main categories of epistemological beliefs, namely theoretical and methodological beliefs (Mouton & Marais, 1992).

1.3.4.1 Theoretical beliefs

Theoretical beliefs can be described as beliefs that can make testable conclusions about social phenomena. There are certain conclusions about the ‘what’ and ‘why’ of human phenomena

and they include all models, theories, interpretations and conceptual definitions of the research (Mouton & Marias, 1992).

A. Conceptual definitions

The relevant conceptual definitions are given below:

- **Work stress** can be defined as the requirements of a job which do not match the resources, capabilities, or needs of a worker and which have harmful physical and emotional effects on one (Goldsmith, 2005). Role-specific stress in this research includes all aspects of role ambiguity, role conflict and role overload.
- **Role ambiguity** describes the extent to which an individual understands the expectations and purpose of his or her tasks or job (Rizzo et al., 1970).
- **Role conflict** refers to the incongruity of how an individual thinks he or she should do his or her work and how supervisors or others tell him or her to do it (Rizzo et al., 1970).
- **Role overload (quantitative)** is defined as the feeling of having too much work to do in the time available (Beehr et al., 1976).
- **Role overload (qualitative)** occurs when the individual feels that his or her work is too demanding or too difficult (Sverke et al., 1999).
- **Depression** can be described as a mood disorder in which extreme unhappiness or sadness, lack of energy, diminished interest or pleasure in things that used to be interesting or create pleasure, feelings of hopelessness and other related symptoms of clinical depression are experienced by an individual (Baron, 2001; Bech, Rasmussen, Raabaek Olsen, Noerholm, & Abildgaard, 2001; Ebersole et al., 2005).
- **Quality of sleep** can be defined as waking up in the morning feeling either tired or rested (Gustavsson et al., 2006; Harvey, Stinson, Whitaker, Moskowitz and Virk, 2008).

- *Use of medication* is any medical aid that can be used for pain, worrying, sleeping and indigestion problems (Doi, Minowa, Okawa, & Uchiyama, 2000).
- *Social support* is a multidimensional construct which can be described as a feeling of being supported to actual support received from co-workers, supervisors and family (Schwarzer & Knoll, 2007). Caplan, Cobb, French, Van Harrison and Pinneau (1975) initially defined social support as the quantity and quality of relationships which provide emotional, informational or instrumental support in stressful situations.

B. Models and theories

A model is defined as an abstract or summary that indicates hypothesised relations in a set of data (Kerlinger & Lee, 2000). A theory is defined as “a set of interrelated constructs (concepts), definitions and propositions that present a systematic view of phenomena by specifying relations among variables, with the purpose of explaining and predicting the phenomena” (Kerlinger & Lee, 2000, p. 11). This research will be based on the Demands-Control-Support Theory/Model, Classical Organisation Theory and the Role Theory.

According to Karasek (1979), and Newell (2002), the Demands-Control-Support Theory/Model uses job demands and job control factors, taking into account a person’s perception of the job demands and his or her perceived ability to meet these demands to determine the perceived stress present and stress related illnesses. Thus, stress causes illnesses which can be prevented by social support - a construct that moderates strain.

The Classical Organisational Theory includes the principle of chain of command and the principle of unity of command. The first refers to hierarchical relationships, where authority flows from the top to the bottom of the organisation. The principle of unity of command states that an employee should only receive orders from one supervisor, preventing conflicting orders or expectations from others. The classical theory also states that any role fulfilled by a person in an organisation should have a clear set of required tasks and responsibilities. Role Theory, on the other hand, states that conflicting expectations of

behaviour can result in stress, dissatisfaction and lower performance (Rizzo et al., 1970). Role Theory also states that unclear expectations of a role can cause ambiguity.

1.3.4.2 Methodological beliefs

Methodological beliefs can be defined as beliefs that conclude the type and structure of scientific research and science (Mouton & Marias, 1992). According to Garbers (1996) such beliefs include all methods, approaches and techniques that are used in any research process.

The empirical study is presented within the positivistic and functionalistic frameworks. The root assumptions of the positivistic framework are that knowledge can be obtained from observable facts or events (Van Niekerk, 1996).

The root assumption of the functionalistic framework is on the psychological process of a person and understanding the role of human beings in society.

1.4 RESEARCH METHOD

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

1.4.1 Phase 1: Literature review

In phase 1 a complete review regarding work stress (role conflict, role ambiguity and role overload), physical and psychological health and social support is done. The sources that will be consulted include:

- Library catalogues
- Textbooks
- Academic search lists
- Internet journals

1.4.2 Phase 2: Empirical study

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

1.4.2.1 Research design

The aim of the research design is to guide the researcher in answering the research questions by specifically indicating each event that needs to take place in the research process. The research design refers to the plans and structures that are used (Kerlinger & Lee, 2000).

The research can be classified as descriptive and explorative. Struwig and Stead (2001) define exploratory research as research into an area which has not been studied before or which little is known about, where the researcher wants to develop primary ideas and a research question which is more focused. Descriptive research, on the other hand, refers to the attempt to describe something such as demographic variables. It also attempts to describe a situation, what is going on and what exists (Struwig & Stead, 2001). This specific research focuses on exploratory as well as on descriptive research, seeing that demographic variables and the relationship between variables will be predicted and described.

The specific design that will be used is a survey design, namely a cross-sectional study. This type of design focuses on a specific sample of the population and takes place at a particular time. This design can be used to measure interrelationships among variables within a population. According to Shaughnessy and Zechmeister (1997) this design is ideal to address the descriptive and predictive functions which are associated with correlation research.

1.4.2.2 Participants

The data will be gathered from people in a training facility of a gold mining operation in South Africa. A convenience sample (N=437) will be used where participants will be selected according to availability or accessibility. The only criterion for qualifying for the inclusion in the study is that participants must currently be employed by the mining training academy.

According to Stevens (1996), a convenience sample group is an appropriate method to use for exploratory research. Although minimum efforts are made to ensure that the sample is representative of the population, a convenience sample will provide sufficient information necessary for the specific research.

The sample group will represent a diverse group of employees with regards to job level, gender, children, household, education level, language, employment status, part- or full time employee and union member status. Biographical data will be included for descriptive purposes only.

1.4.2.3 Measuring battery

Work stress (consisting of role ambiguity, role conflict and role overload), depression, quality of sleep, use of medication and social support will be measured with the following instruments:

- **Role ambiguity ((Lack of) Goal clarity).** This instrument was developed using a combination of items from Caplan et al. (1975) and Rizzo et al. (1970). The instrument consists of four items and is scored on a five-point scale. A typical item is *“I know exactly what is expected of me”*, and a high score indicates a higher level of goal clarity. In previous research Näswall, Baraldi, Richter, Hellgren and Sverke (2006) have done a study on four sample groups on two different occasions. They found that the reliability of this instrument was adequate with alpha coefficients ranging from 0.78 to 0.86.
- **Role conflict.** This instrument is modified and adapted based on the scale by Rizzo et al. (1970) and is aimed at measuring role conflict between how the employee thinks the work should be done and how supervisors or others tell them to do it. The instrument consists of four items and is scored on a five-point scale. A typical item is *“I do things that are going to be accepted by one person and not accepted by others”*, and a high score indicates a high level of this construct. In previous research Näswall et al. (2006) have done a study on four sample groups on two different occasions. They have found that the reliability of this instrument was adequate with alpha coefficients ranging from 0.76 to 0.81.

- **Role overload – quantitative.** This instrument consists of three items (Beehr et al., 1976) and is aimed at measuring the feeling of having too much to do in too little time. The instrument is scored on a five-point scale. A typical item is “*I often have too much to do in my job*”, and a high score indicates a high level of work load. In previous research Näswall et al. (2006) have done a study on four sample groups on two different occasions. They found that the reliability of this instrument was adequate with alpha coefficients ranging from 0.73 to 0.81.

- **Role overload – qualitative.** This instrument was developed by Sverke et al. (1999) and is aimed at measuring the sense that the work is too difficult or demanding. The instrument consists of four items and is scored on a five-point scale. A typical item is “*My work contains elements that are too demanding*”, and a high score indicates a high level of this construct. In previous research Näswall et al. (2006) have done a study on four sample groups on two different occasions. They found that the reliability of this instrument was adequate with alpha coefficients ranging from 0.71 to 0.78.

- **Depression.** This 17-item scale was developed by Bech et al. (2001) and is aimed at measuring the most important symptoms of clinical depression (e.g. feelings of hopelessness, low self-worth, lack of interest in life, worrying, guilt and changes in appetite or sleep) and to what extent these symptoms have been present during the last two weeks. There is also an additional item reflecting to what extent these symptoms have been problematic during the last two weeks. The responses were given on a four-point scale. A typical item is “*Have you in the past two weeks felt yourself lacking in strength and energy*”, and a high score indicates a more severe depression. In previous research Näswall et al. (2006) have done a study on four sample groups on two different occasions. They found that the reliability of this instrument was adequate with alpha coefficients ranging from 0.90 to 0.93.

- **Quality of sleep.** This instrument was developed by Gustavsson et al. (2006) and is aimed at measuring sleep problems. The instrument consists of four items and is scored on a five-point scale. A typical item is “*I have difficulties falling asleep*”, and a high score indicates a high level of this construct. In previous research Näswall et al. (2006) have done a study on

four sample groups on two different occasions. They found that the reliability of this instrument was adequate with alpha coefficients ranging from 0.83 to 0.85.

- **Use of medication.** This instrument is aimed at measuring the use of different types of medication. The instrument consists of five items and is scored on a five-point scale. A typical item is “*I use medication for acid indigestion, heart burn or gastric ulcers*”, and a high score indicates a high level of this construct. No previous data in terms of the reliability of this scale in South Africa is available.
- **Social support.** This instrument was developed based on Caplan et al. (1975) and other social support literature and is aimed at measuring social support from co-workers, supervisors and family. The instrument consists of ten items and three factors and is scored on a five-point scale. A typical item is “*I usually receive help from my colleague(s) when something needs to be done quickly*”, and a high score indicates that a sense of support is available. In previous influential research, Caplan et al. (1975) found that the reliability of this instrument was adequate with alpha coefficients ranging from 0.73 to 0.83.
- **Biographical questionnaire.** A biographic questionnaire will be included to gather information about demographic characteristics. Information regarding type (learner/ trainer), gender, children, household status, educational level, language, employment status, part-time or full time employment and union membership participation will be included in the questionnaire.

1.4.2.4 Statistical analysis

The statistical analysis will be carried out with the help of the SPSS-program. The reliability of the constructs will be assessed through the use of Cronbach-alpha coefficients. Descriptive statistics will be used to analyse the data. The use of the correlation coefficients will help determine differences and similarities between the groups regarding their relationships with the different constructs. In terms of the outcome variables (quality of sleep, use of medication and depression) groups will be created to designate high and low levels of the constructs (i.e. “good” and “poor” quality of sleep, “high” and “low” levels of medication usage and “high”

and “low” levels of depression). Logistic regression will then be used to predict which independent variables describe group membership. Physical and psychological health will be used as dependent variables to determine the impact that work stress as well as social support has on health. Logistic regression will then be performed to assess, separately, the impact of the independent variables on the likelihood that participants will report sleep problems, medication usage and depression. The hypothesised moderating effect of social support will be tested for by creating interaction terms of the moderator (social support) with the predictor (work stress) (Aiken & West, 1991).

1.4.2.5 Ethical considerations

Research must always be conducted in an ethical manner. According to Struwig and Stead (2001) ethics refer to a “system of moral, behaviours and rules”. Research ethics provide researchers with moral guidelines on how to conduct research in a morally acceptable manner. These guidelines ensure an ethical climate by stating the following (Struwig & Stead, 2001):

- Approval and permission must be obtained from management.
- Participants should be informed about their rights as well as the type and aim of the research; they must also feel free to forfeit the research at any given point
- The researcher must at all times be respectful towards the participants. This includes confidentiality and autonomy of the information obtained by the participants and respecting the privacy of the participants. The survey is anonymous, thus individuals with physical and psychological health problems will not be identifiable. Feedback to the organisation in terms of groups that score high on the outcome variables will, however, be given for intervention.
- The participants are also entitled to feedback, keeping in mind that the researcher must try to avoid at all times doing any harm to participants, seeing that the welfare of others is a major concern when doing research.

1.5 CHAPTER DIVISION

The chapters in this mini-dissertation are presented as follows:

Chapter 1: Research proposal and problem statement.

Chapter 2: Research article.

Chapter 3: Conclusions, limitations and recommendations.

1.6 CHAPTER SUMMARY

Chapter 1 contains the research proposal, a discussion of the problem was formulated and a motivation for the importance and relevance of this research was given. The general objective of the study is to determine the relationship between role-specific stress and physical and psychological health and the effect of social support in a mining training academy. This was done through an investigation of the literature regarding health, role-specific stress and social support. Research questions were formulated to direct the study. This was followed by a detailed description of the paradigms and methods that will be used to guide and direct the research in terms of methodology. Chapter 2 will be the research article, which will contain the empirical results of the study.

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CHAPTER 2

RESEARCH ARTICLE

ROLE STRESS, PHYSICAL AND PSYCHOLOGICAL HEALTH AND SOCIAL SUPPORT IN A MINING TRAINING ACADEMY

ABSTRACT

Gold mines in South Africa play a significant role in the economy of the country, but they are also under immense pressure to produce and be competitive globally. The objective of this study was to investigate the relationship between role-specific stress and physical and psychological health and to determine whether social support has a moderating effect between these variables. A cross-sectional survey design was used. A convenience sample (N=437) was taken from a South African gold mining company. Descriptive and inferential statistics were used to analyse the data. The results indicated that when an employee experiences role stress, health problems can occur and that social support can be used to reduce stress and improve health. Logistic regression analyses showed that if participants experience role-specific stress and they receive supervisor support, it can predict their quality of sleep and the use of medication. On the other hand, the moderating effect of social support between role stress and depression was not supported in this research.

OPSOMMING

Goudmyne in Suid-Afrika speel 'n belangrike rol in die land se ekonomie, maar is onder enorme druk om te produseer en om wêreldwyd kompetend te wees. Die doelwit van die studie is om die verhouding tussen rolspesifieke stres en fisiese en psigologiese gesondheid te ondersoek en om te bepaal of sosiale ondersteuning 'n modererende effek tussen dié veranderlikes het. 'n Dwarsdeursnee opname ontwerp is gebruik. 'n Gerieflikheidssteekproef (N=437) is by 'n Suid-Afrikaanse goudmyn gedoen en beskrywende en inferensiële statistiek is gebruik om die data te analiseer. Die resulte toon dat wanneer 'n werknemer rolstres ervaar, kan gesondheidsprobleme voorkom. Sosiale ondersteuning kan egter stres verminder en gesondheid verbeter. Logistiese regressie-analises toon dat indien deelnemers rolspesifieke stres ervaar en hulle ondersteuning van die toesighouer ontvang, dit hulle kwaliteit van slaap en die gebruik van medikasie kan voorspel. Daarteenoor is die modererende effek van sosiale ondersteuning tussen rolstres en depressie nie deur die navorsing ondersteun nie.

Mining started as early as 1887 in South Africa. South Africa is rated as one of the world's largest producers of key reserves – gold, manganese ore and platinum- and provides a high level of industrial and production skills and a broad range of research in the mining industry, which forms the basis of South Africa's success in the international economy (Open Directory Project, 1887-2010). In 2006, South Africa was rated as the world's largest producer of gold and platinum, and although the country is currently in the fourth position behind China, Australia and the United States, it still occupies the position as one of the world's main leaders in mining (Ruffini, 2010). Mining is the biggest mineral foreign income earner in South Africa, responsible for 27,4% mineral revenues, with gold and platinum mines employing 56% of South Africa's mining labour force (Open Directory Project, 1887-2010).

The contribution of South African gold mines to the economy cannot be over emphasised. In view of the fact that gold mines play such an important role in the economy of South Africa, one of the country's main focuses is on industrial developmental activities such as new technology, new projects, new approaches and better labour relations (Open Directory Project, 1887-2010).

In sharp contrast to their importance, South Africa's gold mines have also deteriorated. According to Vishnu Pillay, an operator at Gold Fields, the decline of the gold mines is due to the worsening health of employees, especially because of high rates of HIV/Aids, the old shafts and the ore bodies that are not always in their prime phase (Ruffini, 2010). Other factors also have a negative impact on South Africa's gold mines, such as a decision to announce a radical increase in the annual electricity tariffs. It might influence the operations of gold mines, because it may imply further retrenchments of employees as there is a big possibility that unprofitable shafts will have to be shut down (Ryan, 2009). At the same time the gold price also has an impact on gold mines. De Lange (2009) stated that commentators are anticipating decreases in the gold price. They also predict hyperinflation, stating that consumer prices will rise sharply in more developed economies which will influence South Africa's gold mining operations.

Work in general is one of the most common sources of stress in today's world. Work stress can be defined as the negative physical and psychological reactions that occur when one's job duties exceeds one's abilities, resources and needs (Goldsmith, 2005). The causes of stress can range from internal (e.g. feeling that work requirements are too difficult to fulfil) to external (e.g. organisational downsizing) (Goldsmith, 2007). Work in the mining industry is highly stressful as it requires shift work most of the time. Work is also done in tremendous discomfort like being underground, having to deal with loud noises, extreme heat and cramped spaces, as well as the anxiety of constant threat (Moodie, 1994; Thompon, 2005). Mining is also characterised by hard physical work which can lead to fatigue, weariness and low energy levels of employees which plays a significant role in occupational health and safety aspects (www.anglogoldashanti.com).

Mining does not only have an effect on the physical, but also on the psychological aspects of employees. The conditions in which a miner works can have an impact on his wellness, which can lead to depression (Lerner & Henke, 2008). If depression is experienced, the physical and cognitive symptoms associated with it can influence a person's work performance (Lam, Michalak, & Yatham, 2009). Depression is an illness which can affect people's learning ability and their decision making as well as have an impact on their visual-spatial skills, memory, and psychomotor speed (Boone et al., 1994; Palmer, Boone, Lesser, & Wohl, 1996; Steffens et al., 2006).

In conclusion, mine workers experience a great deal of stress on a daily basis. Not only are there global factors and issues in South Africa that put pressure on mine workers that can lead to work-related stress, but there are also factors within the mining environment itself that can contribute to the experience of stress. The mining industry must realise the impact that all these factors have on their employees and the stress that it can create for them (Stephens & Pugmire, 2008). Plotkin (2009) found that ongoing work-related stress is strongly associated with physical and psychological health problems. Taking this into consideration, the focus of this research is then to evaluate the stress experienced by miners and the effect it has on their physical and psychological health.

Role-specific stress

Fulfilling numerous roles in one's life, often at the same time, can create stress, because each role has certain behaviour patterns of how one should behave or act in a given role (Newell, 2002; Robbins, 1993). Role conflict, role ambiguity (or lack of role clarity) and role overload is considered the most common sources of work stress (Hang-yue, Foley, & Loi, 2005).

Role conflict refers to a situation in which people experience incongruity of how they think they should act or perform and how supervisors or others tell them to do their work (Baron, 2001; Rizzo, House, & Lirtzman, 1970). Antòn (2009) found that role conflict does not necessarily influence an employee's work performance directly, but will most likely have an impact on his/her behaviour or attitudes. In accordance with the above, Antòn found that these behaviours or attitudes will most likely result in dissatisfaction with work and/or an intention to leave the organisation.

Role ambiguity, on the other hand, describes the extent to which a person understands the expectations of a specific task or job (Rizzo et al., 1970; Robbins, 1993). It refers to the degree to which an individual is uncertain of what is expected of him or her to do; when job requirements are unclear (Newell, 2002). Tremblay and Roger (2004) reported that earlier research indicates that role ambiguity can result in negative consequences because people tend to feel stressed when goals are not clear. Tremblay and Roger (2004) further stated that these consequences can include decreased satisfaction with supervisors, colleagues, salary and decreased job satisfaction, and that all of these aspects are in turn antecedents to tension, fear, hostility, loss of self-confidence and lower productivity.

Role overload occurs due to the sheer volume of work (Hall, 1995). Two dimensions of role overload can be distinguished, namely (1) quantitative role overload, when a person feels that he/ she has been assigned too much work to do for the time available, regardless of the difficulty of the work involved, and (2) qualitative role overload, when the individual feels that his or her work requires skills, abilities and knowledge beyond that available to him or her (Beehr, Walsh, & Taber, 1976; Sverke, Hellgren, & Öhrming, 1999). According to Hall

(1995) quantitative and qualitative role overload is linked through the interaction of employees' abilities and competence and the conditions of their work.

Previous research found that role overload is one of the most essential components of work stress (Glass, 1990; Jamal, 2005). Role overload is usually experienced in organisations where there is a lack of resources and frequent threats of cutbacks (Yip & Rowlinson, 2006). When role overload is experienced, it can disrupt one's social and family life. Quantitative role overload has been found to have a negative impact on a person's health and can also result in absenteeism due to accidents (Weiler, 2005). French (1989) initially established that the effects of role overload can be reduced when employees perceive that social support is available at work.

Physical and psychological health

Stephens and Pugmire (2008) stated that all employers should become more concerned about the prevention and reduction of stress in the workplace. Workload and unfair work practices are two of the most common aspects which have an important impact on physical and psychological health (Huddleston, Stephens, & Paton, 2007). Strazdins (2004) found that when employees have a positive experience at work - such as receiving social support - it will have a positive effect on their physical health and - although less - also a positive effect on their psychological health. On the other hand, he also found that when employees have a negative experience at work it will have a negative impact on their psychological health, but little effect on their physical health. Regardless of this, Strazdins (2004) also found that psychological distress is strongly associated with poor physical health. Contributing to this, various researchers have examined the relationship between physical and psychological health and established that when exposed to stressful events, psychological functioning has been found to be a potential contributor to a broad range of physical diseases (Cohen & Herbert, 1996; Herbert & Cohen, 1993). It is therefore possible to conclude that there is a strong association between work stress and physical and psychological health.

Physical health is an important aspect that needs considerable attention in the working environment today. Two physical health problems, the quality of sleep and the use of

medication, can be good indicators of current physical health, more so when stress is present. Lack of sleep can influence employees' work performance and have harmful and costly consequences for employers. Employees' quality of sleep can influence their decision-making and productivity as already mentioned (Anon, 1994). According to Nevid, Rathus and Greene (2006) and Ohayon (1996) stress is strongly linked with sleep problems and impaired functioning, which in turn can result in workplace accidents. On the other hand, the use of medication can also be a good indicator that stress is present. Doi, Minowa, Okawa and Uchiyama (2000) found that when people experience stress, the chances of using medication is a lot bigger than when no stress is experienced.

In various models and theories of healthy work organisations, psychological health has been shown to be directly influenced by organisationally related factors (Jaffe, 1995; Shoaf, Genaidy, Karwowski & Huang, 2004). A variety of research has documented that work-related factors have repeatedly been found to be one of the most significant factors in determining employees' health and well-being (Allen, Pahl, & Quine, 1990; Hatton & Emerson, 1995). Akerboom and Maes (2006) stated that organisations should focus more on work-related factors in order to improve employees' and organisations' health. These authors also came to the conclusion that more research is needed about the relationship between organisational factors and the health and well-being of employees.

Depression, a psychological health problem, can also be a consequence of work stress (Anderson, 2008; Wang, 2004). A variety of research concluded that depression and work stress are closely linked (Aneshensel, 1986; Kessler, 1997). Depression is a mood disorder, which on the one hand can have extremely harmful effects on a person (Anderson, 2008; Baron, 2001), and on the other hand negative influences on his or her work performance (Lam et al., 2009). According to Lemer et al. (2010) depression can lead to early retirement, on-the-job functional limitations, absenteeism and sometimes job loss.

Physical and psychological health-related problems can thus be the result of work stress; the effects that health problems can have on employees' performance can influence the organisation's performance and imply certain costs for the organisation (Lam et al., 2009).

Researchers have found that health problems can cost employers in terms of lost work productivity, absenteeism, unpaid leave and workday interruptions (Wang, 2007).

Beehr (1995) and Prince (2001) found that the relationship between work stress and health can be moderated by social support. Social support can be defined as the emotional, informational or material support provided by others (House, 1981; Schwarzer, Knoll, & Rieckmann, 2004). In an organisational setting, social support can lessen the strain on employees caused by work demands and help them to cope (Payne & Fletcher, 1983; Price, 2001). Social support can be applied in organisations to reduce the cost of work-related health problems and health problems in general. A positive relationship between social support and health has been found numerous times (Cohen, Underwood, & Gottlieb, 2000; Geertsen, 1997; Taylor, 2002). Various studies have shown that social support improves mental and emotional health (Aneshensel, 1986; Paykel, 1994; Pearlin, Lieberman, Menaghan, & Mullan, 1981), affecting one's ability to cope with different kinds of life stressors (Furnharn & Walsh, 1991) and moderating or buffering the effects of work-related stressors (Kirmeyer, 1990).

Social support can be derived from supervisors, colleagues and family members. Supervisor support has been shown to have dramatic effects on an employee. Kirk-Brown (1999) found that miners perceived supervisor support as the only source of support that had a major impact on their experience of emotional exhaustion, even though support from family and colleagues was also available to them. This may be because supervisors are able to reduce workload and simplify role expectations (Mayes, 1986). Apart from this, colleague and family support also plays an important role when employees experience work-related stress. Colleagues can for example help with workload and cover for one another, whereas family members can comfort one another and provide valuable feedback (Goldsmith, 2007; Maestas et al., 2008).

In conclusion, it is essential for organisations to focus on social support provided to employees, since social support has a direct effect on employees' experience of work-related stressors and the outcomes of stress such as physical and psychological health problems (Swanson & Power, 2001). The objective of this study was therefore to investigate the

relationship of role stressors to self-reported physical and psychological health outcomes, as indicated by quality of sleep, use of medication and reported depression. It would also be of interest to investigate the moderating effect of work-based and non-work sources of social support on the relation between work-related stress and health.

METHOD

Research design

The design of this research can be classified as descriptive and explorative. Descriptive research is described as an effort to explain certain demographic variables, a specific situation, or what is happening and what is real. On the other hand, exploratory research is when a researcher focuses on an area where no previous research is available or where there is little known, and aims to develop specific ideas and a detailed research question into that area (Struwig & Stead, 2001). Demographic variables and the relationship between different individual and organisational variables are included in this research; the focus is therefore both descriptive and exploratory.

The specific design that was used is a cross-sectional study, executed by means of a survey to gather data and achieve the research objectives. The study is done at one point in time on a specific sample of people to determine the interrelations among variables. According to Shaughnessy and Zechmeister (1997) this design is ideally suited to descriptive and exploratory research.

Participants

The data was gathered from a training academy of a gold mining operation in South Africa. A convenience sample (N=437) was used, where the only criterium for the inclusion in the study was that participants had to be employed by the mining training academy at that stage.

The sample group represent a diverse group of employees with regards to job level, gender, children, household, education level, language, employment status, part- or full time employee and union member status. Biographical data was gathered for descriptive purposes only.

Approval and permission was obtained from management to distribute the questionnaires. Questionnaires were distributed to each available employee in the mining training academy. Participants were allowed to complete the questionnaire at their own time and return it to management, who send it to the researchers. All questionnaires were treated with confidentiality to avoid any harm to participants. After the interpretation of the data, feedback was given to management for intervention.

Table 1

Characteristics of the Participants (n=437)

Item	Category	Frequency	Percentage
Type	Learner	230	52,60
	Trainer	171	39,10
Gender	Male	340	77,80
	Female	93	21,30
Children	Younger than 12	222	50,80
	Older than 12	209	47,80
Household	Single	109	24,90
	Married or living with a partner	257	58,80
	Living with parents	43	9,80
	Divorced or separated	7	1,60
	Remarried	9	2,10
Education	Grade 10 (Standard 8)	52	11,90
	Grade 11 (Standard 9)	34	7,80
	Grade 12 (Standard 10)	196	44,90
	Technical College Diploma	70	16,00
	Technicon Diploma	34	7,80
	University degree (BA, BComm, BSc, Honours)	38	8,70
	Postgraduate degree (Masters or Doctorate)	1	0,20
Language	Afrikaans	115	26,30
	English	25	5,70
	Sepedi	15	3,40
	Sesotho	89	20,40
	Setswana	52	11,90
	isiSwati	9	2,10
	Tshivenda	3	0,70
	isiNdebele	2	0,50
	isiXhosa	70	16,0
	isiZulu	16	3,70
	isiTsonga	21	4,80
	Other	9	2,10
Employment Status	Permanent	290	66,40
	Other	131	30,00
Part-/ Full time	Full time	418	95,70
	Part-time	10	2,30

Union member	Yes	324	74,10
	No	102	23,30

The participants consisted of 52,6% learners, while 39,1% were trainers. The sample consisted mostly of males (77,8%) and over half of the respondents (50,80%) indicated that they had a young child (younger than 12) at home. About one fifth (19,7%) of the participants had an education level lower than a Grade 12 (completed high school). The majority (58,8%) of the participants were married or living with a partner. Furthermore, the sample consisted of 26,3% Afrikaans speaking and 5,7% English speaking participants. The following languages: Sepedi, Sesotho, Setswana, isiSwati, Tshivenda, isiNdebele, isiXhosa, isiZulu, isiTsonga and other languages were representative of most of the other participants, making up 65,6% of the sample. Most of the participants were employed full time (95,7%), on a permanent (66,40) basis, and were union members (74,10).

Measuring instruments

Work stress (consisting of role ambiguity, role conflict and role overload), depression, quality of sleep, use of medication and social support were measured by means of the following instruments:

Role ambiguity ((Lack of) goal clarity). The instrument consists of four items, and *“I know exactly what is expected of me”* is representative of a typical item. Items for this scale were answered using a five point scale, where a high score implies a higher level of goal clarity. The scale is based on the research of Caplan, Cobb, French, Van Harrison and Pinneau (1975) and Rizzo et al. (1970). Näswall, Baraldi, Richter, Hellgren and Sverke (2006) confirmed the reliability of this instrument over four samples of working individuals on two different occasions with alpha coefficients ranging from 0,78 to 0,86.

Role conflict. The instrument consists of four items, and *“I do things that are going to be accepted by one person and not accepted by others”* is representative of a typical item. This scale was answered on a five point scale where a high score implies more role conflict. It is based on the research of Rizzo et al. (1970). Näswall et al. (2006) confirmed the reliability of

this instrument across different samples and times with alpha coefficients ranging from 0,76 to 0,81.

Role overload – quantitative. This instrument is based on the research of Beehr et al.'s (1976) measure of the degree to which a person feels uncertain of what is expected of him/her to do. It consists of three items, where *“I often have too much to do in my job”* is a typical item. Items for this scale were on a five point scale with a high score implying a higher level of workload. Näswall et al. (2006) confirmed the reliability of this instrument across samples with alpha coefficients ranging from 0,73 to 0,81. Previous research with this scale in South Africa showed an alpha coefficient of 0,59. Considering that it was one of the first studies that used this scale, further research is deemed necessary (Pienaar, Sieberhagen, & Mostert, 2007).

Role overload – qualitative. This instrument was developed by Sverke et al. (1999) and measures the degree to which a person feels that his/her work is too difficult or demanding. It consists of four items, with *“My work contains elements that are too demanding”* being a typical item. A high score on a five point scale implies a high level of this construct. Näswall et al. (2006) confirmed the reliability of this instrument with alpha coefficients ranging from 0,71 to 0,78. Previous South African research also indicates that this scale showed an adequate alpha coefficient of 0,77 (Pienaar et al., 2007).

Depression. This instrument consists of 17 items a high score on a four point scale implies that more symptoms of depression are present. It was developed from items by Bech, Rasmussen, Raabaek Olsen, Noerholm and Abildgaard (2001) and Olsen, Jensen, Noerholm, Martiny and Bech (2003) to measure the degree to which symptoms of depression have been present during the last two weeks. A typical item is *“Have you in the past two weeks felt...yourself lacking in strength and energy”*. Näswall et al. (2006) confirmed the reliability of this instrument with alpha coefficients ranging from 0,90 to 0,93. The reliability of this scale in South Africa is indicated with an alpha coefficient of 0,90 (Bonnet, 2007).

Quality of sleep. This instrument was developed by Gustavsson et al. (2006) and is aimed at measuring sleep problems. This instrument consists of four items, where *“I have difficulties*

falling asleep” is representative of a typical item. Items for this scale were formulated using a five point scale (a high score implies a high level of this construct, i.e. poor quality of sleep). Näswall et al. (2006) confirmed the reliability of this instrument with alpha coefficients ranging from 0,83 to 0,85. This scale could not be found in previous South African research and an investigation into its reliability presents a unique contribution of this study.

Use of medication. This instrument consists of five items to measure the use of different types of medication. “*I use medication for acid indigestion, heart burn or gastric ulcers*” is representative of a typical item. Items are scored using a five point scale (a high score implies a high level of this construct i.e. high levels of self-medication or medication usage). No previous data in terms of the reliability of this scale is available in South Africa and results of this study present an important first step in investigating the reliability of the scale locally.

Social support. This instrument was developed by Caplan et al. (1975) to measure social support from co-workers, supervisors and family. Caplan et al. (1975) confirmed the reliability of this instrument with alpha coefficients ranging from 0,73 to 0,83. Previous local research reports sufficient reliability scores of 0,91 for the supervisor and 0,80 for co-worker support scale (Pienaar et al., 2007). It consists of ten items and three factors, where “*I usually receive help from my colleague(s) when something needs to be done quickly*” is representative of a typical item. Scales are scored using the same five point scale.

Biographical questionnaire. To gather information about demographic features of participants, a biographic questionnaire was included in the survey. Information regarding type of employee (learner/ trainer), gender, children, household status, educational level, language, employment status, part- or full time employed and union membership participation were included in the questionnaire.

Statistical analysis

The statistical analysis was conducted with the help of the SPSS-programme (SPSS, 2010). Since the cut-off for most behavioural science research is when p-values are smaller than 0,05, results are regarded as significant if such (Christensen & Stoup, 1991). Cronbach-alpha

coefficients were used to determine the reliability of the constructs and to analyse the biographical data and scales, descriptive statistics were used. Correlation coefficients were used to help determine differences in the relationships between the different constructs. In terms of the outcome variables (quality of sleep, use of medication and depression) groups were created to designate high and low levels of the constructs through a median-split (i.e. “good” and “poor” quality of sleep, “high” and “low” levels of medication usage and “high” and “low” levels of depression). Logistic regression was then used to predict which independent variables describe group membership. Physical and psychological health was used as dependent variables to determine the impact of work stress as well as social support on health. Logistic regression was performed to assess, separately, the impact of the independent variables on the likelihood of reporting sleep problems, medication usage and depression. By creating interaction terms of the moderator (social support) with the predictor (work stress), the hypothesized moderating effect of social support was tested (Aiken & West, 1991).

RESULTS

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

Table 2

Descriptive Statistics and Cronbach Alpha Coefficients of the Measuring Instruments

Item	Mean	SD	Skewness	Kurtosis	α
Goal clarity	4,19	0,70	-1,09*	1,29*	0,62
Role conflict	2,45	0,77	0,39	-0,20	0,56
Role overload (quantitative)	2,92	0,79	-0,03	-0,11	0,45
Role overload (qualitative)	2,45	0,78	0,49	0,35	0,63
Total role overload	2,68	0,68	0,12	0,15	0,70
Social support from colleagues	3,79	0,89	-0,56	-0,07	0,81
Social support from supervisor	3,47	1,10	-0,50	-0,39	0,86
Social support from family	3,59	0,91	-0,40	-0,31	0,76
Depression	1,88	0,49	0,89	1,88*	0,89
Quality of sleep	2,34	0,85	0,68	0,58	0,73
Use of medication	1,62	0,74	1,97*	4,44*	0,81

*High skewness and/or kurtosis

Inspection of Table 2 shows that acceptable Cronbach alpha coefficients were obtained for most of the scales. Most of the alpha coefficients were higher than the guideline of $\alpha > 0,70$,

except those of Goal Clarity, Role Conflict, and Qualitative and Quantitative Role Overload scales (Nunnally & Bernstein, 1994). Although the reliability coefficients of Goal Clarity and Role Conflict appear to be on the low side, they are retained for analysis due to the explorative nature of this study. A new variable for Role Overload namely Total Role Overload was computed. This variable represents Total Role Overload of participants and was constructed by using all the qualitative and quantitative items. Furthermore, the scores on all of the scales were normally distributed except for Goal Clarity, Depression and Use of Medication.

Table 3 below reports the correlations between job stress, social support and physical and psychological health. Pearson product-moment correlation coefficients were used to specify the relationship between all the variables.

Table 3

Correlation Coefficients between Job Stress, Social Support and Physical and Psychological Health

	1	2	3	4	5	6	7	8
1. Goal clarity	-	-	-	-	-	-	-	-
2. Role conflict	-0,40 ^{***}	-	-	-	-	-	-	-
3. Total role overload	-0,34 ^{***}	0,54 ^{***+}	-	-	-	-	-	-
4. Depression	-0,25 ^{**}	0,33 ^{***}	0,38 ^{***}	-	-	-	-	-
5. Social support from colleagues	0,24 ^{**}	-0,20 ^{**}	-0,20 ^{**}	-0,19 ^{**}	-	-	-	-
6. Social support from supervisor	0,28 ^{**}	-0,20 ^{**}	-0,26 ^{**}	-0,10 [*]	0,44 ^{***}	-	-	-
7. Social support from family	0,20 ^{**}	-0,03	-0,16 ^{**}	-0,08	0,48 ^{***}	0,35 ^{***}	-	-
8. Quality of sleep	-0,23 ^{**}	0,23 ^{**}	0,23 ^{**}	0,68 ^{***+}	-0,16 ^{**}	-0,15 ^{**}	-0,07	-
9. Use of medication	-0,19 ^{**}	0,29 ^{**}	0,21 ^{**}	0,48 ^{***}	-0,08	-0,08	-0,09	0,45 ^{***}

* Correlation is significant at the 0,01 level

** Correlation is significant at the 0,05 level

+ Correlation is practically significant $r > 0,30$ (medium effect)

***Correlation is practically significant $r > 0,50$ (large effect)

As can be seen in Table 3, Goal Clarity shows statistically significant negative relationships with Role Conflict (practically significant, medium effect), Total Role Overload (practically significant, medium effect), Depression, Quality of Sleep and Use of Medication. Goal Clarity also shows statistically significant positive relationships with all dimensions of Social Support (Colleagues, Supervisor and Family). Role Conflict shows statistically significant

positive relationships with Total Role Overload (practically significant, large effect), Depression (practically significant, medium effect), Quality of Sleep and Use of Medication. Role Conflict also shows statistically significant negative relationships with Social Support from Colleagues and Supervisors. Total Role Overload shows statistically significant negative relationships with all of the scales of Social Support (Colleagues, Supervisor and Family) and positive relationships with Depression (practically significant, medium effect), Quality of Sleep and Use of Medication. Furthermore, Depression shows statistically significant positive relationships with Quality of Sleep (practically significant, large effect) and Use of Medication (practically significant, medium effect). Depression also shows statistically significant negative relationships with Social Support from Colleagues and Supervisor. On the other hand, Social Support from Colleagues shows a statistically significant negative relationship with Quality of Sleep and statistically and practically significant positive relationships with Social Support from Supervisor (medium effect) and Family (medium effect). Social Support from Supervisor shows a statistically significant positive relationship with Social Support from Family (practically significant, medium effect) and a negative relationship with Quality of Sleep. Lastly, Quality of Sleep shows a statistically and practically significant positive relationship with Use of Medication (medium effect).

In the fourth table the logistic regression analysis reports the likelihood of role stressors and social support to predict quality of sleep.

Table 4

Logistic Regression Predicting Likelihood of Reporting Sleep Problems

	B	S.E.	Wald	df	p	Odds Ratio	95% C.I. for EXP(B)	
							Lower	Upper
Total Overload	0,15	0,19	0,60	1	0,44	1,16	0,80	1,69
Goal Clarity	-0,30	0,19	2,38	1	0,12	0,74	0,51	1,08
Role Conflict	0,22	0,17	1,56	1	0,21	1,24	0,88	1,74
Social Support Colleagues	-0,13	0,16	0,74	1	0,39	0,88	0,65	1,19
Social Support Supervisor	-0,11	0,11	0,88	1	0,35	0,90	0,72	1,12
Social Support Family	-0,02	0,14	0,02	1	0,90	0,98	0,75	1,30
Total Overload_Social Support Colleagues	-0,29	0,24	1,42	1	0,23	0,75	0,47	1,20
Total Overload_Social Support Supervisor	0,45	0,22	4,16	1	0,04*	1,56	1,02	2,40
Total Overload_Social Support Family	-0,03	0,22	0,02	1	0,89	0,97	0,63	1,49
Goal Clarity_Social support Colleagues	-0,38	0,21	3,30	1	0,07	0,69	0,46	1,03
Goal Clarity_Social Support Supervisor	0,05	0,17	0,08	1	0,78	1,05	0,75	1,46
Goal Clarity_Social Support Family	0,07	0,21	0,11	1	0,74	1,07	0,72	1,60
Role Conflict_Social Support Colleagues	-0,04	0,23	0,03	1	0,85	0,96	0,61	1,50
Role Conflict_Social Support Supervisor	-0,17	0,19	0,80	1	0,37	0,85	0,59	1,22
Role Conflict_Social Support Family	0,19	0,22	0,76	1	0,38	1,21	0,79	1,84
Constant	0,23	1,08	0,04	1	0,84	1,25		

The baseline model indicated that 53,7% of the sample could be correctly classified. Testing of the model with the first set of independent variables (Total Overload, Goal Clarity and Role Conflict) a statistically significant model was produced a χ^2 ($df=3$; $N=404$) = 15,42; $p=0,001$, indicating that the model was able to distinguish between respondents who did and did not report a sleep problem. The Hosmer-Lemeshow Test indicated a non-significant value ($\chi^2=7,80$; $p=0,45$) 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 only explains between 3,7% and 5% of the variance. This model actually classified only 60,4% of cases correctly.

When Social Support from Colleagues, Supervisors and Family were entered in the second step, a statistically significant model was produced, χ^2 ($df=3$, $N=404$) = 18,80, $p=0,05$,

indicating that the model was able to distinguish between respondents who reported and did not report a sleep problem. The model as a whole explained between 4,5% (Cox and Snell R^2) and 6,1% (Nagelkerke R^2) of the variance in sleep status, and correctly classified 61,6% of cases. The Hosmer-Lemeshow Test indicated a non-significant value ($\chi^2=12,36$; $p=0,14$), which still indicates support for the model.

In step 3 the interaction terms of the Role Stress variables with the Social Support variables were added to the regression and a statistically significant model was produced, χ^2 ($df=3$, $N=404$) = 28,22; $p=0,02$, indicating that the model was able to distinguish between respondents who reported and did not report a sleep problem. The Cox and Snell R^2 and the Nagelkerke R^2 now indicated that the model explained significantly more variance (i.e. between 6,7 and 9% of the variance). The Hosmer-Lemeshow Test indicated a non-significant value ($\chi^2=5,80$; $p=0,67$), which still indicates support for the model. The percentage accuracy in classification rose to 60,9% for this model which is somewhat better than the baseline model (53,7% vs. 60,9%). As seen in Table 4, only the interaction term of total overload and social support from supervisor made a statistically significant contribution to the model, recording an odds ratio of 1,56. It is graphically illustrated below to clearly illustrate and aid understanding of this interaction effect:

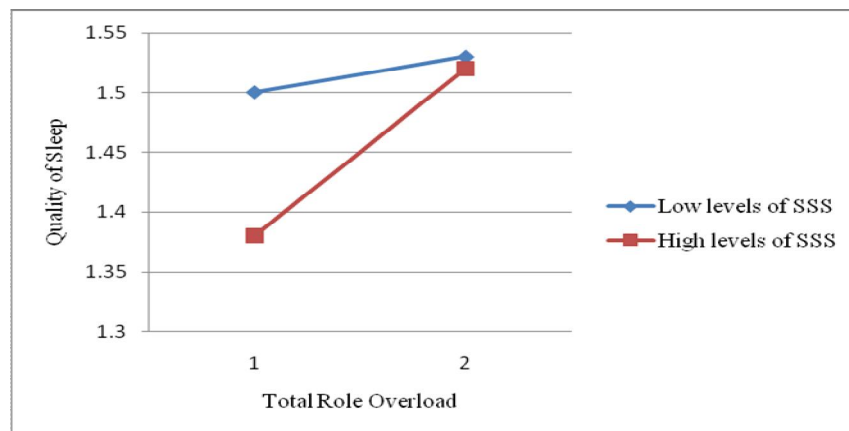


Figure 1. *Interaction effect between Total Role Overload and Social Support from Supervisors on Quality of Sleep*

The graph illustrates that respondents who experience low levels of Role Overload (point 1 on x-axis) and much Supervisor Support (red line) have better Quality of Sleep than those who experience low levels of Overload but little Supervisor Support (blue line).

Furthermore, it appears that when high levels of Role Overload (point 2 on x-axis) are experienced, the difference in Quality of Sleep is very small when high or low levels of Supervisor Support is available. None the less, respondents with low Supervisor Support still experience poor Quality of Sleep. It therefore seems that Social Support from Supervisors plays a big role in Quality of Sleep when low levels of Overload are experienced.

Table 5 below reports the likelihood that role stressors and social support will predict the use of medication.

Table 5

Logistic Regression Predicting Likelihood of Reporting the Use of Medication

	B	S.E.	Wald	df	P	Odds Ratio	95% C.I. for EXP(B)	
							Lower	Upper
Total Overload	0,39	0,21	3,55	1	0,06	1,48	0,98	2,23
Goal Clarity	-0,10	0,20	0,23	1	0,64	0,91	0,61	1,35
Role Conflict	0,37	0,18	4,11	1	0,04*	1,45	1,01	2,08
Social Support Colleagues	-0,22	0,17	1,62	1	0,20	0,81	0,58	1,12
Social Support Supervisor	0,07	0,13	0,28	1	0,60	1,07	0,83	1,38
Social Support Family	-0,13	0,15	0,73	1	0,39	0,88	0,66	1,18
Total Overload_Social Support Colleagues	0,18	0,27	0,43	1	0,51	1,19	0,71	2,01
Total Overload_Social Support Supervisor	0,57	0,24	5,35	1	0,02*	1,76	1,09	2,84
Total Overload_Social Support Family	0,21	0,24	0,76	1	0,39	1,23	0,77	1,96
Goal Clarity_Social support Colleagues	-0,42	0,25	2,73	1	0,09	0,69	0,40	1,08
Goal Clarity_Social Support Supervisor	0,56	0,20	7,95	1	0,01*	1,74	1,19	2,57
Goal Clarity_Social Support Family	0,48	0,23	4,25	1	0,04*	1,61	1,02	2,54
Role Conflict_Social Support Colleagues	0,21	0,25	0,69	1	0,41	1,23	0,75	2,03
Role Conflict_Social Support Supervisor	-0,04	0,21	0,03	1	0,86	0,97	0,65	1,44
Role Conflict_Social Support Family	-0,09	0,23	0,16	1	0,69	0,91	0,58	1,44
Constant	-1,91	1,17	2,67	1	0,10	0,15		

Direct logistic regression was performed to assess the impact of a number of factors on the likelihood that respondents would report that they use medication. The baseline model indicated that 59,1% of the sample could be correctly classified. Testing of the model with the first set of independent variables (Total Overload, Goal Clarity and Role Conflict), a statistically significant model was produced a χ^2 ($df=3$, $N=408$) = 27,12; $p=0,001$, indicating that the model was able to distinguish between respondents who did and did not report the use of medication. The Hosmer-Lemeshow Test indicated a non-significant value ($\chi^2= 8,56$; $p=0,38$), 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 only explains between 6,4% and 8,7% of the variance. This model actually correctly classified only 62,3% of cases correctly.

When Social Support from Colleagues, Supervisors and Family were entered in the second step, a statistically significant model was produced, χ^2 ($df=3$, $N=408$) = 29,68; $p=0,001$ indicating that the model was able to distinguish between respondents who reported and did not report the Use of Medication. The model as a whole explained between 7% (Cox and Snell R^2) and 9,5% (Nagelkerke R^2) of the variance in the Use of Medication, and correctly classified 62% of cases. The Hosmer-Lemeshow Test indicated a non-significant value ($\chi^2=12,76$; $p=0,12$), which still indicates support for the model.

In step 3 the interaction terms of the Role Stress variables with the Social Support variables were added to the regression and a statistically significant model was produced, χ^2 ($df=3$, $N=408$)=60,91; $p=0,001$, indicating that the model was able to distinguish between respondents who reported and did not report the Use of Medication. The Cox and Snell R^2 and the Nagelkerke R^2 now indicated that the model explained significantly more variance (i.e. between 13,9 and 18,7% of the variance). The Hosmer-Lemeshow Test indicated a non-significant value ($\chi^2=9,51$; $p=0,30$), which still indicates support for the model. The percentage accuracy in classification for this model rose to 68,1%, which is better than the baseline model (59,1% vs. 68,1%). As shown in Table 5, only four of the independent variables made a unique statistically significant contribution to the model (Role Conflict, and the interaction terms of Total Role Overload and Social Support from Supervisor, Goal Clarity and Social Support from Supervisor, and Goal Clarity and Social Support from Family). The odds ratio for Role Conflict was 1,45, indicating that a participant who experiences Role Conflict is 1,45 times more likely to also indicate the Use of Medication. To more clearly illustrate the interaction effects, it is graphically illustrated below:

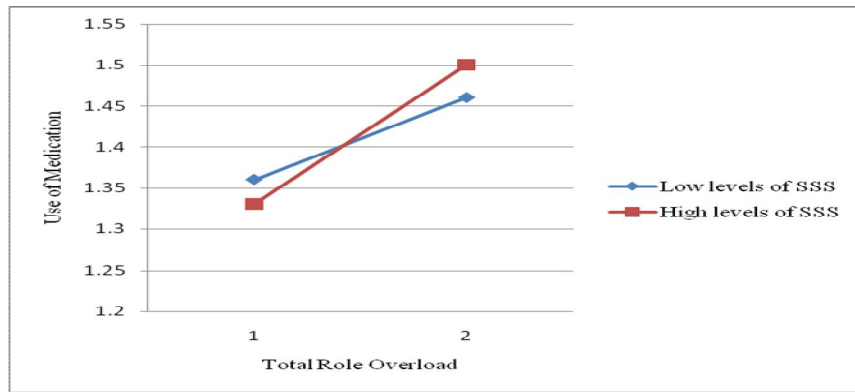


Figure 2. *Interaction effect between Total Role Overload and Social Support from Supervisors on the Use of Medication*

The figure indicates that when Role Overload is low (point 1 on x-axis), respondents with high support use little Medication. But when Role Overload is high (point 2 on x-axis), respondents with high Support use much Medication. It therefore appears that the more Social Support received from Supervisors contributes to the Use of Medication when Role Overload is experienced.

Figure 3 below graphically depicts the interaction effect of Goal Clarity and Social Support from Supervisors on the Use of Medication.

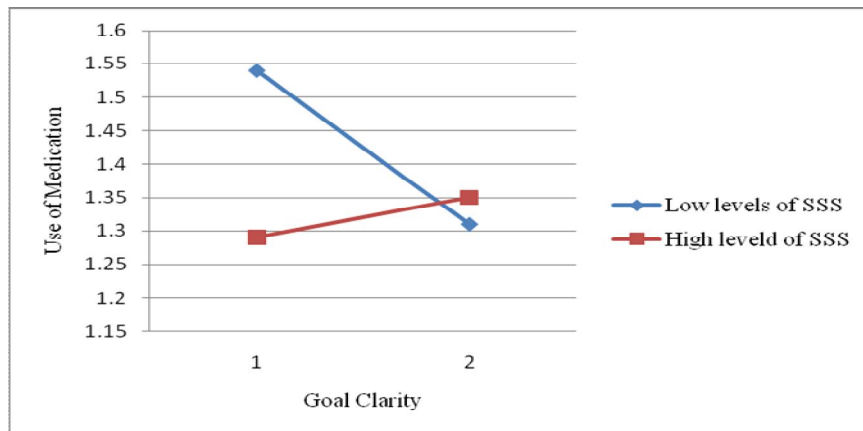


Figure 3. *Interaction effect between Goal Clarity and Social Support from Supervisors on the Use of Medication*

When respondents experience low levels of Goal Clarity and little Social Support from Supervisors they use more Medication, whereas respondents who experience much Supervisor Support use less Medication. On the other hand, respondents who experience high levels of Goal Clarity and much Social Support from Supervisors' show higher levels of Medication Usage than those with little Support from Supervisors. Thus, if a respondent experiences Goal Clarity and high levels of Supervisor Support, it has a negative impact on the Use of Medication. The effect of a higher level of Goal Clarity is especially prominent when participants experience little Support from Supervisors.

Figure 4 below graphically illustrates the interaction effect of goal clarity and social support from family on the use of medication.

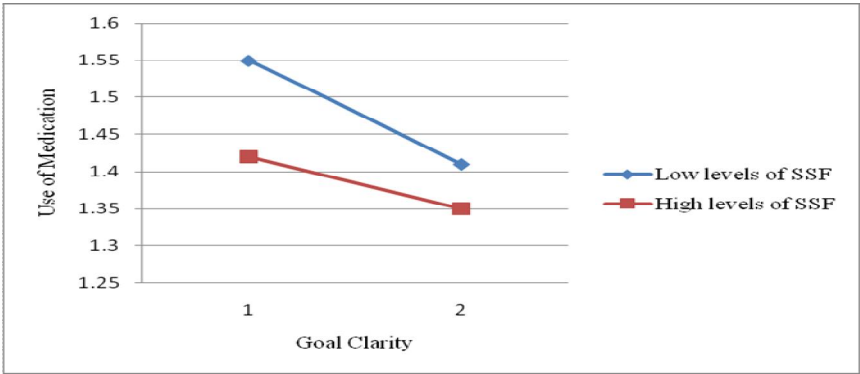


Figure 4. *Interaction effect between Goal Clarity and Social Support from Family on the Use of Medication*

It can be seen in Figure 4 above that respondents who receive much Social Support from Family use little Medication, whether they experience low or high levels of Role Clarity. Thus, Social Support from Family has a noticeable influence on Medication Usage.

In Table 6 the logistic regression analysis for predicting depression is given.

Table 6

Logistic Regression Predicting Likelihood of Reporting Depression

	B	S.E.	Wald	df	p	Odds Ratio	95% C.I. for EXP(B)	
							Lower	Upper
Total Overload	0,56	0,21	6,91	1	0,01*	1,74	1,15	2,64
Goal Clarity	-0,40	0,20	3,95	1	0,05*	0,67	0,45	1,00
Role Conflict	0,60	0,20	9,88	1	0,00*	1,82	1,25	2,64
Social Support Colleagues	-0,25	0,17	2,22	1	0,14	0,78	0,56	1,08
Social Support Supervisor	-0,03	0,12	0,05	1	0,82	0,97	0,77	1,23
Social Support Family	0,03	0,15	0,04	1	0,83	1,03	0,77	1,38
Total Overload_Social Support Colleagues	0,23	0,28	0,69	1	0,41	1,26	0,73	2,15
Total Overload_Social Support Supervisor	0,05	0,24	0,04	1	0,85	1,05	0,66	1,67
Total Overload_Social Support Family	0,15	0,23	0,41	1	0,52	1,16	0,74	1,82
Goal Clarity_Social support Colleagues	-0,18	0,21	0,73	1	0,39	0,84	0,56	1,26
Goal Clarity_Social Support Supervisor	-0,31	0,17	3,34	1	0,07	0,74	0,53	1,02
Goal Clarity_Social Support Family	0,24	0,21	1,37	1	0,24	1,28	0,85	1,92
Role Conflict_Social Support Colleagues	-0,44	0,26	2,96	1	0,09	0,64	0,39	1,06
Role Conflict_Social Support Supervisor	-0,14	0,20	0,46	1	0,50	0,87	0,59	1,30
Role Conflict_Social Support Family	0,32	0,23	1,89	1	0,17	1,38	0,87	2,17
Constant	-1,36	1,17	1,35	1	0,25	0,26		

Direct logistic regression was performed to assess the impact of a number of factors on the likelihood that respondents would report that they had Depression. The baseline model indicated that 53,9% of the sample could be correctly classified. When testing of the model with the first set of independent variables (Total Overload, Goal Clarity and Role Conflict) a statistically significant model was produced, $\chi^2 (3, N=388) = 58,31, p=0,001$, indicating that the model was able to distinguish between respondents who reported and did not report symptoms of Depression. The Hosmer-Lemeshow Test indicated a non-significant value ($\chi^2=17, 66; p=0,24$), 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 found that the model explains only between 14% and 18,6% of the variance. This model actually classified only 67,5% of cases correctly.

When Social Support from colleagues, supervisors and family were entered in the second step, a statistically significant model was produced, $\chi^2 (3, N=388) = 62,07, p=0,001$, indicating that the model was able to distinguish between respondents who reported and did not report symptoms of Depression. The model as a whole explained between 14,8% (Cox and Snell R^2) and 19,7% (Nagelkerke R^2) of the variance in symptoms of depression and correctly classified 67,3% of cases. The Hosmer-Lemeshow Test indicated a non-significant value ($\chi^2=5, 10; p=0,75$), which still indicates support for the model.

In step 3 the interaction terms of the Role Stress variables with the Social Support variables were added to the regression and a statistically significant model was produced, $\chi^2 (df=3, N=388)=73,25; p=0,001$, indicating that the model was able to distinguish between respondents who reported and did not report symptoms of Depression. The Cox and Snell R^2 and the Nagelkerke R^2 now indicated that the model explained significantly more variance (i.e. between 17,2 and 23% of the variance). The Hosmer-Lemeshow Test indicated a non-significant value ($\chi^2=6,74; p=0,57$), which still indicates support for the model. The percentage accuracy classification for this model rose to 68,8%, which is better than the baseline model (53,9% vs. 68,8%). As shown in Table 6, only three of the independent variables made a unique statistically significant contribution to the model (Total Role Overload, (lack of) Goal Clarity and Role Conflict), and none of the interaction terms proved to be statistically significant. The odds ratio for Total Role Overload was 1,74, indicating that a participant who experiences Role Overload is 1,74 times more likely to also report Depression. Goal Clarity's odds ratio indicated that participants who experiences Goal Clarity are 0,67 times less likely to report Depression. Lastly, the odds ratio for Role Conflict indicated that participants who experience Role Conflict were 1,82 times more likely to report Depression.

DISCUSSION

The aim of the current study was to examine the relationships between work stress, indicators of physical and psychological health and depression, and investigate the moderating effect of social support. The results show that all the measuring instruments used in this study are reliable in terms of their use, except for measures of goal clarity and role conflict. All of these measures have been found to be internationally reliable (Caplan et al., 1975; Näswall et al., 2006) with the exception of the scale indicating use of medication, where no previous research is available. Bonnet (2007) and Pienaar et al. (2007) previously found the measures of role overload (both qualitative and quantitative), depression and social support to be reliable and valid in the South African context. In terms of goal clarity and role conflict, no previous data was found regarding the reliability of these scales in South Africa and the current results can be used as a first step to investigate the reliability of these scales locally.

It is evident that a significant relationship exists between employees' experience of role stressors and their health. Robbins (1993) stated that work-related stress can have extremely serious consequences on health. Various other researchers found that work-related aspects are one of the main factors in determining employees' health and well-being (Allen, Pahl, & Quine, 1990; Hatton & Emerson, 1995). Confirming previous research, the results of this study showed that role conflict and role overload were positively related to depression, the use of medication and quality of sleep, whereas goal clarity was negatively related to health (Anderson, 2008; Doi, Minowa, Okawa & Uchiyama, 2000; Nevid, Rathus & Greene, 2006; Wang, 2004). When work stress is experienced, physical and psychological health problems may therefore also be experienced.

Echoing the classic findings of Payne and Flether (1983), results obtained here also indicate that if social support is present, employees should cope better with role stressors. The focus in this study was on three well-known sources of social support, namely support from supervisors, colleagues and family. Carlson and Perrew (1999), as well as Vanfossen (1981) found that support from these three sources helps to reduce role stressors and their effects. In line with these findings the results of this study indicated that goal clarity was positively related to all the dimensions of social support. It can thus be assumed that when goals are not

clear (role ambiguity), the relationship will be different. Furthermore, role conflict and role overload were negatively related to social support from supervisor, colleagues and family. Although it is clear that role stressors have a significant relationship with the dimensions of social support, it must be noted that role conflict only has a relationship with work-based social support (i.e. from colleagues and supervisors). Social support from family may therefore not help to reduce role conflict experienced at work. This research confirms previous findings, establishing that when social support is experienced within the work environment it will relate inversely to work-related outcomes such as role stress, job dissatisfaction and psychological health (Moyle, 1998).

Regarding physical and psychological well-being, various researchers found that social support can have a positive effect on health in general (Bogossian, 2007; Cohen, Underwood and Gottlieb, 2000, Taylor, 2002). In this research depression shows a negative relationship with social support from colleagues and supervisors, which contributes to previous findings (Aneshensel, 1986; Paykel, 1994; Pearlin et al., 1981). With regards to physical well-being, social support from colleagues and supervisors shows a negative relationship with quality of sleep, which indicates that the lower the support received, the higher the possibility that sleep problems may occur. Interestingly, the use of medication is not influenced by the support received. Due to the fact that no previous research could be found in terms of the use of medication scale in South Africa, it can be assumed that although social support does not influence the use of medication, other factors that were not included in this study may have an impact on the use of medication. Another interesting finding in this study was that social support from family does not have an effect on physical or psychological health. LaRoco, House and French (1980) and Kirk-Brown (1999) found that supervisor and colleague support was more important to employees than other sources of support. This may be because work-related sources of support are able to reduce workload and simplify role expectations (Mayes, 1986).

To summarise: this research indicates that when work stress is experienced, people in the specific mining training academy are most likely to experience physical and psychological health problems too. In terms of the moderating effect of social support, the findings are consistent with previous findings indicating that social support reduces work stress and has a

positive effect on health (House, 1981; Price, 2001). It is obvious in this research that social support received from the organisation helps employees to cope better with work stress, confirming Payne and Fletcher's (1983) findings. Although social support from family can help employees to cope better with work demands, social support from colleagues and supervisors is also found likely to be more effective.

Three constructs namely depression, quality of sleep and use of medication were included in this research to be indicative of general physical and psychological health. The findings indicate that social support, especially from colleagues and supervisors, can also moderate the relation of work stress to physical health outcomes. Most of the results are therefore consistent with the Job-Demand-Control model of Robert Karasek (1979) which states that social support as a moderator helps to reduce work stress and improve health.

None of the stress or support variables had an impact on sleep problems, but it was illustrated that the interaction of total role overload and social support from supervisors has an impact on the quality of sleep. When low levels of role overload are experienced, social support from supervisors has a big impact on the quality of sleep, but when high levels of role overload are experienced, the quantity of supervisor support does not have a major impact on the quality of sleep. Previous research showed that work-related stress, no matter the quantity, is strongly related with sleep problems and that social support at work can have a direct impact on the outcomes of these stressors (French, 1989; Nevid, Rathus & Greene, 2006; Ohayon, 1996; Swanson & Power, 2001).

In terms of predicting the use of medication, one independent variable has been found to be significant. Role conflict was shown to have a direct impact on the use of medication. Respondents experiencing role conflict tend to be 1.45 times more likely to also report the use of medication, regardless of the support received. The interaction effect between total role overload and social support from supervisors was also proven to be statistically significant. When role overload is low, respondents with high support use little medication, but when role overload is high respondents with high support use much medication. These findings contribute to previous research where it has been found that the moderating effect of social support is inconsistent; it can have either a positive or negative impact on health in

times of stress (Beehr, 1995). The suggestion here is then that supervisor support coupled with high role overload contributes to an increased use of medication. The presence of support may - within the stressful context of overload - be experienced as hovering, and therefore negative.

Furthermore, the interaction effect between goal clarity and social support from supervisors and the interaction effect between goal clarity and family support has been found to have a contradictory effect on the use of medication. If employees experience role ambiguity and much supervisor support, they tend to use little medication. When respondents experience goal clarity and high levels of supervisor support, it has a negative impact on the use of medication. Beehr (1995) found that the effects of social support can sometimes have a negative impact on health. It can then be assumed that when employees know what they must do in their role they do not need supervisor support; when it is provided, it could burden them.

On the other hand - also regarding goal clarity - when employees experience much family support they tend to use little medication. This can be explained by Oosthuizen's (2006) findings that non-work related sources (family) provide an emotional kind of support, whereas work-related sources (supervisors and colleagues) provide a more practical, structured kind of support. Due to the fact that people tend to use medication to help with pain, worrying and sleeping (Doi, Minowa, Okawa, & Uchiyama, 2000), emotional support may lessen the need to use medication in order to deal with any kind of feeling or emotion.

Lastly, contributing to previous research (Anderson, 2008; Aneshensel, 1986; Wang, 2004), this study found that role specific stress has a direct impact on depression. When respondents experience role overload, lack of goal clarity or role conflict, they are more likely to report depression than those who do not experience role stress. The moderating role of social support is not supported here. Research linking stress, social support and depression has been found to be inconsistent. In terms of social support, the findings in this study contradict those of most previous research stating that social support has a positive impact on depression (Aneshensel, 1986; Paykel, 1994), whereas this research found that social support does not have any impact on depression. Thus, according to this study, when respondents experience social support it will not decrease the occurrence of depression.

The findings indicate that social support does play a moderating role between unique dimensions of work stress and physical health. Social support, especially from supervisors, has a direct impact on quality of sleep and use of medication when stress is experienced. With regards to psychological health and work stress, the findings indicate that social support does not play a moderating role. Although literature suggests that social support is significant in reducing stress and that it has positive effects on depression (Aneshensel, 1986; Paykel, 1994), its moderating effect is not supported by the current findings.

RECOMMENDATIONS AND LIMITATIONS

With regard to work-related stress experienced by employees, it was found that social support from colleagues and supervisors helps to directly reduce role stressors and their effects. In terms of physical and psychological health it was also found that social support, again especially from supervisors and colleagues, helps to reduce depression and improve the quality of sleep. The organisation can help employees by clarifying goals and role expectations, as well as focus on the amount and appropriate difficulty level of tasks assigned to each employee. In addition, social support from supervisors and colleagues seems to have a positive effect on role-specific stress and health. The organisation can therefore start to develop programmes to enhance support from within the organisation in order to reduce work stress and improve health.

Limitations of this study must also be considered to place the results in the appropriate context. First, the data was cross-sectional. A longitudinal design is recommended for future studies as it may demonstrate more valid results and a better examination of the relationship between constructs. Secondly, the nature of the sample limits the results to only one mining training academy, therefore making it difficult to generalize the results to other mining training academies. It is recommended that future research considers different mining organisations. Lastly, only three constructs were used to determine physical and psychological health, without considering other health constructs. Future research should consider adding more constructs to indicate physical and psychological health to more fully represent these domains.

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CHAPTER 3

CONCLUSIONS, LIMITATIONS AND RECOMMENDATIONS

The intention of this chapter is to provide a conclusion of the literature review and the empirical results of the study. The limitations of the current study are discussed and recommendations for the organisation as well as for future research are made.

3.1 CONCLUSIONS

3.1.1 Conclusions from the literature

The first objective of the study was to conceptualise, according to the literature, the variables and the relationship between work stress (role conflict, ambiguity and overload), physical and psychological health and social support.

Work stress can be described as the requirements of a job which do not match the resources, capabilities, or needs of an employee and which can have harmful physical and emotional effects on a person (Goldsmith, 2005). Hang-yue, Foley and Loi (2005) identify role ambiguity, role conflict and role overload as the most important sources of work-related stress.

Role conflict refers to the incongruity of how an individual thinks he or she should do his or her work and how supervisors or others tell him or her to do it (Rizzo, House, & Lirtzman, 1970). Rizzo et al. found that role conflict can have a negative impact on job satisfaction, decision making and coping behaviour and that it can also lead to stress and anxiety.

Role ambiguity (Lack of role clarity) is experienced when role expectations are not clearly understood, or when there is a lack of clarity about expectations (Newell, 2002; Rizzo et al., 1970; Robbins, 1993). Research has indicated that people who experience role ambiguity tend to feel stressed; they experience tension, fear, hostility, dissatisfaction with supervisors and colleagues and have lower productivity levels (Tremblay & Roger, 2004).

Role overload occurs when an employee feels that he or she is expected to do more than time allows (quantitative) and when the work is too demanding or difficult (qualitative) (Beehr, Walsh, & Taber, 1976; Sverke, Hellgren, & Öhrming, 1999). Quantitative and qualitative role overload are linked through the interaction of employees' abilities and competence on the one hand, and the conditions of their work on the other hand (Hall, 1995). In previous research role overload was found to be the most important component of work-related stress (Glass, 1990; Jamal, 2005). Role overload can have a negative impact on an employee's health and can contribute to work accidents (Weiler, 2005).

Depression can be described as a mood disorder in which extreme unhappiness or sadness, feelings of hopelessness and other related symptoms of clinical depression, lack of energy and diminished interest or pleasure in things that used to be interesting or create pleasure, are experienced by an individual (Baron, 2001; Bech, Rasmussen, Raabaek Olsen, Noerholm and Abildgaard, 2001; Ebersole, Hess, Touhy, & Jett, 2005). It is a psychological health problem that can be created by work stress (Anderson, 2008). When depression is experienced, one's work performance will be negatively influenced. Lemer et al. (2010) found that depression can result in early retirement, absenteeism, on-the-job functional limitations and sometimes job loss.

Quality of sleep can be described as waking up in the morning feeling either tired or rested (Gustavsson et al., 2006). Quality of sleep has been found to be strongly associated with stress and that it can influence an employee's decision making and productivity (Anon, 1994; Nevid, Rathus and Greene, 2006).

Use of medication is any medical aid that can be used for pain, worrying, sleeping and indigestion problems (Doi, Minowa, Okawa, & Uchiyama, 2000). Doi et al. found that people tend to use some sort of medication when stress is experienced.

Social support is a multi-dimensional construct which can be described as ranging from a feeling of being supported to actual support received from co-workers, supervisors and family (Schwarzer & Knoll, 2007). Schwarzer, Knoll and Rieckmann (2004) further define it as the emotional, informational or material support provided by others. Previous research

indicated that when social support is provided in an organisational setting, employees will cope better with high job demands and work-related stress (Payne & Fletcher, 1983), as well as reduce the cost of work-related health problems and health problems in general (Cohen, Underwood, & Gottlieb, 2000; Taylor, 2002). Although previous research found that social support predominantly reduces employees' experience of work-related stressors and can promote better health (Swanson & Power, 2001), the effects of social support also proved to be inconsistent in that they can worsen the effects of stress and can have a negative impact on health (Beehr, 1995).

3.1.2 Conclusions from the empirical study

The second objective was to determine the relationship between work stress, physical and psychological health and social support in a sample of employees in a mining organisation.

The direction of the relationships between role conflict, total role overload, depression, quality of sleep and use of medication indicates that stress and health are inversely related. When employees experience stress they are likely to experience health problems too. On the other hand, social support from supervisor, colleagues and family are also significantly related and all three relate negatively to work stress. The assumption can be made that an increase in social support can be associated with a decrease in work stress. Social support can help employees cope better with work stress and lessen its negative effects. Support from supervisors and colleagues are furthermore related to depression and social support from supervisors to quality of sleep. If these two sources of support are present, so should be physical and psychological health. Therefore it can be concluded that when the employees of the mining training academy receive support in their work environment it will have a positive effect on their health, and they will be less likely to experience health problems.

The third objective was to establish whether work stress and social support can be used to predict employees' experience of physical and psychological health.

Depression, quality of sleep and use of medication were used in this study to indicate psychological and physical health respectively.

With regards to sleep problems, the interaction terms of role stress and social support from supervisors demonstrated that if role overload is experienced, the quantity of supervisor support received will have a positive impact on the quality of sleep.

Regarding the use of medication, role conflict was the only independent variable that made a significant contribution to the use of medication. Respondents experiencing role conflict were 1.45 times more likely to use medication, regardless of the support received. With regards to the moderating effect of social support, three interaction terms reached significance. The interaction between total role overload and social support from supervisor suggested that if an employee receives supervisor support and experiences high levels of role overload, it contributes to an increased use of medication. The second interaction term of goal clarity and social support from supervisor concluded that supervisor support only makes a difference to the use of medication when low levels of goal clarity are experienced. This indicates that when an employee does not know what is expected of him/ her, supervisor support can lower medication usage. The third interaction term of goal clarity and social support from family found that family support has a noticeable impact on the use of medication, whether low or high levels of goal clarity are experienced. The assumption can be made that family support, no matter the circumstances, may lessen the need to use medication.

Lastly, in terms of depression, the moderating effect of social support was investigated and none of the interaction terms made a significant contribution. This finding indicated that if an employee experiences role specific stress (total role overload, (lack of) goal clarity and role conflict) it can make a direct contribution to experiencing depression, whereas social support does not seem to have any impact on depression.

The fourth objective was to establish if social support plays a moderating role between work stress and physical and psychological health.

The findings indicated that social support does play a moderating role between unique dimensions of work stress and physical health. More specifically, when total role overload is experienced, supervisor support has an impact on the quality of sleep. It plays a similar role

between total role overload and goal clarity with regards to the use of medication. Support from family also has a moderating effect between goal clarity and the use of medication. It seems that employees who receive support from their supervisor and family when they experience work stress are more likely to report better physical health than those who do not receive support.

With regards to psychological health and work stress the findings indicated that social support does not play a moderating role. Although literature suggests that social support is significant in reducing stress and that it has positive effects on depression (Aneshensel, 1986; Paykel, 1994), its moderating effect is not supported by the current findings.

3.2 LIMITATIONS

Certain limitations must be taken into consideration to place the results of this study in the appropriate context. First, the cross-sectional nature of this study is considered to be a limitation, as it only measures employees' attitudes and opinions at one point in time. A longitudinal study would have demonstrated more valid results and a better examination of the constructs, because it repeatedly measures employees' attitudes and opinions over an extended period of time, enabling one to draw stronger relations and conclusions. Longitudinal research would greatly add to the current findings, specifically within the context of managing employee health and related costs.

Secondly, the nature of the sample is also considered a limitation. Although the sample size is considered large enough to generalize the results to the specific mine, the study was limited to only one mining training academy, therefore making it difficult to generalize the results to employees working in other mines or industries.

Lastly, only three constructs were used to determine physical and psychological health without considering other health constructs, thus limiting this research to making holistic recommendations with regards to the management of physical and psychological health. The independent variables also predicted relatively low amounts of variance in the dependent variables. Sleep problems, the use of medication and depression are good indicators of health

problems associated with work stress; and using more variables would have made the research too complex. Thus, health is understandably a complex interplay of many factors and the three variables considered here only provide part of the bigger picture.

3.3 RECOMMENDATIONS

The final objective set for this research was to provide recommendations to the organisation regarding the variables studied, as well as for future research. This is done under separate headings below.

3.3.1 Recommendations for the organisation

The organisation can protect its employees by clarifying goals and role expectations, as well as focusing on the amount and appropriate difficulty level of tasks assigned to each employee. The absence of these could create or lead to increased feelings of work stress.

It is further recommended that the importance of the support received from within the organisation, especially supervisor support, must be recognised. Developing programmes to provide adequate supervisor support can reduce work stress experienced by employees and it can help to eliminate or decrease health problems that are related to role-specific stress. Providing adequate supervisor support can also create a constructive atmosphere and culture in the organisation, which may possibly lead to increased social support received from colleagues.

3.3.2 Recommendations for future research

Future research should continue to examine the moderating effects of social support between role specific stress and physical and psychological health. Physical and psychological health was also measured by only three constructs (quality of sleep, use of medication and depression) in this study. Future research should consider adding more constructs to determine physical and psychological health. The use of medication was not influenced by work-related social support in this research. More variables must be investigated and

measured to determine which factors can have an impact on the use of medication. A longitudinal design in future studies would further provide a better examination of the moderating effect of social support on work-related stress and on employees' health. Lastly, for the purpose of future research, different mining organisations must be considered in order to generalise results.

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