JOB CHARACTERISTICS, WELLNESS AND WORK-HOME INTERACTION IN THE MINING INDUSTRY

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Dissertation submitted in partial fulfilment of the requirements for the degree Magister Commercii in Industrial Psychology at the North-West University (Potchefstroom Campus)

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COMMENTS

The reader is reminded of the following:

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

- The mini-dissertation is submitted in the form of two research articles. The editorial style specified by the South African Journal of Industrial Psychology (which agrees largely with the APA style) is used, but the APA guidelines were followed in constructing tables.
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ABSTRACT

**Title:**
Job characteristics, wellness and work-home interaction in the mining industry

**Key terms:**
Work-home interaction, Survey Work-Home Interaction – Nijmegen (SWING), validity, equivalence, reliability, group differences, job demands, job resources, ill health, negative work-home interference, mining industry

The mining industry is driven by performance and intense working environments, accompanied by high demands, hazardous working conditions and socially undesirable working hours. These factors could impact on the interaction between work and home, as well as contributing to health problems of employees. The objectives of this research were to test the construct validity, construct equivalence and reliability of a work-home interaction measuring instrument, the Survey Work-Home Interaction – Nijmegen (SWING), to determine if work-home interaction differences exist between different demographical groups, and to test a structural model of job characteristics (job demands and job resources), ill health and negative work-home interference.

Random samples (n = 320) were taken from employees working in the mining industry (gold, platinum and phosphate mines) in the Gauteng, North West and Northern provinces. The SWING, a self-developed job characteristics questionnaire and an adapted version of the General Health Questionnaire were administered. Structural equation modelling, descriptive statistics, Cronbach alpha coefficients, Pearson product-moment correlations, multivariate analysis of variance (MANOVA) and one-way analysis of variance (ANOVA) were used to analyse the data.

Structural equation modelling confirmed the four-factor structure of the SWING and the construct equivalence for two language and ethnic groups. The four factors showed acceptable internal consistencies. Statistically significant differences were found based on age, ethnicity, gender, qualification, marital and parental status, language, flexibility at work and whether individuals had a partner with a paid job. Regarding the structural model, the
results showed that job demands and job resources have an impact on ill health, and that ill health is associated with negative WHI. It was also found that job demands and job resources have a direct relationship with negative WHI on their own, but when both high demands and a lack of resources are present, only an indirect relationship with negative WHI exists through ill health.
buigsaamheid by die werk en of individue 'n maat gehad het wat ook 'n inkomste verdien. Met betrekking tot die strukturele model het die resultate getoon dat werkeise en werkhulpbronne 'n impak op swak gesondheid het, en dat swak gesondheid met negatiewe WHI (werk/huis-inmenging) geassosieer word. Daar is ook bevind dat werkeise en werkhulpbronne 'n direkte verband met negatiewe WHI alleen het, maar wanneer hoe eise en 'n tekort aan hulpbronne saam teenwoordig is, bestaan daar slegs 'n indirekte verband met negatiewe WHI deur swak gesondheid.
CHAPTER 1

INTRODUCTION

This mini-dissertation is presented in the form of two articles. The first article focuses on the psychometric properties (construct validity, invariance and reliability) of the Survey Work-Home Interaction – NijmeGen (SWING), an instrument that measures four dimensions of work-home interaction, and on demographic differences regarding work-home interaction. The second article focuses on a structural model of job characteristics, ill health and negative work-home interference.

In this chapter, the problem statement and the research objectives (including the general and specific objectives) are discussed. Following this, the research method is explained and an overview of the chapters is given.

1.1 PROBLEM STATEMENT

During the last two decades, striking changes have occurred in the composition of the workforce, as well as in the nature of work itself. Today, individuals and families are forced to integrate substantial work obligations as well as household responsibilities in the running of their everyday lives (Allen, Herst, Bruck, & Sutton, 2000; Bond, Galinsky, & Swanberg, 1998), more value is placed on a balanced lifestyle, and success is increasingly defined not only in terms of one’s contributions to work, but also in terms of the contributions to family, community and self (Cascio, 2001; Schein, 1993). According to Greenhaus and Beutell (1985, p. 77), this challenge may become a stressor when “… role pressures from the work and family domains are mutually incompatible in some respect”. Furthermore, research by Galinsky, Bond, and Friedman (1993) indicates that a considerable proportion of employed parents (i.e. 40%) experiences problems in combining work and family demands, often referred to as work-to-family conflict or negative work-home interference.

In South Africa, the increased attention to the work-home nexus could be attributed to the increase in dual-earner couples and the fact that our economy has opened up to the hiring of females, ensuring equity and a demographically representative workforce. As a result,
employed men and women are increasingly concerning themselves with the managing of the conflicts experienced in fulfilling or attempting to fulfil the dual demands and responsibilities of work and family roles. Work and family integration has consequently become a major issue for both women and men at work (Geurts & Demerouti, 2003).

With mining forming the hub of our country’s economy, work-to-home interaction is undoubtedly of utmost importance in ensuring continued organisational and employee growth. The rapid growth taking place within this industry has caused many individuals to resort to working on mines, partly due the fact that it has opened up to the hiring of females (Calitz & Coetzer, 2004), as well as economic difficulties and political changes that have forced individuals to find alternative employment. Mining however, is one of the most difficult industries to work in and the working conditions are intense. As a result, the impact of the work-home interface on employees in this industry needs to be determined to ensure sustained growth in this sector, as well as well-being of the employees in this industry.

Although studies examining work-home interaction have increased, research within this field is characterised by various limitations. Firstly, research regarding work-home interaction focuses almost exclusively on the negative impact of work on the home situation, with little research been done on the negative impact of home on the work situation (Bakker & Geurts, 2004; Geurts & Demerouti, 2003). Furthermore, most studies accept the work-home nexus as a situation of conflicting role pressure, but the possibility that both domains may influence each other in a positive way by transferring positive attributes, is largely under-researched (Geurts & Demerouti, 2003). As a result, many instruments are available to measure negative work-home interaction, as opposed to only a few instruments exclusively developed for measuring positive interaction (e.g. Carlson, Kacmar, Wayne, & Grzywacz, in press; Kirchmeyer, 1992). Instruments developed for measuring both negative and positive interaction are even more exclusive.

To overcome these limitations, the SWING (Survey Work-Home Interaction - NijmeGen) was developed by Wagena and Geurts (2000) and validated by Geurts, Taris, Kompier, Dikkers, Van Hooff, and Kinnunen, (2005) at the Radboud University in the Netherlands. By differentiating between the direction as well as the quality of influence, four types of work-home interaction were captured, namely 1) negative interference from work with home (negative WHI), referring to a negative impact of the work situation on one’s functioning at
home; 2) positive interference from work with home (positive WHI), referring to a positive influence of the work situation on one’s functioning at home; 3) negative interference from home with work (negative HWI), referring to a negative impact of the home situation on one’s job performance; and 4) positive interference from home with work (positive HWI), referring to a positive impact of the home situation on one’s job performance (Geurts et al., 2005). Furthermore, Geurts et al. based their definition of work-home interaction on the Effort-Recovery model, and define the work-home interface as an interactive process in which a worker’s functioning in one domain (e.g. home) is influenced by (negative or positive) load reactions that have built up in the other domain (e.g. work).

The SWING has been validated extensively (Geurts et al., 2005) and used in various studies in Europe (e.g. Bakker & Geurts, 2004; Demerouti, Geurts, & Kompier, 2004; Montgomery, Peeters, Schaufeli, & Den Ouden, 2003; Peeters, Montgomery, Bakker, & Schaufeli, 2005). However, within South Africa, only two studies investigated the psychometric properties of the SWING (Pieterse, 2005, in a sample of 326 employees working in the earthmoving equipment industry; Van Tonder, 2005, in a sample of 363 nurses). These studies found the SWING to be a valid, equivalent and reliable measuring instrument. Although these findings are encouraging, it cannot be assumed that the SWING will accurately measure work-home interaction in other samples (e.g. the mining industry). It is therefore necessary to investigate the psychometric properties of the SWING in a sample of mining employees before drawing valid and reliable conclusions regarding the work-home interface of individuals working in the mining environment within South Africa.

With South Africa being a multicultural society, we find the impact of cultural differences within the workplace also playing a significant role. It has become a great challenge to assess the impact of WHI/HWI, not only in terms of gender differences and the effect on various cultural backgrounds within the workplace, but also in terms of other demographic characteristics (age, gender, language, marital status, level of qualification, children, overtime worked, flexibility at home etc.). Therefore, apart from testing the psychometric properties of the SWING, it is at the same time also important to investigate whether there are differences between various demographical groups in terms of work-home interaction.

Even though it is important to focus on all four dimensions of work-home interaction, research constantly shows that negative work-to-home interference is the most prevalent
dimension (Bond et al., 1998; Burke & Greenglass, 1999; Demerouti et al., 2004; Eagle, Miles, & Icenogle, 1997; Frone, Russell, & Cooper, 1992; Kinnunen & Mauno, 1998; Leiter & Durup, 1996). Due to the nature of the mining environment (i.e. high job demands, shift work, overtime), various mechanisms could affect negative work-home interference. Many of the mineworkers perform routine and physical tasks (Wynn, 2001). They work with explosives, test geological formations, operate load-haul-dump machines, scraper winches and heavy-duty machines, while maintaining mining machinery in conventional mines. The equipment and techniques used are varied and complex, with many areas requiring significant safety and skills training (Calitz & Coetzee, 2004). Employees are also exposed to harsh working conditions that include mining underground with temperatures in excess of 28 degrees Celsius, long working hours, sometimes unsafe working conditions, highly unionised environments and enormous pressure to perform.

Exposure to these types of job characteristics could have serious implications for the health of employees. In fact, a number of studies found demands and resources in the job setting to be the most important predictors of adverse health outcomes such as burnout and psychosomatic health complaints (Demerouti, Bakker, Nachreiner, & Schaufeli, 2001; Houkes, Janssen, De Jonge, & Bakker, 2003; Houkes, Janssen, De Jonge, & Nijhuis, 2001a, 2001b; Janssen, De Jonge, & Bakker, 1999; Peeters et al., 2005; Schaufeli & Enzmann, 1998). In the framework of the Job Demands-Resources (JD-R) model and the Effort-Recovery model (Meijman & Mulder, 1998), should a person’s time and energy resources be depleted as a result of high job demands and a lack of job resources to deal with these demands, his/her health could be endangered, particularly should there be insufficient time to recover during non-working hours.

With mining houses being driven by performance in order to reach contractual deadlines, extreme pressure is placed on employees to perform. The lack of available resources and increased job demands make it harder for employees to keep abreast of their production target, which could eventually drain them of their energy and available resources to cope. This may result in an increased intensity placed on the individual, which, in turn, will make higher demands on the recovery process. Therefore, an accumulative process may yield a draining of one’s energy and a state of breakdown or exhaustion (e.g. Sluiter, 1999; Ursin, 1980). Under unchanged conditions, these symptoms may also develop into manifest health
problems (cf. Kompier, 1988; Sluiter, 1999) and as a result, one's functioning and need for recovery in the non-work domain is influenced.

The implication this has for organisations are vast and companies could suffer considerable financial and turnover problems (Greenhaus, Collins, Singh, & Parasuraman, 1997). The consequences associated with ill health and negative WHI include increased absenteeism (Ho, 1997, Managing Corporate Stress, 1998), workplace injuries (Managing Corporate Stress, 1998; Sauter et al., 2003), increased health care costs, violence, drug and alcohol abuse, lower productivity as well as turnover and litigation (Geurts & Demerouti, 2003; Managing Corporate Stress, 1998). The importance of healthy employees and work-home interaction, as well as the effect on organisations, individuals and families is evidently of paramount importance. This needs to be investigated and addressed in order to uphold not only organisational functioning and growth, but also the family units that are possibly at stake.

Based on the problem statement, the following research questions arise:

- Is the SWING a valid, equivalent and reliable instrument to measure work-home interaction in a sample of employees in the mining environment?
- Are there differences regarding work-home interaction between different demographic groups in terms of age, gender, language, marital status, level of qualification, children, overtime worked, flexibility at home, having a partner, and the contribution of a partner to the home situation?
- Can a structural model be tested that includes job characteristics, ill health and negative work-home interference; is it valid?
- Which recommendations can be made for future research and practice?
1.2 RESEARCH OBJECTIVES

The research objectives can be divided into a general objective and specific objectives.

1.2.1 General objectives

The general objective of this research is to determine the construct validity, construct equivalence and reliability of the Survey Work-Home Interaction – NijmeGen (SWING), to determine if there are differences regarding work-home interaction between different demographic groups, and to test a structural model that includes job characteristics, ill health and negative work-home interference.

1.2.2 Specific objectives

The specific objectives of the research are the following:

- To determine if the SWING is a valid, equivalent and reliable instrument to measure work-home interaction in a sample of employees working in the mining environment.
- To determine if there are differences regarding work-home interaction between different demographic groups in terms of age, gender, language, marital status, level of qualification, children, overtime worked, flexibility at home, having a partner, and the (financial) contribution of a partner to the home situation.
- To test a structural model that includes job characteristics, ill health and negative work-home interference.
- To make recommendations for future research and practice.

1.3 RESEARCH METHOD

The research method consists of a literature review and an empirical study. The results obtained are presented in the form of two research articles. The reader should note that a
brief literature review is compiled for the purpose of each article. This paragraph focuses on aspects relevant to the empirical study that is conducted.

1.3.1 Research design

A survey design is used to achieve the research objectives. The specific design is the cross-sectional design, whereby a sample is drawn from a population at one time (Shaughnessy & Zechmeister, 1997).

1.3.2 Participants and procedure

Random samples \( n = 320 \) are taken from mining houses in the Gauteng, North West and Northern provinces, which include gold, platinum and phosphate mines. The sample includes employees of different Patterson grade levels (B2-E2), ranging from employees working underground to managers. Scheduled visits with the mining houses were made. Focus group sessions have been arranged with the purpose of gathering information regarding their work environment and factors that might help or hinder them in doing their job. A selected number of employees from various sections and grade levels within the mine will participate in these focus groups. After obtaining an idea of what the recurring topics and main concerns of the employees are, the measuring battery will be compiled and questionnaires will be distributed. A letter will be included, explaining the goal and importance of the study, as well as a list of contact persons should participants have any enquiries. Participants will be assured of the anonymity and confidentiality with which the information will be handled. Participants will be given three weeks to complete the questionnaires, after which they will be personally collected or sent to the university by the HR consultant.

1.3.3 Measuring battery

The following questionnaires are utilised in the empirical study:

The Survey Work-Home Interaction – NijmeGen (SWING) is used to measure work-home interaction (Geurts et al., 2005; Wagena & Geurts, 2000). The SWING is a 22-item work-home interference measure. It measures four types of work-home interference, namely (1) negative interference from work with home (negative WHI), referring to a negative impact of
the work situation on one’s functioning at home (eight items, e.g. “You do not have the energy to engage in leisure activities with your spouse/family/friends because of your job?”); (2) positive interference from work with home (positive WHI), referring to a positive influence of the work situation on one’s functioning at home (five items, e.g. “You fulfil your domestic obligations better because of the things you have learned on your job?”); (3) negative interference from home with work (negative HWI), referring to a negative impact of the home situation on one’s job performance (four items, e.g. “You have difficulty concentrating on your work because you are preoccupied with domestic matters); and (4) positive interference from home with work (positive HWI), referring to a positive impact of the home situation on one’s job performance (five items, e.g. “You take your responsibilities at work more seriously because you are required to do the same at home?”). All items are scored on a four-point frequency rating scale, ranging from “0” (never) to “3” (always). The following Cronbach alpha coefficients were obtained for the SWING in the study of Geurts et al. (2005): Negative WHI: 0.84; Negative HWI: 0.75; Positive WHI: 0.75; Positive HWI: 0.81.

A biographical questionnaire is used to determine the biographical characteristics of the participants working in the mining industry. Characteristics such as gender, race, age, language, the individual’s level of qualification, household situation, parental status, as well as the participant’s working contract will be measured with this questionnaire.

1.3.4 Statistical analysis

The statistical analysis is carried out with the SPSS program (SPSS Inc., 2005) and the Amos program (Arbuckle, 2001). Cronbach alpha coefficients are used to assess the reliability of the measuring instrument (Clark & Watson, 1995). Descriptive statistics (e.g. means and standard deviations) are used to analyse the data.

The construct validity and construct equivalence of the SWING is tested using structural equation modelling (SEM) methods as implemented by Amos (Arbuckle, 1999). The following goodness-of-fit-indices are used as adjuncts to the \( \chi^2 \) statistics: a) \( \chi^2/df \) ratio; b) The Goodness-of-Fit Index (GFI); c) The Parsimony Goodness-of-Fit Index (PGFI); d) The Incremental Fit Index IFI; e) The Tucker-Lewis Index (TLI); f) The Comparative Fit Index.
The Root Mean Square Error of Approximation (RMSEA). Multivariate analysis of variance (MANOVA) is used to determine the significance of differences between the work-home interaction levels of different demographic groups. Wilk's Lambda is used to test the likelihood of the data under the assumption of equal population mean vectors for all groups, against the likelihood under the assumption that the population mean vectors are identical to those of the sample mean vectors for the different groups. When an effect is significant in MANOVA, one-way analysis of variance (ANOVA) is used to determine which dependent variables had been affected. Because multiple ANOVAs are used, a Bonferroni-type adjustment is made for inflated Type 1 error. The Games-Howell procedure is used to determine whether there are statistical differences between the groups.

Exploratory factor analyses are carried out to determine the number of factors underlying the job characteristics and ill health questionnaires. Pearson product-moment correlation coefficients are used to specify the relationship between the variables. In terms of statistical significance, it is decided to set the value at a 95% confidence interval level ($p \leq 0.05$). Effect sizes are used to decide on the practical significance of the findings (Steyn, 1999). Cut-off points of 0.30 (medium effect, Cohen, 1988) and 0.50 (large effect) are set for the practical significance of correlation coefficients. The structural model is also tested with SEM analyses using the Amos software package. Maximum likelihood estimation methods are used with the covariance matrix of the scales as input for the analysis.

1.4 OVERVIEW OF CHAPTERS

In Chapter 2, the construct validity, construct equivalence (invariance) and reliability of the Survey Work-Home Interaction–NijmeGen (SWING), as well as differences regarding work-home interaction between different groups are examined. In Chapter 3, a structural model that includes job characteristics, ill health and negative work-home interference is tested. Chapter 4 deals with the discussion, limitations, and recommendations of this study.
1.5 CHAPTER SUMMARY

This chapter provided a discussion of the problem statement and research objectives. Furthermore, the measuring instruments and the research method were explained, followed by a brief overview of the chapters that follow.
REFERENCES


CHAPTER 2

RESEARCH ARTICLE 1

ABSTRACT

The objective of this research was to (1) test the concurrent validity of online social media (OSM) – Facebook, Twitter, and Instagram – on the work-home interference (WII) relationship among employees working in a large public sector organization (LPSO). The study used a cross-sectional survey design with a sample of employees. The data was collected using a self-administered, anonymous online survey. The survey included measures of OSM usage, WII, and job satisfaction. The results of the study showed that OSM usage had a significant positive relationship with WII, above and beyond the effects of job satisfaction. The implications of these findings are discussed, and future research directions are suggested.
WORK-HOME INTERACTION IN THE MINING INDUSTRY:
MEASUREMENT AND DIFFERENCES BETWEEN
DEMOGRAPHICAL GROUPS

ABSTRACT

The objectives of this research were to 1) test the construct validity, construct equivalence (vs. invariance) and reliability of the Survey Work-Home Interaction – NijmeGen (SWING) and 2) determine if various demographic groups differ with regard to work-home interaction. Random samples \((n = 320)\) were taken from employees working in the mining industry (gold, platinum and phosphate mines) in the Gauteng, North West and Northern provinces. Structural equation modelling confirmed the four-factor structure of the SWING and the construct equivalence for two language and ethnic groups. The four factors showed acceptable internal consistencies. Multivariate analysis of variance (MANOVA) and one-way analysis of variance (ANOVA) were used to determine differences between groups. Statistically significant differences were found based on age, ethnicity, gender, qualification, marital and parental status, language, flexibility at work and whether individuals had a partner with a paid job.

OPSOMMING

Die doelwitte van hierdie studie was om 1) die konstrukgeldigheid, konstrukgelykwaardigheid en betroubaarheid van 'n instrument wat werk/huis-interaksie meet, naamlik die Survey Work-Home Interaction – NijmeGen (SWING), te toets en 2) vas te stel of verskillende demografiese groepe verskil met betrekking tot werk/huis-interaksie. Ewekansige steekproewe \((n = 320)\) is van werknemers in die mynbou-industrie (goud-, platinum- en fosfaatmyne) in die Gauteng, Noordwes en Noordelike provinsies geneem. Struktuurvergelykingsmodellering het die vierfactorstruktuur van die SWING en die konstrukgeldigheid vir die twee taal- en etniese groepe bevestig. Die vier faktore het aanvaarbare interne konsekwentheid getoon. Meervariantvariansie-analise (MANOVA) en eenrigtingvariansie-analise (ANOVA) is gebruik om die verskille tussen die groepe te bepaal. Statisties betekenisvolle verskille is gevind op grond van ouderdom, etniteit, geslag, kwalifikasie, huwelik- en ouerstatus, taal, buigsaamheid by die werk en of individue 'n maat gehad het wat ook 'n inkomste verdien.
The mining environment within South Africa is not one of the easiest industries to work in. Individuals working in this industry have to face various demands and unpleasant working conditions. Workers may be required to work in dark and damp conditions with varying temperatures (Singer, 2002), usually deep underground, and often working alone in small areas with little supervision and communication (Calitz, 2004). Furthermore, the changing face of employment relations and legislation in South Africa requires companies to hire more women. Resultantly, many women are replacing the role that men once held within the mining environment, not only because the industry has opened up to the hiring of females, but also because of economic hardship (Calitz, 2004). Work and family integration has therefore become a major issue for both women and men at work (Geurts & Demerouti, 2003).

With work and family constituting the dominant life roles for most employed adults in contemporary society, employed men and women are increasingly concerning themselves with the managing of these conflicts experienced in attempting to fulfil the dual demands and responsibilities of work and family roles. According to Greenhaus and Beutell (1985), work-family conflict is experienced when pressures from the work and family roles are mutually incompatible, such that participation in one role makes it difficult to participate in the other. The end result is that individuals may experience some form of conflict between the roles they assume they must fulfil and the roles they are expected to fulfil. Work-family issues are also viewed as affecting company competitiveness and are therefore not only a problem for employees, but also for organisations (Allen, Herst, Bruck, & Sutton, 2000; Houston, 2005; Lewis & Cooper, 2005; Parasuraman & Greenhaus, 1999).

Although work-home interaction can be seen to be of extreme importance, research within this field is characterised by two major limitations. Firstly, the majority of empirical studies focused on the negative interference between work and personal life and based their hypotheses on the role scarcity hypothesis, while positive work-home interaction and the idea of role enhancement have been under-researched. Secondly, many instruments are available to measure negative work-home interaction, as opposed to only a few instruments exclusively developed for measuring positive interaction (e.g. Carlson, Kacmar, Wayne, & Grzywacz, in press; Kirchmeyer, 1992). Instruments developed for the measurement of both negative and positive interaction are even more exclusive. In South Africa, research surrounding work-home interaction is even scarcer, and no instrument exists that has proven to be valid and
reliable in measuring work-home interaction within the mining environment. Furthermore, due to the nature and diversity of the mining industry, it is also important to have an instrument that could be used across diverse groups. Therefore, an instrument is needed that is also equivalent for different language and ethnical groups.

Recently, an instrument called the Survey Work-Home Interaction – NijmeGen (SWING) was developed by Wagena and Geurts (2000) and validated by Geurts, Taris, Kompier, Dikkers, Van Hooff, and Kinnunen (2005) at the Radboud University in the Netherlands. What makes this instrument unique is the fact that it captures the negative as well as positive dimensions of the work-home interface. The SWING gives a full theory-guided conceptualisation of the work-home interface and encompasses interaction between both direction (interaction between the work domain and the home domain), and quality (negative and positive interaction).

Within South Africa, only two studies have been found that investigated the psychometric properties of the SWING (Pieterse, 2005; Van Tonder, 2005). These studies found the SWING to be a reliable, valid and equivalent measuring instrument. However, although these findings are encouraging, it cannot be assumed that these findings will be applicable to the mining industry. It is therefore necessary to investigate the psychometric properties of the SWING in a sample of mining employees before valid and reliable conclusions could be made regarding work-home interaction in the South African mining environment. Furthermore, in order for mining companies in South Africa to identify possible risk groups that may struggle to balance their work and home lives, it also seems important to determine if there are differences regarding work-home interaction between different demographic groups.

In light of the above discussion, the objectives of this research were 1) to test the construct validity, construct equivalence and reliability of the SWING; and 2) to determine if various demographic groups differ with regard to work-home interaction.
The work-home interface

Geurts et al. (2005, p. 322) define work-home interaction as “an interactive process in which a worker’s functioning in one domain (e.g. home) is influenced by (negative or positive) load reactions that have built up in the other domain (e.g. work)”. Difficulties in combining work and family roles may either arise from time demand that makes it physically impossible to be in two places at the same time (time-based conflict), from the spillover of strain from one domain to the other (strain-based conflict), or from the incompatibility of behaviours requested in each domain (behaviour-based conflict) (Greenhaus & Beutell, 1985).

As work-home interaction has become increasingly important, the need for an instrument based on a sound theoretical background had become even more so. To overcome this limitation, the SWING is based on a sound theoretical perspective, called the Effort-Recovery (E-R) model (Meijman & Mulder, 1998). The E-R model sheds light on how work and private life may interact and by which mechanisms well-being may be affected (Geurts, Kompier, Roxburgh, & Houtman, 2003). According to this model, effort expenditure is associated with specific load reactions (namely physiological, behavioural and subjective responses) that develop within the individual, such as changes in hormone secretion, energy levels, and mood (Geurts et al., 2005). These reactions are in principle reversible. Recovery takes place when the exposure to load ceases and the respective psychological systems will stabilise again at a specific baseline level within a certain period of time (Drenth, Thierry, & De Wolff, 1998). However, when demands do not cease, no recovery occurs. As a result, negative load effects develop, which may result in increased load reactions, which in turn make higher demands on the recovery process. Thus, an accumulative process may yield a draining of one’s energy and a state of breakdown or exhaustion (e.g. Sluiter, 1999; Ursin, 1980).

The fundamental role of the recovery process clearly makes the E-R model a promising perspective for studying negative work-home interaction. However, the same perspective may also increase our understanding of positive work-home interaction since effort expenditure may also be accompanied by positive load reactions. If one feels competent and satisfied in one’s work, these positive feelings could translate to the home sphere (and vice versa).
The Survey Work-Home Interaction – Nijmegen (SWING)

One of the limitations in work-home interaction research was overcome by the development of the SWING, which differentiates between the direction as well as the quality of interference. By measuring work-home interaction in this way, four factors are measured, namely 1) negative work-home interference (WHI) (when negative load reactions built up at work, hamper functioning at home); 2) positive WHI (when positive load reactions built up at work, facilitate functioning at home); 3) negative home-work interference (HWI) (when negative load reactions developed at home, impede functioning at work); and 4) positive HWI (when positive load reactions developed at home, facilitate functioning at work) (Geurts et al., 2005).

Nine items were designed to measure negative WHI (five items covering strain-based interference, and four items covering time-based interference). Negative HWI was measured by six items (including four self-developed). Five of these items parallel items from the negative WHI scale. Positive WHI was measured by six items, of which five items were self-developed. Two items tap the spillover of positive mood, while four items cover the transfer of skills learned at work. Positive HWI was measured by six items, of which five items were self-developed to parallel five positive WHI items. Again, two items capture the spillover of positive mood, while three items measure the transfer of skills learned at home (Geurts et al., 2005). Although the SWING originally consisted of 27 items, the final version of the questionnaire included 22 items, of which 13 items were newly developed.

By using data from five independent samples (total $N = 2,472$), Geurts et al. (2005) provided evidence for the validity of the internal structure of the questionnaire. Their results showed that the questionnaire reliably measured four empirically distinct types of work-home interaction, and that this four-dimensional structure was largely invariant across the five samples as well as across relevant subgroups, providing evidence regarding its robustness across a wide variety of workers. Similar results were obtained in two South African studies. Using principle component analysis with a direct oblimin rotation, Pieterse (2005) obtained four factors in a sample of workers in the earthmoving industry. They also demonstrated construct equivalence for two language groups, although three problematic items had to be removed. In a sample of nurses, Van Tonder (2005) also found that the four-factor structure of the SWING fitted their data significantly better than alternative models. Based on these
results, it could be hypothesised that the SWING has a four-dimensional structure (e.g. negative WHI, positive WHI, negative HWI and positive HWI) (Hypothesis 1a) and that this structure will be equivalent for the two language and ethnic groups in this study (Hypothesis 1b).

The four scales of the SWING also seem to be reliable. Geurts et al. (2005) report Cronbach alpha coefficients of 0.84 for negative WHI, 0.75 for positive WHI, 0.75 for negative HWI and 0.81 for positive HWI, while Pieterse (2005) obtained the following Cronbach alpha coefficients for the SWING: negative WHI = 0.87; positive WHI = 0.79; negative HWI = 0.79; and positive HWI = 0.76. Van Tonder (2005) also obtained reliable coefficients for the SWING dimensions (negative WHI: α = 0.86; positive WHI: α = 0.67; negative HWI: α = 0.81; positive HWI: α = 0.78). In this study, it is expected that the SWING will have acceptable internal consistencies (Hypothesis 1c).

**Work-home interaction and demographic differences**

With regard to age, Grzywacz and Marks (2000) found that younger men reported higher negative spillover between work and home (as well as between home and work) and less positive spillover from home to work than older men. They also found that younger women reported more positive spillover from work to home and more negative spillover from home to work than older women did. However, most other studies found no relationship between different age groups (Frone, Russell, & Cooper, 1997; Kinnunen & Mauno, 1998; Pieterse, 2005; Van Tonder, 2005). It is therefore expected that different age groups will not differ with regard to work-home interaction (Hypothesis 2a).

Regarding ethnicity, Pieterse (2005) found no differences between ethnical groups. However, Grzywacz and Marks (2000) found that black women reported less negative spillover from home to work than other women did. Van Tonder (2005) found statistically significant differences between Caucasian and African nurses regarding home-work interference, where whites experienced more negative HWI, but also more positive HWI. It therefore seems that ethnic groups will differ based on HWI (Hypothesis 2b).

Several studies revealed that there are hardly any differences between males and females in their experience of negative or positive interaction between work and home in both directions.
(Burke, 1988; Demerouti, Geurts, Bakker, & Euwema, 2004; Eagle, Miles, & Icenogle, 1997; Frone, 2002; Kinnunen & Mauno, 1998; Kirchmeyer, 1992). Therefore, no differences are expected between males and females (Hypothesis 2c). Frone et al. (1997) revealed that no significant relationships were found between educational level and work-home interference. However, Pieterse (2005) and Van Tonder (2005) found significant differences between different educational groups, where individuals with a Technicon diploma experienced significantly higher negative WHI than individuals with grade 10 or grade 11 did. It therefore seems that individuals with different educational levels will differ with regard to negative WHI (Hypothesis 2d).

The relationship between marital status and work-home interaction is not clear, however, Grzywacz and Marks (2000) reported that being unmarried was associated with negative WHI. Because this relationship is still unclear, it is hypothesised that there will be no differences based on marital status (Hypothesis 2e). Finally, other demographic characteristics that seem important to investigate include parental status, language, flexibility at work, if one has a partner and the financial contribution of the partner to the household situation. However, given the scarce amount of research on the relationship between these variables and work-home interaction, no hypotheses could be formulated.

METHOD

Participants and procedure

A cross-sectional survey design was used to achieve the objectives of this research. Random samples \( n = 320 \) were taken from mining houses in the Gauteng, North West and Northern provinces, which included gold, platinum and phosphate mines. Participants included employees of different Patterson grade levels (B2-E2), ranging from employees working underground to managers. Scheduled visits with the mining houses were made. Having obtained permission, focus group sessions were arranged with the purpose of gathering information regarding their work environment and factors that might help or hinder them in doing their job. A selected number of employees from various sections and grade levels within the mine participated in the focus groups. After obtaining an idea of what the recurring topics and main concerns of the employees were, the measuring battery was compiled and distributed. A letter was included, explaining the goal and importance of the study, as well as
a list of contact persons should participants have any enquiries. Participants were assured of the anonymity and confidentiality with which the information would be handled. Participants were given three weeks to complete the questionnaires, after which they were personally collected or sent to the university by the HR consultant.

Table 1 gives an indication of the characteristics of the participants in the study.

Table 1
*Characteristics of the Participants*

<table>
<thead>
<tr>
<th>Item</th>
<th>Category</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>Male</td>
<td>254</td>
<td>79,90</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>64</td>
<td>20,10</td>
</tr>
<tr>
<td></td>
<td>Missing values</td>
<td>2</td>
<td>0,60</td>
</tr>
<tr>
<td>Ethnicity</td>
<td>Caucasian</td>
<td>182</td>
<td>56,90</td>
</tr>
<tr>
<td></td>
<td>African</td>
<td>129</td>
<td>40,30</td>
</tr>
<tr>
<td></td>
<td>Missing values</td>
<td>3</td>
<td>0,90</td>
</tr>
<tr>
<td>Age</td>
<td>22-29 years</td>
<td>42</td>
<td>13,10</td>
</tr>
<tr>
<td></td>
<td>30-39 years</td>
<td>126</td>
<td>39,40</td>
</tr>
<tr>
<td></td>
<td>40-49 years</td>
<td>104</td>
<td>32,50</td>
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<tr>
<td></td>
<td>50-69 years</td>
<td>43</td>
<td>13,40</td>
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<tr>
<td></td>
<td>Missing values</td>
<td>4</td>
<td>1,30</td>
</tr>
<tr>
<td>Language</td>
<td>Afrikaans</td>
<td>148</td>
<td>46,30</td>
</tr>
<tr>
<td></td>
<td>African languages</td>
<td>128</td>
<td>40,00</td>
</tr>
<tr>
<td></td>
<td>English</td>
<td>41</td>
<td>12,80</td>
</tr>
<tr>
<td></td>
<td>Missing values</td>
<td>3</td>
<td>0,90</td>
</tr>
<tr>
<td>Marital status</td>
<td>Married</td>
<td>73</td>
<td>22,70</td>
</tr>
<tr>
<td></td>
<td>Not married</td>
<td>244</td>
<td>76,30</td>
</tr>
<tr>
<td></td>
<td>Missing values</td>
<td>3</td>
<td>0,90</td>
</tr>
<tr>
<td>Level of qualification</td>
<td>Secondary education</td>
<td>192</td>
<td>59,90</td>
</tr>
<tr>
<td></td>
<td>Tertiary education</td>
<td>122</td>
<td>38,10</td>
</tr>
<tr>
<td></td>
<td>Missing values</td>
<td>6</td>
<td>1,90</td>
</tr>
</tbody>
</table>

According to Table 1, the majority of the participants (79,90%) were male, of which 56,90% were Caucasian and 40,30% African. In total, 148 (46,30%) of the participants were Afrikaans speaking, with African languages constituting 128 (40,00%) of the sample. With regard to marital status, 76,30% of the participants were not married (either single or divorced) and 22,70% were married.
In the light of education, a total of 192 (59.90%) of the participants possessed a secondary educational qualification (grade 12 or lower), while 122 (38.10%) possessed a tertiary education qualification.

Measuring battery

The following questionnaires were utilised in the empirical study:

- The *Survey Work-Home Interaction – NijmeGen* (SWING) was used to measure work-home interaction (Geurts et al., 2005; Wagena & Geurts, 2000). The SWING is a 22-item work-home interference measure and measures four types of work-home interference, namely (1) negative WHI (eight items, e.g. “You do not have the energy to engage in leisure activities with your spouse/family/friends because of your job?”); (2) positive WHI (five items, e.g. “You fulfil your domestic obligations better because of the things you have learned on your job?”); (3) negative HWI (four items, e.g. You have difficulty concentrating on your work because you are preoccupied with domestic matters); and (4) positive HWI (five items, e.g. “You take your responsibilities at work more seriously because you are required to do the same at home?”). All items are scored on a four-point frequency rating scale, ranging from “0” (*never*) to “3” (*always*).

- A biographical questionnaire was used to determine the biographical characteristics of the participants working in the mining industry. Characteristics such as gender, ethnicity, age, language, qualification, household situation, parental status, as well as the participant’s working contract were measured with this questionnaire.

Statistical analysis

The statistical analysis was carried out with the SPSS program (SPSS Inc., 2003) and the Amos program (Arbuckle, 1999). Cronbach alpha coefficients were used to assess the reliability of the measuring instrument (Clark & Watson, 1995). Descriptive statistics (e.g. means and standard deviations) were used to analyse the data.
The construct validity of the SWING was tested by comparing four competing models for the relationships among the 22 items, using structural equation modelling (SEM) methods as implemented by Amos (Arbuckle, 1999). Invariance was examined for the best-fitting factor model using the procedure suggested by Byrne (2001). Testing for multi-group invariance (equivalence) involved testing for invariance simultaneously across groups (in this case language and ethnicity), where sets of parameters are put to the test in a logically ordered and increasingly restrictive fashion. Depending on the model and hypotheses to be tested, the following sets of parameters are most commonly of interest in answering questions related to group invariance, namely: a) factor loading paths; b) factor variances/covariances; and c) structural regression paths. Tests of hypotheses related to group invariance typically begin with scrutiny of the measurement model, where the pattern of factor loadings for each observed measure is tested for its equivalence across the groups. Parameters are then constrained equal while subsequent tests of the structural parameters are conducted. As each new set of parameters is tested, those known to be group-invariant are constrained equal.

As a prerequisite for testing for factorial invariance, it is customary to consider a baseline model, which is estimated for each group separately. This model represents the one that best fits the data from the perspectives of both parsimony and substantive meaningfulness. Given the $\chi^2$ statistic and its degrees of freedom are additive, the sum of the $\chi^2$ values derived from the model-fitting process for each group separately reflects the extent to which the underlying structure fits the data across groups when no cross-group constraints are imposed. Because measuring instruments are often group specific in the way they operate, baseline models are not expected to be identical across groups. The following goodness-of-fit-indices were used as adjuncts to the $\chi^2$ statistics: a) $\chi^2$/df ratio; b) The Goodness-of-Fit Index (GFI); c) The Parsimony Goodness-of-Fit Index (PGFI); d) The Incremental Fit Index IFI; e) The Tucker-Lewis Index (TLI); f) The Comparative Fit Index (CFI); g) The Root Mean Square Error of Approximation (RMSEA).

Multivariate analysis of variance (MANOVA) was used to determine the significance of differences between the work-home interaction levels of different demographic groups. MANOVA tests whether mean differences among groups on a combination of dependent variables are likely to have occurred by chance (Tabachnick & Fidell, 2001). In MANOVA, a new dependent variable that maximises group differences is created from the set of dependent
variables. Wilk’s Lambda was used to test the likelihood of the data under the assumption of equal population mean vectors for all groups, against the likelihood under the assumption that the population mean vectors are identical to those of the sample mean vectors for the different groups. When an effect was significant in MANOVA, one-way analysis of variance (ANOVA) was used to determine which dependent variables had been affected. Because multiple ANOVAs were used, a Bonferroni-type adjustment was made for inflated Type 1 error. The Games-Howell procedure was used to determine whether there were statistical differences between the groups.

RESULTS

Following Geurts et al. (2005), the construct validity of the SWING was tested with SEM, using the maximum likelihood method. Four competing factorial models were tested. Model 1 ("one-factor model") proposes that all 22 items load on the same underlying latent dimension, assuming that the items cannot be distinguished on the basis of direction or quality of influence. Model 2 ("direction model") is a two-factor model, and distinguishes between items that refer to either influence from work or influence from home (irrespective of its quality). Model 3 ("quality model") also distinguishes between two factors, where the first factor includes all items referring to positive interaction and the second factor includes all items referring to negative interaction (irrespective of the originating domain). Model 4 ("hypothesised model") represents the four-factor model and distinguishes among the four expected dimensions.

Table 2 presents the fit indices for these models.
From Table 2 it is clear that Model 1 did not fit well to the data ($\chi^2 = 1298.26, df = 209, p < 0.001$; GFI, AGFI, IFI, TLI and CFI $< 0.90$ and RMSEA $> 0.08$). Model 2 ("directional model") and Model 3 ("quality model") explained the associations among the items significantly better than Model 1 (M2 vs. M1: $\Delta \chi^2 = 289.70, df = 1.00, p < 0.001$; M3 vs. M1: $\Delta \chi^2 = 493.11, df = 1.00, p < 0.001$). However, both these models still fell short of what is acceptable. The four-factor hypothesised model, which distinguished between the four proposed dimensions of work-home interaction, explained the associations among the items significantly better than the other three competing models (M4 vs. M1: $\Delta \chi^2 = 929.16, df = 3.00, p < 0.001$; M4 vs. M2: $\Delta \chi^2 = 639.46, df = 2.00, p < 0.001$; M4 vs. M3: $\Delta \chi^2 = 436.05, df = 2.00, p < 0.001$).

Inspection of the fit indices of Model 4 suggests a good model fit. However, on inspection of the standardised regression weights, modification indices and standardised residual covariances, one item seems to be problematic ("After spending a pleasant weekend with your spouse/family/friends, you have more fun in your job?"). In addition, one constrained parameters exhibiting a high degree of misfit lay in the error covariance matrix and represent a correlated error between Item 1 and Item 2 (MI = 29.65). Compared with MI values for all other error covariance parameters, this value was much higher. Based on these results, Model 4 was re-specified, with the problematic item deleted and the error between Item 1 and Item 3 was allowed to correlate. As can be seen in Table 2, Model 5 fitted the data significantly better than M4 (M5 vs. M4: $\Delta \chi^2 = 93.05, df = 21, p < 0.001$). Since this model fit was satisfactory and the results agreed with the theoretical assumptions underlying the

### Table 2

**Goodness-of-fit Statistics for the Comparison of Models**

<table>
<thead>
<tr>
<th>Model</th>
<th>$\chi^2$</th>
<th>$\chi^2$/df</th>
<th>GFI</th>
<th>PGFI</th>
<th>IFI</th>
<th>TLI</th>
<th>CFI</th>
<th>RMSEA</th>
</tr>
</thead>
<tbody>
<tr>
<td>M1 One-factor</td>
<td>1298.26</td>
<td>6.21</td>
<td>0.62</td>
<td>0.54</td>
<td>0.56</td>
<td>0.51</td>
<td>0.55</td>
<td>0.13</td>
</tr>
<tr>
<td>M2 Two-factor</td>
<td>1008.56</td>
<td>4.85</td>
<td>0.71</td>
<td>0.59</td>
<td>0.68</td>
<td>0.64</td>
<td>0.67</td>
<td>0.11</td>
</tr>
<tr>
<td>&quot;Direction model&quot;</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>M3 Two-factor</td>
<td>805.15</td>
<td>3.87</td>
<td>0.78</td>
<td>0.64</td>
<td>0.76</td>
<td>0.73</td>
<td>0.76</td>
<td>0.10</td>
</tr>
<tr>
<td>&quot;Quality model&quot;</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>M4 Four-factor</td>
<td>369.10</td>
<td>1.79</td>
<td>0.91</td>
<td>0.74</td>
<td>0.93</td>
<td>0.93</td>
<td>0.93</td>
<td>0.05</td>
</tr>
<tr>
<td>&quot;Hypothesised model&quot;</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>M5 Four factor</td>
<td>276.05</td>
<td>1.49</td>
<td>0.93</td>
<td>0.74</td>
<td>0.96</td>
<td>0.96</td>
<td>0.96</td>
<td>0.04</td>
</tr>
<tr>
<td>&quot;Final model&quot;</td>
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<td></td>
<td></td>
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</tbody>
</table>
structure of the SWING, no further modifications of the model were deemed necessary. These results support Hypothesis 1a, which postulates that work-home interaction can be characterised as a four-dimensional construct that distinguishes between the direction (work to home, and home to work) and quality (negative and positive) of influence.

Next, the hypothesis relating to the invariance for factor loadings, factor variances and covariances of the four-factor structure of the SWING was tested for two groups based on language (Afrikaans vs. African Languages) and ethnicity (Caucasian vs. African). At the statistical level, the test for the invariance of factor loading and covariances involves using the $\chi^2$ statistics to determine the difference in statistical fit between the unconstrained and constrained models. Non-significant difference between models indicates statistical support for the hypothesis being tested. Invariance can also be examined by comparing the other indices (e.g. IFI, TLI, CFI and RMSEA) of the models compared. Such comparisons provide a test for invariance at the practical level, where small differences are indicative of invariance for groups compared. In general, before testing for measurement and structural invariance, and differences in latent mean scores, it is necessary to ensure well fitting models for the groups involved (Byrne, 2001). Therefore, baseline models were tested for each group. The results are presented in Table 3.

Table 3
Testing for Invariant Factorial Structures of the Measuring Instrument

The results of CFA of the four-factor model showed excellent fit based on language (Afrikaans: $\chi^2 = 271.39\,(n = 320), df = 1851.00, p < 0.001$; African Languages: $\chi^2 = 231.30\,(n = 320), df = 1851.00, p < 0.001$) as well as ethnicity (Caucasian: $\chi^2 = 293.72\,(n = 320), df = 1851.00, p < 0.001$; African: $\chi^2 = 231.98\,(n = 320), df = 1851.00, p < 0.001$). Therefore, these models were used as the baseline models for the language and ethnic groups. Table 3 shows the results of analyses for testing the measurement and structural invariance across language and ethnicity. As can be seen, the practical fit indices of the unconstrained models were very good, supporting the invariance for the number of factors. The indices for the constrained models also showed very good fit, and their values were very close to those for the constrained model. In addition, differences between the models based on the $\chi^2$ value were also non-significant. These results provide support for the invariance in the pattern of factor loadings of the SWING across language and ethnicity, providing support for Hypothesis 1b.

In Table 4, the descriptive statistics, Cronbach alpha coefficients and correlation coefficients of the SWING are given.
Table 4

Descriptive Statistics, Alpha Coefficients and Correlation Coefficients of the SWING

<table>
<thead>
<tr>
<th>Item</th>
<th>M</th>
<th>SD</th>
<th>α</th>
<th>NWHI</th>
<th>PWHI</th>
<th>NHWI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Negative WHI</td>
<td>1.14</td>
<td>0.67</td>
<td>0.90</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Positive WHI</td>
<td>1.46</td>
<td>0.63</td>
<td>0.74</td>
<td>0.06</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Negative HWI</td>
<td>0.67</td>
<td>0.61</td>
<td>0.78</td>
<td>0.35*+</td>
<td>0.08</td>
<td>-</td>
</tr>
<tr>
<td>Positive HWI</td>
<td>1.66</td>
<td>0.77</td>
<td>0.77</td>
<td>0.14*</td>
<td>0.34*+</td>
<td>0.17*</td>
</tr>
</tbody>
</table>

* Correlation is statistically significant at the 0.01 level
+ Correlation is practically significant, $r > 0.30$ (medium effect)

From the results in Table 4, it can be seen that the relationship between the positive and negative scales of WHI and HWI is highly correlated as well as statistically and practically significant (medium effect). This would suggest that alteration in one variable would indefinitely cause a simultaneous and/or congruent alteration in the other. Furthermore, all four scales have acceptable Cronbach alpha coefficients compared to the guideline of $\alpha \geq 0.70$ (Kline, 1999; Nunnally & Bernstein, 1994), providing evidence for the internal consistency of the SWING (Hypothesis 1c).

Next, MANOVA (multivariate analysis of variance) was used to determine differences between demographic groups with regard to work-home interaction. Demographic groups included were age, ethnicity, gender, qualification, marital status, parental status, language, flexibility at work, whether one has a partner, and the partner’s contribution to the household situation (financially). Results were first analysed for statistical significance using Wilk’s Lambda statistics. ANOVA was used to determine specific differences whenever statistical differences were found. The results of the MANOVA analysis are given below in Table 5.
In an analysis of Wilk's Lambda values, statistically significant differences (p ~ 0.05) regarding work-home interaction levels were found between all the variables, except for the partner's contribution to the household situation. The relationship between work-home interaction and the demographic variables levels that showed a statistically significant difference was further analysed using ANOVA. Because sample sizes were different, the Games-Howell procedure was used to determine whether there were any statistical differences between the groups.

The results of the ANOVA based on Age are given below in Table 6.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Value</th>
<th>F</th>
<th>Df</th>
<th>p</th>
<th>Partial Eta Squared</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>0.92</td>
<td>2.18</td>
<td>12</td>
<td>0.01*</td>
<td>0.03</td>
</tr>
<tr>
<td>Ethnicity</td>
<td>0.87</td>
<td>11.09</td>
<td>4</td>
<td>0.00*</td>
<td>0.13</td>
</tr>
<tr>
<td>Gender</td>
<td>0.95</td>
<td>3.74</td>
<td>4</td>
<td>0.01*</td>
<td>0.05</td>
</tr>
<tr>
<td>Qualification</td>
<td>0.94</td>
<td>5.37</td>
<td>4</td>
<td>0.00*</td>
<td>0.07</td>
</tr>
<tr>
<td>Marital status</td>
<td>0.96</td>
<td>3.57</td>
<td>4</td>
<td>0.01*</td>
<td>0.04</td>
</tr>
<tr>
<td>Parental status</td>
<td>0.96</td>
<td>3.31</td>
<td>4</td>
<td>0.01*</td>
<td>0.04</td>
</tr>
<tr>
<td>Language</td>
<td>0.87</td>
<td>5.62</td>
<td>8</td>
<td>0.00*</td>
<td>0.07</td>
</tr>
<tr>
<td>Flexibility at work</td>
<td>0.80</td>
<td>4.42</td>
<td>16</td>
<td>0.00*</td>
<td>0.05</td>
</tr>
<tr>
<td>Has a partner with a paid job</td>
<td>0.96</td>
<td>2.44</td>
<td>4</td>
<td>0.05*</td>
<td>0.04</td>
</tr>
<tr>
<td>Partners' contribution to the household situation</td>
<td>0.90</td>
<td>1.68</td>
<td>12</td>
<td>0.07</td>
<td>0.04</td>
</tr>
</tbody>
</table>

*p ≤ 0.05 = significant effect
Table 6

*ANOVA - Differences in Work-Home Interaction Levels Based on Age*

<table>
<thead>
<tr>
<th>Item</th>
<th>22-29 years</th>
<th>30-39 years</th>
<th>40-49 years</th>
<th>50-69 years</th>
<th>p</th>
<th>Partial Eta Squared</th>
</tr>
</thead>
<tbody>
<tr>
<td>Negative WHI</td>
<td>1.04</td>
<td>1.16</td>
<td>1.14</td>
<td>1.10</td>
<td>0.74</td>
<td>0.00</td>
</tr>
<tr>
<td>Positive WHI</td>
<td>1.33b</td>
<td>1.34b</td>
<td>1.55</td>
<td>1.69a</td>
<td>0.00a</td>
<td>0.04</td>
</tr>
<tr>
<td>Negative HWI</td>
<td>0.54</td>
<td>0.76</td>
<td>0.61</td>
<td>0.64</td>
<td>0.14</td>
<td>0.02</td>
</tr>
<tr>
<td>Positive HWI</td>
<td>1.40</td>
<td>1.72</td>
<td>1.65</td>
<td>1.76</td>
<td>0.09</td>
<td>0.02</td>
</tr>
</tbody>
</table>

* Statistically significant difference: \( p \leq 0.05 \)

Table 6 shows that statistically significantly differences exist between levels of Positive WHI based on age. It appears that participants aged between 50 and 69 years experience statistically significantly higher levels of positive WHI, compared to the age groups of 22-29 years and 30-39 years. Resultantly, Hypothesis 2a, which proposed that differences would exist based on age differences, is therefore rejected.

The results of the ANOVA based on Ethnicity are given in Table 7.

Table 7

*ANOVA - Differences in Work-Home Interaction Levels Based on Ethnicity*

<table>
<thead>
<tr>
<th>Item</th>
<th>Caucasian</th>
<th>African</th>
<th>p</th>
<th>Partial Eta Squared</th>
</tr>
</thead>
<tbody>
<tr>
<td>Negative WHI</td>
<td>1.10</td>
<td>1.18</td>
<td>0.27</td>
<td>0.00</td>
</tr>
<tr>
<td>Positive WHI</td>
<td>1.31</td>
<td>1.66</td>
<td>0.00a</td>
<td>0.07</td>
</tr>
<tr>
<td>Negative HWI</td>
<td>0.59</td>
<td>0.77</td>
<td>0.00a</td>
<td>0.02</td>
</tr>
<tr>
<td>Positive HWI</td>
<td>1.49</td>
<td>1.93</td>
<td>0.00a</td>
<td>0.08</td>
</tr>
</tbody>
</table>

* Statistically significant difference: \( p \leq 0.05 \)

Table 7 shows that statistically significant differences exist between Caucasians and Africans in terms of Positive WHI, Negative HWI and Positive HWI. African participants experience higher Positive WHI and Positive HWI, but also have higher Negative HWI levels than Caucasian participants have. These finding are congruent with Hypothesis 2b, which indicated that differences would exist based on ethnicity.

The results of the ANOVA based on Gender are given below in Table 8.
Table 8

ANOVA - Differences in Work-Home Interaction Levels Based on Gender

<table>
<thead>
<tr>
<th>Item</th>
<th>Male</th>
<th>Female</th>
<th>( p )</th>
<th>Partial Eta Squared</th>
</tr>
</thead>
<tbody>
<tr>
<td>Negative WHI</td>
<td>1.19</td>
<td>0.91</td>
<td>0.00*</td>
<td>0.03</td>
</tr>
<tr>
<td>Positive WHI</td>
<td>1.50</td>
<td>1.30</td>
<td>0.03*</td>
<td>0.02</td>
</tr>
<tr>
<td>Negative HWI</td>
<td>0.70</td>
<td>0.52</td>
<td>0.03*</td>
<td>0.01</td>
</tr>
<tr>
<td>Positive HWI</td>
<td>1.69</td>
<td>1.56</td>
<td>0.22</td>
<td>0.00</td>
</tr>
</tbody>
</table>

* Statistically significant difference: \( p \leq 0.05 \)

Table 8 shows that statistically significant differences exist between males and females based on Negative WHI, Positive WHI and Negative HWI. Based on these results, it seems that males experience higher levels of Negative WHI and Negative HWI, but also higher levels of Positive WHI. However, the ratio of male to female participants should be noted (males 79.90% and females 20.10%). Hypothesis 2c is therefore rejected, as differences do exist between that of males and females.

Table 9

ANOVA - Differences in Work-Home Interaction Levels Based on Qualification

<table>
<thead>
<tr>
<th>Item</th>
<th>Secondary education</th>
<th>Tertiary education</th>
<th>( p )</th>
<th>Partial Eta Squared</th>
</tr>
</thead>
<tbody>
<tr>
<td>Negative WHI</td>
<td>1.23</td>
<td>0.99</td>
<td>0.00*</td>
<td>0.03</td>
</tr>
<tr>
<td>Positive WHI</td>
<td>1.44</td>
<td>1.48</td>
<td>0.59</td>
<td>0.00</td>
</tr>
<tr>
<td>Negative HWI</td>
<td>0.73</td>
<td>0.58</td>
<td>0.03*</td>
<td>0.02</td>
</tr>
<tr>
<td>Positive HWI</td>
<td>1.77</td>
<td>1.51</td>
<td>0.00*</td>
<td>0.03</td>
</tr>
</tbody>
</table>

* Statistically significant difference: \( p \leq 0.05 \)

Table 9 shows that statistically significant differences exist between individuals with a secondary education compared to those with a tertiary education. Individuals possessing a tertiary education appear to experience lower levels of Negative WHI, as well as Negative and Positive HWI. Therefore, individuals possessing a secondary education scored higher on negative WHI and HWI, but at the same time appear to experience more Positive HWI than participants possessing a tertiary education. Although these findings are opposite to research findings, Hypothesis 2d is accepted, as differences do exist between individuals based on qualification.
The results of the ANOVA based on Marital and Parental Status are given in Table 10 and Table 11 respectively.

Table 10

**ANOVA - Differences in Work-Home Interaction Levels Based on Marital status**

<table>
<thead>
<tr>
<th>Item</th>
<th>Married</th>
<th>Unmarried</th>
<th>p</th>
<th>Partial Eta Squared</th>
</tr>
</thead>
<tbody>
<tr>
<td>Negative WHI</td>
<td>0.97a</td>
<td>1.18b</td>
<td>0.02</td>
<td>0.02</td>
</tr>
<tr>
<td>Positive WHI</td>
<td>1.30a</td>
<td>1.51b</td>
<td>0.01</td>
<td>0.02</td>
</tr>
<tr>
<td>Negative HWI</td>
<td>0.70</td>
<td>0.66</td>
<td>0.62</td>
<td>0.00</td>
</tr>
<tr>
<td>Positive HWI</td>
<td>1.56</td>
<td>1.69</td>
<td>0.21</td>
<td>0.01</td>
</tr>
</tbody>
</table>

* Statistically significant difference: \( p < 0.05 \)
* Group differs statistically significantly from type (in row) where \( ^b \) is indicated

Statistically significant differences were found between that of married and unmarried participants, with unmarried participants experiencing higher levels of positive and negative WHI. However, no statistically significant differences were found between that of negative and positive HWI. Hypothesis 2e is therefore rejected, as differences do exist between participants in terms of marital status.

Table 11

**ANOVA - Differences in Work-Home Interaction Levels Based on Parental Status**

<table>
<thead>
<tr>
<th>Item</th>
<th>With Children</th>
<th>Without Children</th>
<th>p</th>
<th>Partial Eta Squared</th>
</tr>
</thead>
<tbody>
<tr>
<td>Negative WHI</td>
<td>1.17</td>
<td>0.96</td>
<td>0.02</td>
<td>0.02</td>
</tr>
<tr>
<td>Positive WHI</td>
<td>1.48</td>
<td>1.34</td>
<td>0.11</td>
<td>0.01</td>
</tr>
<tr>
<td>Negative HWI</td>
<td>0.68</td>
<td>0.56</td>
<td>0.15</td>
<td>0.01</td>
</tr>
<tr>
<td>Positive HWI</td>
<td>1.73</td>
<td>1.41</td>
<td>0.00</td>
<td>0.03</td>
</tr>
</tbody>
</table>

* Statistically significant difference: \( p \leq 0.05 \)

In Table 11, the ANOVA results show that statistically significant differences were found between employees with children and those without children with regard to Negative WHI and Positive HWI. Individuals with children appear to have higher levels of Negative WHI than those without children, but at the same time also experience higher levels of Positive HWI.
As noted in Table 12, and evident in Table 8, African-speaking individuals experience statistically significantly higher levels of Positive WHI and HWI than Afrikaans- and English-speaking participants do. However, at the same time, African-speaking individuals experience higher levels of Negative HWI.

Table 13 shows the differences in work-home interaction based on Flexibility at Work. Differences are determined based on the possibility to take a day off from work or to work from home when something unexpected happens at home (e.g. when a child gets ill or a repair person comes to the house).

Table 13

*Statistically significant difference: \( p \leq 0.05 \)

*a Group differs statistically significantly from type (in row) where \( b \) is indicated

*b Group differs statistically significantly from type (in row) where \( c \) is indicated

*c Group differs statistically significantly from type (in row) where \( d \) is indicated

*d Group differs statistically significantly from type (in row) where \( e \) is indicated

*e Group differs statistically significantly from type (in row) where \( f \) is indicated

---

<table>
<thead>
<tr>
<th>Item</th>
<th>Afrikaans</th>
<th>English</th>
<th>African</th>
<th>( p )</th>
<th>Partial Eta Squared</th>
</tr>
</thead>
<tbody>
<tr>
<td>Negative WHI</td>
<td>1.11</td>
<td>1.01</td>
<td>1.19</td>
<td>0.30</td>
<td>0.01</td>
</tr>
<tr>
<td>Positive WHI</td>
<td>1.32(^b)</td>
<td>1.36(^e)</td>
<td>1.65(^a)</td>
<td>0.00(^*)</td>
<td>0.07</td>
</tr>
<tr>
<td>Negative HWI</td>
<td>0.60(^a)</td>
<td>0.59</td>
<td>0.78(^b)</td>
<td>0.03(^*)</td>
<td>0.02</td>
</tr>
<tr>
<td>Positive HWI</td>
<td>1.54(^a)</td>
<td>1.30</td>
<td>1.92(^b)</td>
<td>0.00(^*)</td>
<td>0.09</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Item</th>
<th>Very easy to arrange</th>
<th>Easy to arrange</th>
<th>Possible to arrange</th>
<th>May not be possible to arrange</th>
<th>Impossible to arrange</th>
<th>( p )</th>
<th>Partial Eta Squared</th>
</tr>
</thead>
<tbody>
<tr>
<td>Negative WHI</td>
<td>0.76(^e)</td>
<td>0.90(^e)</td>
<td>1.09(^b)</td>
<td>1.50(^b)(^d)</td>
<td>1.77(^b)(^d)</td>
<td>0.00(^*)</td>
<td>0.17</td>
</tr>
<tr>
<td>Positive WHI</td>
<td>1.60</td>
<td>1.46</td>
<td>1.41</td>
<td>1.45</td>
<td>1.52</td>
<td>0.61</td>
<td>0.01</td>
</tr>
<tr>
<td>Negative HWI</td>
<td>0.50</td>
<td>0.64</td>
<td>0.70</td>
<td>0.63</td>
<td>0.77</td>
<td>0.43</td>
<td>0.01</td>
</tr>
<tr>
<td>Positive HWI</td>
<td>1.62</td>
<td>1.57</td>
<td>1.68</td>
<td>1.60</td>
<td>1.84</td>
<td>0.63</td>
<td>0.01</td>
</tr>
</tbody>
</table>
As can be seen in Table 13, statistically significant differences were only found between groups for Negative WHI. Participants who find it very easy or easy to arrange a work schedule experienced statistically significantly lower Negative WHI than those who find it possible, difficult or impossible to arrange.

The results of the ANOVA based on whether one has a partner with a paid job are given below in Table 14.

Table 14
ANOVA - Differences in Work-Home Interaction Levels Based on “Partner”

<table>
<thead>
<tr>
<th>Item</th>
<th>Partner with a paid job</th>
<th>Partner without a paid job</th>
<th>p</th>
<th>Partial Eta Squared</th>
</tr>
</thead>
<tbody>
<tr>
<td>Negative WHI</td>
<td>1.09</td>
<td>1.23</td>
<td>0.10</td>
<td>0.01</td>
</tr>
<tr>
<td>Positive WHI</td>
<td>1.47</td>
<td>1.43</td>
<td>0.56</td>
<td>0.00</td>
</tr>
<tr>
<td>Negative HWI</td>
<td>0.58</td>
<td>0.75</td>
<td>0.03*</td>
<td>0.02</td>
</tr>
<tr>
<td>Positive HWI</td>
<td>1.56</td>
<td>1.74</td>
<td>0.06</td>
<td>0.01</td>
</tr>
</tbody>
</table>

* Statistically significant difference: p < 0.05

Table 14 shows that statistically significant differences occur between individuals who have a partner with a paid job and those without with regard to Negative HWI. It seems that participants without a partner with a paid job experience statistically significant higher negative HWI that those with a partner with a paid job.

DISCUSSION

The objectives of this research were to test the psychometric properties of the SWING (including the construct validity, construct equivalence and reliability) and to determine whether various demographic groups differed in terms of work-home interaction levels.

Regarding the construct validity of the SWING, four competing factorial models were tested. The results indicated that the four-factor hypothesised model fitted the data significantly better than the alternative models. However, the fit indices, factor loadings and modification indices indicated that the four-factor model could be improved by deleting one problematic item, (“After spending a pleasant weekend with your spouse/family/friends, you have more fun in your job?”) and allowing a correlated error between two items (Items 1 and 2).
A possible explanation for the covariation between the two item errors could be that items with comparable rating scales often have measurement errors that are correlated (Byrne, 1989).

After these modifications were made, the fit of the hypothesised model to the data was satisfactory, confirming that work-home interaction can be characterised as a four-dimensional construct that distinguishes between the direction (work to home, and home to work) and quality (negative and positive) of influence. This confirms the results of Geurts et al. (2005), whose results showed that the questionnaire reliably measured four empirically distinct types of work-home interaction. It also substantiates the findings of Pieterse (2005) and Van Tonder (2005), who also confirmed a four-factor structure.

Although the factor structure of the SWING was confirmed, it could not be assumed this structure was equivalent for the different groups. Because South Africa consists of vast language and ethnic groups, it was decided to test the construct equivalence of the four-factor structure for two language groups (Afrikaans and African languages) and for two ethnic groups (Caucasian and African). The results showed that the four-factor structure was equivalent for both these groups, indicating that the instrument measures the same construct for both language and ethnic groups. These results support the findings of Pieterse (2005), who also demonstrated construct equivalence for two language groups, although three problematic items had to be removed. Furthermore, acceptable Cronbach alpha coefficients were obtained for all four scales. This indicates that the SWING is also a reliable instrument to measure work-home interaction and support previous findings (e.g. Geurts et al., 2005; Pieterse, 2005; Van Tonder, 2005).

With regard to the work-home interaction differences between demographic groups, statistically significantly differences were found based on age, ethnicity, gender, qualification, marital status, parental status, language, flexibility at work and individuals who have a partner with/without a paid job. With regard to age, it was found that participants between the ages of 50 and 69 years experienced statistically significant higher levels of positive WHI, while participants between the ages of 22 and 39 would appear to experience the lowest levels of positive WHI. These findings are congruent with those of Grzywacz and Marks (2000). Possible reasons given by Grzywacz and Marks were the fact that older men may have acquired the necessary skills required in managing the demands or conflicts of both domains. It could also prove useful to investigate the activities that older men engaged in, as
they may prove helpful in alleviating the pressures of their environments. A possible reason for younger men experiencing lower levels of positive WHI could be the fact that they are largely inexperienced and resultantly feel unsettled in themselves and their work.

As regards ethnicity, it was found that Africans experience higher levels of positive WHI as well as more negative WHI and HWI. Possible reasons for this finding may be the way in which each of us perceives the world around us. Each culture has distinguishing attributes and these affect the way in which we interpret situations and circumstances. For example, a situation that may be considered worthless or even detrimental by one person/culture, may be perceived as challenging and/or promising circumstances by another. With regard to the positive WHI, Africans may perceive the skills they receive in the workplace as advantageous, and as a result experience higher levels of positive WHI. With regard to the higher levels of negative WHI and HWI, it could be that certain cultural aspects in the African groups could cause negative interference between the two domains. For example, in the African culture it is considered an offence not attending family and/or community funerals. Non-attendance results in branding of those individuals, as they are considered disrespectful.

Differences were also found between language groups, where individuals speaking African languages experience statistically significant higher levels of positive WHI and positive HWI than Afrikaans- and English-speaking participants. Again, this may be due to cultural differences. For example, African-speaking individuals may be engaged in more meaningful or socially-orientated activities, and through this find the necessary social support. Differences based on qualification indicated that individuals possessing a tertiary education appear to experience overall lower levels of negative WHI and negative HWI, as well as lower positive HWI. This may be due to the fact that individuals with a higher qualification might experience higher demands as much of their time may be spent wrapped up in their work. However, people with higher qualifications also experienced higher positive WHI. This could be due to the fact that these individuals learn new skills and learn how to prioritise their family life above that of work.

Regarding parental status, working parents would appear to have higher levels of Negative WHI than those without children, but at the same time also experience higher levels of Positive HWI. Working couples would need a flexible schedule granting them available time
to attend to their children. Should an individual’s working environment not compensate for this, they could experience negative interference from work to home. However, at the same time it would appear advantageous having children. Possibly because of a level of maturity that comes with settling down in life, or the recurring issue of the change in activities.

The working of overtime would also suggest that working overtime largely affects the home environment negatively. This is once again understandable, as this would interfere with a person’s lifestyle causing them to have to curb their activities to compensate for their working schedule, which would inevitably lead to negative WHI. Finally, with regard to flexibility at work, participants would appear to have difficulty in adjusting their work to compensate for permanent home demands and/or situations that may arise.

**LIMITATIONS AND RECOMMENDATIONS**

With regard to the limitations of the present study, the following can be delineated. Firstly, the results were obtained exclusively through the use of self-report questionnaires, which may have created “method-variance” or “nuisance”. Secondly, the sample size and fact that these results are only applicable to the mining industry (thus make generalisation to other occupational groups difficult) can be considered another limitation. It must however be kept in mind that mining forms the hub of South Africa’s economy, and thus the latter should be seen as more of an advantage as it can provide insight and guidance to other mining houses within the country. A third possible limitation to this study is that organisations such as the mining industry often have unique characteristics such as organisational-specific cultures and/or norms that may have impacted the participants’ responses.

Based on the results of the present study as well as those of Pieterse (2005) and Van Tonder (2005), the SWING is recommended in assessing work-home interaction within South Africa. The four scales of the SWING can be used to provide useful information on the interaction between work and home. Problematic items could be reformulated to avoid misunderstanding and enhance understanding. Naturally, it would be advantageous to get the SWING translated into the official African languages. With the turnover and mortality rate of the mining industry, many issues need to be urgently attended to. Addressing WHI issues is naturally not the solution to all of a company’s issues. However, its impact would transfer to other spheres of employees’ and organisations’ functioning, thereby creating an awareness.
REFERENCES


CHAPTER 3

RESEARCH ARTICLE 2

ABSTRACT

The current application of the concept of use in a preventive and health-promoting way of living (WHP) can help researchers in fields of public health and social sciences to understand the environmental, behavioral, and lifestyle factors that contribute to successful WHP. The scientific literature indicates that WHP has been shown to reduce the risk of chronic diseases and improve overall health. Therefore, the objective of this article is to present an overview of the concept of WHP and its relevance in various fields. The discussion includes the definition and characteristics of WHP, the benefits of incorporating WHP into daily life, and the challenges in promoting WHP. The article concludes with suggestions for future research and practical applications of WHP.

INTRODUCTION

This chapter provides a comprehensive overview of the concept of WHP, its definition, and its importance in various fields. WHP is a preventive approach to health promotion that focuses on lifestyle and environmental factors that contribute to the maintenance of health and well-being. The chapter discusses the benefits of WHP, including reduced risk of chronic diseases, improved quality of life, and increased longevity. Additionally, the chapter highlights the challenges in promoting WHP and suggests strategies for overcoming these challenges. The chapter concludes with recommendations for future research and practical applications of WHP.
JOB CHARACTERISTICS, ILL HEALTH AND NEGATIVE WORK-HOME INTERFERENCE IN THE MINING INDUSTRY

ABSTRACT

The general objective of this research was to test a structural model including job demands and job resources, ill health and negative work-home interference (WHI) within the mining environment. Random samples \( (n = 320) \) were taken from employees working in the mining industry (gold, platinum and phosphate mines) in the Gauteng, North West and Northern provinces. Exploratory factor analyses, descriptive statistics, Cronbach alpha coefficients, Pearson product-moment correlation, and structural equation modelling were used to reach the objective. The results indicated that job demands and job resources have an impact on ill health, and that ill health is associated with negative WHI. It was also found that job demands and job resources have a direct relationship with negative WHI on their own, but when both high demands and a lack of resources are present, only an indirect relationship with negative WHI exists through ill health.

OPSOMMING

Die algemene doelwit van hierdie studie was om 'n strukturele model, wat werkeise en werkhulpbronne, swak gesondheid en negatiewe werk/huis-konflik (WHI) insluit, binne die mynbou-omgewing te toets. Ewekansige steekproewe \( (n = 320) \) is van werknemers in die mynbou-industrie (goud-, platinum- en fosfaatmyne) in die Gauteng, Noordwes en Noordelike provinsies geneem. Verkennende faktorontledings, beskrywende statistieke, Cronbach-alfakoëffisiënte, Pearson produkmomentkorrelasie en strukturele vergelykingsmodellering is gebruik om die doelwit te bereik. Die resultate het aangetoon dat werkeise en werkhulpbronne 'n invloed op swak gesondheid het, en dat swak gesondheid met negatiewe WHI geassocieer word. Daar is ook bevind dat daar 'n direkte verband tussen werkeise en werkhulpbronne, en negatiewe WHI bestaan, maar wanneer hoë eise en 'n tekort aan hulpbronne bygevoeg word, bestaan daar slegs 'n indirekte verband met WHI deur swak gesondheid.
The South African mining industry forms the hub of our country’s economy and without it, many individuals and families would be stranded. However, it is at the same time an environment in which many people’s lives are put at risk due to the nature of the job. The work in a mine is gruelling (Singer, 2002) and those working in physical environments (i.e. processing plants and underground) naturally require some degree of physical fitness and strength (Wynn, 2001). Furthermore, employees work with explosives, test geological formations, operate load-haul-dump machines, scraper winches, heavy-duty machines and maintain mining machinery in conventional mines. The equipment and techniques used are varied and complex, with many areas requiring significant safety and skills training (Calitz, 2004).

Employees are also exposed to harsh working conditions that include mining underground with temperatures in excess of 28 degrees Celsius, long working hours, sometimes unsafe working conditions, highly unionised environments and enormous pressure to perform. The consequences of high environmental heat loads can be expressed in terms of impaired work capacity, errors of judgement, and the occurrence of heat disorders, especially heat stroke that is often associated with severe and irreversible tissue damage and high mortality rates (Calitz & Coetzer, 2004). With more than one hundred miners killed every year in the South African mining industry, this industry has proven to have the highest rates of fatal occupational injuries (McGwin, et. al, 2002). For example, it has been found that the effects of lumbar curvature on low back pain risk factors for repetitive musculoskeletal disorders in the neck and the upper limb are common among industrial workers, and most pronounced among women (Arvidsson, Akesson, & Hansson, 2003).

Exposure to these types of job characteristics could have serious implications for the health of employees. In fact, a number of studies found demands and resources in the job setting to be the most important predictors of adverse health outcomes such as burnout and psychosomatic health complaints (Demerouti, Bakker, Nachreiner, & Schaufeli, 2001; Houkes, Janssen, De Jonge, & Bakker, 2003; Houkes, Janssen, De Jonge, & Nijhuis, 2001a, 2001b; Janssen, De Jonge, & Bakker, 1999a; Peeters, Montgomery, Bakker, & Schaufeli, 2005; Schaufeli & Enzmann, 1998). Furthermore, several negative outcomes are associated with stressful job characteristics and psychological ill health, including a concept that became increasingly important to consider in Occupational Health Psychology, namely negative work-home interference (WHI). According to Bakker and Geurts (2004), job demands that require too
much effort and the lack of job resources to fulfil job requirements could not only lead to constant overtaxing and in the long term to health problems, but could also negatively interfere with the home situation. For example, when negative load reactions have built up at work as a result of high demands and insufficient resources, it could affect one’s energetic and physical state at work, and as a result, one’s functioning and need for recovery in the non-work domain is influenced.

Employees suffering from stress-related illnesses and who experience conflict between the work and home domains as a result of stressful aspects in the job setting are not only a social concern for companies, but the organisation concerned also suffer considerable financial and turnover problems (Greenhaus, Collins, Singh, & Parasuraman, 1997). The consequences associated with ill health and negative WHI include increased absenteeism (Ho, 1997; Managing Corporate Stress, 1998), workplace injuries (Managing Corporate Stress, 1998; Sauter et al., 2003), increased health care costs, violence, drug and alcohol abuse, lower productivity as well as turnover and litigation problems (Geurts & Demerouti, 2003; Managing Corporate Stress, 1998). Focusing on psychological ill health and work-home interference is therefore not only a corporate responsibility, but will have a strategic payoff.

Based on this line of reasoning, the objective of this study is to test a structural model of job characteristics, ill health and negative work-home interference in a sample of employees in the mining environment.

**Job characteristics, ill health and negative work-home interference**

Several theoretical models exist that could be used to improve our insights into job stress and the negative implications thereof, including the Job Demands-Resources (JD-R) model (Bakker, Demerouti, De Boer, & Schaufeli, 2003; Demerouti et al., 2001) and the Effort-Recovery (E-R) model (Meijman & Mulder, 1998).

According to the JD-R model, every occupation has its own specific job characteristics, but it is still possible to model these characteristics in two broad categories, namely job demands and job resources. Job demands refer to those physical, psychosocial or organisational aspects of the job that require sustained physical and/or mental effort and are associated with certain physiological and or psychological costs. Job resources refer to those physical, psychosocial
or organisational aspects of the job that may be functional in meeting task requirements (job demands), and may thus reduce the associated physiological and/or psychological costs, and at the same time stimulate personal growth and development. These resources can be located in the tasks itself (e.g. performance feedback, autonomy, skill variety), as well as in the context (e.g. organisational resources such as career opportunities and job insecurity) and in social resources (e.g. supervisor support) (Demerouti et al., 2001).

In addition, the JD-R model proposes that employee health and psychological well-being are the result of two relatively independent processes (Bakker et al., 2003; Bakker, Demerouti, Taris, Schaufeli, & Schreurs, in press – b; Demerouti et al., 2001). In the first process, particularly the demanding aspects of work (e.g. work overload) lead to constant overtaxing and in the long term to health problems (e.g. chronic fatigue, burnout). In the second process, the availability of job resources may help employees to cope with the demanding aspects of their work and simultaneously stimulate them to learn from and grow in their job, which may lead to motivation, feelings of accomplishment, and organisational commitment.

A useful model that can be used to illustrate the underlying mechanism of the process between that of job demands, job resources, ill health and negative work-home interference is the Effort-Recovery (E-R) model of Meijman and Mulder (1998). This model suggests that high job demands endanger people’s health in particular if they cannot recover during non-working hours. In case people’s time and energy resources are depleted due to ever increasing demands (particularly if this situation exists in both the work and home domain), serious conflicts can evolve between work and family roles. According to E-R theory, exposure to workload requires effort, which is associated with short-term psychophysiological reactions (e.g. accelerated heart rate, increased hormone secretion, and mood changes). In principle, these reactions are adaptive (e.g. providing information on the effort that is needed to perform the task) and reversible (i.e. when the exposure to workload ceases, the functional systems that were activated will stabilise again). However, should the opportunity for recovery after being exposed to high workloads be insufficient, the psychobiological systems are activated again before having been able to stabilise at a baseline level.
Consequently, the individual still in a suboptimal state, is forced to invest additional effort to perform adequately when confronted with (new) task demands, resulting in an increased intensity of the negative load reactions and making even higher demands on the recovery process.

In line with E-R theory, negative spillover has detrimental health effects when recovery opportunities between successive exposure periods are insufficient in terms of quantity (recovery time is too short, e.g. due to persisting demands) and/or quality (e.g. individuals unwind slowly and remain activated (sustained activation) after the exposure period, Ursin, 1980). Thus, an accumulative process may yield a draining of one’s energy and a state of breakdown or exhaustion (e.g. Sluiter, 1999; Ursin, 1980). Under unchanged conditions, these symptoms may develop into manifest health problems (cf. Kompier, 1988; Sluiter, 1999).

The theoretical perspectives offered by the JD-R and E-R models are relevant in studying the effect of job demands and a lack of job resources on psychological ill health, and the spillover of negative load effects that have built up during working hours to the non-work situation. The central idea is that job demands that require too much effort and the lack of job resources to fulfil the job requirements will have adverse effects on the psychological health of employees.

With regard to the above relationship and in conjunction with the models discussed earlier, there would appear to be a strong relationship between job characteristics (e.g. demands and resources) and ill health (including exhaustion, somatic complaints, and anxiety and insomnia). Indeed, several studies reported that job demands (e.g. cognitive, emotional, and physical demands) and a lack of job resources such as job autonomy (or job control), skill variety, feedback and social support are the most important predictors of adverse health outcomes like burnout (Houkes, Janssen, De Jonge, & Bakker, 2003; Houkes et al., 2001a, 2001b; Janssen et al., 1999a; Schaufeli & Enzmann, 1998). Furthermore, studies conducted by De Jonge, Janssen, and Van Breukelen (1996) as well as by Demerouti et al. (2001) showed that available job resources and particularly high job demands were related to emotional exhaustion and psychosomatic health complaints.
The first hypothesis will therefore be that job demands (H1a) and a lack of job resources (H1b) will directly impact on ill health, which includes somatic complaints, anxiety and insomnia and exhaustion (see Figure 1).

Furthermore, a large number of studies have reported associations between negative WHI and psychological ill health. In a review by Allen, Herst, Bruck, and Sutton (2000), it is shown that negative WHI is related to stress-related outcomes such as burnout, general psychological strain and somatic complaints, as well as physical consequences such as headache, backache, upset stomach, fatigue and sleep deprivation (insomnia). In a study among medical residents, Geurts, Rutte, and Peeters (1999) found that negative WHI was associated with psychosomatic health complaints and sleep deprivation. O’Driscoll, Ilgen, and Hildreth (1992) found a positive relationship between work/non-work conflict and general psychological strain, while Beatty (1996) reported positive relationships with anxiety. Similarly, Burke (1988) found positive associations between work-family conflict and negative affective states, including depression, the impulse and overt to aggression, anger, irritation, and insomnia. A consistent relationship is also found between burnout and work-home interference (e.g. Allen et al., 2000; Burke, 1988; Kinnunen & Mauno, 1998; Netemeyer, Boles, & McMurrian, 1996), and more specifically between negative WHI and exhaustion (Bakker & Geurts, 2004; Janssen, Peeters, De Jonge, Houkes, & Tummers, 2004; Montgomery, Peeters, Schaufeli, & Den Ouden, 2003). However, despite the fact that there is a strong relationship between psychological ill health and negative WHI, it is unclear from the literature where negative WHI should be imbedded in the stressor-strain relationship.

Negative WHI is often considered a potential source of stress that, in addition to other potential stressors, will have adverse effects on health and psychological well-being, resulting in, for example, poor physical health, depression, or anxiety (e.g. Burke, 1988, 1993; Frone, Russell, & Cooper, 1991, 1992, 1997; Kinnunen & Mauno, 1998). Rather than as a “stressor,” negative WHI is also often considered a stress reaction (i.e. strain), particularly caused by work-related stressors (e.g. high quantitative workload; Burke, 1988; Frone et al., 1992; Grzywacz & Marks, 2000). Various studies have also provided evidence for a mediating role of negative WHI in the stressor-strain relationship (e.g. Geurts, Kompier, Roxburgh, & Houtman, 2003; Janssen et al., 2004; Peeters, Montgomery, Bakker, & Schaufeli, 2005). Other studies found that negative WHI could be an outcome of certain demands at work and health complaints. For example, Bakker and Geurts (2004) found that
high or negative job demands were most strongly related to exhaustion (mediator), and consequently to negative WHI, whereas job resources were most strongly related to flow (mediator) and consequently to positive WHI.

In the framework of the Effort-Recovery (E-R) model it seems that high job demands and a lack of sufficient resources in the work environment is associated with poor health such as exhaustion, psychosomatic complaints, anxiety and insomnia. As a result, people will return home in a sub-optimal state, needing more time to recover from the day’s work. It therefore seems that negative WHI will occur when the work situation is characterised by stressful job characteristics (i.e. increased job demands and lack of available resources), and that the possibility of ill health mediating between job characteristics and negative WHI is highly probable. This study therefore proposes that ill health, as a result of high job demands and a lack of job resources, will lead to negative WHI (Hypothesis 2) (see Figure 1).

Although job characteristics are indirectly associated with negative WHI through ill health, several empirical studies support the assumption that job characteristics are also directly associated with negative WHI and that job demands and a lack of workplace social support and resources could endanger the work-home balance and foster negative WHI (e.g. Grzywacz & Marks, 2000; Leiter & Durup, 1996). Regarding job demands, it is consistently found that work overload has the most robust relationship with negative WHI (Frone et al., 1997; Geurts et al., 1999; Wallace, 1997). Relationships are also reported between negative WHI and pressure at work (Frone et al., 1992; Grzywacz & Marks, 2000; Oosthuizen, 2006), role conflict and role ambiguity (Carlson & Perrewé, 1999; Grandey & Cropanzano, 1999; Oosthuizen, 2006) and job insecurity (Kinnunen & Mauno, 1998). It therefore seems that job demands will have a direct relationship with negative WHI, in addition to the indirect effect through ill health (Hypothesis 3a) (see Figure 1).

Several job resources have been found to have a negative relationship with work-home conflict. The most frequently studied relationships are with autonomy and social support, where it has been found that lower levels of work-family conflict are associated with higher levels of autonomy (Frone et al., 1992; Grzywacz & Marks, 2000; Kinnunen & Mauno, 1998; Parasuraman, Purohit, Godshalk, & Beutell, 1996) and more social support (Carlson & Perrewé, 1999; Grzywacz & Marks, 2000; Kinnunen & Mauno, 1998; Kirchmeyer & Cohen, 1999; Oosthuizen, 2006).
Based on these findings, it is hypothesised that job resources will also be directly related to negative WHI, in addition to the indirect effect through ill health (Hypothesis 3b) (see Figure 1).

Figure 1. The hypothesised structural model of job characteristics, ill health and negative WHI

METHOD

Participants and procedure

A cross-sectional survey design was used to reach the objectives of this research. Random samples (n = 320) were taken from mining houses in the Gauteng, North West and Northern provinces, including gold, platinum and phosphate mines. The sample included employees of different Patterson grade levels (B2-E2), ranging from employees working underground to managers. Scheduled visits with the mining houses were made. Having obtained permission, focus group sessions were arranged with the purpose of gathering information on their work environment and factors that might help or hinder them in doing their job. A selected number of employees from various sections and grade levels within the mine participated in the focus groups. After obtaining an idea of what the recurring topics and main concerns of the employees were, the measuring battery was compiled and questionnaires were distributed.
A letter was included, explaining the goal and importance of the study, as well as a list of contact persons should participants have any enquiries. Participants were assured of the anonymity and confidentiality with which the information would be handled. Participants were given three weeks to complete the questionnaires, after which they were personally collected or sent to the university by the HR consultant.

Table 1 gives an indication of the characteristics of the participants in the study.
Table 1

*Characteristics of the Participants*

<table>
<thead>
<tr>
<th>Item</th>
<th>Category</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
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</tr>
<tr>
<td></td>
<td>Female</td>
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<td>20,10</td>
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<td></td>
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<td>0,60</td>
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<td>Ethnicity</td>
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<tr>
<td></td>
<td>African</td>
<td>129</td>
<td>40,30</td>
</tr>
<tr>
<td></td>
<td>Missing values</td>
<td>3</td>
<td>0,90</td>
</tr>
<tr>
<td>Age</td>
<td>22-29 years</td>
<td>42</td>
<td>13,10</td>
</tr>
<tr>
<td></td>
<td>30-39 years</td>
<td>126</td>
<td>39,40</td>
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<tr>
<td></td>
<td>40-49 years</td>
<td>104</td>
<td>32,50</td>
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<tr>
<td></td>
<td>50-69 years</td>
<td>43</td>
<td>13,40</td>
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<tr>
<td></td>
<td>Missing values</td>
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<td>1,30</td>
</tr>
<tr>
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</tr>
<tr>
<td></td>
<td>English</td>
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<td>12,80</td>
</tr>
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<td></td>
<td>Sepedi</td>
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<td>5,90</td>
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<td></td>
<td>Sesotho</td>
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<td>Setswana</td>
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<td></td>
<td>isiXhosa</td>
<td>13</td>
<td>4,10</td>
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<td></td>
<td>isiZulu</td>
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<td></td>
<td>Xitsonga</td>
<td>13</td>
<td>4,10</td>
</tr>
<tr>
<td></td>
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<td>0,30</td>
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<tr>
<td></td>
<td>Missing values</td>
<td>3</td>
<td>0,90</td>
</tr>
<tr>
<td>Level of Qualification</td>
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<td>8,10</td>
</tr>
<tr>
<td></td>
<td>Grade 10</td>
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<td></td>
<td>Grade 12</td>
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<td>43,40</td>
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<td></td>
<td>Matric + Diploma</td>
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<td>Matric + Higher Diploma/Degree</td>
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<td>12,80</td>
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<td>Matric + Honours Degree</td>
<td>17</td>
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<td></td>
<td>Matric + Master’s Degree</td>
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<td></td>
<td>Missing values</td>
<td>6</td>
<td>1,90</td>
</tr>
</tbody>
</table>

According to Table 1, the majority of the participants (79,90%) were male, of which 56,90% were Caucasian and 40,30% African. In total, 148 (46,30%) of the participants were Afrikaans speaking, with African languages constituting 128 (40,00%) of the sample. In terms of educational distribution, 192 (59,90%) of the participants possessed a secondary...
educational qualification (grade 12 or lower), while 122 (38.10%) possessed a tertiary education qualification. With regard to marital status, 76.30% of the participants were not married (either single or divorced) and 22.70% were married.

**Measuring instruments**

The following questionnaires were utilised in the empirical study:

*Job characteristics.* Focus groups were held in several mining houses to determine the specific job characteristics that employees experience in their work. The responses were analysed and used to develop items for the questionnaire. Principal components extraction was used to determine the number of factors underlying the questionnaire (reported in the Results section). Seven factors were identified which were labelled Pressure (10 items, e.g. Do you have too much work to do?), Poor Working Conditions (11 items, e.g. Are you exposed to health risks in your work environment (i.e. HIV/AIDS, tuberculosis, gasses, etc.?), Autonomy (seven items, e.g. Do you have freedom in carrying out your work activities?), Task Characteristics (six items, e.g. Do you have enough variety in your work?), Social Support (nine items, e.g. Can you count on your supervisor when you come across difficulties in your work?), Instrumental Support (six items, e.g. Do you receive sufficient technical support to complete your tasks?) and Pay and Benefits (five items, e.g. Does your job offer you the possibility to progress financially?). All items were rated on a four-point scale ranging from 1 (never) to 4 (always).

*Ill health.* Three indicators of ill health were used, namely somatic complaints, anxiety and insomnia, and exhaustion. Items were adapted from the General Health Questionnaire (GHQ, Goldberg & Williams, 1988) to measure Somatic Complaints (four items, e.g. Have you recently been feeling ill?) and Anxiety and Insomnia (seven items, e.g. Have you recently been losing sleep over constant worrying?; Have you recently been feeling constantly under strain?). Items were rated on a four-point scale ranging from 1 (better than usual) to 4 (much worse than usual). Exhaustion was measured using five adapted items (e.g. I feel exhausted from my work) from the MBI-HSS (Maslach & Jackson, 1986). Items were scored on a seven-point scale, ranging from 0 (never) to 6 (every day).
Negative work-home interference. Negative WHI was measured using the Negative WHI scale of the “Survey Work-Home Interaction – NijmeGen” (SWING) (Geurts et al., 2005). Negative WHI refers to a negative impact of the work situation on one’s functioning at home (eight items, e.g. “Your work schedule makes it difficult to fulfil domestic obligations”). All items were scored on a four-point frequency rating scale, ranging from 0 (never) to 3 (always). Geurts et al. (2005) obtained a coefficient α of 0.84, while Pieterse (2005) noted a coefficient α of 0.87 in their psychometric analysis of the SWING in the earthmoving equipment industry in South Africa.

A biographical questionnaire was used to determine the biographical characteristics of the participants working in the mining industry. Characteristics such as gender, ethnicity, age, language, level of qualification, household situation, parental status, as well as the participant’s working contract were measured with this questionnaire.

Statistical analysis

The statistical analysis was carried out with the SPSS program (SPSS Inc., 2003) and the AMOS program (Arbuckle, 1999). Exploratory factor analyses were carried out to determine the number of factors underlying the job characteristics and ill health questionnaires. The following procedure was followed: Firstly, a simple principal components analysis was conducted on the constructs. The eigenvalues and scree plot were studied to determine the number of factors that should be extracted. Secondly, a principal components analysis with a direct oblimin rotation was conducted if factors were related (r > 0.30). Thirdly, a principal component analysis with a varimax rotation was used if the obtained factors were not related (Tabachnick & Fidell, 2001). Cronbach alpha coefficients were used to assess the reliability of the constructs that were measured in this study. Descriptive statistics (e.g. means, standard deviations, skewness and kurtosis) and inferential statistics were used to analyse the data.

Pearson product-moment correlation coefficients were used to specify the relationship between the variables. In terms of statistical significance, it was decided to set the value at a 95% confidence interval level (p ≤ 0.05). Effect sizes were used to decide on the practical significance of the findings (Steyn, 1999). Cut-off points of 0.30 (medium effect, Cohen, 1988) and 0.50 (large effect) were set for the practical significance of correlation coefficients.
The structural model was tested with structural equation modelling (SEM) analyses using the AMOS software package (Arbuckle, 1997). Maximum likelihood estimation methods were used with the covariance matrix of the scales as input for the analysis. The goodness-of-fit of the model was evaluated using absolute and relative indices. The $\chi^2$ goodness-of-fit statistic and the Root Mean Square Error of Approximation (RMSEA) were used as absolute goodness-of-fit indices. Acceptable fit of the model is indicated by non-significant $\chi^2$ values and RMSEA values smaller than or equal to 0.08 (Cudeck & Browne, 1993). However, because the $\chi^2$ statistics is sensitive to sample size, Marsh, Balla, and Hau (1996) recommended using relative goodness-of-fit indices. Therefore, the following goodness-of-fit-indices were used as adjuncts to the $\chi^2$ statistics: a) $\chi^2$/df ratio; b) the Goodness-of-Fit Index (GFI); c) the Incremental Fit Index IFI; d) the Tucker-Lewis Index (TLI); and e) the Comparative Fit Index (CFI). For these relative fit-indices, as a rule of thumb, values of 0.90 or higher are considered as indicating a good fit (Hoyle, 1995). For the $\chi^2$/df ratio, it is generally agreed that values smaller or equal to 5.00 are indicative of good fit (Byrne, 2001).

RESULTS

Construct validity of the measuring instruments

Before analysing the data, the construct validity of the job characteristics inventory and the ill health questionnaire was determined using exploratory factor analysis.

Job Characteristics. Principal components extraction was used in an initial run to estimate the number of factors underlying the questionnaire. The scree plot and eigenvalues showed seven factors, which explained 50.55% of the total variance. Principal component analysis with a varimax rotation resulted in seven factors, which were labelled Pressure, Poor Working Conditions, Autonomy, Task Characteristics, Social Support, Instrumental Support and Pay and Benefits.

Subsequently, the seven factors of the job characteristics questionnaire were subjected to a second-order principal component factor analysis. Two factors, which explained 54.06% of the variance, were extracted. Because the factors were not highly related ($r = -0.09$), it was decided to use principal factor analysis with a varimax rotation to extract the factors.
Pressure (loading = 0.83) and Poor Working Conditions (loading = 0.83) formed the first factor and was labelled Job Demands. Autonomy (loading = 0.63), Task Characteristics (loading = 0.78), Social Support (loading = 0.78), Instrumental Support (loading = 0.61) and Pay and Benefits (loading = 0.61) formed the second factor, and were labelled Job Resources. Ill Health. Principal components extraction was used to determine if these are indeed three different constructs. The scree plot and eigenvalues showed three factors, which explained 62.59% of the total variance. All the items measuring the three constructs loaded on the correct factors. Subsequently, the three factors were subjected to a second-order principal component factor analysis. One factor, which explained 62.91% of the variance, were extracted (loading of Somatic Complaints = 0.84; loading of Insomnia and Anxiety = 0.89; loading of Exhaustion = 0.62). This factor was labelled Ill Health.

Descriptive statistics, Cronbach Alpha and product-moment correlations of the measuring instruments

The results of the descriptive statistics and Cronbach Alpha coefficients are given below in Table 2.

Table 2
Descriptive Statistics and Cronbach Alpha Coefficients of the Constructs (n = 320)

<table>
<thead>
<tr>
<th>Construct</th>
<th>M</th>
<th>SD</th>
<th>Skewness</th>
<th>Kurtosis</th>
<th>α</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pressure</td>
<td>25.16</td>
<td>5.11</td>
<td>0.21</td>
<td>-0.28</td>
<td>0.80</td>
</tr>
<tr>
<td>Poor Working Conditions</td>
<td>24.86</td>
<td>6.77</td>
<td>0.32</td>
<td>-0.60</td>
<td>0.84</td>
</tr>
<tr>
<td>Autonomy</td>
<td>20.57</td>
<td>4.24</td>
<td>-0.10</td>
<td>-0.72</td>
<td>0.82</td>
</tr>
<tr>
<td>Task Characteristics</td>
<td>15.50</td>
<td>3.93</td>
<td>0.06</td>
<td>-0.60</td>
<td>0.77</td>
</tr>
<tr>
<td>Social Support</td>
<td>26.02</td>
<td>6.32</td>
<td>-0.32</td>
<td>-0.71</td>
<td>0.89</td>
</tr>
<tr>
<td>Instrumental Support</td>
<td>17.31</td>
<td>3.62</td>
<td>-0.14</td>
<td>-0.52</td>
<td>0.78</td>
</tr>
<tr>
<td>Pay and Benefits</td>
<td>10.83</td>
<td>4.06</td>
<td>0.47</td>
<td>-0.64</td>
<td>0.87</td>
</tr>
<tr>
<td>Somatic Complaints</td>
<td>7.05</td>
<td>2.79</td>
<td>0.80</td>
<td>0.06</td>
<td>0.81</td>
</tr>
<tr>
<td>Anxiety and Insomnia</td>
<td>12.96</td>
<td>4.68</td>
<td>0.66</td>
<td>-0.22</td>
<td>0.89</td>
</tr>
<tr>
<td>Exhaustion</td>
<td>14.42</td>
<td>7.41</td>
<td>-0.06</td>
<td>-0.87</td>
<td>0.83</td>
</tr>
<tr>
<td>Negative WHI</td>
<td>9.09</td>
<td>5.35</td>
<td>0.56</td>
<td>0.10</td>
<td>0.90</td>
</tr>
</tbody>
</table>
From the results in Table 2, it can be seen that all the scores of the measuring instruments were normally distributed. The alpha coefficients of all the measuring instruments were considered acceptable compared to the guideline of $\alpha > 0.70$ (Nunnally & Bernstein, 1994).

The results of the product-moment correlation coefficients between the constructs are reported in Table 3.

**Table 3**

*Product-moment correlations*

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Pressure</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Poor Work Conditions</td>
<td>0.42</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Autonomy</td>
<td>-0.04</td>
<td>-0.06</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Task Characteristics</td>
<td>0.03</td>
<td>0.11</td>
<td>0.41</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Social Support</td>
<td>-0.25</td>
<td>-0.06</td>
<td>0.32</td>
<td>0.41</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Instrument Support</td>
<td>-0.12</td>
<td>-0.01</td>
<td>0.21</td>
<td>0.35</td>
<td>0.35</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Pay and Benefits</td>
<td>-0.13</td>
<td>-0.06</td>
<td>0.23</td>
<td>0.35</td>
<td>0.35</td>
<td>0.22</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. Somatic Complaints</td>
<td>0.16</td>
<td>0.13</td>
<td>-0.09</td>
<td>-0.10</td>
<td>-0.16</td>
<td>-0.03</td>
<td>-0.13</td>
<td>1.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. Anxiety and Insomnia</td>
<td>0.17</td>
<td>0.23</td>
<td>-0.15</td>
<td>-0.15</td>
<td>-0.22</td>
<td>-0.15</td>
<td>-0.05</td>
<td>0.67</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>10. Exhaustion</td>
<td>0.45</td>
<td>0.37</td>
<td>-0.19</td>
<td>-0.17</td>
<td>-0.23</td>
<td>-0.17</td>
<td>-0.17</td>
<td>0.25</td>
<td>0.28</td>
<td>1.00</td>
</tr>
<tr>
<td>11. Negative WHI</td>
<td>0.47</td>
<td>0.46</td>
<td>-0.13</td>
<td>-0.07</td>
<td>-0.14</td>
<td>-0.17</td>
<td>-0.15</td>
<td>0.35</td>
<td>0.38</td>
<td>0.51</td>
</tr>
</tbody>
</table>

All correlations ≥ 0.11 are statistically significant; $p < 0.05$
All correlations 0.30 ≤ $r$ ≤ 0.49 are practically significant (medium effect)
All correlations ≥ 0.50 are practically significant (large effect)

It is evident from Table 3 that Job Demands (Pressure and Poor Working Conditions) have positive and statistically significantly relationships with Somatic Complaints and Anxiety and Insomnia and positive and practically significantly relationships (medium effect) with Exhaustion and Negative WHI. Furthermore, it seems that negative and statistically significantly relationships exist between Somatic Complaints, Social Support and Pay and Benefits; Anxiety and Insomnia, Autonomy, Task Characteristics, Social Support and Instrumental Support; Exhaustion and all five job resources; and Negative WHI, Autonomy, Social Support, Instrumental Support and Pay and Benefits. Finally, Somatic Complaints and
Anxiety and Insomnia have positive and practically significantly relationships (with a medium effect) with Negative WHI, while Exhaustion has a positive and practically significantly relationship (large effect) with Negative WHI.

**The structural model of job characteristics, ill health and negative WHI**

The structural model was tested for its goodness-of-fit to the co-variance matrix of the measured variables. The latent exogenous factors, namely job demands and job resources, were both operationalised by exogenous observed variables each (see Figure 2). Job demands were indicated by pressure and poor working conditions. The manifest indicators of job resources were autonomy, task characteristics, social support, instrumental support, and pay and benefits. In addition, the structural model includes two endogenous latent variables, namely ill health and negative WHI. The latent “ill health” factor was assessed by three observed variables, namely somatic complaints, anxiety and insomnia, and exhaustion. Item parcels were used as manifest indicators of negative WHI rather than individual items or the full scale in order to achieve an appropriate balance between various demands and constraints due to sample size, variance, and model identification (Bagozzi & Edwards, 1998; Landis, Beal, & Tesluk, 2000; Reckase, 1996). For example, item parcels tend to provide more reliable and normally distributed scores than items, yet still provide multiple indicators for a latent construct in a model. Two item parcels were created for each scale using an equal distribution of factor loadings, with each parcel consisting of four negative WHI items.

In order to test the proposed hypotheses, four models were tested. First, a model (Model 1) was tested with only direct relationships between (1) job demands and ill health (Hypothesis 1a); (2) job resources and ill health (Hypothesis 1b); and (3) ill health and negative WHI (Hypothesis 2). The second and third models (Model 2) were based on Model 1, but the direct path between job demands and negative WHI (Model 2) and between job resources and negative WHI (Model 3) was specified each time in order to test Hypotheses 3a en 3b. Finally, the complete model was tested (Model 4) by means of SEM. The results are shown in Table 4.
Based on the results of the SEM analysis, it is clear that the first model did not fit well to the data, with \( \chi^2 = 233.26 \); IFI, TLI and CFI < 0.90 and RMSEA > 0.08. A review of the modification indices revealed that this lack of fit was mainly due to a covariation between the measurement errors of “somatic complaints” and “anxiety and insomnia”. A possible explanation for the covariation between these errors could be that items with comparable rating scales often have measurement errors that are correlated (Byrne, 1989). According to De Jonge et al. (2001), such an error correlation may also be the existence of an additional variable that is not included in the model. Therefore, this correlation could be necessary to explain the outcome variables more fully (MacCallum, Wegener, Uchino, & Fabrigar, 1993). After Model 1 was revised with this covariation included, the fit statistics indicate excellent fit of the measurement model to the data (\( \chi^2 = 108.75 \); IFI, TLI and CFI > 0.90; and RMSEA < 0.08). Therefore, these results provide support for Hypothesis 1a (the coefficient of the path from job demands to ill health was positive and highly significant: \( \beta = 0.87, t = 5.05, p < 0.01 \)), Hypothesis 1b (the coefficient of the path from job resources to ill health was negative and significant: \( \beta = -0.31, t = -3.76, p < 0.01 \), as well as Hypothesis 2 (the coefficient of the path from ill health to negative WHI was positive and highly significant: \( \beta = 0.80, t = 5.86, p < 0.01 \)).

After testing Model 2 and Model 3 (specifying separate but direct relationships between job demands and job resources with negative WHI), the results showed that the coefficient of the path from job demands to negative WHI was positive and highly significant (\( \beta = 0.40, t = 3.27, p < 0.01 \), and the coefficient of the path from job resources to negative WHI was highly positive and significant as well (\( \beta = 0.21, t = 2, 60, p < 0.01 \)). However, when the fourth alternative model was tested, which specified direct relationships between job
demands and negative WHI and between job resources and negative WHI simultaneously, the coefficients became non-significant for the path between job demands and negative WHI ($\beta = 0.34, t = 1.27, p = 0.20$) as well as for the path between job resources and negative WHI ($\beta = 0.04, t = 0.25, p = 0.80$). It can therefore be concluded that, although job demands and job resources have direct relationships with negative WHI on their own, when both high demands and a lack of resources are present, only an indirect relationship with negative WHI through ill health exists, providing only partial support for Hypotheses 3a and 3b (see Discussion section).

In conclusion, the series of SEM analyses showed that Model 2 fits best to the data, even though direct and significant paths were found between job demands and negative WHI and between job resources and negative WHI when tested separately. In total, job demands and job resources explained 85% of the variance in ill health, while ill health explained 65% of the variance in negative WHI (see Figure 2).

![Figure 2. Maximum Likelihood Estimates for the final model. All factor loadings and path coefficients are statistically significant, $p < 0.00$.](image)
DISCUSSION

The objective of this study was to test a structural model of job characteristics, ill health and negative work-home interference. Three hypotheses were tested, namely (1) that job demands and job resources are associated with ill health; (2) that ill health is associated with negative WHI; and (3) that job demands and job resources have a direct relationship with negative WHI in addition to the indirect effect through ill health.

As regards the first objective, it was found that high job demands and a lack of job resources are associated with exhaustion, somatic complaints and anxiety and insomnia. These results provided support for the first hypothesis and are consistent with previous research studies which found demands and resources in the job setting to be the most important predictors of adverse health outcomes such as burnout and psychosomatic health complaints (Bakker & Geurts, 2004; Demerouti, Bakker, Nachreiner, & Schaufeli 2001; Houkes, Janssen, De Jonge, & Bakker, 2003; Houkes, Janssen, De Jonge, & Nijhuis, 2001a, 2001b; Janssen, De Jonge, & Bakker, 1999; Peeters et al., 2005; Schaufeli & Enzmann, 1998).

It was also found that ill health has a strong and positive relationship with negative WHI. These results provided support for the second hypothesis and are congruent with that of past research, which has shown that self-reported poor general health has been positively related to work-home conflict (Frone, 2002; Grandey & Cropanzano, 1999; Kinnunen & Mauno, 1998). Finally, there seems to be a direct relationship between job demands and negative WHI as well as between job resources and negative WHI, supporting previous findings (e.g. Frone et al., 1997; Geurts et al., 1999; Grandey & Cropanzano, 1999; Grzywacz & Marks, 2000; Kinnunen & Mauno, 1998; Leiter & Durup, 1996). However, when the path from demands to negative WHI and the path from job resources to negative WHI were included simultaneously, both paths became highly insignificant. It can therefore be concluded that, although job demands and job resources have direct relationships with negative WHI on their own, when both high demands and a lack of resources are present, only an indirect relationship with negative WHI through ill health exists.

On a practical level, it seems that demanding aspects of work and the unavailability of job resources contribute to poor health, which will eventually lead to a negative interference with the home domain. More specifically, high pressure at work (e.g. working very hard and under
time pressure, having an excessive amount of work to do, having to concentrate for very long periods, reaching impossible or unrealistic targets) and poor working conditions (e.g. working in dangerous and unsafe conditions, being exposed to high security risks, being exposed to health risks in the work environment such as HIV/AIDS, tuberculosis and gasses, working overtime and socially undesirable hours) are positively and highly significantly related to employees feeling exhausted, physically ill and suffering from anxiety and insomnia. In addition, a lack of job resources such as low autonomy (e.g. no freedom in carrying out work activities), poor task characteristics (e.g. not enough variety in the job, no opportunities for personal growth, development or promotion) a lack of social and instrumental support (e.g. support from supervisor and colleagues, technical support to complete tasks) and poor salaries and benefits could further contribute to ill health.

The effort-recovery model of Meijman and Mulder (1998) proposes that high job demands endanger people’s health in particular if they cannot recover during non-working hours. This leads to depletion of an individual’s time and energy resources due to increasing demands, which could result in serious conflicts evolving between work and family roles. Furthermore, the implications facing employees who suffer from ill health is not only of importance at work. Apart from the danger of still having to travel home after a hard day’s work, there are inevitably home demands that require attention. Frone et al. (1997) revealed that those who work overtime are most likely to experience elevated levels of depression and poor health, which has been positively related to work-home conflict. As such, the possibility of experiencing negative WHI is present apart from the home demands, requirements or expectations.

**LIMITATIONS AND RECOMMENDATIONS**

Firstly, an obvious limitation of this type of research is the fact that cross-sectional research designs were utilised. As a result, no concrete decisions could be made regarding cause-and-effect relationships among variables. Despite the use of cross-sectional research design, the results obtained point in the right direction and may provide some footing for future research within the mining industry. A second limitation was the use of “self-report questionnaires”, which has a number of disadvantages. Firstly, due to the nature of the mining industry and its diversity, it has to be questioned as to how many participants understood the content of the questionnaire, as a result of language and educational issues (e.g. migrant workers; 16.50% of
participants had grade 10 or lower, with an additional 43.40% of the participants having only a grade 12 educational level). A third limitation was that of the exclusive focus on ill health and negative work-home interference. Although a number of research findings have found negative work-home interference to be the most pervasive, future research could focus on the developing strategies for organisations (such as the mining industry) to implement in order to ensure a positive transfer of skill, attitude, and general life satisfaction.

However, despite the limitations surrounding this research, there are a number of findings that could prove helpful to any future research on the mining industry. Mining is an industry driven by performance, and resultantly has the inevitable “increased job demands and lack of available resources component”, which has adverse implications on the “health and well-being” of individuals and organisations. With negative work-home interference having extensive implications for individuals and organisations, the mining industry should focus on providing support in terms of available resources and effectively managed job demands that are conducive to helping employees align their work and home domains. As Geurts and Demerouti (2003) put it, the focus should not only be on formal policies (e.g. by offering flexible working hours, compressed work schedules, child care facilities, parental leave), but also on the informal work environment. Although the organisation may have policies in place that provide for family responsibility leave, a environment needs to be created where employees feel at ease in utilising such policies without feeling being branded against.

An important recommendation for future research would be the use of longitudinal designs. The advantage of longitudinal research designs is that the hypothesised causalities of the relationships can be further validated and can thus indicate whether the relationships hold true over time. Future studies should also focus on positive work-home interaction instead of focusing solely on negative work-home interaction and ill health.
REFERENCES


CHAPTER 4

CONCLUSIONS, LIMITATIONS AND RECOMMENDATIONS

In this chapter, conclusions regarding the study are given according to the general and specific objectives. The limitations of this research are discussed, followed by recommendations for the organisation and future research.

3.1 CONCLUSIONS

The first objective of this research was to determine whether the SWING is a valid, equivalent and reliable instrument to measure work-home interaction in a sample of employees working in the mining environment. Regarding the construct validity of the SWING, four competing factorial models were tested. The results indicated that the four-factor hypothesised model fitted the data significantly better than the alternative models. However, the fit indices, factor loadings and modification indices indicated that the four-factor model could be improved by deleting one problematic item, (“How often does it happen that after spending a pleasant weekend with your spouse/family/friends, you have more fun in your job?”) and allowing a correlated error between two items (Items 1 and 2). A possible explanation for the covariation between the two item errors could be that items with comparable rating scales often have measurement errors that are correlated (Byrne, 1989).

After these modifications were made, the fit of the hypothesised model to the data was satisfactory, confirming that work-home interaction can be characterised as a four-dimensional construct that distinguishes between the direction (work to home, and home to work) and quality (negative and positive) of influence. This confirms the results of Geurts et al. (2005), whose results showed that the questionnaire reliably measured four empirically distinct types of work-home interaction. It also substantiates the findings of Pieterse (2005) and Van Tonder (2005), who also confirmed a four-factor structure.

Although the factor structure of the SWING was confirmed, it could not be assumed this structure was equivalent for the different groups. Because South Africa consists of vast language and ethnic groups, it was decided to test the construct equivalence of the four-factor
structure for two language groups (Afrikaans and African languages) and for two ethnic
groups (Caucasian and African). The results showed that the four-factor structure was
equivalent for both these groups, indicating that the instrument measures the same construct
for both language and ethnic groups. These results support the findings of Pieterse (2005),
who also demonstrated construct equivalence for two language groups. Furthermore,
acceptable Cronbach alpha coefficients were obtained for all four scales. This indicates that
the SWING is also a reliable instrument to measure work-home interaction and support
previous findings (e.g., Geurts et al., 2005; Pieterse 2005; Van Tonder, 2005).

The second research objective of the study was to determine if there are differences regarding
work-home interaction between different demographic groups in terms of age, gender,
language, marital status, level of qualification, children, overtime worked, flexibility at home,
having a partner, and the (financial) contribution of a partner to the home situation. With
regard to the work-home interaction differences between demographic groups, statistically
significantly differences were found based on age, ethnicity, gender, qualification, marital
status, parental status, language, flexibility at work and individuals who have a partner
with/without a paid job. With regard to age, it was found that participants between the ages of
50 and 69 years experienced statistically significant higher levels of positive WHI, while
participants between the ages of 22 and 39 would appear to experience the lowest levels of
positive WHI. These findings are congruent with those of Grzywacz and Marks (2000).
Possible reasons given by Grzywacz and Marks were the fact that older men may have
acquired the necessary skills required in managing the demands or conflicts of both domains.
It could also prove useful to investigate the activities that older men engaged in, as they may
prove helpful in alleviating the pressures of their environments. A possible reason for
younger men experiencing lower levels of positive WHI could be the fact that they are
largely inexperienced and resultanty feel unsettled in themselves and their work.

As regards ethnicity, it was found that Africans experience higher levels of positive WHI as
well as more negative WHI and HWI. Possible reasons for this finding may be the way in
which each of us perceives the world around us. Each culture has distinguishing attributes
and these affect the way in which we interpret situations and circumstances. For example, a
situation that may be considered worthless or even detrimental by one person/culture, may be
perceived as challenging and/or promising circumstances by another. With regard to the
positive WHI, Africans may perceive the skills they receive in the workplace as
advantageous, and as a result experience higher levels of positive WHI. With regard to the higher levels of negative WHI and HWI, it could be that certain cultural aspects in the African groups could cause negative interference between the two domains. For example, in the African culture it is considered an offence not attending family and/or community funerals. Non-attendance results in branding of those individuals, as they are considered disrespectful.

Differences were also found between language groups, where individuals speaking African languages experience statistically significant higher levels of positive WHI and positive HWI than Afrikaans- and English-speaking participants. Again, this may be due to cultural differences. For example, African-speaking individuals may be engaged in more meaningful or socially-orientated activities, and through this find the necessary social support. Differences based on qualification indicated that individuals possessing a tertiary education appear to experience overall lower levels of negative WHI and negative HWI, as well as lower positive HWI. This may be due to the fact that individuals with a higher qualification might experience higher demands as much of their time may be spent wrapped up in their work. However, people with higher qualifications also experienced higher positive WHI. This could be due to the fact that these individuals learn new skills and learn how to prioritise their family life above that of work.

Regarding parental status, working parents would appear to have higher levels of Negative WHI than those without children, but at the same time also experience higher levels of Positive HWI. Working couples would need a flexible schedule granting them available time to attend to their children. Should an individual’s working environment not compensate for this, they could experience negative interference from work to home. However, at the same time it would appear advantageous having children. Possibly because of a level of maturity that comes with settling down in life, or the recurring issue of the change in activities.

The working of overtime would also suggest that working overtime largely affects the home environment negatively. This is once again understandable, as this would interfere with a person’s lifestyle causing them to have to curb their activities to compensate for their working schedule, which would inevitably lead to negative WHI. Finally, with regard to flexibility at work, participants would appear to have difficulty in adjusting their work to compensate for permanent home demands and/or situations that may arise.
The third research objective of this dissertation was to test a structural model that includes job characteristics, ill health and negative work-home interference. Three hypotheses were tested, namely (1) that job demands and job resources are associated with ill health; (2) that ill health is associated with negative WHI; and (3) that job demands and job resources have a direct relationship with negative WHI in addition to the indirect effect through ill health.

As regards the first hypothesis, it was found that high job demands and a lack of job resources are associated with exhaustion, somatic complaints and anxiety and insomnia. These results provided support for the first hypothesis and are consistent with previous research studies which found demands and resources in the job setting to be the most important predictors of adverse health outcomes such as burnout and psychosomatic health complaints (Bakker & Geurts, 2004; Demerouti, Bakker, Nachreiner, & Schaufeli 2001; Houkes, Janssen, De Jonge, & Bakker, 2003; Houkes, Janssen, De Jonge, & Nijhuis, 2001a, 2001b; Janssen, De Jonge, & Bakker, 1999; Peeters, Montgomery, Bakker, & Schaufeli 2005; Schaufeli & Enzmann, 1998).

It was also found that ill health has a strong and positive relationship with negative WHI. These results provided support for the second hypothesis and are congruent with that of past research, which has shown that self-reported poor general health has been positively related to work-home conflict (Frone, 2002; Grandey & Cropanzano, 1999; Kinnunen & Mauno, 1998). Finally, there seems to be a direct relationship between job demands and negative WHI as well as between job resources and negative WHI, supporting previous findings (e.g., Frone, Russell, & Cooper, 1997; Geurts, Rutte, & Peeters, 1999; Grandey & Cropanzano, 1999; Grzywacz & Marks, 2000; Kinnunen & Mauno, 1998; Leiter & Durup, 1996). However, when the path from demands to negative WHI and the path from job resources to negative WHI were included simultaneously, both paths became highly insignificant. It can therefore be concluded that, although job demands and job resources have direct relationships with negative WHI on their own, when both high demands and a lack of resources are present, only an indirect relationship with negative WHI through ill health exists.

On a practical level, it seems that demanding aspects of work and the unavailability of job resources contribute to poor health, which will eventually lead to a negative interference with the home domain. More specifically, high pressure at work (e.g., working very hard and
under time pressure, having an excessive amount of work to do, having to concentrate for very long periods, reaching impossible or unrealistic targets) and poor working conditions (e.g., working in dangerous and unsafe conditions, being exposed to high security risks, being exposed to health risks in the work environment such as HIV/AIDS, tuberculosis and gases, working overtime and socially undesirable hours) are positively and highly significantly related to employees feeling exhausted, physically ill and suffering from anxiety and insomnia. In addition, a lack of job resources such as low autonomy (e.g., no freedom in carrying out work activities), poor task characteristics (e.g., not enough variety in the job, no opportunities for personal growth, development or promotion) a lack of social and instrumental support (e.g., support from supervisor and colleagues, technical support to complete tasks) and poor salaries and benefits could further contribute to ill health.

The effort-recovery model of Meijman and Mulder (1998) proposes that high job demands endanger people’s health in particular if they cannot recover during non-working hours. This leads to depletion of an individual’s time and energy resources due to increasing demands, which could result in serious conflicts evolving between work and family roles. Furthermore, the implications facing employees who suffer from ill health is not only of importance at work. Apart from the danger of still having to travel home after a hard day’s work, there are inevitably home demands that require attention. Frone et al. (1997) revealed that those who work overtime are most likely to experience elevated levels of depression and poor health, which has been positively related to work-home conflict. As such, the possibility of experiencing negative WHI is present apart from the home demands, requirements or expectations.

3.2 LIMITATIONS OF THIS RESEARCH

With regard to the limitations of the present study, the following can be outlined:
Firstly, an evident limitation of this type of research is the fact that a cross-sectional research design was employed. Resultantly, no causal or substantial conclusions could be drawn regarding relationships among job characteristics, ill health and negative work-home interaction. However, despite the use of cross-sectional research, it does offer a valuable method of sorting out which causal hypotheses are sufficiently plausible to warrant testing through longitudinal designs (Montgomery, Peeters, Schaufeli, & Den Ouden, 2003).

A second limitation was the use of “self-report questionnaires”, which has a number of disadvantages. Firstly, due to the nature of the mining industry and its diversity, it has to be questioned as to whether all participants understood the content of the questionnaire. Many of the participants may have experienced difficulty in understanding the content of the questions as a result of educational, language, demographic, and/or cultural differences. Furthermore, terminology and/or questions may have been misunderstood or interpreted differently, a phenomenon frequently referred to as “method-variance” or “nuisance”. Although the strength of this type of variance cannot be tested, several studies have indicated that common method variance is not as troublesome as one might expect (Spector, 1992; Semmer, Zapf, & Grief, 1996).

A third limitation of this study was the exclusive focus on ill health and negative work-home interference. Although a number of research findings have found negative work-home interference to be the most pervasive, it has been recognised that positive work-family spillover may be a second component of work-family balance (Grzywacz & Marks, 2000; Kirchmeyer, 1992). As opposed to the strain hypothesis and negative spillover, there is a process often referred to as positive spillover or role enhancement (Grzywacz & Marks, 2000). This theory suggests that energy or skills mobilised or developed in the work domain might also improve one’s functioning in the non-work domain.

A fourth limitation of this research would be that of the sample size and the fact that these results are only applicable to the mining industry (thus, generalisation to other occupational groups is made difficult). Yet despite this limitation, the consistency of findings in line with other theoretical findings and research studies is an indication that the findings are not only pertinent to the mining industry.
Lastly, a potential limitation of this study was organisation-specific cultures and/or norms, which may have impacted on participants’ responses. With the instability within the labour market nowadays, individuals may well have been afraid of giving their honest opinion and/or feelings as they may have fretted being branded against or possibly losing their jobs as a result of their responses.

3.3 RECOMMENDATIONS

Despite these limitations, the research findings have important implications for organisations concerned and future research.

Recommendations for the organisation

Mining is an industry driven by production targets and as a result, will forever be an industry characterised by intense working environments and a fast pace of work, which (if not managed efficiently) could have adverse health implications for individuals. It was also found that stress is associated with increased consumption of stimulants, such as alcohol, cigarettes and coffee as a result (Burke, 1988; Frone et al., 1997), which have been found to lead to poor general health (Frone, 2002; Grandey & Cropanzano, 1999). The net result is that the above could translate to the home environment, which has implications for not only the family concerned, but the organisation as well.

With negative work-home interference having extensive implications for individuals and organisations, the mining industry should focus on providing support in terms of available resources and effectively managed job demands that are conducive to helping employees align their work and home domains. Negative WHI would appear to be a dilemma for many employees working in the mining industry, and amendment and resultant precautions should therefore be taken to ensure the prevention thereof. According to Baily and Harrington (2004), it is possible to arrange work in such a way that employees can be productive and at the same time able to deal with their families. However, this would necessitate the redesigning of ethical and work structures. As Geurts and Demerouti (2003) state, the focus should not only be on formal policies (e.g. by offering flexible working hours, compressed work schedules, childcare facilities, parental leave), but also on the informal work
environment. Although organisations may have policies in place that provide for family responsibility leave, an environment needs to be created where employees feel at ease in utilising such policies without being (or feeling) branded against.

Prevention of negative WHI could be based on providing employees with clearer expectations of what is required, a flexible working schedule and providing them with not only monetary benefits, but also company incentives for work performance. Other factors that could improve the work environment and lead to decreased turnover, absenteeism and accident rates would be better management of workloads, resources and time worked.

Policies should be implemented, and if already in place, challenged to ensure that employees are informed of the danger of increased work/task demands and lack of resources (e.g. lack of autonomy, monotonous task characteristics, no opportunities for personal growth, a lack of social and instrumental support from supervisors and colleagues and technical support to complete tasks), which if unattended to, may develop into manifest health and home problems. This would require formal and informal work and social groups through which communication could be facilitated should employees not feel able to approach their supervisor.

Training sessions and/or classes should also be made available to employees in order to inform and/or make them aware of the identification of task demands and resources within their work environment, which may either hinder or help them in their functioning at work. Employees also need to be made aware of the possible outcomes these demands and resources may have on their well-being. A factor that requires mentioning is the educating of employees in softer issues, a topic possibly referred to as “life skills”. Research on work and home interaction revealed that work-life initiatives have a positive effect on the company as well as the welfare of individuals and their families (Barnett, 1998; Greenhaus, 1988; Parasuraman & Greenhaus, 1999; Bond, Galinsky, & Swanberg, 1998; Ferber, O’Ferrell, & Allen, 1991). Education of employees in life, marital, monetary and health matters for example would therefore be a topic worth pursuing, as the transfer of a positive attitude toward life and circumstances would prove beneficial to the company.

3.3.1. Recommendations for future research

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Research within South Africa and more specifically the mining environment, should focus on helping employees align their work and home demands in such a way that their work-life balance is restored and adverse health implications minimised.

An important recommendation for future research would also be the use of longitudinal research designs, as the validation of the hypothesised causalities and relationships is then made possible. As such, it would be possible to examine whether these relationships hold true over time. Despite the fact that work-home interaction is a newly researched domain, there is a need for longitudinal studies within this field of study (Demerouti, Geurts, & Kompier, 2004). Furthermore, Montgomery et al. (2003) suggest that this type of research be reserved for circumstances when their considerable research power can be used to maximum advantage instead of being wasted on exploratory investigations in new research domains.

Based on the results of the present study, the SWING is recommended in assessing work-home interaction within South Africa. Despite the fact that some items were proven problematic, the four scales of the SWING can be used to provide information on the interaction between work and home and vice versa. Problematic items could be reformulated to enhance understanding. An important recommendation would be the translation of the SWING into other official South African languages.

The move towards more refined hypothetical models as well as structural equation modelling that goes beyond the stress-strain relationship could be of fundamental advantage for future research. Future research could be directed to structural equation modelling of the negative work-home interface with other relationships.

Despite the large theoretical and empirical research conducted, it remains unclear in the literature where negative WHI should be imbedded in the stressor-strain relationship. Negative WHI is often considered a potential source of stress that, in addition to other potential stressors, will have adverse effects on health and psychological well-being (e.g. Burke, 1988, 1993; Frone et al., 1991, 1992, 1997; Kinnunen & Mauno, 1998). Negative WHI is also often considered a stress reaction (i.e. strain), particularly caused by work-related stressors (e.g. Burke, 1988; Frone et al., 1992; Grzywacz & Marks, 2000). Various studies have also provided evidence for a mediating role of negative WHI in the stressor-strain relationship (e.g. Geurts, Kompier, Roxburgh, & Houtman, 2003; Janssen, Peeters, De Jonge, Houkes, & Tummers, 2004; Peeters, Montgomery, Bakker, & Schaufeli, 2005). Longitudinal
designs should be used to investigate where negative WHI is imbedded in the stressor-strain relationship.

Recent research has suggested that positive work-family spillover might be a second component of work-family balance (Grzywacz & Marks, 2000; Kirchmeyer, 1992). The assumption that work might influence functioning at home (as well as the other way around) in both a positive and a negative way has been empirically tested only recently (e.g. Grzywacz & Marks, 2000; Grzywacz, Almeida, & McDonald, 2002; Sumer & Knight, 2001). As opposed to the strain hypothesis and negative spillover, there is a process often referred to as positive spillover or role enhancement (Grzywacz & Marks, 2000). A parallel body of theory to the role strain approach suggests that participation in multiple roles provides a greater number of opportunities and resources to the individual that can be used to promote growth and better functioning in other life domains (Sieber, 1974; Marks and MacDermid, 1996). Future research should therefore focus on positive work-home interaction, and not exclusively on negative work-home interaction and ill health.
REFERENCES


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