Psychological well-being and coping in the context of employee stress

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- The mining company where the study was conducted and the research team, in particular, the research assistants, Merriam Modimoeng and Eric Phasha for assisting with data collection at the mine.

Declaration

I, Thabisile Radebe, solemnly declare that *Psychological well-being and coping in the context of employee stress* is the current research study and is submitted towards the obtainment of a Master of Arts in Human Resource Management at the North-West University, and was completed in accordance with the Copyright Act (Act No. 98 of 1978) of the Republic of South Africa. All literature consulted during the compilation of this research have been acknowledged and referenced according to the American Psychological Association's Publication Manual (6th edition) and no single section of the present research has been plagiarized from any author or institution, and as such it remains the intellectual property of the author.

I confirm that the submission of the present research is for examination purposes only at the North-West University, and that it has not been submitted for any other purpose to any third party.

TG Radebe

Summary

Psychological well-being and coping in the context of employee stress

The importance of psychological well-being in the workplace continues to draw attention from both researchers and practitioners. An engaged and flourishing employee is an important human capital for any organisation (Boehm & Lyubomirsky, 2008; Keyes & Grzywacz, 2005; Rothmann, 2014; Seligman, 2008, 2011; Swart, 2012). Since work also constitutes the primary life domain for economically active, employed adults (Geldenhuys, Łaba, & Venter, 2014), it makes sense that the study of well-being focuses on this population.

Work environments are driven by intense global competition (Rothmann & Rothmann, 2010) that requires engaged and flourishing employees. Schaufeli and Bakker (2001) defined work engagement as a positive, fulfilling, work-related state of mind that is characterised by vigour (physical), dedication (cognitive) and absorption (emotional). Flourishing at work occurs when individuals feel satisfied with their lives at work and in their other life domains, experience positive emotions, and are psychologically and socially well (Rothmann, 2013; Keyes, 2007). Both work engagenent and positive mental health are associated with positive organisational outcomes including organisational citizenship behaviours and commitment (Diedericks & Rothmann, 2014). Positive processes at work, however, cannot be viewed in isolation from the negative factors impacting the health and happiness of employees.

Blue-collar employees experience both psychological and physical demands (Schreuder et al., 2008), and are therefore more prone to experience greater levels of stress. In addition to a majority of them being less educated, and earning less income (Lee & Mohamed, 2006; Sharma, 2015), they often work under difficult conditions. This set of conditions suggest how vulnerable this group of employees can be. Nonetheless, their work

makes a great contribution to the economy of many countries around the world. Thus, it is crucial for competitive organisations to pay more attention to effectively manage work-related stress among blue-collar employees.

Stress should be viewed in relation to coping strategies (Armikhan, 1990; Utsey, Adams, & Bolden, 2000; Utsey, Brown, & Bolden, 2004). Coping refers to those actions or behaviours individuals employ to manage stress (Lazarus & Folkman, 1984b). Research has alluded to problem-focused and emotion-focused coping strategies (Carver, 1997; Lazarus & Folkman, 1984b). In the current study, the researcher focuses on health behaviours as coping mechanisms which include components of the COPE scale (Carver, 1989; 1997). These behaviours include relaxation, eating and weight control, preventive medicine, exercise and fitness, safety, sleep, and use of caffeine among others (Ingledew, Hardy, Cooper, & Jemal, 2013). Work is both a source of positive and negative well-being outcomes, without the two being opposites of each other. The objectives of this study were, firstly, to determine the influence of socio-demographic variables and work-related factors on work engagement and positive mental health of blue-collar workers. Secondly, the study sought to investigate the stress vulnerability profiles and their ability to distinguish levels of work engagement, flourishing and coping health behaviours as used by blue-collar employees in the mining sector.

The sample consisted of 237 blue-collar employees from a platinum mining company situated in the northern part of South Africa. The participants completed a battery of five questionnaires aimed at determining their self-reported level of work engagement, flourishing, stress vulnerability and coping health behaviours. They also provided their biographical details. The following measuring instruments were applied: Utrecht Work Engagement Scale (UWES; Rothmann, 2011; Schaufeli & Bakker, 2001), Mental Health

Continuum Short Form (MHC-SF; Keyes, 2002, 2007), Stress Overload Scale (SOS; Amirkhan, 2012), and Coping Health Behaviours (Ingledew et al., 2013).

Multivariate analyses in SPPS and Structural Equation Modelling (SEM) in Mplus were performed. Using structural equation modelling in Mplus, direct effects with personal characteristics and work-related properties being antecedents, and work engagement (vigour and dedication), and positive mental health (emotional, social and psychological well-being) as outcomes were tested. Latent class analysis based on item-level responses for the personal vulnerability subscale of SOS, and comparison of the latent classes was also used. The results indicated that gender, age, social support at work, and authority to make decisions were significantly associated with all three well-being dimensions (emotional, psychological and social). Social support at work was the only work-related factor which influenced vigour and dedication of work engagement. Latent class analysis resulted in the emergence of four classes of personal vulnerability to stress. These classes were compared for work engagement (vigour and dedication), and positive mental health (emotional, psychological, and social well-being), as well as coping behaviour.

The results are important as they add value, first, in the field of positive organisational psychology at work by identifying factors which affect positive functioning in as far as work engagement and flourishing are concerned. The second contribution is to the theory of stress at work, through identifying groups of blue-collar employees which differ in terms of their vulnerability to stress and how this influences positive processes. Such information is important for managing high levels of well-being so that the organisation can achieve its objectives through its people.

Preface

- This mini-dissertation complies with the article format identified by the North-West University in rule: A 4.4.2.9.
- This article will be submitted for possible publication in the South African Journal of Industrial Psychology. This mini-dissertation adheres to the guidelines established by the American Psychological Association (APA: 6th edition).
- Consent for the submission of this mini-dissertation for examination purposes (in fulfilment of the requirements for the Master's degree in Human Resource Management has been provided by the research supervisor, Prof IP Khumalo.
- This mini-dissertation was submitted to Turn-it-in which established that this mini-dissertation falls within the norms of acceptability regarding plagiarism.

Letter of consent

I, the co-author, hereby give consent that Thabisile Radebe, the first author, submit the manuscript towards the obtainment of a Master's degree in Human Resource Management titled: *Psychological well-being and coping in the context of employee stress*.

The two articles making up this dissertation will be submitted for possible publication in relevant journals such as the South African Journal of Psychology and the South African Journal of Industrial Psychology. For these publications, the student will serve as the first author, while the supervisor will be the second author and corresponding author. Prof IP Khumalo acted as supervisor and project head of this research inquiry.

IP Khumalo
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Structure of the research mini-dissertation

The present research is submitted in the form of a mini-dissertation as per the requirements for completion of the degree Master of Arts in Human Resource Management at the North-West University. The structure of the mini-dissertation is as follows:

Chapter 1: Introduction. In this section, the researcher introduces the study and provides a review of key concepts and an outline of relevant research within the field of positive mental health, work engagement, stress, and health behaviours as coping.

Chapter 2: Article one. This section contains manuscript one for examination.

Chapter 3: Article two. This section contains manuscript two for examination.

Chapter 4: Critical self-reflection by the researcher. In this section, the researcher provides a critical reflection of her experiences throughout the process of conducting the study, what she found interesting about the study and what this meant to her.

Chapter 1

Introduction and problem statement

Introduction. An interest in positive psychology within work settings (Bakker & Schaufeli, 2008; Cameron, 2005; Donaldson & Ko, 2010; Gilbert & Kelloway, 2014; Mills, Fleck, & Kozikowski, 2013) is gaining momentum. This is a significant shift from psychology's skewed focus on a pathogenic view of behaviour in the workplace. The role played by different positive psychological constructs including work engagement (Kagan, 2010; Olivier & Rothmann, 2007; Rothmann & Rothmann, 2010), flourishing (Keyes, 2007; Keyes & Grzywacz, 2007; Rothmann, 2013) and meaning in work (Geldenhuys, Laba & Venter, 2014; Steger & Dik, 2009; 2010) have been extensively studied in the recent while. The main reasons for this, especially in the work context, could be twofold. Firstly, work is a primary life domain for the economically active and employed adults (Geldenhuys et al., 2014). Secondly, the potential positive influence of well-being includes the impact on the functioning of organisations, and the ability for employee retention, commitment and high performance (Bakker, Schaufeli, Leiter & Taris, 2008; Harter, Schmidt & Hayes, 2002; Schaufeli & Bakker, 2004).

A greater research gap is in the area of the well-being and optimal functioning of blue-collar workers, especially in South Africa. The flourishing of blue-collar employees within work contexts is to a certain extent largely unexplored and there is a need for better targeted studies for this population. The companies in the mining industry produce ore like platinum, goal or coal and other platinum group metals (PGMs) in quantities determined by their occurrence in the ores mined. This industry presents an interesting avenue for the study of workplace flourishing given challenges identified for the industry which include subdued commodity prices, constrained infrastructure, high labour costs, and strained labour-management relations. Employment in the mining industry is not always considered a

suitable career choice due to adverse working conditions (Limpitlaw et al., 2005). Health and safety conditions are at times challenging, female employees are often subjected to gender stereotyping, and the machinery and equipment used underground are still conventional (Moraka, & Jansen van Rensburg, 2015). Despite of the challenes presented above, mining contributes significantly to the economy of South Africa. The direct contribution of the mining sector on the gross domestic product (GDP) was approximately 312 billion ZAR (6.8%) in 2017 (Chamber of Mines of South Africa, 2017). This industry employs a large number of blue-collar workers in South Africa (Chamber of Mines of South Africa, 2017). In 2018 alone, the mining sector contributed R351 billion to the South African GDP with a total of 456,438 people were employed in the mining sector in 2018 (Chamber of Mines of South Africa, 2018). It would be interesting to understand how employees flourish even in these environments.

Research has to date predominantly focused on white-collar employees' psychological well-being (e.g., Boshoff, Potgieter, van Rensburg, & Ellis, 2014; Coetzer, & Rothmann, 2007; Louw, & Viviers, 2010). Meanwhile, scientific research conducted on blue-collar workers has focused primarily on stress at work (MacDonald, Karasek, Punnett, & Scharf, 2001; Sharma, 2015), burnout and, to a lesser extent, work engagement (Brand-Labuschagne, Mostert, Rothmann, & Rothmann, 2012; Kagan, 2010; Joe,R & Rothmann, 2016). Understanding the antecedents of engagement and flourishing of blue-collar workers is deemed important by the researcher since it would inform practice in the form of well-designed and targeted workplace interventions aimed towards improving work performance and productivity. Against this background, the present study is undertaken and follows two main objectives. The first has to do with understanding how socio-demographic variables and work-related factors influence work engagement and flourishing. The second objective seeks to investigate the naturally occurring personal vulnerability to stress profiles of blue-collar

employees, study how they distinguish engagement, flourishing and adopted coping health behaviours. The thesis, presented as two studies reported in two articles aims to answer the following research questions:

1. How did socio-demographic variables and work-related factors influence flourishing?
2. How did socio-demographic variables and work-related factors influence work engagement?
3. What was the profile of stress overload of blue -collar and how does it influence work engagement, flourishing and coping mechanism?
4. How did flourishing influence levels of work engagement?

To this end, the study adopted a quantitative research design. A cross-sectional survey design was implemented to achieve the aim of this study. The study utilised data from one sample drawn from a population at one point in time, thus cross-sectional (Field, 2013; Huysamen, 1994). It is advantageous because it is was linked to low costs, less time, and did not require intensive labour. However, this design did not allow the researcher to demonstrate causality (Bhattacherjee, 2012; Field, 2013). It was therefore impossible to conclude causality in this study. Data was subjected to structural equation modelling (SEM) analyses in Mplus (version 8.1) (Geiser, 2013; Kline, 2011; Muthén & Muthén, 1998-2017) and Multivariate analyses in SPPS (version 25) (Field, 2013; Pallant, 2010). SEM in Mplus was a preferred method because it enabled the simultaneous analysis of both indicator and latent variables (Muthén & Muthén, 1998-2017).

For the first article, preliminary analysis established measurement models of the measuring instruments with the aim of examining construct validity. The adequacy of these models were judged based on a set of model fit indices, namely Chi square ($\chi 2$), Root Mean

Square Error of Approximation (RMSEA), Comparative Fit Index (CFI), Tucker-Lewis Index (TLI), Standard Root Mean Square Residual (SRMR), Akaike Information Criterion (AIC) and Bayesian Information Criterion (BIC). Good fit was expected when CFI and TLI values are above .90, $\chi 2$ value were lower and non-significant, and a RMSEA value was below .08 (Byrne, 2012; Kline, 2010). AIC and BIC were expected to be smaller to indicate better fit. Structural equation models were estimated to answer research questions involving direct effects between the determinant variables (socio-demographic and work-related factors) and the outcome variables (dimensions of flourishing and engagement). The determinant variables were namely age, gender, marital status, educational attainment, authority of making decisions, social support at work, number of work hours, and years of experience. The outcome variables, Vigour; Dedication; Social well-being, Psychological well-being, and Emotional well-being were treated as latent variables. Significant standardised direct effects coefficients (β) were indicated by p-values of below 0.05, while confidence intervals without the zero-value indicated at 95%. Direct effects were also tested to determine the relationship between positive mental health (Emotional, Psychological and Social well-being) and work engagement (Vigour and Dedication).

For the second study, multivariate analyses in SPPS (version 25) (Field, 2013; Pallant, 2010) and Structural Equation Modelling (SEM) in Mplus (version 8.1) (Byrne, 2012; Geiser, 2013; Muthén & Muthén, 1998-2017) were applied to investigate the dynamics among employee's personal vulnerability to stress, work engagement, positive mental health, and coping health behaviours.

Firstly, a latent class analysis (Geiser, 2013; Rosato & Baer, 2012) based on item-level responses on the personal vulnerability to stress, and the mean score comparisons across the latent classes for the outcome variables were obtained. The responses of participants to the 11 of the 12 items of the personal vulnerability subscale of the Stress Overload Scale

were treated as categorical data and used to identify classes of stress vulnerability among this group of blue-collar employees. The following model fit indexes were applied to identify the best solution: LRχ2 (Likelihood Ratio Chi Square), BIC (Bayesian Information Criterion), SSABIC (Sample Size Adjusted BIC), AIC (Akike Information Criterion), CAIC (Consistent AIC), LMR-LRT (Lo-Mendall-Rubin Adjusted Likelihood Ratio Test), and BLTR (Bootstrapped Likelihood Ratio Test). For good fit, BIC, SSABIC, AIC and CAIC were expected to be lower, while the LRχ2 were expected to be lower and not significant but it was expected that the LMR-LRT will be statistically significant. (Nylund, Asparouhov, and Muthen, 2007). According to Nylund et al. (2007), the best fit indexes to use are the Lo-Mendel-Rubin adjusted log likelihood ratio and the BIC descriptive fit index (Schwarz, 1978) for the purposes of exploring the best solution. Secondly, a one-way analysis of variance (ANOVA) was then conducted to explore mean score differences across the latent classes (Field, 2013). The analysis of variance (ANOVA) was utilised since it is a powerful tool for the analysis of univariate multiple group comparisons of outcome variable mean scores. It allowed the researcher to compare more than two independent groups. It was therefore used to compare the means of the latent groups emerging from LCA in order to determine whether these groups are significantly different from each other on the basis of vigour, dedication, emotional well-being, psychological well-being, social well-being, eating and weight control, exercise and fitness, safety, sleep, caffeine use, alcohol use, smoking, and general self-care. The Tukey post hoc tests were used for investigating in-between group differences (Field, 2013; Pallant, 2010).

The following section discusses the concepts of importance in this study in detail, which are psychological well-being, work engagement and flourishing.

Literature review

Psychological well-being. Khumalo, Temane, and Wissing (2013) positioned general psychological well-being as a conceptual framework capturing the essential complexity of well-being, making it flexible, multifaceted, and evolving in nature. According to them, it includes dimensions from both hedonic and eudaimonic perspectives (Ryan, & Deci, 2001). Hedonic well-being encompasses the subjective experience of happiness or pleasure and includes the judgement of good or bad elements of one's life (Diener, 2000; Huta, 2016; Ryan, & Deci, 2001). On the other hand, a eudaimonic perspective of well-being refers to meaningfulness, authenticity, and striving for potential (Ryan, & Deci, 2001; Ryff & Singer, 2008; Huta, 2016). Keyes (2002), Ryan et al. (2008) as well as Huta and Waterman (2014) maintained that hedonic thinking leads to short-term happiness, whereas eudaimonic living leads to a more enduring and lasting happiness, but, ultimately, both perspectives are concerned with individuals living a good life. Ryff reported six dimensions of psychological well-being, namely autonomy, environmental mastery, personal growth, positive relations with others, purpose in life, and self-acceptance (Ryff, 1989; Ryff, & Singer, 1998, 2008). *Autonomy* refers to independence and self-determination in actions, and the ability to resist social pressures to think and act in certain ways. *Environmental mastery* is about the ability to either choose or create environments suitable to one's own mental conditions as a way of showing mental health. *Personal growth* alludes to developing one's potential and realising it over time, being open to new experiences and considering one's self as a developing system. *Positive relations* with others is defined as having warm, satisfying relationships, showing affection and intimacy to others and managing the dynamics involved in human relationships well. *Purpose in life* is about having goals and a sense of direction and having beliefs about life that give meaning to it. *Self-acceptance* is about being at peace with the past,

acknowledging and accepting both the good and bad aspects of the self and having a general positive attitude towards the self (Ryff, & Singer, 1998; 2008).

Work engagement. Work engagement has received great attention from both researchers and professionals in South Africa and else-where in the world (Kagan, 2010; May, Gilson & Harter, 2004; Rothmann & Rothmann, 2010; Schaufeli & Bakker, 2004; Strümpfer, 2003). However, enhancing work engagement in a maintainable way remains a challenge despite years of research on the topic (Rautenbach, & Rothmann, 2017). One of the reasons for the interest in work engagement was the shift in focus in psychology from pathogenic focus, malfunctioning and damage, to happiness, human strengths and optimal functioning (Rothmann, 2003; Strümpfer, 2003; Seligman, & Csikszentmihalyi, 2000). Kahn (1990, p. 694) initially defined engagement as the "harnessing of organisational members' selves to their work-role by which they employ and express themselves physically, cognitively and emotionally during role performance". Engagement is an expression of cognitive, emotional and physical energies that individuals exert to ensure an active and complete involvement in a role or task (Rich, Lepine, & Crawford, 2010). Kahn's definition dovetails with that of Schaufeli and Bakker (2001) who define work engagement as a positive, fulfilling, work-related state of mind that is characterised by vigour (physical), dedication (cognitive) and absorption (emotional) components. *Vigour* is a state of high levels of energy and mental resilience throughout one's work (Bakker, 2011; Schaufeli & Bakker, 2002). *Dedication* is experiencing significance, enthusiasm and inspiration of one's work (Bakker, 2011; Schaufeli, & Bakker, 2001). *Absorption* is a state where one is wrapped up in one's work and has difficulty detaching from it (Bakker, 2011; Schaufeli & Bakker, 2002). Work engagement predicts positive organisational outcomes including productivity, job satisfaction, motivation, commitment, low turnover intention, customer satisfaction, return on assets, profits and shareholder value (Bakker, Schaufeli, Leiter, & Taris, 2008;

Harter et al., 2002; Schaufeli, & Bakker, 2004). Furthermore, engaged employees use their discretionary efforts at work and put priority on quality work outputs (Salanova, Llorens, Cifre, Martinez, & Schaufeli, 2003). The benefits outlined above provide the reason for the study of work engagement, especially with a focus on identifying its determinants among blue-collar employees.

Flourishing. Flourishing refers to appraisals made by individuals indicating elements of feeling good (i.e., satisfaction and positive affect balance), and functioning well psychologically (personal) and socially (public) (Keys, 2002; Keyes, & Annas, 2009). Corey Keyes developed the model which he referred to as the Mental Health Continuum (MHC; Keyes, 2002; 2005; 2007) based on his positive mental health thesis. The model proposes the state of complete mental health known as flourishing. The opposite of flourishing is not mental illness, but rather a relative absence of well-being known as languishing. The scores on self-reported emotional, psychological, and social well-being scales determine one's position on the continuum (Keyes, 2002). Therefore, flourishing is indicated by higher scores on emotional or subjective well-being (positive emotions and job satisfaction), psychological well-being (self-acceptance, personal growth, purpose in life, environmental mastery and autonomy), and, lastly social well-being (social integration, social coherence, social acceptance, social contribution and social growth) (Keyes, 1998; 2002; 2005; 2007). Individuals flourish when they experience high levels of at least one measure of emotional well-being and high levels of at least six measures of psychological and social well-being (Keyes, 2002). Conversely, languishing individuals experience low levels of at least one measure of emotional well-being, and low levels of at least six measures of psychological and social well-being. Flourishing is an important human capital as employees who do well provide their organisations with a competitive advantage (Keyes, & Grzywacz, 2005). It is

therefore important that this state of being should be promoted. In addition, flourishing is seen to contribute to national psychological wealth (Oishi & Schimmack, 2010).

The operationalisation of flourishing at work has been applied through the Mental Health Continuum Short Form (MHCSF; Keyes, 2002; 2005). Another research effort for flourishing in the workplace was made by Rothmann (2013) in the Southern African region. In his work, Rothmann (2013) reviewed findings of studies on happiness and flourishing in order to identify a framework for flourishing within workplaces and investigate possible antecedents and outcomes of flourishing.

Antecedents of flourishing – work factors and socio-demographic variables.

Flourishing of individuals, as explained by the positive mental health model of Keyes', (2005; 2007), is reliant on organisational context, work factors and individual characteristics (Rothmann, 2013). A review of findings from various studies conducted by Rothmann (2013) pointed to work-role fit, the availability of resources (physical, cognitive and emotional), positive and supportive relationships with superiors and fellow employees, challenging and interesting responsibilities and tasks, well-defined goals and clarity of one's role, sensible remuneration, opportunities for development and job security as some of the antecedents. In a study conducted within a fast-moving consumer goods environment Rautenbach and Rothmann (2017) found that advancement, work-life balance and authentic leadership are determinants of flourishing. Furthermore, they found that job insecurity, and compensation did not predict flourishing at work (Rautenbach, & Rothmann, 2017).

In as far as socio-demographic variables are concerned, research by Diener (2000) and Diener and Ryan (2009) reported that gender, education attainment and cohabiting are positively related to emotional and psychological well-being. Higher education attainment and employment status were linked to social well-being (Keyes, & Shapiro, 2004). Male gender, high education attainment and married individuals are more likely to flourish in

comparison to female gender, low education attainment and single individuals (Keyes, 2002; Keyes & Simoes, 2012). Schotanus-Dijkstra et al. (2015) found a higher prevalence of positive mental health among younger individuals and those with higher education level. The results of Schotanus-Dijkstra (2012) were contrary to those of Keyes and Simoes (2012) in that females were more flourishing.

Antecedents of work engagement – work factors and socio-demographic variables.

Engagement levels as a psychological state vary across time (Asiwe, Rothmann, Jorgensen, & Hill, 2017; Rothbard & Patil 2012). Past research studies identified factors that influence work engagement and included social support from supervisors and colleagues, skill variety, autonomy and learning opportunities as antecedents of work engagement (Albrecht, 2010; Bakker & Demerouti, 2008; Barkhuizen, Rothmann, & Van de Vijver, 2013; Rothmann, & Rothmann, 2010; Schaufeli, & Bakker, 2004). Du Plessis and Boshoff (2018) investigated the influence of authentic leadership, psychological capital, and follower behaviour on work engagement. They found that work engagement could be explained by the psychological capital of the employee rather than by authentic leadership qualities. Furthermore, meaning and improving employee psychological capital had the potential to enhance the levels of work engagement of employees.

Gender has been found to play a role in work engagement in different ways depending on the population and context. In their scale validation study conducted in nine countries, Schaufeli, Bakker, and Salanova (2006) reported weak and ambiguous relationship between gender and work engagement in their scale validation study in nine countries while previous research by Schaufeli and Bakker (2003) reported no significant correlation between age and work engagement for the overall sample. Conversely, in a study among UK employees, Avery et al. (2007) found that work engagement decreases with age, meaning the older one becomes, the less engaged one becomes. Vanam (2009) found a positive association between

education and work engagement; the more the respondents were educated, the higher they become engaged in their work. However, in Avery et al.'s (2007) study, education and work engagement were not related.

Positive processes at work are also influenced by unmanageable job demands and thus lead to stress (Asiwe et al., 2015; Els, Mostert, & De Beer, 2015; Gauche, de Beer, & Brink, 2017; Gillet, Evelyne, Huyghebaert, & Colombat, 2015). In light of the possible large array of negative experiences and influences, there is therefore a greater need to better understand the factors which may lead to conditions of positive adaptation at work (Maddux, 2002, in Snyder & Lopez, 2002).

Stress. Stress as a result of the interaction between demands and the perceived ability to respond effectively to them has received considerable attention in literature (Amirkhan, 2012; Coetzer, & Rothmann, 2004; Cooper, & Cartwright, 1994; Folkman, 2011; Jackson, & Rothmann, 2006; Lazarus, 1991). Dewe, Cox, and Ferguson (1993) assert that stress is not a factor stemming from the individual or the environment alone, but is rather a dynamic and ongoing interaction between an individual and the environment. As a result, stress arises when the demands of a particular encounter as appraised by the individual is about to exceed the available resources, thereby threatening well-being (Lazarus, 1991) and bringing about change in the persons' psychological and/or physiological condition in an attempt to cope with the encounter (Cooper et al., 2001; Siu, 2002). Similarly, Amirkhan (2012) refers to the interaction between the event load and persons' vulnerability to stress in the stress overload model. According to Amirkhan (2012), the extent to which individuals are influenced negatively by various factors depends on their susceptibility to stress. As in other life domains, stress at work can therefore be seen as a result of an imbalance between environmental demands and an individual's capability to handle the demands (Lazarus, & Folkman, 1984).

Cartwright and Cooper (2002) developed a stress model that includes the following stressors: work relationships, work-life balance, overload, job security, control, resources and communication. While poor health, whether psychological, physical or both, is an outcome of stress, it is the reported levels of poor health which can be used to establish if workplace pressures have positive or damaging effects; however, poor health is not necessarily indicative of workplace stress (Cartwright, & Cooper, 2002). Occupational stress is linked to health and safety problems and has implications for the well-being of organisations or institutions (Rees, 1995; Rees, & Redfern, 2000) and could also potentially lead to disengagement, which in turn affects employees' commitment to the organisation (Schaufeli & Bakker, 2004).

***Coping using health behaviours*.** Stress is viewed in relation to coping strategies (Armikhan, 1990). Coping is defined as those actions or behaviours that continuously change to manage external or internal demands (Lazarus, & Folkman, 1984b). Therefore, coping is process oriented and contextual in nature. People may engage in poor health behaviours such as smoking or large intake of caffeine to help them cope with stress. While the majority of the research on coping has relied heavily on the use of coping strategies such as problem-focused and emotion-focused coping (Carver, 1997; Utsey, Adams, & Bolden, 2004; Utsey, Brown, & Bolden, 2000), relatively little research has examined the links between stress, coping, and health behaviours (Kaplan, Madden, Mijanovich, & Purcaro, 2013; Lemaire & Wallace, 2010). However, some researchers examined links between stress and diet, exercise, and other health behaviours (e.g., Salmon, 2001; Wardle, Steptoe, Oliver, & Lipsey, 2000). Health behaviours are any observable behaviours that involve health as a consequence, but not necessarily as a primary goal (Ingledew et al., 2013) and include exercise, drinking and eating. Conceptually, health behaviours are not always for the purpose of coping; for example, people exercise to stay fit, socialise, have fun and to look more attractive in addition

to the possibility of wanting to cope with stress (Thøgersen-Ntoumani, Fox, & Ntoumanis, 2005). Similarly, people may drink alcohol within their social relationships and/or for purposes of celebration. They may also use alcohol to ease distress (Cooper et al., 1992; Halim, Hasking, & Allen, 2012). Some health behaviours such as eating and exercising are critical to health and well-being; they are closely linked to mental and physical functioning, and morbidity and mortality. However, people's health behaviours are in large part affected by their stress levels or their vulnerability to stress. Work stress was associated with poorer health behaviours, including higher levels of smoking, less exercise, and poorer diet (Ng, & Jeffrey, 2003). A review of 46 studies conducted by Siegrist and Rödel (2006) examined health behaviours and work stress, and found consistent relationships only with increased alcohol consumption, especially among males and increased likelihood of being overweight. In a daily diary study, Park, Armeli, and Tennen (2004) found that college students engaging in a lot of alcohol consumption in order to cope were more likely to drink more on those days they considered to be more stressful. Exercise creates resources that reduce stressful encounters (MacFarlane, & Montgomery, 2010). Approximately 30% of physicians used physical exercise as a direct means to reduce work-related stress and anxiety (Lemaire & Wallace, 2010). Interestingly, Jackson, Knight, and Rafferty (2010) found that a poorer diet and increased smoking were related to better mental health (but poorer physical health) among African Americans.

Conclusion. Work and personal factors have an influence on the individuals' subjective well-being. What is important though, is to study context-specific factors and their contribution to positive functioning. With this in mind, the mining industry provides such an opportunity for research. When employees function positively, this benefits themselves and their organisations equally. Therefore, the understanding of the interplay between socio-demographic and work factors on work engagement and flourishing can provide the ideal

opportunity to re-examine interventions geared towards increasing well-being among mining blue-collar employees with the specific stress profiles in mind.

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Chapter 2

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Flourishing and work engagement: The influence of socio-demographic and work-related factors in South African mine workers

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Flourishing and work engagement: The influence of socio-demographic and work-related factors in South African mine workers.

Abstract

The present study investigates the influence of personal characteristics and work-related factors on positive mental health and work engagement among blue-collar employees in the mining sector. A sample of 237 blue-collar employees (79.3% male; average age of 35 years) completed a workplace adapted Mental Health Continuum Short Form (MHC-SF) and the Utrecht Work Engagement Scale (UWES), and provided information about their personal characteristics (age, gender, marital status, and education attainment) and work-related factors (work experience, work hours, authority to make decisions, and social support at work). Using structural equation modelling in Mplus, direct effects where personal characteristics and work-related properties are antecedents, and work engagement (vigour and dedication), and positive mental health (emotional, social and psychological well-being) are outcomes, were tested. The study also investigated whether positive mental health influenced work engagement. Results showed that gender, age, social support at work, and authority to make decisions were significantly associated with all three well-being dimensions. Social support was the only work-related factor significantly associated with vigour and dedication. Authority to make decisions, work experience and hours of work did not show any significant impact on work engagement. Only emotional well-being from the dimensions of positive mental health was positively associated with vigour and dedication at work. Not only is the well-being of workers important for their engagement, but it is to a larger extent, shaped by work-related factors more than personal characteristics. Work-based well-being interventions need to target and be more sensitive to work-related factors such as social support, authority to make decisions and working hours rather than being generic in nature.

***Keywords**:* blue-collar; flourishing, mining; socio-demographics, work factors, work engagement.

Flourishing and work engagement: The influence of socio-demographic and work-related factors in South African blue-collar employees.

Introduction

An engaged and flourishing employee is an important human capital for any organisation (Boehm, & Lyubomirsky, 2008; Keyes, & Grzywacz, 2005; Rothmann, 2014; Seligman, 2008; Seligman, 2011; Swart, 2012). Positive mental health positively influences several indices of workplace functioning including job satisfaction, organisational commitment, and organisational citizenship behaviour (Diedericks, & Rothmann, 2014). Work-role fit, job characteristics, co-worker relations, and remuneration favourably influence work-place positive mental health (Rothmann, 2014). Thus, a diversity of personal and work environment factors combines to effect well-being and work-based functioning, including engagement with various degrees of influence.

However, presently available literature is still littered with empirical studies which are either concerned with examining problems among individuals in the workplace or simultaneously study negative and positive realities of work experiences (De Witte, & Lens, 2008; Leiter, & Maslach, 2016; Van den Broeck, Vansteenkiste, van Beek, Hu, Schaufeli, Taris, & Schreurs, 2012). Such studies include those concerned with burnout (Leiter & Maslach, 2016) and workaholism (van Beek et al., 2012), among others. Studies in Positive Organisational Psychology (POP; Bono, Davies, & Rasch, 2012; Cameron, & Spreitzer, 2012; Cameron, & Caza, 2004; Donaldson & Ko, 2010) which focus on positive processes and outcomes of organisations and individuals in them, seem to be primarily concerned with white-collar workers, and remain generally blind to and silent about blue-collar workers. Similarly, the field of Strategic Human Resource Management (SHRM; Armstrong, 2006), interested in creating and maintaining a healthy environment for individuals, seems to have also neglected the blue-collar workers. Therefore, the present study was interested in

investigating the influence of personal characteristics and work-related properties on work-based positive mental health and work engagement among blue-collar employees in the South African mining setting.

The mining industry is linked to a number of challenges such as increased working and labour costs, strained labour-management relations, an uncertain regulatory environment, (Deloitte, & Touche, 2013; Davenport, 2014). Companies in response, implemented cost cutting projects, putting mines under care and maintenance, and cutting down on non-profitable operations among other things (Njini, & Van der Walt, 2018). With the above, the mining industry presents an interesting avenue to study flourishing in line with challenges given. In South Africa the direct contribution of the mining sector to GDP was approximately 312 billion ZAR (6.8%) in 2017 (Chamber of Mines of South Africa, 2017). This industry employs a large number of blue-collar workers in South Africa (Chamber of Mines of South Africa, 2017). In 2018 the mining sector contributed R351 billion to the South African gross domestic product (GDP) with a total of 456,438 people were employed in the mining sector in 2018 (Chamber of Mines of South Africa, 2018).

Therefore, it is important that the knowledge and promotion of the well-being of these employees remain a central point of focus for human resources and industrial organisational psychology practitioners. This is especially true for developing economy countries such as South Africa that bear a greater share of the problems. The optimal functioning of blue-collar workers within the South African platinum mines, as indexed by flourishing and work engagement, is important for not only the workers, but also their organisations and the national economy. Positive mental health and work engagement are important contributors to achieving the organisational objectives of high performance, organisational citizenship and commitment (Rothmann, 2013, 2014). In addition to being consistently engaged in their work, flourishing employees have low levels of absenteeism, they prosper and learn, are more

happy, self-motivated and successful. (Keyes, 2007). Similarly, engaged employees are considered to be profitable and productive (Bakker, 2011; Harter, Schmidt, & Hayes, 2002). Due to the above, the study of engagement and flourishing is important also with critical consideration of the vulnerability that comes with working in mining industries for employees.

Determinants of workplace positive mental health. Flourishing in the workplace can be predicted by job and organisational factors, such as social support, a factor which is characterised by caring and supportive environments that allow for the experience of meaning in work (Rautenbach, 2015; Redelinghuys, Rothmann & Botha, 2018), work-role fit (Pratt, & Ashforth, 2003; Rothmann, & Welsh, 2013; Steger, & Dik, 2010) as well as supervisor and co-worker relations (Rothmann, & Welsh, 2013). It is therefore critical to know the factors affecting flourishing for a specific group of employees, taking into consideration the cultural and work environment context.

Determinants of work engagement. Significant variation in work engagement levels has been caused by socio-demographics and work factors (Chaudhary, & Rangnekar, 2017; Geldenhuys, & Henn, 2017). Factors reported as determinants of work engagement include job resources such as social support from colleagues, performance feedback, skill variety, autonomy, and learning opportunities (Albrecht, 2010; Bakker, & Demerouti, 2008); environmental conduciveness to productive work, employee feedback from management, job security and sense of safety to communicate issues with management were also drivers of engagement (Kagan, 2010). In a South African mining context, job design and human resource development practices have been found to be predictors of work engagement (Hlapho, 2016). Socio-demographic variables found to favour work engagement include male gender (Chaudhary, & Rangnekar, 2017; Sharma, Goel, & Sengupta, 2017), younger age

(Chaudhary, & Rangnekar, 2017; Sharma et al., 2017), higher education attainment and work experience (Sharma et al., 2017), and marital status (Geldenhuys, & Henn, 2017).

Positive mental health as an influencer of work engagement. Flourishing and work engagement are important for any workplace. Work engagement is thought to influence flourishing (Peterson, Park, & Seligman, 2005; Seligman, 2011). However, in a comprehensive model of flourishing in the workplace, Rothmann (2013) positions work engagement within the psychological well-being component of flourishing along with meaning, self-determination and harmony. Previous research confirms the relationship between work engagement and flourishing. For example, job satisfaction and affective commitment were antecedents of work engagement in a study among frontline employees across high and low customer contact service environments (Barnes, & Collier, 2013). If employees are engaged in their work and experience job satisfaction, they are more likely to flourish (Bowling, Eschleman, & Wang, 2010; Harter, Schmidt, & Keyes, 2002). In addition, work engagement is associated with social well-being because it contributes to a meaningful and comprehensible life by making an individual feel part of society (Keyes, 2007).

Aim, objectives and hypotheses of the present study

The purpose of this study was to investigate the relationships among personal socio-demographic characteristics, work-related factors, positive mental health and work engagement with the view to achieve three specific objectives. The first objective was to investigate the influence of personal socio-demographic characteristics and work-related properties as determinants of positive mental health. The second objective aimed to investigate the influence of personal socio-demographic characteristics and work-related factors relating to work engagement. The third objective of the study was to investigate the relationship between positive mental health and work engagement and whether positive mental health is the determinant of work engagement. The personal characteristics of concern

were age, gender, marital status, and (levels of) educational achievement. The work-related characteristics included authority to make decisions, social support at work, number of work hours, and years of experience. The following five literature-informed broad hypotheses were investigated:

a) Positive mental health will be higher for older employees, males and those with a higher level of education, and would be low for young employees, females, and those with a lower level of education.
b) Normal working hours, higher levels of decision making and longer work experience would be linked to positive mental health (flourishing), while longer working hours, low levels of decision making, and little work experience will be linked to poorer mental health (languishing).
c) Work engagement will be higher for younger employees, the married and those with a high level of education, while older employees, singles, divorced or widowed employees and those with lower levels of education will be more disengaged.
d) Normal working hours, higher levels of decision making and longer work experience will be linked to work engagement while longer working hours, low levels of decision making, and little work experience will be linked to disengagement.
e) Higher level of positive mental health (flourishing) is associated with higher levels of work engagement.

Research method

Design

A cross-sectional survey was implemented to achieve the aim of this study. This type of survey utilises data from one sample drawn from a population at one point in time (Field, 2013; Huysamen, 1994). A cross-sectional design is advantageous because it is less time

consuming, inexpensive, and less labour intensive. However, these types of designs cannot demonstrate causality (Bhattacherjee, 2012; Field, 2013) and it was therefore impossible to conclude causality in the present study. Data were subjected to structural equation modelling (SEM) analyses in Mplus (version 8) (Geiser, 2013; Kline, 2011; Muthén, & Muthén, 1998-2017). SEM in Mplus was preferred because it enables the simultaneous analysis of both indicator and latent variables.

Participants and setting

The participants were blue-collar employees from a major mining company in the northern part of South Africa. The primary business of this company is to produce platinum and other platinum group metals (PGMs) and provides resource-to-market service, supplying its global customers with a range of mined and recycled products. Although the researcher had wanted to include a large, representative and inclusive number of employees as possible, a convenience sample of 300 people was reached, and they agreed to participate. However, the validation process after the collection of data left the researcher with only 237 participants who had completed the questionnaires in full. The sample included 188 (79.3%) male and 48 (20.3%) female participants. The age of 35 years was the most reported, the sample had an average age of 35.66 (sd=7.12), the youngest person was 20 years and the oldest was 57 years old. A percentage of 44.3 of the participants were married, 41.4% were single, and 10.1% were cohabiting. None of the participants reported being divorced or widowed.

Measuring instruments

Biographical details were collected by asking participants to provide information about their gender, marital status, and age. Work-related factors included their level of education, occupation, working hours, authority to make decisions, and their perceived level of social support. Psychological constructs were measured using the Mental Health

Continuum Short Form (MHC-SF; Keyes, 2006; Keyes et al., 2008) for positive mental health and the Utrecht Work Engagement Scale (UWES; Schaufeli, Bakker, & Salanova, 2006) for work engagement.

The Mental Health Continuum Short Form **(MHC-SF; Keyes, 2006; Keyes et al., 2008)** was used to assess employees' level of positive mental health, also known as flourishing at work. Flourishing is operationalised as high scores on emotional well-being (EWB; 3 items), psychological well-being (PWB; 6 items), and social well-being (SWB; 5 items) dimensions. For the purposes of this study, the scale's items were adapted to a workplace context. In line with this adaptation, the well-being dimensions can be exemplified by such items as: "*Satisfied with your work?*" (EWB); "*That you had experiences that challenged you to grow and become a better person at work?*" (PWB); and "*That you belonged to your work community, like a soccer team at work?*" (SWB). They were measured on a six-point frequency scale ranging from 1 (never) to 6 (everyday). In South Africa, the scale was used in a sample of Setswana-speaking adults where favourable psychometric properties were found such as Cronbach's alpha coefficients of .79 (for EWB), .78 (for PWB), and .68 (for SWB) were reported (Khumalo, Temane, & Wissing, 2011).

In the present study, the measurement model of the three-factor solution of the MHC-SF, as displayed in Figure 1, demonstrated good fit after being improved through applying one modification index suggestion for residual covariance between items 13 and 14 (MI=23.673; EPC=.356). Item 13 reads: "*Confident to think or express your own ideas and opinions at work?*", and item 14 reads: "*Your work has a sense of direction or meaning to it?*". This model was compared with two competing models (unidimensional factor solution, and the original three-factor model), whose model fit indices are displayed in Table 1. The nested measurement models for MHC-SF were a unidimensional model (Model 1), the theoretically intended three- factor (Model 2), and the improved three-factor model with

residual error covariance between items 13 and 14 (Model 3). Model three was the best fitting one (CFI=.930; TLI=.912; RMSEA=.113, p=<.000, CI: lower, .098, upper, .127).

< Figure 1 approximately here >

The Utrecht Work Engagement Scale **(UWES; Schaufeli, Bakker, & Salanova, 2006)** was used to assess workers' levels of work engagement. It consists of nine items organised into three subscales, namely Vigour (3 items), Dedication (3 items) and Absorption (3 items) (Schaufeli et al., 2006). The items were measured on a six-point frequency scale, ranging from 0 (never) to 6 (always). Sample items included "*At my job, I feel strong and vigorous*" (Vigour), "*I am proud of the work that I do*" (Dedication) and "*I get carried away when I am working*" (Absorption). In a study involving different occupational employee groups, Schaufeli et al. (2006) found good psychometric properties, and reported Cronbach's alpha coefficients of 0.88 for Vigour, 0.90 for Dedication, and 0.86 for Absorption. In a South African sample of industrial psychologists, van Zyl, Deacon and Rothmann (2010) found the following Cronbach's alpha coefficients: 0.78 for Vigour, 0.89 for Dedication, and 0.78 for Absorption. As displayed in Figure 2, the measurement model of the two-factor model of the UWES (Vigour and Dedication) in this sample demonstrated the best fit indices compared to the other competing models. The nested measurement models for UWES were as follows: a unidimensional model (Model 1), the theoretically intended three-factor model (Model 2), and the two-factor model with vigour and dedication (Model 3). The two-factor model with Vigour and Dedication was the best fitting one (CFI=.959; TLI=.924; RMSEA=.141, p=<.000, [95% CI: .103 .182]).

< Figure 2 approximately here >

Table 1 shows different measurement models and their fit indices for MHC-SF and UWES. Modification indices were used to improve the nested models.

< Table 1 approximately here >

Research procedure and ethical aspects

Firstly, the researcher obtained permission to conduct the research at the mining organisation in the Limpopo Province of South Africa and was granted ethical clearance by the University's Research Ethics Committee who awarded the clearance number NWU-HS-2016-0175. Recruitment of participants who occupied positions of shift boss, rigger, LHD, PTVs, electricians, boilermakers, and general workers among others, was conducted through distribution of flyers and announcements during the company's safety meetings, tea breaks, and worker union gatherings. After informed written consent that covered the objectives, importance and outcomes envisioned for the study, the data collection procedure, ethical aspects of voluntary participation and anonymity, participants were presented with a set of questionnaires which they completed in a supervised environment and returned after the completion. Participants who indicated that they wanted individual feedback were given written feedback. General dissemination happened in the form of flyers and general addresses at convenient group meetings convened by the company and unions. A general report with no specific employee names was made available to the company Human Resources Management (HRM) department as well as the trade unions. This report showed the patterns and trends and makes recommendations.

Statistical analysis

Structural equation modelling (SEM) in Mplus (version 8) (Byrne, 2012; Geiser, 2013; Muthén & Muthén, 1998; 2017) and multivariate analysis in SPSS (version 25) were applied. Firstly, as part of a preliminary analysis the measurement models of the measuring instruments of the main constructs needed to be established for construct validity. This has been reported in the Method section above. The adequacy of these models was judged based

on a set of model fit indices, namely Chi square (χ^2), Root Mean Square Error of Approximation (RMSEA), Comparative Fit Index (CFI), Tucker-Lewis Index (TLI), Standard Root Mean Square Residual (SRMR), Akaike Information Criterion (AIC) and Bayesian Information Criterion (BIC). Good fit was expected when CFI and TLI values are above .90, χ^2 value is lower and non-significant, and a RMSEA value is below .08 (Byrne, 2012; Kline, 2010). AIC and BIC were expected to be smaller to indicate better fit.

Secondly, the substantive research questions of this study were answered through structural models involving direct effects between the determinant variables (socio-demographic and work-related factors) and the outcome variables (dimensions of flourishing and engagement). The determinant variables were the observed indicator variables, namely age, gender, marital status, educational attainment, authority of making decisions, social support at work, number of work hours, and years of experience. The outcome variables, Vigour; Dedication; Social well-being, Psychological well-being, and Emotional well-being were treated as latent variables. Significant standardised direct effects coefficients (β) were indicated by p-values of below 0.05, while confidence intervals without the zero value were indicated at 95%. Similar direct effects were tested to determine the relationship between positive mental health (Emotional, Psychological and Social well-being) and work engagement (Vigour and Dedication).

Results

Positive mental health

Personal characteristics and positive mental health. The best fitting direct effects model (displayed in Figure 3a) was characterised by the following modification indices: error covariance between MHC13 and MHC14 items (MI=23.730; EPC=0.356), error covariance between MHC4 and MHC 5 items (MI=21.802; EPC=2.269), and error covariance between

age and marital status (MI=17.419; EPC=0.521). As seen in Table 2, when compared to the other nested models, this adjusted model was superior to the others. CFI=.931; TLI=.916; RMSEA=.081, p<.000 [95% CI: 0.069 0.092]. In this model, the direct effects from independent variables of age, gender, marital status, and educational attainment to dependent variables of Emotional, Psychological and Social well-being were tested. As displayed in Table 4, only five direct effects of the possible twelve were significant. Gender was significantly associated with Emotional well-being, while age and gender were both significantly associated with Social and Psychological well-being. The younger the employee, the greater Social and Psychological well-being he or she experienced.

Work-related properties and positive mental health. Three modification indices were necessary to arrive at the best fitting direct effects model, namely error covariance between MHC4 and MHC8 items (MI= 18.014; EPC= -.416), error covariance between MHC13 and MHC 14 items (MI= 23.626; EPC= .354), and error covariance between authority to make decisions and social support at work (MI= 10.734; EPC= .051). This model is displayed in Figure 3b, CFI=.928; TLI=.912; RMSEA=.083, p<.000 [95%CI: 0.072 0.094]. The model shows the correlation between the independent variables of authority to make decisions, social support at work, number of work hours and work experience, and the dependent variables of Emotional, Social and Psychological well-being. As shown in Table 5, only five of the possible twelve direct effects were significant. Perceived social support at work (positively) and working hours (inversely) were significantly associated with Emotional well-being. Perceived social support had a significant positive association with Social well-being. Authority to make decisions and social support at work had a significant and positive association with Psychological well-being.

<Table 2 approximately here>

Work engagement

Personal characteristics and work engagement. As displayed in Figure 4a, the best fitting direct effects model had an error covariance between age and marital status (MI=21.560; EPC=2.256), CFI=.941; TLI=.921; RMSEA=.090, p<.000 [95% CI: 0.068 0.112]. Direct effects between the independent variables of age, gender, marital status and education attainment, and the dependent variables of Vigour and Dedication were tested. As shown in Table 6, none of the eight direct effects tested proved to be significant.

Work-related properties and work engagement. As Table 3 indicates, the model testing direct effects between independent variables of authority to make decisions, social support at work, number of work hours and work experience, and the dependent variables of Vigour and Dedication fit the data well (CFI=.940; TLI=.921; RMSEA=.090, p<.000 [95% CI: .068 .112]). Only two direct effects were significant of the eight (see Table 7). Perceived social support at work was positively associated with both Vigour and Dedication. The other independent variables, namely authority to make decisions, working hours and years of experience did not have significant influence on the reported levels of Vigour and Dedication.

Positive mental health and work engagement. As set out in Figure 5, the model of the direct effects between positive mental health, represented by Emotional, Social and Psychological well-being and work engagement represented by Vigour and Dedication, had good fit; χ^2 (158) = 468.88, p<.000; RMSEA=.091, p<.000, 90%CI [0.081 0.100]; CFI=.919; TLI=.903; SRMR=.050. Emotional well-being had a positive significant association with Vigour (0.832, p<.000 [90% CI, 0.534 1.131]), and Dedication (0.948, p<.000 [90% CI: 0.655 1.240]). No other significant direct effects were found, as seen in Table 7. This result indicates that Psychological and Social well-being dimensions were not predictors of work engagement in this sample.

Discussion

The aim of this study was to investigate how personal socio-demographic variables and work-related factors were associated with positive mental health and work engagement among blue-collar employees' workplace within the South Africa mining sector. Antecedents of interest included personal characteristics such as age, gender, marital status, and educational attainment (personal characteristics), while significant work-related factors consisted of aspects such as authority to make decisions, social support at work, number of work hours, and years of experience (work-related factors). Their role as determinants of emotional well-being, social well-being, psychological well-being, vigour and dedication was tested and the following conclusions could be reached.

Firstly, the main finding was that work-related properties and socio-demographic characteristics partially accounted for flourishing and engagement in the workplace. Secondly, the tests indicated that social support, authority to make decisions, work hours, gender, and education level had the greatest influence on positive mental health. Lastly, it was established that of the three components of positive mental health, only emotional well-being influenced work engagement, while only social support positively influenced work engagement.

Positive mental health

Personal characteristics as determinants of positive mental health. While gender was significantly associated with emotional, psychological, and social well-being; age was shown to be a significant determinant of psychological and social well-being. Interestingly, it was also found that age and marital status are interdependent; thereby indicating that marital status is a function of age with older participants being married and the younger ones being single. Male gender was found to place employees at an advantage in that the male mining

employees were found to function better than women in terms of emotional, psychological, and social well-being. Keyes and Simoes (2012) also established that men scored better than women on the measure of positive mental health among adults in data taken from the Midlife in the United States (MIDUS) study of 1995. In the context of the present study, this finding is not surprising since the mining sector is known to be a male-dominated industry with conditions that do not always favour women (Ashworth et al., 2004, Badenhorst, 2012).

In a study of over 90 countries, Meisenberg and Woodley (2015) found that although some indicators of gender equality and female status relate to higher job and life satisfaction, being actively employed and having a prolonged history of educational life was negatively related to the well-being of females. In contrast to this, there have been relatively recent studies reporting that women have a better chance of flourishing than their male counterparts. A good example of such is research done by Schotanus-Dijkstra (2015) in a Dutch population. Furthermore, there are also findings that show no significant difference between well-being as reported by either men or women. For example, in their scale validation study from nine countries, Schaufeli, Bakker and Salanova (2006) reported no significant differences in work engagement levels of men and women. In addition to that specific study, Mostert and Rothmann (2006) also reported no significant association between gender and work engagement in their study on South African police service officers, while a year earlier, Coetzee and Rothmann (2005) had also found no significant correlation between gender and work engagement in their study among employees of a higher educational institution in South Africa. It is worth noting that none of these studies were conducted among blue-collar mining employees as was done in the present study which highlights the need for more studies concerned with mining employees' well-being in South Africa.

The age differences in psychological well-being have also been reported in other workplace studies (e.g., Avery, McKay, & Wilson, 2007; Coetzee, & de Villiers, 2010;

Robinson, Hooker, & Hayday, 2007; Wissing, & Van Eeden, 2002) and they were confirmed by the current study's finding that while younger age placed employees at an advantage for social and psychological well-being, it did not do the same with emotional well-being. This means that younger mineworkers reported greater levels of psychological well-being and perceived their work social structures to be functioning well. However, this functioning was not superior in terms of emotional well-being in comparison to their older counterparts. Similar findings of Carstensen (1995) showed that older workers were more likely to experience positive emotions compared to negative emotions relative to young employees in a sample of African American and Caucasian American blue- and white-collar workers. This indicates that older employees were likely to experience high levels of emotional well-being as is the case in the current study. Warr (2007) suggested more broadly that there is a positive linear relationship between age and job-related well-being.

Work factors as determinants of positive mental health. Not surprisingly, workplace social support was a predictor of emotional, psychological, and social well-being in the current study. This strong positive effect of social support on overall work-related positive mental health can be ascribed to the collectivist socio-cultural context of the workers (see Wissing, & Temane, 2008). Positive organisational practices which promote well-being include compassionate support and caring (Cameron, Mora, Leutscher, & Calarco, 2011). Social support and social participation are linked to higher subjective and psychological well-being (Diener, & Seligman, 2002, 2004; Huppert, 2009; Keyes, 1998) as well as resilience, vitality and mental health (Barry, 2009; Lehtinen et al., 2005). Consequently, it seems that social support remains a core factor contributing to flourishing, even in the mining sector.

The authority to make decisions, which is a representation of autonomy at work, was a significant determinant of psychological well-being but neither of emotional nor social well-being in the current study. This means that those who perceived themselves to be

empowered to make decisions and could exercise autonomy in their work environment experienced high levels of positive functioning and were able to use their strengths.

Interestingly and perhaps in keeping with a more collectivist socio-cultural orientation and interdependent self-construal, the authority to make decisions covaried with social support. This indicates that this aspect (authority to make decisions) was a function of social support in the present study. In other words, the ability to make and effect decisions is made possible through the support of co-workers and superiors. Research in a sample of nurse leaders indicates that much of this autonomy is derived from access to information, knowledge transfer and close personal relationships that enhance both supervisor and colleague support (Shirey, 2004). Another empirical study found that social support at work was positively correlated to job autonomy and high job performance among a diverse group of workers in a public hospital (Park, Wilson, & Lee, 2004). Support from the supervisor was also related to participants' experiences of job satisfaction and autonomy in the study of Ramesar (2006).

Working long hours was found to be particularly detrimental to the emotional well-being of the mining workers, a finding that confirmed similar results in an empirical study by Shutte, Chastang, Malard, Parent-Thirion, Vermeylen and Niedhammer (2014) in which employees reported a significant decrease in well-being levels when weekly working hours were high. This was especially so for male employees when compared to their female counterparts. In a study conducted by Virtanen et al. (2011), it was established that long working hours negatively influenced positive mental health and placed workers at higher risk for depression and anxiety. High working hours, beyond what legislation deems as normal, significantly increased chances of depressive and anxiety symptoms and influenced negatively sleeping quality according to a study conducted by Afonso, Fonseca, and Pires (2017). Similarly, by using secondary data from the Korean Working Condition Survey

(KWCS), Lee et al. (2013) found that long work hours had an adverse effect on emotional well-being. More specifically, they found that as work hours increased, the odds ratio of the possible depression group increased accordingly.

Work engagement

Personal characteristics as determinants of work engagement. None of the four socio-demographic variables mentioned previously were significantly associated with work engagement. This indicates that the extent of being engaged at work could not be distinguished on the basis of age, marital status, gender or level of education. These results is consistent with findings from previous research such as the studies of Rothmann among South African police service officers (Mostert, & Rothmann, 2006) and employees in higher education (Coetzee, & Rothmann, 2005), both of which reported no significant association between gender and work engagement. In their multi-country study on the psychometric properties of Utrecht Work Engagement Scale (UWES), Schaufeli and Bakker (2003) also reported that there was no significant correlation between age and work engagement.

Work-related factors as determinants of work engagement. Of the four work-related factors investigated, only social support had a significant effect on vigour and dedication. This finding again positions social support as an important component in optimally functioning employees. The other workplace factors (authority to make decisions, working hours and years of experience) did not have any impact on work engagement. Previous research has implied that the role of co-worker social support as a job resource is capable of impacting engagement (May et al., 2004; Richardsen, Burke, & Martinussen, 2006; Schaufeli, & Bakker, 2004). Support from colleagues helps to get work done in a timely manner and has the potential to buffer the impact of workload on and burnout among employees in a higher education institution (Bakker, Demerouti, & Euwema, 2005b). The psychological condition of safety is experienced as a result of managerial support, and

supportive and trusting relationships with others in the organisation (Kahn, 1990). Bakker, Demerouti, and Verbeke (2004) found that social support is a job resource essential to managing high job demands and engaging in extra role behaviours. Similarly, Sargent and Terry (2000) found high levels of co-worker support to be associated with better work performance.

Positive mental health as determinant of work engagement. In terms of positive mental health as a determinant of work engagement, it was found that only emotional well-being positively influenced work engagement. This implies that the capacity to be engaged in work is derived from happiness, but not from the other two expressions of eudaimonic well-being. Eudaimonia (e.g., growth, meaning, authenticity, excellence) and hedonia (e.g., pleasure, enjoyment, comfort, absence of distress) are recognised to be concepts central to the study of well-being (Huta, & Waterman, 2014) in which aspects of seeking growth and excellence in eudaimonic perspective are much more sustainable over time than pleasure seeking. When referring to hedonia, Keyes (2002) uses the term emotional well-being. In a study focusing on various nations and their orientations to the seeking of happiness (pleasure, engagement and meaning), Park, Peterson and Ruch (2009) found that they differed in their orientations and clustered into three groups. One cluster was defined by a high endorsement of pleasure-seeking and engagement; the second was defined by a relatively high endorsement of engagement-seeking and meaning; lastly, the third cluster relates to a relatively low endorsement of all three ways of seeking happiness. This finding also expresses a possible interpretation that a blue-collar worker in a mining sector is not necessarily driven by any sense of eudaimonic motivation to complete his or her work but is rather driven by a more hedonic, pleasure-seeking orientation and not the meaningfulness of the work itself.

Limitations

The significance of these findings should be interpreted within the context of a few limitations. Firstly, data were gathered at only one operation of a major mining company in South Africa and did not cut across all their various operations. This had a significant influence on the demographic composition of the sample and, therefore, the generalisability and the level of cross-cultural comparison of the results were limited. Future research can extend the sample to include blue-collar employees from other operations or even extend it to similar companies in South Africa to gain a better, more detailed understanding of how work and socio-demographics influence positive functioning in terms of work engagement and flourishing. The research design used in the study provides for further limitations of the study in that quantitative surveys were used to gather information in a self-report fashion.

Conclusion, implications, and recommendations

In most studies, socio-demographic variables and work-related properties are not the primary focus. This study sought to investigate the socio-demographics and work factors which influence flourishing and work engagement. Furthermore, the study investigated the association between level of work engagement and flourishing among blue-collar employees in South African mines as to fill this specific gap in research and enhance the growing body of knowledge related to employee flourishing and work engagement in developing countries such as South Africa.

The findings of this study can be summed up as follows: flourishing is positively influenced by age and gender as well as social support and authority to make decisions. Males function superior to females in terms of flourishing. This is true since the mining industry is still dominated by males. Personal demographics do not influence work engagement, and social support at work functions superior in terms of work-related factors.

Work engagement is a function of emotional well-being as far as the model of flourishing is concerned. This indicates that the capacity to be engaged in work is derived from happiness, but not from the other two expressions of eudaimonic well-being (psychological and social well-being). Social support at work has a powerful effect in that it cuts across all gender and age groups making it an important resource for mining blue-collar workers. The success and positive functioning of mining employees seem to be reliant upon their co-workers' and supervisors' support.

Given the reality of the current business environment, maximising the potential of a diverse workforce is not only a social imperative, but could provide organisations and the country at large with a significant competitive advantage (Rahmatallah, 2013). Human resource professionals and/or industrial psychologists need to tailor wellness programmes that promote and increase social support culture at work and foster decision making in the area of expertise, even of those mining employees who fall into lower levels of the organisation's hierarchy. Furthermore, working hours should always be regulated to ensure that they do not influence well-being or promote mental illness.

Efforts of driving development of women in mining should be increased since, based on the study's findings, the researcher is of the opinion that women in and first-time entrants to the mining industry should be extensively supported by the organisations employing them. This is based on the finding that since in the current study, men functioned more superiorly to women when it comes to workplace flourishing. Organisational development specialists who are concerned with improving workplace wellness and effectiveness, should look into ways to improve emotional well-being. The reason for this is wellbeing is linked to, among other things, work engagement and commitment. Long work hours are also shown to have an impact on emotional well-being. In conclusion, the results suggest that when blue collars are happy they are more able and motivated to apply themselves in their work.

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Table 1

Confirmation of measurement models for the operationalisation of positive mental health and work engagement measuring instruments

Model	Fit indices for Mental Health Continuum Short-Form											
	BIC	AIC	X^2	Df	P	RMSEA	P	90% CI		CFI	TLI	SRMR
MHC Model 1	9227	9087	495.05	77	<.000	.162	<.000	.148	.176	.847	.819	.056
MHC Model 2	10570	10414	291.378	74	<.000	.111	<.000	.098	.125	.919	.901	.044
MHC Model 3	**9018**	**8865**	**264.742**	**73**	**<.000**	**.113**	**<.000**	**.098**	**.127**	**.930**	**.912**	**.042**
UWE Model 1	7000	7094	173.219	27	<.000	151	<.000	.130	.173	.902	.869	.053
UWE Model 2	7085	6981	148.008	24	<.000	.148	<.000	.125	.171	.917	.875	.051
UWE Model 3	**4745**	**4679**	**45.820**	**8**	**<.000**	**.141**	**<.000**	**.103**	**.182**	**.959**	**.924**	**.036**

BIC = Bayesian Information Criterion; AIC = Akaike Information Criterion; X^2 = Chi Square; DF = Degrees of freedom; p = Probability value; RMSEA = Root Mean Square Error of Approximation; CFI = Comparative Fit Index; TLI = Tucker-Lewis Index; SRMR = Standard Root Mean Square Residual. MHC model 1 = uni-factor; MHC model 2 = theoretical three factors; MHC model 3 = improved theoretical three factors. UWE Model 1 = uni-factor; UWE Model 2 = theoretical three-factor; UWE Model 3 = two-factor model

Table 2

Confirmatory factor analysis of the direct effects models where the dependent variable is positive mental health

Independent variable Model	Fit indices											
	BIC	AIC	X^2	Df	P	RMSEA	p	90% CI		CFI	TLI	SRMR
Model 1: personal characteristics	13619	13394	371.745	124	<.000	.092		.081	.103	.908	.891	.051
Model 2: personal characteristics	13602	13373	349.299	123	<.000	.088		.077	.099	.916	.900	.050
Model 3: personal characteristics	13584	13335	325.118	122	<.000	.084		.073	.095	.925	.910	.042
Model 4: personal characteristics	**13571**	**13335**	**307.051**	**121**	**<.000**	**.081**	**<.000**	**.069**	**.092**	**.931**	**.916**	**.042**
Model 1: work factors	12975	12749	374.647	124	<.000	.092		.082	.103	.909	.892	.051
Model 2: work factors	12958	12729	352.260	123	<.000	.089		.078	.100	.917	.900	.050
Model 3: work factors	12942	12710	330.957	122	<.000	.085		.074	.096	.924	.909	.048
Model 4: work factors	**12936**	**12701**	**319.891**	**121**	**<.000**	**0.083**		**.072**	**.094**	**.928**	**.912**	**.042**

BIC = Bayesian Information Criterion; AIC = Akaike Information Criterion; X^2 = Chi Square; DF = Degrees of freedom; p = Probability value; RMSEA = Root Mean Square Error of Approximation; CFI = Comparative Fit Index; TLI = Tucker-Lewis Index; WRMR = Weighted Root Mean Square Residual.

Table 3

Confirmatory factor analysis of the direct effects models where the dependent variable is work engagement

Model: Independent variable	Fit indices										
	BIC	AIC	X^2	Df	P	RMSEA	90% CI		CFI	TLI	SRMR
Model 1: personal characteristics	7661	7782	108.254	30	<.000	.105	.084	0.127	.917	.892	.060
Model 2: personal characteristics	**7764**	**7639**	**84.345**	**29**	**<.000**	**.090**	**.068**	**.112**	**.941**	**.921**	**.044**
Model 1: work factors	**7156**	**7035**	**87.243**	**30**	**<.000**	**.090**	**.068**	**.112**	**.940**	**.921**	**.051**

BIC = Bayesian Information Criterion; AIC = Akaike Information Criterion; X^2 = Chi Square; DF = Degrees of freedom; p = Probability value; RMSEA = Root Mean Square Error of Approximation; CFI = Comparative Fit Index; TLI = Tucker-Lewis Index; WRMR = Weighted Root Mean Square Residual.

Table 4

Direct effects of personal characteristics and positive mental health based on the best structural model

Independent variable	Emotional Well-Being					
					95% confidence interval	
	Estimate	SE	Est./SE	Sig.	Lower	Upper
Age	-0.090	0.073	-1.230	0.219	-0.234	0.030
Gender	**-0.155**	**0.068**	**-2.294**	**0.022**	**-0.287**	**-0.044**
Marital status	-0.047	0.072	-0.642	0.521	-0.189	0.073
Education	-0.013	0.068	-0.194	0.846	-0.147	0.099
Independent variable	Social Well-Being					
					95% confidence interval	
	Estimate	SE	Est./SE	Sig.	Lower	Upper
Age	**-0.141**	**0.073**	**-1.940**	**0.052**	**-0.284**	**-0.022**
Gender	**-0.229**	**0.067**	**-3.427**	**0.001**	**-0.360**	**-0.119**
Marital status	-0.010	0.073	-0.140	0.889	-0.154	0.110
Education	-0.035	0.068	-0.519	0.604	-0.170	0.077
Independent variable	Psychological Well-being					
					95% confidence interval	
	Estimate	SE	Est./SE	Sig	Lower	Upper
Age	**-0.155**	**0.071**	**-2.172**	**0.030**	**-0.295**	**-0.038**
Gender	**-0.179**	**0.066**	**-2.696**	**0.007**	**-0.309**	**-0.070**
Marital status	0.020	0.071	0.278	0.781	-0.120	0.137
Education	-0.017	0.067	-0.254	0.800	-0.148	0.093

Table 5

Direct effects of work-related characteristics and positive mental health based on the best structural model

Independent variable	Emotional Well-Being					
					95% confidence interval	
	Beta	SE	Est./SE	Sig.	Lower	Upper
Authority for decisions	-0.093	0.066	-1.410	0.159	-0.222	0.036
Support at work	**-0.319**	**0.063**	**-5.037**	**0.000**	**-0.444**	**-0.195**
Working hours	**-0.181**	**0.065**	**-2.795**	**0.005**	**-0.308**	**-0.054**
Years of experience	0.030	0.065	0.471	0.638	-0.096	0.157
Independent variable	Social Well-Being					
					95% confidence interval	
	Beta	SE	Est./SE	Sig.	Lower	Upper
Authority for decisions	-0.110	0.067	-1.629	0.103	-0.241	0.022
Support at work	**0.292**	**0.065**	**4.473**	**0.000**	**0.420**	**0.164**
Working hours	-0.127	0.066	-1.905	0.057	-0.257	0.004
Years of experience	0.029	0.066	0.443	0.657	-0.100	0.159
Independent variable	Psychological well-being					
					95% confidence interval	
	Beta	SE	Est./SE	Sig	Lower	Upper
Authority for decisions	**0.143**	**0.066**	**2.160**	**0.031**	**0.273**	**0.013**
Support at work	**0.292**	**0.064**	**4.532**	**0.000**	**0.418**	**0.166**
Working hours	-0.013	0.066	-0.192	0.848	-0.143	0.117
Years of experience	-0.044	0.065	-0.670	0.503	-0.171	0.084

Table 6

Direct effects of personal characteristics and work engagement based on the best structural model

Independent variable	**Dependent variable is Vigour**					
					95% confidence interval	
	Estimate	**SE**	**Est./SE**	**Sig.**	**Lower**	**Upper**
Age	0.056	0.076	0.730	0.465	-0.093	0.205
Gender	-0.034	0.071	-0.480	0.632	-0.173	0.105
Marital status	-0.015	0.075	-0.203	0.839	-0.162	0.132
Education	-0.062	0.072	-0.856	0.392	-0.202	0.079
Independent variable	**Dependent variable is Dedication**					
					95% confidence interval	
	Estimate	**SE**	**Est./SE**	**Sig.**	**Lower**	**Upper**
Age	-0.040	0.075	-0.535	0.593	-0.188	0.107
Gender	-0.092	0.070	-1.313	0.189	-0.230	0.045
Marital status	-0.013	0.075	-0.180	0.858	-0.160	0.133
Education	-0.017	0.071	-0.241	0.809	-0.157	0.122

Table 7

Direct effects of work-related characteristics and work engagement based on the best structural model

Independent variable	**Dependent variable is Vigour**					
					95% confidence interval	
	Beta	**SE**	**Est./SE**	**Sig.**	**Lower**	**Upper**
Authority for decisions	-0.114	0.072	-1.594	0.111	-0.254	0.026
Support at work	**0.184**	**0.072**	**2.570**	**0.010**	**0.325**	**0.044**
Working hours	-0.050	0.072	-0.696	0.486	-0.192	0.091
Years of experience	-0.025	0.070	-0.353	0.724	-0.162	0.113
Independent variable	**Dependent variable is Dedication**					
					95% confidence interval	
	Beta	**SE**	**Est./SE**	**Sig.**	**Lower**	**Upper**
Authority for decisions	0.011	0.071	0.161	0.872	-0.128	0.151
Support at work	**0.207**	**0.070**	**2.952**	**0.003**	**0.345**	**0.070**
Working hours	0.028	0.072	0.390	0.698	-0.112	0.168
Years of experience	-0.006	0.070	-0.090	0.928	-0.144	0.131

Table 8

Direct effects of positive mental health and work engagement

Independent variable	**Dependent variable is Vigour**					
					95% confidence interval	
	Estimate	**SE**	**Est./SE**	**Sig.**	**Lower**	**Upper**
EWB	**0.832**	**.152**	**5.463**	**<.000**	**0.534**	**1.131**
SWB	-0.362	.229	-1.585	0.113	-0.810	0.086
PWB	0.129	.169	0.763	0.446	-0.203	0.461
Independent variable	**Dependent variable is Dedication**					
					95% confidence interval	
	Estimate	**SE**	**Est./SE**	**Sig.**	**Lower**	**Upper**
EWB	**0.948**	**.149**	**6.346**	**<.000**	**0.655**	**1.240**
SWB	-0.615	.228	-2.699	0.007	-1.062	-0.168
PWB	0.306	.167	1.831	0.067	-0.022	0.635

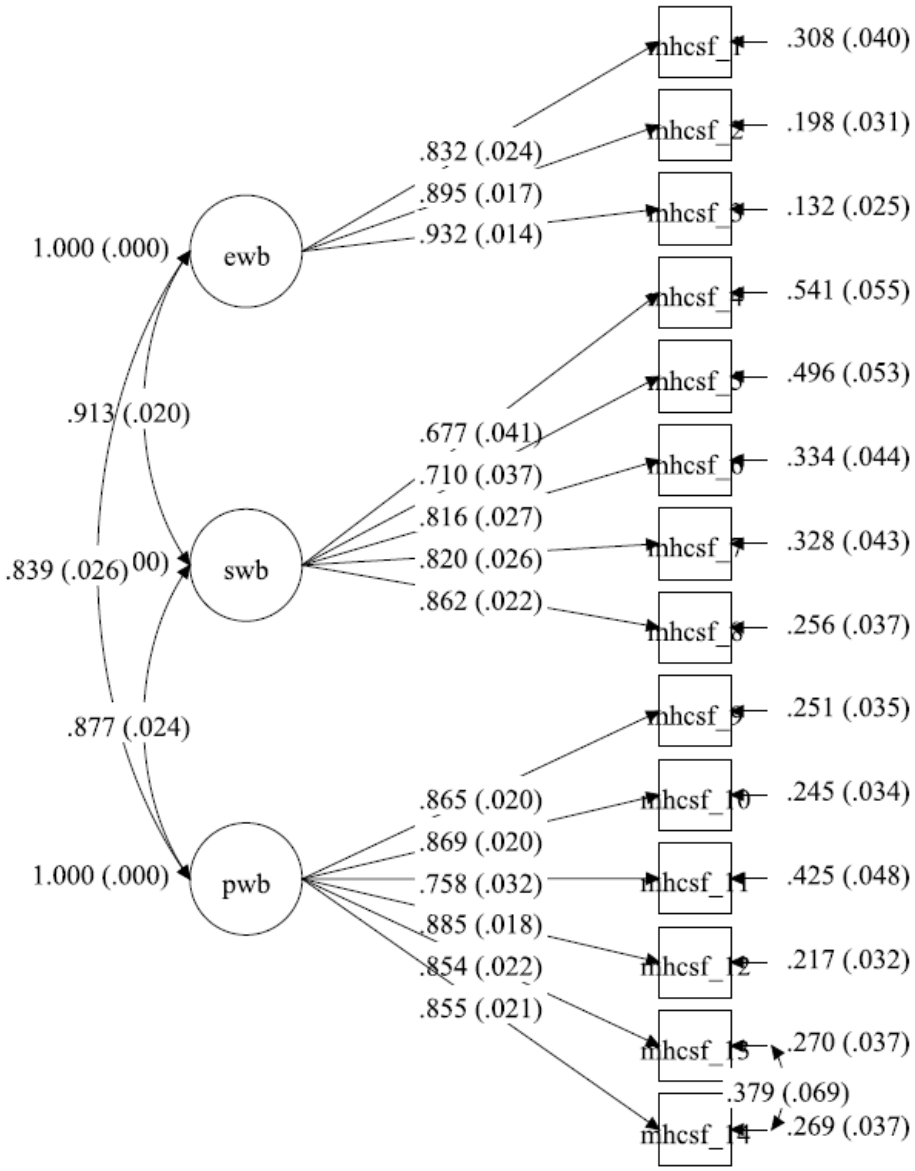


Figure 1. Measurement model for the MHC-SF

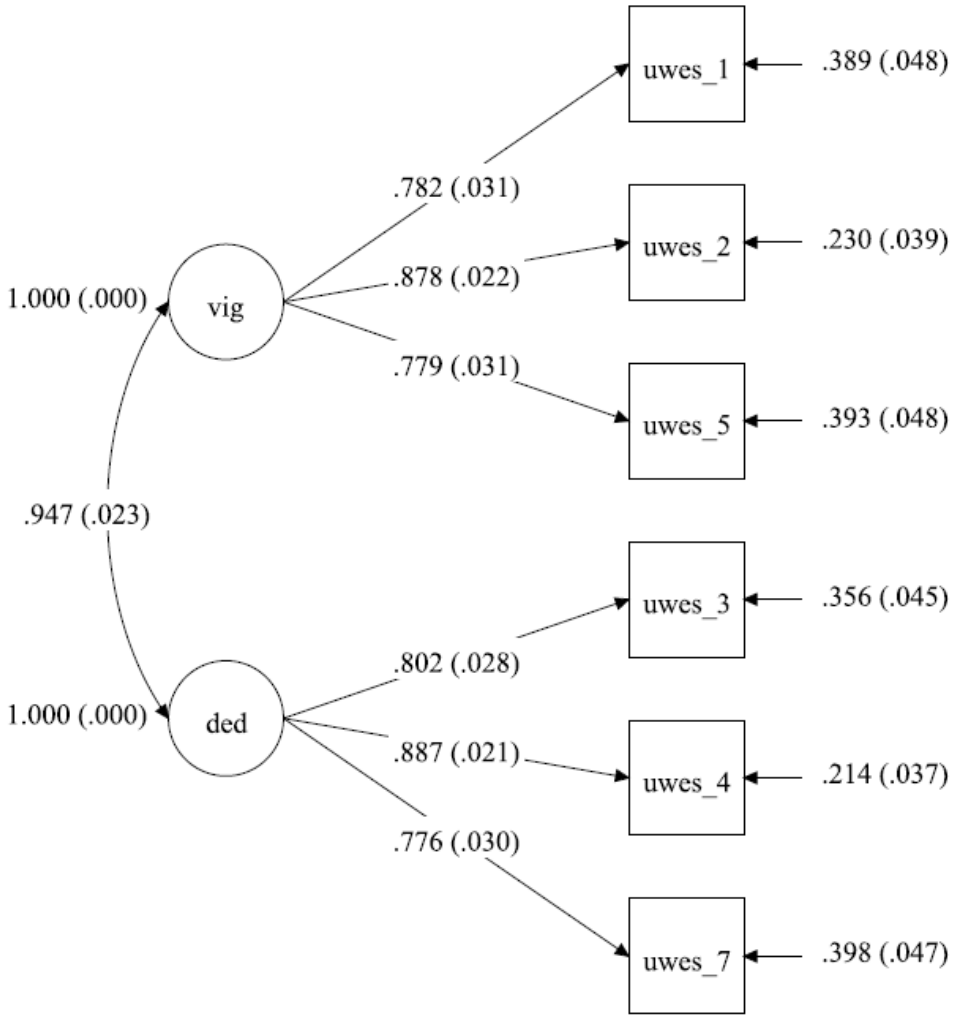
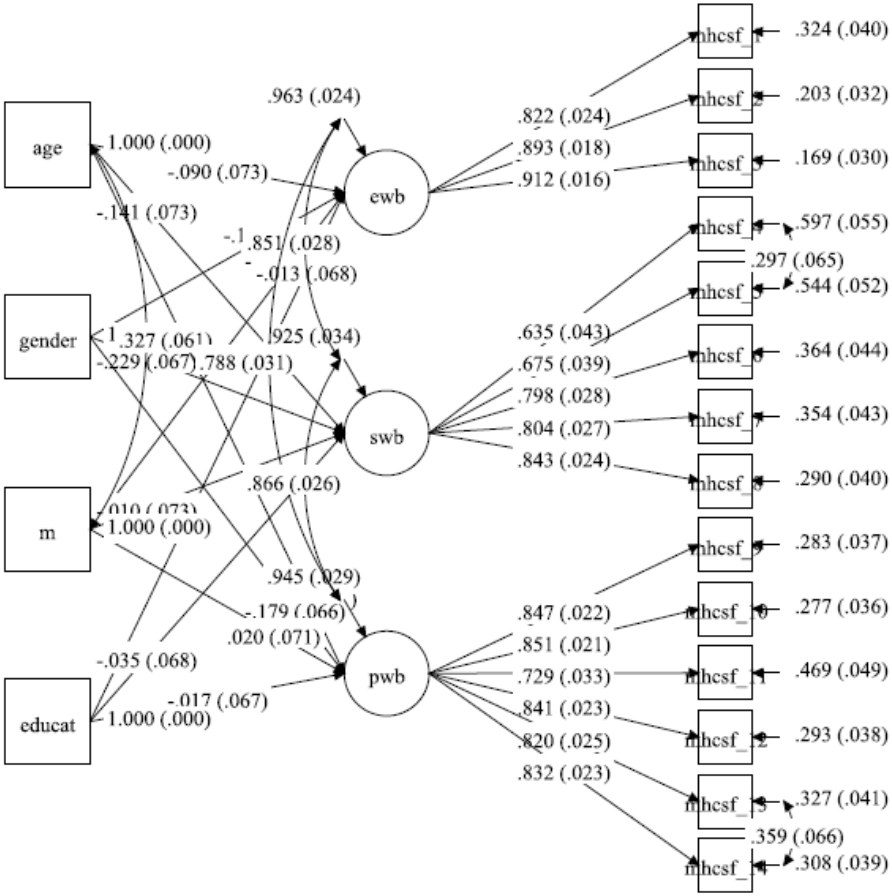
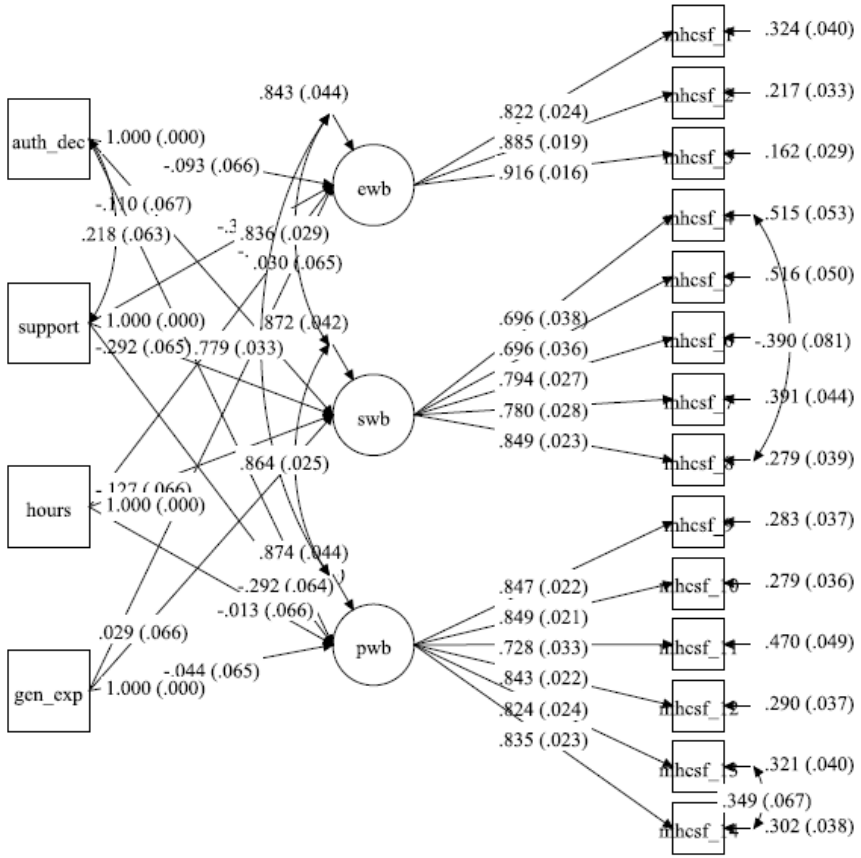


Figure 2. Measurement model for the UWES

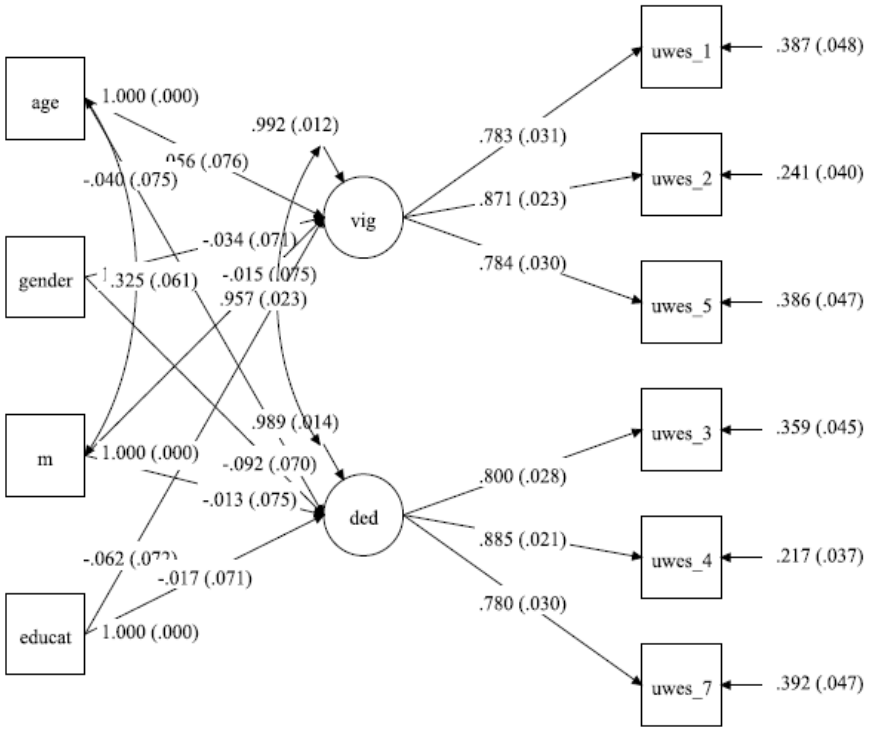


a) Direct effects of personal socio-demographic characteristics and positive mental health

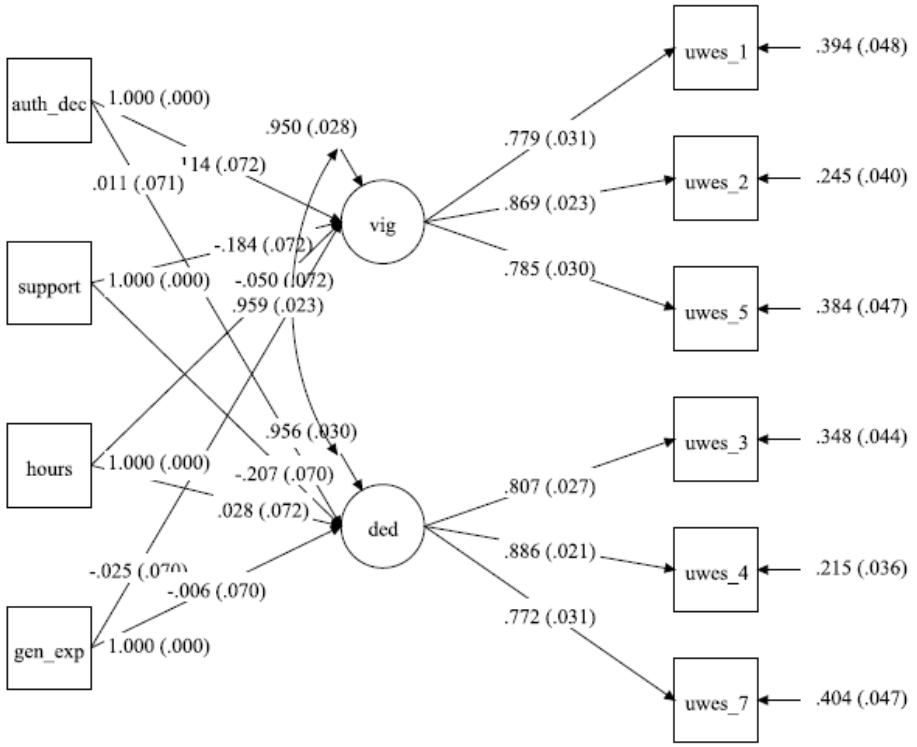


b) Direct effects of work-related characteristics and positive mental health

Figure 3. Positive mental health is the outcome



a) Direct effects of personal socio-demographic characteristics and work engagement



b) Direct effects of work-related characteristics and work engagement

Figure 4. Work engagement is the outcome

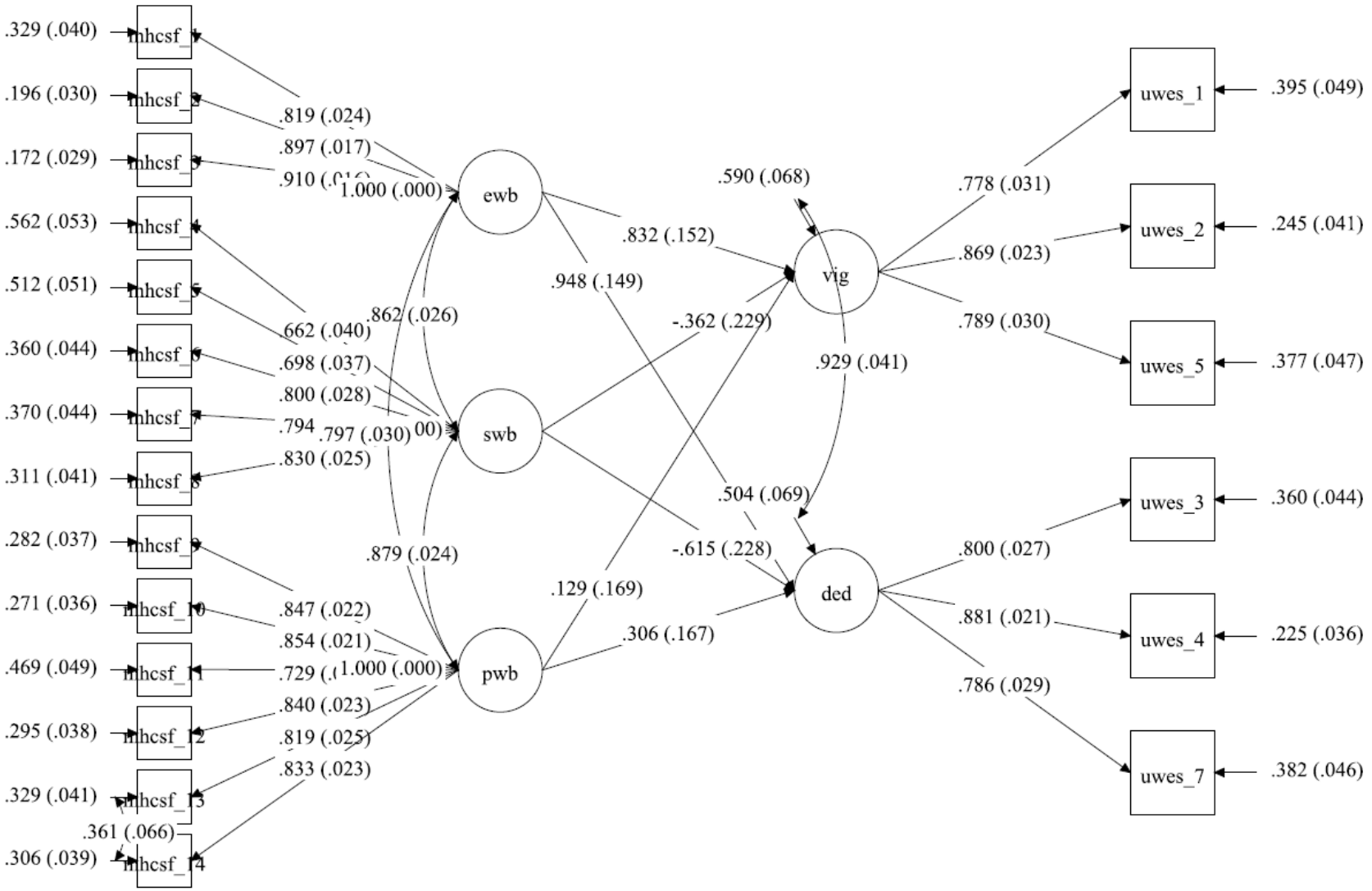


Figure 5. Positive mental health and work engagement

Chapter 3

Manuscript for examination

Manuscript Title, Authors and Addresses

Latent class analysis of vulnerability to stress: Implications for work engagement, positive mental health and coping.

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Latent class analysis of vulnerability to stress: Implications for work engagement, positive mental health and coping.

Abstract

The present study investigated the implications of personal vulnerability to stress on work engagement, positive mental health and coping health behaviours of blue-collar employees in the South African mining sector. To achieve the above aim, a sample of 237 participants (79.3% male; average age of 35 years) completed the following scales: Stress Overload Scale (SOS), Health Behaviours as Coping (HBC), workplace adapted Mental Health Continuum Short-Form (MHC-SF) and the Utrecht Work Engagement Scale (UWES). Analyses were performed using SPPS and Structural Equation Modelling (SEM) in Mplus and based on the analyses, four emergent personal vulnerability to stress latent classes (Low, Average, High, and Undifferentiated) were compared for their scores on Dedication and Vigour, as well as Emotional, Social, and Psychological well-being. Results show that Emotional and Social well-being indicated no differences across the four-stress vulnerability classes. Work engagement was significantly higher for the low personal vulnerability to stress class and Psychological well-being was significantly higher for the high stress vulnerability class. The high stress vulnerability class endorsed eating, exercise and alcohol use as coping health behaviours. Moderate personal stress vulnerability class reported using self-care as a coping health behaviour. Based on the above results, the study has implications for I/O psychologists in that they can better identify workplace factors that play a role in making employees more vulnerable to stress. This approach can assist blue-collar workers in the mining sector to function more effectively as well as caution these employees against the use of negative health behaviours for coping with stress. This information also informs ways of developing more personal resources to deal or cope with demands which lead to stress.

***Key words**:* Stress overload, engagement, positive mental health, coping and well-being.

Introduction

For many business organisations and companies, the indicators of success are productivity and profit. Therefore, the recent tough economic times have had detrimental effects on many businesses (Giorgi, Shoss, & Leon-Perez, 2015), including the mining sector. This instability and rapid change in the workplace landscape have had a tremendous effect, especially in terms of blue-collar employees in the more volatile employment settings such as the mining sector. Blue-collar employees are key contributors to the mining sector and its productivity. By extension, the success of mining largely depends on blue-collar workers (Luthans, & Youssef, 2007; Sharma, 2015). Therefore, the present study investigated the vulnerability of this group of workers to stress and the implications thereof as related to their work engagement, positive mental health and coping health behaviours.

Empirical studies in which negative effects (Ekundayo, 2014) and antecedents of stress (Coetzer, & Rothmann, 2006; Marinaccio et al., 2013; Rothmann, & Malan, 2010; Sharma, 2015) are explored dominate the presently available literature and scientific reports on employee vulnerability to stress. Unfortunately, only limited studies have explored the interplay between stress and positive mental health, and even fewer have focused on blue-collar employees. The few studies with such a focus include those of Boshoff, Potgieter, van Rensburg and Ellis (2014), Page, Milner, Martin, Turrell, Giles-Corti, & LaMontagne (2014), Nela and Kotzé, (2017), Wilson, Wissing and Schutte (2017). Page et al. (2014) examined whether positive mental health moderates the job stress-distress relationship and found that it modified the impact of work stress on psychological distress. Boshoff et al. (2014) explored

levels of occupational stress and mental well-being in a sample of South African teachers and found that high levels of flourishing co-occur with considerable amounts of work stress.

Scientific interest in stress among humans dates back to the seminal work of Selye (1956; cited by Amirkhan, 2012) in which stress was defined as the threat to homeostasis. The definition has since been extended to include allostatic adaptation to demands on the body (McEwen, 2000) and psychological distress on human behaviour (Folkman, Lazarus, Dunkel-Schetter, DeLongis, & Gruen, 1986). From this series of developments and insights, Amirkhan (2012) argued in favour of a more comprehensive conceptual model which he termed stress overload. By stress overload, Amirkhan (2012) referred to the interplay between demands and resources. According to this model, the convergence of high demands (event load) and low resources (personal vulnerability) result in the experience of stress and ultimately render an individual vulnerable to illness (Amirkhan, 2012). It is this conceptualisation of stress which the present study applied in seeking to understand employee vulnerability. Stress is seen as the individual's ongoing interaction with the environment when the demands of an environment exceed the person's available resources to respond effectively, thereby threatening their well-being (Dewe, Cox, & Ferguson, 1993; Folkman, 2011; Lazars, 1991). Blue-collar employees are more prone to stress as the majority of them are less educated, work in strenuous conditions and earn smaller incomes in comparison to white-collar employees who are more educated and work in favourable work conditions (Cooper, Dewe, & O'Driscoll, 2001; Sharma, 2015; Zafir, Makhbul, & Idrus, 2009). The vulnerability of this group to stress necessitates greater research investment by organisations, researchers and wellness practitioners.

It is also accepted that not all stress is negative. In fact, sometimes individuals experience their work as meaningful and challenging, which leads to 'eustress' (a positive psychological response to a stressor as indicated by a positive psychological state), and in

turn promotes engagement, even in demanding situations (Nelson, & Simmons, 2003). However, chronic exposure to stress is linked to a variety of negative health behaviours. Work stress, for instance, is associated with poor health behaviours, including higher levels of smoking, less exercise, and poorer diet (Ng, & Jeffrey, 2003). A review of 46 studies by Siegrist and Rödel (2006) found a consistent relationship between health behaviours and work stress only with increased alcohol consumption, particularly among men.

Coping refers to the cognitive and behavioural efforts with which individuals manage external and/or internal demands perceived as having a disruptive effect on functioning or behaviour (Armikhan, 1990; Folkman et al., 1986). Traditional strategies to cope include problem solving, being emotionally focused, and seeking social support, among others (Armikhan, 1990; Folkman et al., 1986; Utsey, Adams, & Bolden, 2000; Utsey, Brown, & Bolden, 2004). Health behaviours are a part of coping mechanisms developed in response to stress and they can either be positive (adaptive) or negative (maladaptive) with either positive or detrimental effect on individuals (Ingledew, Hardy, Cooper, & Jemal, 2013). The health behaviours to which Ingledew and colleagues refer to include eating comfort foods, taking things easy, trying to keep physically fit, and trying to eat healthy, among others. There are also unhealthy behaviours which are adopted as coping mechanisms, they include smoking, drinking alcohol or drinking too much caffeine (Ingledew et al., 1996, 2013). In the studies of Ingledew and colleagues (1996; 2013), coping mechanisms were represented by six factors: problem-focused, emotion-focused, and avoidance, as well as behaviours of exercising, eating and self-care. These six factors present the main categories constituting coping, which have been previously studied along with various socio-demographics. Women, when compared to men, were found to employ emotion-focused coping and eating. Older individuals tend to use more problem-focused coping and self-care (Ingledew et al., 1996,

2013). Therefore, the use of health behaviours provides a promising avenue for the study of coping with stress and positive psychological processes.

Work engagement and flourishing. According to the positive mental health model of Keyes (2002, 2005, 2007), flourishing is seen as a state characterised by high levels of emotional, psychological and social well-being. In the workplace, flourishing is described as a state where employees prosper, thrive, learn, engage, are self-motivated, express themselves positively and experience happiness (Bono, Davies, & Rasch, 2012). Rothmann (2013) defined workplace flourishing as a state wherein individuals feel good (i.e., are satisfied with their jobs and experience positive emotions at work), function well psychologically as expressed in terms of energy, dedication, self-determination and meaningfulness, and are functioning well socially as expressed by social acceptance, growth, contribution, coherence, and integration. According to Rothmann (2013, 2014), engagement is a component of the comprehensive model of workplace flourishing. Kahn (1990, p. 694) defined engagement as the "harnessing of organisational members' selves to their work-role by which they employ and express themselves physically, cognitively and emotionally during role performance". However, although the abovementioned research and definitions are widely recognised, it is Schaufeli, Bakker and Salanova's (2006) conceptualisation and operationalisation of work engagement which has received most attention and been used globally. They defined work engagement as an active, positive work-related state characterised by vigour, dedication, and absorption (Schaufeli et al., 2006). *Vigour* refers to high levels of energy and mental resilience while working, whereas *Dedication* refers to being strongly involved in one's work and experiencing a sense of significance, enthusiasm, and challenge. *Absorption* can be defined as a state of fully concentrating in one's work to a point that time passes quickly.

Developments in engagement research have shown that absorption is not a consistent indicator of work engagement and as such, some South African researchers have tended to remove it from the operationalisation of work engagement (e.g., Jackson, Rothmann & Van der Vijver, 2006; Rothmann, & Jorgensen, 2007; Rothmann, & Pieterwsazse, 2007). Naudé and Rothmann (2004a) found that the absorption scale was not reliable in the South African sample of emergency workers. Several studies have subsequently operationalised work engagement as consisting of only two factors, namely Vigour and Dedication (e.g., Coetzer, & Rothmann, 2007; De Bruin, & Henn, 2013; Nerstad, Richardsen, & Martinussen, 2010).

***Relationship between stress, flourishing and work engagement*.** Research indicated that stress can potentially lead to disengagement at work (Schaufeli, & Bakker, 2004a). Jackson and Rothmann (2006) found that excessive job demands lead to exhaustion and mental distance among South African teachers. Occupational stress negatively affected the mental well-being and job satisfaction of those who work within a university context (Connolly, Willock, Hipwell, & Chisholm, 2009). Among blue-collar workers, Sharma (2015) found that stress negatively affected performance and led to a decrease in the overall production, lower profits and a negative image of the organisation. Therefore, employees who are burdened by job demands and feel under pressure suffer and underperform and this situation results in negative outcomes for the organisation (Schaufeli, & Bakker, 2004a).

It makes sense that organisations should work towards having engaged and well-functioning employees who can sustainably contribute to the organisation since the survival of organisations is dependent on flourishing employees who feel good and function well (Keyes, & Grzywacz, 2005). Keyes (2007) findings demonstrated that benefits of flourishing at work included fewer workdays missed, fewer half-days and less work falloffs, and lower health limitations of daily living. Flourishers also have positive attitude which allows them to work collaboratively and support their colleagues where needed. Therefore, flourishing is an

important human capital as it enables employees to engage in positive behaviours at work and accomplish their goals and that of the organisation within their work environments (Seligman, 2008).

Latent class analysis (LCA). The primary purpose for using latent class analysis is to allow for the emergence of naturally occurring groups of employees, based on their responses to a measured construct, from apparently homogeneous overall sample (Geiser, 2013; Ling et al. 2016; Rosato, & Baer, 2012). It was important in this study to investigate the naturally occurring profiles or patterns of how mining employees experience and report personal vulnerability to stress. The approach of categorising a sample into classes allows for the study of outcomes to distinguish meaningful group characteristics from each other. Latent class analysis is also an improvement on similar analysis strategies such as cluster analysis, which have been advantageous over the long-standing variable-based analyses in that they reveal naturally occurring patterns of diversity among participants (see Geiser, 2013; Rosato & Baer, 2012).

Context. This study takes place among South African mining sector blue-collar workers. Presently, the mining sector is characterised by numerous challenges including a high supply of product amidst a lowering demand for cheap product imports from other countries; inconsistent electricity supply; and high fuel costs forcing the exporting of their product has been done through the harbour (Montiea, 2015). The blue-collar employees in this sector mainly occupy unskilled or semi-skilled jobs, requiring basic literacy, and perform work of a manual nature (Lee, & Mohamed, 2006). They are employed mostly in the manufacturing, mining, construction, electrical, transport and security industries (Lee, & Mohamed, 2006). They are directly implicated in the production process in many manufacturing organisations (Sharma, 2015), and as such significantly contribute to the economy (Montiea, 2015). In South Africa, the contribution of mines to GDP was

approximately 312 billion ZAR (6.8%) in 2017 (Chamber of mines of South Africa, 2017). Therefore, it makes sense to study the effect that such conditions have on the functioning of employees within these contexts. Tough economic conditions for employees may lead to an increase in stress and mental health problems (Buss, 2009). Furthermore, research has shown that organisational change such as downsizing, implementation of new equipment or plant and restructuring, can and often does lead to stress and increases in injury/ illness (Morris, Hassard, & McCann, 2006; Rees, & Redfern, 2000).

In the mining sector, these employees work with explosives; test geological formations; operate load-haul-dump machines, scraper winches and heavy-duty machines; and maintain mining machinery in conventional mines (Calitz, 2004). More critically, these employees are exposed to harsh working conditions that include mining underground at temperatures in excess of 28° Celsius, noise and dust, long working hours, unsafe working conditions, highly unionised environments and enormous pressure to perform (Calitz, 2004; Montiea, 2015). Due to these contributing factors, it becomes more important for organisations to pay more attention to dealing with any work-related stress of blue-collar employees. In the light of the lack of well-being studies among blue-collar employees, the present study sought to explore positive mental health, work engagement and how they are influenced by stress overload experience in the South African mining context.

The current study. The aim of this study is to investigate the consequences or outcomes of work-related vulnerability to stress overload among blue-collar workers. This was achieved first by determining stress vulnerability latent profiles of blue-collar employees using latent class analysis. Secondly, the study investigated the ability of the classes to distinguish levels of work engagement, positive mental health, and health coping behaviours. Based on the transactional process of stress overload, the researcher used the stress overload scale (Amirkhan, 2012) as a measure to assess personal vulnerability (person's ability to

cope) to measure the experience of stress. This study may be important for its contribution to the work context – especially for the mining industry – to science, and practice (for I/O Psychologists and HRM practitioners) in that it provides person-centred stress vulnerability latent class profiles for blue-collar employees, and their behavioural outcomes. This information may in turn assist in the drawing up of stress management programmes targeted at those who are at the highest risk of ill-health to increase their functioning in terms of engagement and flourishing.

Method

Design

A cross-sectional survey design was implemented to achieve the aim of this study. It utilises data from one sample drawn from a population at one point in time (Field, 2013; Huysamen, 1994). It is advantageous because it is inexpensive, less time consuming, and does not require intensive labour. However, cross-sectional designs cannot demonstrate causality (Bhattacherjee, 2012; Field, 2013) and it is therefore impossible to conclude causality in this study. Data were subjected to structural equation modelling (SEM) analyses in Mplus (version 8.1) (Geiser, 2013; Kline, 2011; Muthén & Muthén, 1998-2017) and Multivariate analyses in SPPS (version 25) (Field, 2013; Pallant, 2010). SEM in Mplus was preferred because it enables the simultaneous analysis of both indicator and latent variables (Muthén & Muthén, 1998-2017).

Research participants and setting

The participants were blue-collar employees from a major mining company in the northern part of South Africa. The primary business of this company is to produce platinum and other platinum group metals (PGMs) in quantities determined by their occurrence in the ores

mined. It provides a service of supplying its customers with a range of mined and recycled products. Although the researcher had intended to include as large, representative and inclusive a number of employees as possible, a convenience sample of 237 employees who agreed to participate was reached. The sample included 188 (79.3%) male and 48 (20.3%) female participants. This male dominance of the sample is reflective of the mining sector workforce and the average age of 35 years was the most reported (mean= 35.66, sd=7.12), the youngest person was 20 years and the oldest was 57 years old. Of this sample, a percentage of 44.3 of the participants were married, 41.4% were single, and 10.1% were cohabiting. Additionally, none of the participants reported being divorced or widowed. Only participants with 100% response on the items of the SOS personal vulnerability to stress (the measure used for latent class analysis) were included in further analysis; therefore the subsequent sample size was 205.

Measuring instruments

Stress Overload Scale **(SOS; Amirkhan, 2012)** consists of 30 items making up two subscales, the latter mentioned being the Event Load (12 items) and Personal Vulnerability (12 items). Six of the items were fillers. The items were measured on a 5-point Likert-type frequency scale, ranging from 1 (not at all) to 5 (a lot). Sample items for the personal vulnerability included "*like things kept piling up?*", while those for the Event load subscale are exemplified by "*like things couldn't get worse?*". Among a community-based sample in the US, Amirkhan (2012) found the scale to have good psychometric properties and reported Cronbach's alpha coefficients of .93 (Personal Vulnerability) and .92 (Event Load). A South African study aimed at validating two versions (30-item long form, and 10-item short form), of the SOS in Setswana found good psychometric properties of the 10-item short form, with

Cronbach's alpha coefficients ranging from .36 to .47 for Event Load and .40 to .59 for Personal Vulnerability (Wilson et al., 2017).

<Figure 1 approximately here>

Mental Health Continuum Short Form **(MHC-SF; Keyes, 2006)** is made up of 14 items divided into three subscales, namely Emotional Well-Being (EWB; 3 items), Psychological Well-Being (PWB; 6 items) and Social Well-Being (SWB; 5 items). The MHC-SF items were adapted to assess employees' levels of positive mental health in the workplace. Items were measured on a 6-point Likert-type frequency scale, ranging from 1 (never) to 6 (everyday). Sample items are: *"interested in your work?"* for EWB, *"good at managing the responsibilities of your daily life at work?"* for PWB; and *"that people are basically good?"* for SWB. In South Africa, the scale has been used in a sample of Setswana-speaking adults (Khumalo et al., 2011). In this study, Khumalo et al. (2011) found Cronbach's alpha coefficients of the three subscales to be .79 (EWB), .78 (PWB), and .68 (SWB).

Health Behaviours as Coping **(Ingledew et al., 2013)** consists of 30 items used to assess the degree to which workers endorsed the listed coping health behaviours. The health behaviours are categorised into nine themes listed as follows: 1. Relaxation, 2. Eating and weight control, 3. Exercise and fitness, 4. Safety, 5. Sleep, 6. Caffeine use, 7. Alcohol use, 8. Smoking, and 9. General self-care. The items were measured on a 4-point Likert scale, ranging from 1 (I haven't been doing this at all) to 4 (I have been doing this a lot). Sample items include, for (1) Relaxation: *"I do things that I find refreshing, calming or relaxing"*, (2) Eating and Weight control: *"I eat foods that I know are not really good for me"*, (3) Exercise and Fitness: *"I do some specific physical activity (e.g. walk, run, cycle, swim workout)"*, (4) Safety: *"I take care to avoid accidents (e.g. while driving, in my leisure time)"*, (5) Sleep: *"I*

make sure to get regular sleep", (6) Caffeine use: *"I drink more caffeine (tea/coffee/cola) than I would normally"*, (7) Alcohol use: *"I use alcohol to help me cope"*, (8) Smoking: *"I smoke (cigarettes, cigars, pipe) to help me cope"*, and (9) General Self-Care: *"I am careful to look after myself"*. Ingledew et al. (2013) found a six-factor solution, explaining a cumulative variance of 47.8%. To the best of the researcher's knowledge, no study has employed health behaviours as coping mechanisms using Ingledew et al.'s (2013) measure in South Africa.

The Utrecht Work Engagement Scale **(UWES; Schaufeli, Bakker & Salanova, 2006)** was used to assess work engagement levels of the participants at work. It consists of eleven items organised to measure its three dimensions: Vigour (3 items), Dedication (3 items) and Absorption (3 items). Some researchers have found psychometric properties for this scale in support of the exclusion of the Absorption subscale (e.g., Brand-Labuschagne et al., 2012; González-Romá, Schaufeli, Bakker & Lloret 2006; Montgomery, Peeters, Schaufeli & Den Ouden 2003). Similarly, in the present study, only Vigour and Dedication subscales were included. The items were measured on a 7-point Likert-type frequency scale, ranging from 0 (never) to 6 (always). Sample items for Vigour include *"At my job, I feel strong and spirited"*, and for Dedication: "*I am proud of the work that I do"*. Schaufeli et al. (2006) found alpha coefficients of .88 for Vigour, .90 for Dedication, and .86 for Absorption. Among a sample of blue-collar workers in South Africa, Brand-Labuschagne et al. (2012) found Cronbach's alpha coefficients of .70 (Vigour) and .83 (Dedication).

Research procedure and ethical aspects

The researcher first obtained permission to conduct the research at the mining organisation in the Limpopo Province, South Africa, and was granted ethical clearance by a university-based Research Ethics Committee who awarded the clearance number NWU-HS-2016-0175. Recruitment of participants, who occupied positions of shift boss, rigger, LHD, PTVs,

electricians, boilermakers, and general workers (among others) was conducted through the distribution of flyers, and announcements during the company's safety meetings, tea breaks, and worker union gatherings. After informed written consent, which included the objectives, importance and outcomes envisioned for the study, the data collection procedure, ethical aspects of voluntary participation and anonymity, the participants were presented with a set of questionnaires which they completed in a supervised environment and returned after the completion. Participants who indicated that they wanted individual feedback, were given the feedback in writing. General distribution occurred in the form of flyers and addresses at convenient group meetings convened by the company and/or unions. A report with no specific employee names was also made available to the company HR management and the company's trade union leaders, indicating trends and making recommendations. Overall, the research ethical principles stipulated for (psychological) research with human beings by the South African Department of Health (2004, 2005), the International Union of Psychological Science [IUP] (2008), and the World Health Organisation (2001) were followed.

Statistical analysis

Multivariate analyses in SPPS (version 25) (Field, 2013; Pallant, 2010) and Structural Equation Modelling (SEM) in Mplus (version 8.1) (Byrne, 2012; Geiser, 2013; Muthén & Muthén, 1998-2017) were utilised to explore the dynamics among employee's personal vulnerability to stress, work engagement, positive mental health, and coping health behaviours.

Latent class analysis. Latent class analysis (Geiser, 2013; Rosato & Baer, 2012) based on item-level responses on the personal vulnerability to stress, and the mean score comparisons across the latent classes for the outcome variables was obtained. The responses of participants to the 11 of the 12 items of the personal vulnerability subscale of the Stress

Overload Scale were treated as categorical data and were used to identify classes of stress vulnerability among this group of employees. The following model fit indexes were used to identify the best solution: LRχ^2 (Likelihood Ratio Chi Square), BIC (Bayesian Information Criterion), SSABIC (Sample Size Adjusted BIC), AIC (Akike Information Criterion), CAIC (Consistent AIC), LMR-LRT (Lo-Mendall-Rubin Adjusted Likelihood Ratio Test), and BLTR (Bootstrapped Likelihood Ratio Test). For good fit, BIC, SSABIC, AIC and CAIC were expected to be lower, while the LRχ^2 should be lower and not significant but it is expected that the LMR-LRT will be statistically significant. (Nylund, Asparouhov, & Muthen, 2007). According to Nylund et al. (2007), the best fit indexes to use are the Lo-Mendel-Rubin adjusted log likelihood ratio and the BIC descriptive fit index (Schwarz, 1978) for the purposes of exploring the best solution. One-way analysis of variance (ANOVA) was then conducted to explore mean score differences across the latent classes (Field, 2013).

ANOVA. The analysis of variance (ANOVA) is particularly powerful for the analysis of univariate multiple group comparisons of outcome variable mean scores. It allows the researcher to compare more than two independent groups. It was therefore used to compare the means of the latent groups emerging from LCA in order to determine whether these groups were significantly different from each other on the basis of vigour, dedication, emotional well-being, psychological well-being, social well-being, eating and weight control, exercise and fitness, safety, sleep, caffeine use, alcohol use, smoking, and general self-care. The Tukey post hoc tests were used for investigating in-between group differences (Field, 2013; Pallant, 2010).

Results

Latent class analysis

Table 1 shows the fit indices for personal vulnerability to stress, represented by 11 items of the SOS subscale. Although the four-class solution did not demonstrate the strongest fit (with the five-class model being better), it was chosen on the basis of best interpretation. The four-class solution was characterised by Entropy=.915, AIC=7045, BIC=7198, and SSA BIC=6985, which are still good indices.

< Table 1 approximately here >

< Table 2 approximately here >

Class 1 (31.7%) was named *Moderate personal vulnerability to stress*; Class 2 (50.5%) was named *Low personal vulnerability to stress*; Class 3 (13.1%) was named *High personal vulnerability to stress*; and Class 4 (4.8%) was named *Undifferentiated profile of personal vulnerability to stress*. A schematic presentation of the profiles characterising these latent classes is presented in Figure 2.

<Figure 2 approximately here>

In analysing the item-level scores of indicators of personal vulnerability, the researcher is working with a cut off score of 3.5 as a demarcation of high and low scores. The results indicate that all the items in Class 3 have high scores, while Class 1 and 2 consistently have low scores. The undifferentiated class 4 item-level scores consist of high, low and moderate scores. As seen in Table 3, all indicator variables show significant differences across the four groups.

<Table 3 approximately here>

The Classes' mean scores on Vigour, Dedication, Emotional, Psychological, and Social well-being were computed and compared using separate analyses of variance (ANOVA) as displayed in Table 4.

Work engagement and positive mental health group comparisons. The in-between group difference for Vigour was shown by F (3) = 5.366, p=.001; for Dedication by F (3) = 5.871, p=.001; and for Psychological well-being by F (3) = 3.172, p=.026. Those which were not significant were Emotional well-being, F (3) = .131, p=.941; and Social well-being, F (3) = 1.110, p=.346.

Vigour. The average personal vulnerability to stress group, Class 1 (mean= 13.11, SD= 4.247) reported higher levels of Vigour when compared with low personal vulnerability to stress, Class 2 (mean= 10.73, SD= 4.367) as shown by p=.007, 95% CI: [0.50 4.26]. No other significant differences were found between the classes; only Class 1 and 2 had significant differences.

Dedication. The average personal vulnerability to stress group, Class 1 (mean= 13.38, SD= 4.251) had higher levels of Dedication when compared with low personal vulnerability to stress, Class 2 (mean= 11.14, SD= 4.576) as shown by p=.013, 95% CI: [0.35 4.13]. Low personal vulnerability to stress group, Class 2 (mean= 11.14, SD= 4.576) scored significantly lower on Dedication when compared with the high personal vulnerability to stress group, Class 3 (mean= 13.76, S= 4.630) as shown by p= .048, 95% CI: [-5.23 -.01]. High stress vulnerability group, Class 3 (mean= 13.76, S= 4.630) performed significantly higher when compared with Class 4 (mean=9.00, SD=4.989) as shown by p= .027, 95% CI [0.39 9.13]. Class 4 (mean=9.00, SD=4.989) performed significantly lower when compared with Class 1 (mean= 13.38, SD= 4.251) as shown by p=. 025, 95% CI [-8.36 -.39].

Psychological well-being. The low personal vulnerability to stress, Class 2 (mean= 16.86, SD= 8.595) performed significantly lower on Psychological well-being when compared with high personal vulnerability to stress group, Class 3 (mean=22.0, SD= 10.112), as shown by p=.046, 90% CI [-10.21 -0.06]. No other significances were reported between the classes.

Emotional and Social well-being. There are no specific pair showing any significant difference between the four classes or Emotional and Social well-being.

<Table 4 approximately here>

Coping health behaviours. Table 5 shows the descriptive statistics of the eight coping health behaviours. The mean scores show that the most frequently used coping health behaviours are eating and weight control (mean=17.33, SD= 4.569) and exercising and keeping fit (mean=14.08, SD= 3.362). This is followed by general self-care (mean= 8.16, SD= 2.410), and alcohol use (mean= 7.53, SD= 3.140). The least frequently used are sleep (mean= 2.14, SD= 1.064) and safety (mean= 2.09, SD= 1.005). In-between group differences for the eight coping health behaviours were as follows: self-care was shown by F (3) = 9.596, p=.000; for eating by F (3) = 12.360, p=.000; for exercise and fitness by F (3) = 10.464, p=.0000, for sleep by F (3) = 7.846, p= .000, for caffeine use by F (3) = 6.066, p=.001, for alcohol use by F (3) = 5.062, P=.002; for smoking by F (3) = 9.394, p=.000 and for safety by F (3) = 10.588.

<Table 5 approximately here>

Self-care. Results show that self-care differed across the latent classes with some being higher than others. The average personal vulnerability to stress group, Class 1 (mean= 8.64, SD= 2.244) was higher than the moderate personal vulnerability to stress, Class 2

(mean= 7.56, SD= 2.291) as shown by p= .019, 95% CI [0.13 2.03]). The moderate personal vulnerability to stress, Class 2 (mean=7.56, SD= 2.291) was lower when compared to the high personal vulnerability to stress group, Class 3 (mean= 10.00, SD= 2.106) as shown by p<.000, 95% CI [-3.77 -1.11]**.** Class 3 (mean= 10.00, SD= 2.106) scored higher than the undifferentiated Class 4 (mean= 6.90, SD= 2.514) as shown by p=.002, 95% CI [0.89 5.31] So, the low personal vulnerability to stress Class 2 seems to use less of self-care as a coping health behaviour as compared to the average group and high personal vulnerability group Class 3. The at-high-risk group also uses more of this coping health behaviour than the undifferentiated group.

Eating and weight control. The endorsement of eating and weight control as a coping health behaviour differed between groups. Class 1, average personal vulnerability to stress group (mean= 18.29, SD= 3.563), performed higher than Class 2 of low personal vulnerability to stress (mean= 16.00, SD= 4.505) as shown by p=.006, [95% CI .50 4.07]. The low personal vulnerability to stress Class 2 on the other hand (mean= 16.00, SD= 4.505) when compared to Class 3 (mean= 21.59, SD= 4.905) performed lowest as shown by p=.010, 95% CI [-6.03 -.58] when it comes to this coping behaviour. Class 3 (mean= 21.59, SD= 4.905) when compared to class 4 (mean= 15.80, SD= 2.573) still perform higher when it comes to eating and weight control, as shown by p<.000, 95% CI [-8.16 -3.03]. High personal vulnerability to stress group (Class 3) scored favoured eating and weight control as a health behaviour to cope. Although they are vulnerable to stress, they adopt positive coping health behaviours in the current study.

Exercise and fitness. Class 1, average personal vulnerability to stress group (mean= 14.78, SD= 3.147), performed the highest compared to the low personal vulnerability to stress, Class 2 (13.02, SD= 3.098) with p= .004, [95% CI .43 3.09]. The moderate personal vulnerability to stress, Class 2 (mean= 13.02, SD= 3.098), performed the lowest when

compared with Class 3 (mean= 16.62, SD= 2.899) on the use of this coping health behaviour (p<.000, 95% CI [-5.39 -1.80]). Class 3, (high vulnerability and class 1), the average stress vulnerability group made the most use of exercise and fitness as a coping health behaviour. Class 2 (low vulnerability) and Class 4, the undifferentiated class used this component the least.

Sleep. Class 1, average personal vulnerability to stress group (mean= 2.31, SD= 1.110) p=.030, 95% CI [.03 .89], performed higher than the moderate personal vulnerability to stress, Class 2 (mean= 1.84, SD= .883). Class 2 (mean= 1.84, SD= .883) p=.025, 95% CI [1.22 -.06]) when compared to high personal vulnerability to stress group, Class 3 (mean= 2.48, SD= 1.369) still performed less superior. Class 2 (mean= 13.02, SD= 3.098) p=.001, 95% CI [-2.24 -.47] performed superior on sleep when compared to Class 4 (mean= 3.20, SD= .919).

Caffeine usage. The moderate personal vulnerability to stress, Class 2 (mean= 5.41, SD= 1.537) p<.000, 95% CI [-2.53 -.56] did not endorse much of this health behaviour when compared to high personal vulnerability to stress group, Class 3 (mean= 6.95, SD= 1.214). None of the other classes endorsed this health behaviour as coping.

***Alcohol use*.** The moderate personal vulnerability to stress, Class 2 (mean= 6.96, SD= 2.347) p=.008, 95% CI [-3.82 -.41] reported using less alcohol compared to the high personal vulnerability to stress group, Class 3 (mean= 9.07, SD= 4.574). Class 2 (mean= 6.96, SD= 2.347) p= .047, 95% CI [-5.25 -.02] used more alcohol than the undifferentiated group, Class 4 (mean= 9.60, SD= 4.033).

Smoking. Class 1, average personal vulnerability to stress group (mean= 5.98, SD= 3.960) p=.007, 95% CI [.29 2.59], used smoking more than Class 2, the low stress vulnerability group (mean= 4.54, SD= 2.195). Class 2, (mean= 4.54, SD= 2.195) p= .005,

95% CI [-3.59 -.48], reported the low use of this health behaviour when compared to high personal vulnerability to stress group, while Class 3 (mean=6.58, SD= 3.797). Class 2 (mean= 4.54, SD= 2.195) p<.000, 95% CI [-6.00 -1.31] performed superior when compared with Class 4 (mean= 8.20, SD= 3.084).

Safety. Class 1 (mean= 2.45, SD= 1.083) p<.000, 95% CI [.33 1.11] reported high on the use of this coping behaviour when compared to Class 2, the low stress vulnerability group (mean= 1.74, SD= .757). Class 2 still performed low when compared to high personal vulnerability to stress group, Class 3 (mean= 2.59, SD= 1.118) p<.000, 95% CI [-1.38 -.33].

<Table 6 approximately here> Group comparison of the coping health behaviours.

Discussion

The main aim of this study was to investigate the consequences or outcomes of work-related vulnerability to stress among blue-collar workers and its interplay with dimensions of well-being. Determining stress vulnerability profiles of blue-collar employees using latent class analysis was the first step towards achieved this aim. Secondly, the study investigated the ability of the classes to distinguish levels of work engagement (Vigour and Dedication), flourishing (Emotional, Psychological, and Social well-being), and the use of health behaviours as coping mechanisms (exercise and fitness, self-care, eating, weight control, sleep, smoking, alcohol usage).

Work engagement, positive mental health and health coping behaviours are good indicators of work-based psychosocial functioning. For example, positive mental health has been found as a good source of satisfaction, happiness and fulfilment. According to Bono et al. (2012), flourishing employees prosper and learn, and are happy, engaged, self-motivated, and successful. Work engagement is also important in that it contributes to the survival of

modern organisations (Bakker & Schaufeli, 2014). Employees who are engaged want to contribute, have a sense of belonging, defend the organisation, work hard and are not interested in moving to other employers. According to Sacks (2017), non-engaged employees create a gap between individuals' efforts and their organisational effectiveness, and this has a negative impact on the organisation's financial performance (Saks, 2017).

Four latent classes emerged from participants' responses to the SOS personal vulnerability to stress scale of Amirkahn (2011). Analysis revealed differential effects for the Personal Vulnerability and Event Load scales, even though they themselves inter-correlated (r = .53). Class 1, named *moderate personal vulnerability to stress group* was made up of 31.7% of the sample. Class 2, named *low personal vulnerability to stress group consisted of* 50.5%, Class 3, *high personal vulnerability to stress group accounted for* 13.1% of the sample, while Class 4, the *undifferentiated profile of personal vulnerability to stress group* made up the remaining 4.8%.

Class 1: ***Moderate personal vulnerability to stress***. The moderate stress vulnerability group reported high levels of engagement as represented by Vigour and Dedication. This group also reported high levels of Psychological well-being, one of the components of positive mental health. This finding could be viewed as an element of eustress (i.e., positive stress) which allows people to thrive even in stressful situations or events. Positive stress research had supported the notion of positive stress experience even in demanding contexts, which leads to or further supports work engagement. Nelson and Simmons (2003) postulated in a chapter review of psychology and work stress theories that when some employees are exposed to work stressors, they do not show signs of burnout, but instead display heightened levels of pleasure in dealing with these stressors. In another review chapter, Ingram and Luxton (2005) opined that even though there are a number of events that are undeniably appraised as stressful by majority of people, individual differences may determine the degree

of stress that is perceived and experienced. The study of Fleige (2017), grounded in the JD-R model, reported that job resources relate to eustress and its positive outcomes more than job demands. Employees associated eustress with positive emotional, mental, physical and behavioural outcomes, which are expected to have positive long-term effects on health and well-being. The Person Environment fit (P-E; Law et al., 1996), one of the theories of stress and well-being, may provide explanations of these results since in this theory the match between environmental challenges and individual's ability to respond positively to the challenges is paramount to well-being. Applying this principle in the current study means that blue-collar employees who reported moderate stress vulnerability had a perfect fit based on P-E perspective, seeing that they functioned well in terms of both dimensions of work engagement and positive mental health. The current study revealed that in terms of adopting health behaviours as coping, this group performed well on general self-care, eating and weight control, exercise and fitness, as well as sleep. The study by Kaiseler, Queirós, Passos and Sousa (2014) found that employees who were in control of their identified stressor, employed more positive and active coping mechanisms– self-care, eating and exercise being considered by the researcher to fall within this category of active coping health behaviours. In a census of 1420 adults taken by the American Psychological Association, eating was found to be one of the health behaviours employed (American Psychological Association, 2013). However, caution should be taken due to the negative effects of overeating (Arnow, Kenardy, & Agras, 1995) that has the potential to result in negative health outcomes which would be detrimental even for organisations, one of the obvious outcomes being obesity. Sleep as a health behaviour can yield positive results and it is not surprising that this group of employees who function positively in terms of work engagement and psychological well-being utilised sleep to cope. Lack of sleep has been reported to provide negative outcomes including distress, drug abuse, increased mortality and morbidity, and a reduction in overall

wellness, performance and productivity (Costa, Accattoli, Garbarino, Magnavita, & Roscelli, 2013; Garbarino, Nobili, & Costa, 2014).

Class 2: ***Low personal vulnerability to stress***. This group reported high scores on the Dedication dimension of work engagement, but low scores on the Psychological well-being dimension of the mental health continuum. Similarly, when employees had high control over their identified stressor they were more likely to experience high levels of engagement in a study among police recruits (Kaiseler et al., 2014). According to the stress and coping theoretical framework (Lazarus, & Folkman, 1984), when individuals experience a high sense of control over an event, they are likely to perceive the experience as challenging. These findings reinforce the view that perceptions of control (less vulnerability) are associated with positive outcomes across a variety of settings (Thompson, & Spacapan, 1991). In the current study, blue-collar employees reported low psychological well-being with low stress, and this could be ascribed to the lack of fit.

Person-environment fit (Law et al., 1996), one of the theoretical explanations for the interaction of stress and well-being, postulates that an individual may wish to have greater challenge at work to function optimally, and that when they reach this, they thrive. The inverse is also true in that if they experience less of what they wish to have, they tend to do less well. The ideal scenario, which might not be what the current sample has, is a situation where there is a strong match between what employees want and what they receive. For health behaviours as coping, employees adopted self-care and exercise in the current study. It seems that low stress and high engagement are linked to positive coping strategies. Kaiseler et al. (2014) found police recruits tend to employ more active coping mechanisms and exercise may fall under these. Rothmann, Jorgensen and Hill (2011) concluded that higher engagement among police officers was predicted by the use of approach coping strategies including problem-focused coping, seeking social support, and turning to religion.

MacFarlane and Montgomery (2010) maintained that exercise creates resources that reduce stressful encounters in a theoretical synthesis of Loehr's theories on stress and physical exercise as well as Folkman and Lazarus' model of cognitive appraisal. In a sample of US residents that examined links between daily stress levels and health behaviours, Krueger and Chang (2008) found that when participants experienced low stress, the use of exercise to cope was high. Similarly, a survey of working physicians found that roughly 30% of the physicians used exercise to reduce work-related stress (Lemaire, & Wallace, 2010).

Class 3: ***High personal vulnerability to stress***. This group experienced low levels of dedication but had high levels of psychological well-being. This finding can be compared to that of Jojo (2016) among South African police officers, in which a negative relationship between work stress and job engagement was reported. Similarly, findings from a sample of Spanish employees (Orgambídez-Ramos, Borrego-Alés, & Mendoza-Sierra, 2014) found that the experience of stress at work was negatively correlated to work engagement. These results are contrary to what Boshoff et al. (2014) found in the study among black South African teachers. In their study, a significant portion (28%) of these participants described themselves as flourishing, and ability to maintain a relatively high level of mental health, despite experiencing high occupational stress, which could be a characteristic of resilient individuals, while only 1.5% of the group described themselves as languishing. Flourishing in This is the.

When it came to health behaviours, this group reported adopting eating, exercise and fitness, self-care and alcohol use as coping health behaviours. A survey among physicians found that roughly 30% of them used physical exercise as a direct means to reduce work-related stress (Lemaire, & Wallace, 2010). Krueger and Chang (2008) stated that in a sample of US residents data showed that when participants experienced more stress, their use of alcohol consumption and cigarette smoking also became high. A cross-sectional study of 12,110 individuals in 26 worksites found work stress to be associated with poorer health

behaviours, including higher levels of smoking, less exercise, and poorer diet (Ng, & Jeffrey, 2003). In a census of 1420 adults taken by the American Psychological Association (2013), among the top answers to the question of how they cope with stress were exercising, drinking alcohol, and smoking. A focus group study among low socio-economic status individuals in New York (Kaplan, Madden, Mijanovich, & Purcaro, 2013) found that all participants recognise overeating, under-eating, smoking and drinking as unhealthy ways to cope with their stress but said that their "willpower to resist bad health behaviours was depleted'' after a long and stressful day. Negative health behaviours such as overeating, alcohol consumption and smoking should be managed effectively, even in relation to the current sample since they will have greater negative impact on well-being.

Class 4: *Undifferentiated vulnerability to stress*. The undifferentiated class performed the lowest on Vigour and Dedication as engagement components. This class reported high levels of psychological well-being. On adopting coping health behaviours, this class adopted more exercise and alcohol use. In a census of 1420 adults taken by the American Psychological Association, among the top answers to the question of how they cope with stress were exercising, drinking alcohol, and smoking (American Psychological Association, 2013). A review of 46 studies examining health behaviours and work stress found consistent relationships only with increased alcohol consumption, particularly among men (Siegrist, & Rödel, 2006).

Summary and conclusion

When it comes to engaging blue-collar employees in South African mines, it is important to consider the dynamics that occur when stress vulnerability is high. Of the four classes of Amirkhan's stress overload model, the majority of the mining blue-collar employees fell under the moderate stress vulnerability class. High stress vulnerability was related to negative

outcomes including low work engagement levels and adopting some negative health behaviours. However, low to moderate stress susceptibility is often good as it may act as a motivating factor to those involved and is positively linked to work engagement. Overall, those with little stress vulnerability were dedicated to their work but did not perform superiorly in terms of psychological well-being – an indicator of positive mental health. While the class that was highly susceptible to stress reported low work engagement levels in terms of Vigour and Dedication but tested as high functioning in terms of positive mental health when considering Psychological well-being. Studies have pointed to the importance of dedication as a positive work attribute and which any organisation can benefit from in terms of high performance; therefore, the absence or lack of this component is a worrying factor for the mining industry. A low to moderate stress vulnerability class was associated with health behaviours which are deemed positive in nature, such as exercise and self-care. Although high stress vulnerability was associated with some positive health behaviours, it also included the adoption of alcohol consumption which is deemed to be one of the negative health behaviours.

Limitations. Although there is significance in the findings of this study, they are to be interpreted in the context of a few limitations. Firstly, data were gathered at only one operation of a major mining company in South Africa and did not cut across all their various operations. This had a significant influence on the demographic composition of the sample and, therefore, the generalisability and the level of cross-cultural comparison of the results was limited. Future research can extend the sample to include blue-collar employees from other operations or even extent to other similar companies in South Africa to gain a better and detailed understanding of stress vulnerability and how it influences positive outcomes at work. The research design used in the study provides for further limitations of the study in that quantitative surveys were used to gather information in a self-report fashion.

Implications and recommendations. Since different employees showed different levels of vulnerability to stress, these stress vulnerability profiles need to be considered when drawing up wellness programmes for mining companies as to effectively address problem areas. It would seem advantageous to create a vehicle through wellness interventions to allow mining blue-collar employees to develop resources that will allow their susceptibility to stress to remain moderate. It would also be beneficial for industrial psychologists who are concerned with managing or improving work engagement to teach blue-collar employees about the importance of adopting positive health behaviours which may lead to fewer psychological health problems. The study provides an opportunity for an investigation into psychological well-being within the context of work stress and coping health behaviours at work. Future research should expand into the interaction that stress and coping health behaviours has on engagement and flourishing, especially for employees in vulnerable contexts such as mining.

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Table 1

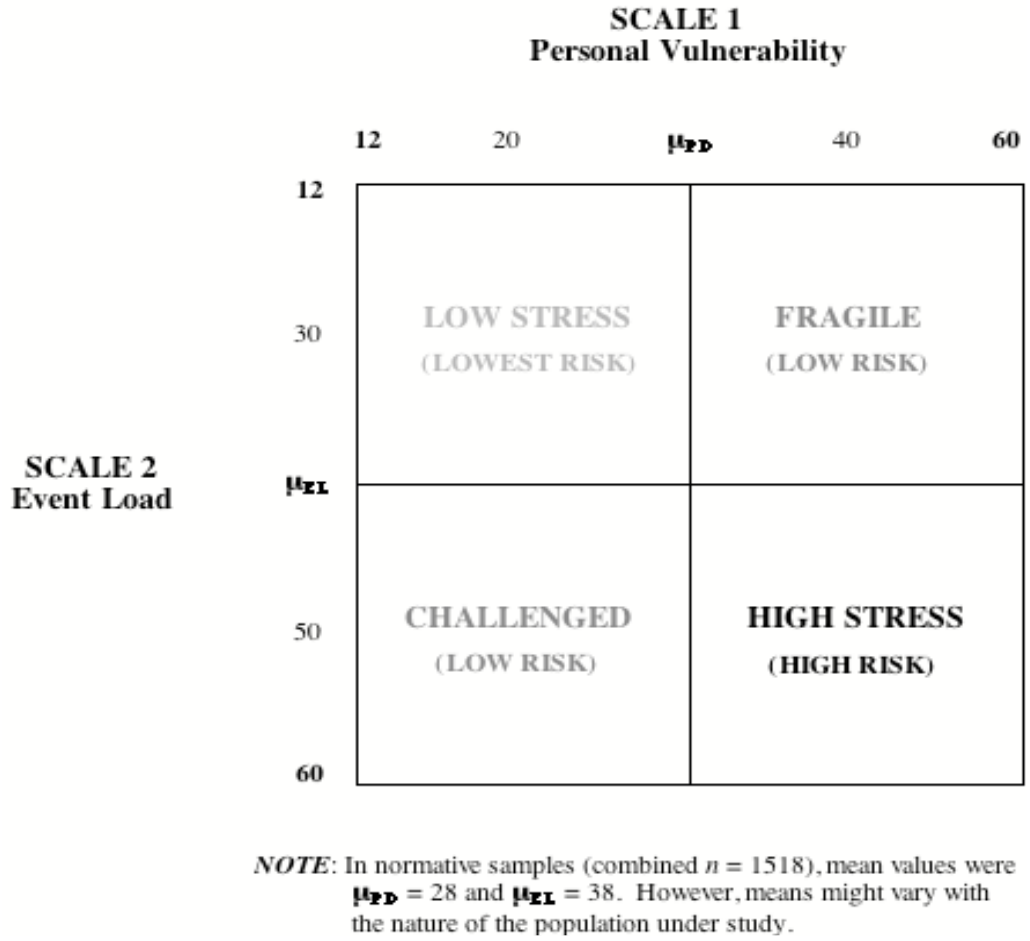
Latent class solution model fit indices for personal vulnerability to stress (N=205)

Model	Log likelihood	AIC	BIC	SSA BIC	Entropy	L-M-R adjusted LRT		Percentage				
						Estimate	p-value	Class 1	Class 2	Class 3	Class 4	Class 5
1 class	-3966	7977	8050	7980	.	.	.	100	.	.	.	.
2 classes	-3599	7266	7379	7272	.924	723.285	.005	66.3	33.7	.	.	.
3 classes	-3476	7045	7198	7052	.915	241.374	.238	52.0	35.3	12.6	.	.
4 classes	**-3430**	**6976**	**7169**	**6985**	**.931**	**91.843**	**.129**	**31.7**	**50.5**	**13.1**	**4.8**	**.**
5 classes	-3383	6907	7139	6917	.931	91.947	.165	40.8	13.4	27.8	4.9	13.2

Table 2

Classification probabilities of the most likely latent class membership (column) by latent class (row)

Classes	Class 1 (%)	Class 2 (%)	Class 3 (%)	Class 4 (%)
1	**.935**	.057	.004	.005
2	.030	**.970**	.000	.000
3	.001	.000	**.998**	.002
4	.005	.000	.007	**.988**



NOTE: In normative samples (combined $n = 1518$), mean values were $\mu_{PD} = 28$ and $\mu_{EL} = 38$. However, means might vary with the nature of the population under study.

Figure 1. Categorical scoring of the stress overload scale (Amirkhan, 2012, p. 7).

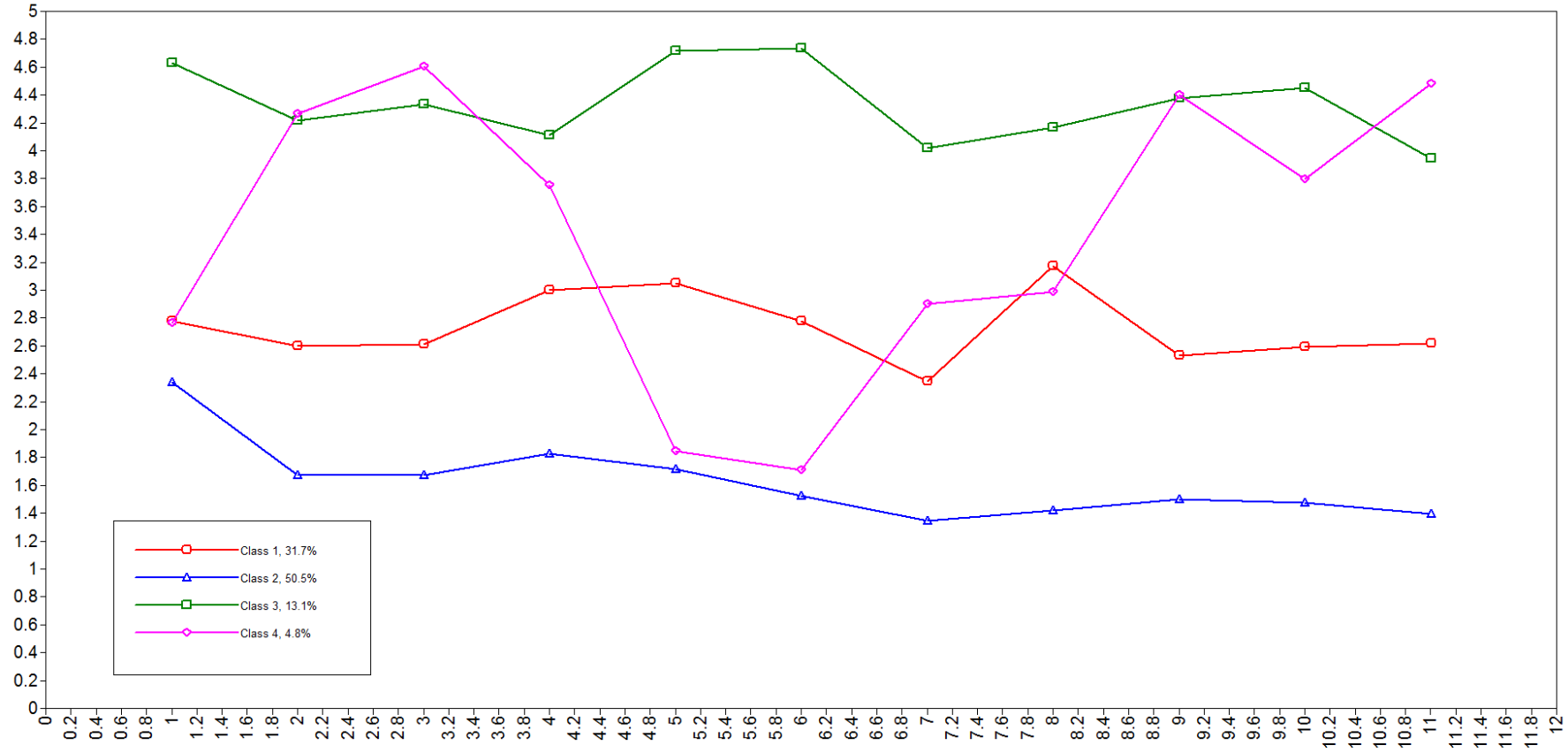


Figure 2. Four-class solution for personal vulnerability to stress (N=205)

Table 3

Item-level mean scores of the personal vulnerability scale per latent class (N=205)

Variable	Class 1 (Average)		Class 2 (Low)		Class 3 (High)		Class 4 (Undifferentiated)		F-ratio	df	P
	Mean	SD	Mean	SD	Mean	SD	Mean	SD			
Inadequate	2.77	1.050	2.34	1.085	**4.63**	.629	2.80	1.317	34.890	3	<.000
No sense of getting ahead	2.61	1.217	1.67	.908	**4.22**	1.121	**4.20**	1.033	54.629	3	<.000
That the odds were against you	2.59	1.218	1.68	.968	**4.33**	.920	**4.60**	.516	63.926	3	<.000
Like you could not cope	2.97	1.333	1.85	.822	**4.11**	1.340	**3.80**	1.687	37.980	3	<.000
Like nothing was going right	3.08	1.301	1.70	.891	**4.70**	.724	1.90	1.197	69.238	3	<.000
Powerless	2.80	1.198	1.52	.607	**4.74**	.447	1.70	.823	116.672	3	<.000
Like your life was out of control	2.34	1.237	1.36	.749	**4.00**	1.387	2.90	1.449	49.609	3	<.000
Like asking what else could go wrong	3.23	1.178	1.39	.769	**4.15**	1.231	3.00	1.563	75.346	3	<.000
Like things could not get worse	2.52	1.054	1.51	.903	**4.37**	.926	**4.40**	.699	84.339	3	<.000
Like there was no escape	2.61	1.268	1.46	.800	**4.44**	.974	**3.80**	1.398	72.251	3	<.000
Like just giving up	2.63	1.254	1.39	.660	**3.93**	1.439	**4.50**	1.269	66.810	3	<.000

Table 4

Standardised mean scores of work engagement and positive mental health, per latent class (N=205)

Latent class 1 (31.7%): Average personal vulnerability to stress						
Variable	Mean	SD	Min	Max	Kurtosis	Skewness
Vigour	13.11	4.247	3	18	-0.587	-0.533
Dedication	13.38	4.251	2	18	0.224	-0.953
Emotional	10.20	4.449	0	18	-0.605	-0.524
Social	14.12	6.985	0	26	-0.764	-0.307
Psychological	19.81	7.954	0	30	-0.179	-0.640
Latent class 2 (50.5%): Low personal vulnerability to stress						
Variable	Mean	SD	Min	Max	Kurtosis	Skewness
Vigour	10.73	4.367	0	18	0.198	-0.275
Dedication	11.14	4.576	0	18	-0.095	0.212
Emotional	9.75	4.742	0	16	-0.644	-0.477
Social	14.27	6.936	0	26	-0.730	-0.100
Psychological	16.86	8.595	0	32	-0.855	-0.040
Latent class 3 (13.1%): High personal vulnerability to stress						
Variable	Mean	SD	Min	Max	Kurtosis	Skewness
Vigour	12.92	5.283	1	18	-0.460	-0.801
Dedication	13.76	4.630	2	18	1.091	-1.314
Emotional	10.15	5.612	0	18	-0.899	-0.674
Social	16.81	8.400	1	30	-0.953	-0.495
Psychological	22.00	10.112	0	36	0.086	-1.042
Latent class 4 (4.8%): undifferentiated profile of personal vulnerability to stress						
Variable	Mean	SD	Min	Max	Kurtosis	Skewness
Vigour	8.75	6.018	1	18	-0.856	0.018
Dedication	9.00	4.989	1	15	-0.984	-0.477
Emotional	9.88	5.330	4	18	-1.669	0.538
Social	16.11	7.688	2	27	0.129	-0.342
Psychological	21.00	9.000	6	30	-0.627	-0.695

Table 5

Coping health behaviours descriptive statistics for the whole sample (N=205)

Variable	Mean	SD	Min	Max	Skewness	Kurtosis
General self-care	8.16	2.410	3	12	-.164	-.780
Eating and weight control	17.33	4.569	7	28	.343	-.314
Exercise and fitness	14.08	3.362	5	20	-.239	-.011
Sleep	2.14	1.084	1	4	.502	-1.046
Caffeine use	5.79	1.681	2	8	-.292	-.736
Alcohol use	7.53	3.140	4	16	.822	.139
Smoking	5.43	2.900	3	12	.811	-.674
Safety	2.09	1.005	1	4	.521	-.826

Table 6

Group comparison of the coping health behaviours

Variable	Class 1		Class 2		Class 3		Class 4				
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	F	df	p
Self-care	8.64	2.244	7.56	2.291	10.00	2.106	6.90	2.514	9.596	3	.000
Eating	18.29	3.563	16.00	4.505	21.59	4.905	15.80	2.573	12.360	3	.000
Exercise	14.78	3.147	13.02	3.098	16.62	2.899	13.89	4.167	10.464	3	.000
Sleep	2.31	1.110	1.84	.883	2.48	1.369	3.20	.919	7.846	3	.000
Caffeine use	5.97	1.891	5.41	1.537	6.95	1.214	6.10	1.449	6.066	3	.001
Alcohol use	7.45	3.104	6.96	2.347	9.07	4.574	9.60	4.033	5.062	3	.002
Smoking	5.98	3.960	4.54	2.195	6.58	3.797	8.20	3.084	9.394	3	.000
Safety	2.45	1.083	1.74	.757	2.59	1.118	2.11	1.167	10.588	3	.000

Chapter 4

Critical self-reflection

This dissertation was completed as part of the requirements for the degree Master of Arts in Human Resource Management. The subject of flourishing for employees in the lowest level of the organisational hierarchy was what drove me to undertake and complete this study. I am passionate about well-being at work as the benefit of it goes beyond an individual but to the larger organisation and economy. I am very grateful for the opportunity to have worked under the supervision of Prof Tumi Khumalo. What we sought to investigate in this study was achieved since we managed to identify work and personal factors which have an impact on positive functioning, clustered employees and profiled them according to their vulnerability to stress and studied the interaction with positive constructs. This information can inform well-being initiatives at work. Given that flourishing is said to be an important human capital for organisations and has benefits such as low absenteeism rate, increased success in work tasks, I was intrigued to find out how a sample of blue-collar employees is functioning considering the lack of studies on these employees within the challenging environments they are subjected to. It gave me a sense of meaning to know that I gave a voice to somewhat an ignored group and contributed some sense of direction to organisations employing them to increase positive functioning.

The question that needed to be answered was simply what is it at work and of individuals that affects their levels of flourishing and how does the interaction with other positive constructs look like in stressful work contexts. The study aimed to determine firstly, the role that socio-demographics and work-related factors plays on reported levels of work engagement and flourishing and secondly to profile blue-collar employees based on the vulnerability to stress overload and further compare these groups with regards to coping health behaviours adopted, engagement and positive mental health levels. Thirdly to determine the relationship that flourishing has on work engagement. For each of the two studies structural equation modelling in Mplus was

used, in addition to Multivariate analyses in SPPS for study 2, to test the relationships between the measured constructs (Field, 2013; Kline, 2011; Muthén & Muthén, 1998; 2017; Pallant, 2010). In terms of the first objective, the findings indicated that male gender, young age, social support at work, authority to make decisions were significantly associated with all three positive mental health dimensions (i.e., emotional, psychological and social) of Keyes' model of positive mental health (Keyes, 2002; 2007). It was not surprising that we found male gender to contribute to superior functioning as indicated by positive mental health, since the mining environments are male dominated. A profound finding was social support being the only work-related factor significantly associated with vigour and dedication as well as emotional, psychological and social well-being. It was as intriguing as it was unexpected to find that authority to make decisions, work experience and hours of work did not show any significant impact on work engagement although some of the previous studies reported an influence of these factors on well-being. Flourishing had some influence on work engagement levels. Emotional wellbeing, a component of flourishing was significantly related to work engagement. Emotional well-being had a positive significant association with Vigour (0.832, p<.000 [90% CI, 0.534 1.131]), and Dedication (0.948, p<.000 [90% CI: 0.655 1.240] respectively. Mining blue-collar employees need to be supported by their peers and supervisors - they are reliant on their team to perform their work duties successfully.

Although we had anticipated to have three differential groups of stress vulnerability, namely the low, medium and high class, results of the second study revealed four latent groups (Class 1: moderate; Class 2: low; Class 3: high and Class 4: undifferentiated group), which were represented by Entropy=.915, AIC=7045, BIC=7198, and SSA BIC=6985, were good indices and supported Amirkhan's stress overload model. Majority of the sample fell within Class 2. Class 1 showed high levels of Vigour while Class 2 reported high levels of Dedication, however, the two Classes performed lowest on dimensions of positive mental health, with Class 2 showing low levels of Psychological well-being than Class 1. Class 3 experienced high levels of Psychological well-being but low work engagement in terms of Vigour and Dedication. Interestingly, medium to high stress

vulnerability supported one of the positive mental health constructs, Psychological well-being. These results were intriguing for the researcher in that Psychological well-being was high when stress vulnerability was at its highest and low when stress vulnerability was at its lowest, which partially would mean, other blue-colars, when faced with stress they flourish than the opposite. Engagement was high at the lowest level of vulnerability. Generally, across the four groups, the most adopted health behaviour was eating followed by exercise and fitness. Class 3 reported adopting eating as well as exercise and fitness more than Class 2. Class 1 reported the use of self-care as a coping health behaviour when compared with Class 2. Class 3 is a relatively significant group when it comes to the use of alcohol as a coping health behaviour. This is something that organisations employing this sample should address, since alcohol is a maladaptive way of coping and will affect the livelihood of these employees.

Having conducted this study, I believe that it remains significant to consider the importance of workplace flourishing and ways through which companies can leverage from it. Understanding what influences this experience at work remains at the heart of driving positive functioning at work. This does not take place in the absence of factors which might counter this positive experience. I felt and still maintain that flourishing does not take place in the absence of negative factors such as stress. However, having a balance between the negative and leveraging on the positive will have a positive result. Practically, I believe this means not using a blanket approach to managing well-being at work but understanding the implications of what is at work which affects employees whether negatively or positively then managing such appropriately. Knowing which groups are at the most risk of ill-health and allow for the implementation of remedial actions is also fundamental and this I believe should be a continuous process since workplace dynamics change from time to time. It would be impossible to address the unknown and this study made an effort to fill this research gap for the current sample. Apart from addressing the negative, is to commend areas in which organisations employing blue collars are doing good. On a positive note these blue-collar employees did not experience high stress vulnerability, the majority of them fell under the Class 2

named the low vulnerability to stress group, represented by 50.5 % of the population. I am convinced that moderate stress is indeed beneficial in the positive functioning of these employees, seeing that it was linked with engagement and a component of flourishing. It was not surprising however, to find that male employees functioned superior in terms of flourishing since mining sector is male dominated. Also, how long hours of work subjected employees to low emotional well-being was expected. It is such working conditions that make this group of employees the most vulnerable given that majority of them are working underground in any given work shift. All in all, I believe that mining organisations are making efforts in the well-being of their blue-collars and if they continue to do more, they will have a majority of their workforce flourishing and adding meaningful value to their business success.

To conclude, this has been a great journey for me. Other times were more challenging while some gave me a sense of meaning. I have gained a lot of insight into the constructs of interest and the guidance from research expert allowed me to grow tremendously in terms of my thought process and writing. This work is the beginning of great things and fascinating information that can be gained through more research work in these work contexts. I believe that there remains much more to be discovered in the future.

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