

WORK-RELATED WELLNESS OF INFORMATION
TECHNOLOGY PROFESSIONALS IN SOUTH AFRICA

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COMMENTS

The reader is reminded of the following:

- References and the editorial style as prescribed by the *Publication Manual (5th edition)* of the American Psychological Association (APA) were followed in this thesis. This is in line with the policy of the Programme in Industrial Psychology of the North-West University to use APA-style in all scientific documents as from January 1999.
- The thesis is submitted in the form of three research articles.

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“I applied mine heart to know, and to search and to seek out wisdom, and to reason of things” (ECCLESIASTES 7:25)

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SUMMARY

Topic: Work-related wellness of information technology professionals in South Africa

Key terms: Burnout, work engagement, positive psychology, information technology professional, work wellness, occupational well-being, work-related wellness, life satisfaction, affectivity, optimism, organisational commitment, job characteristics, variety, relationship with supervisor, remuneration, independence, job resources, job demands, strain, reliability, construct validity, bias, equivalence, moderator effects.

The information technology industry is considered to be one of the most demanding industries, with significant social, physical and psychological consequences for the well-being of the information technology professional. Work wellness and general psychological well-being plays an important role in the well-being of the information technology professional. The measurement of work-related wellness requires valid, reliable and culturally fair measuring instruments. However, research on work wellness and occupational well-being in South Africa is lacking, especially in the information technology context.

A lack of norms for work-related wellness in South Africa makes the identification of work-related wellness in the information technology industry difficult. Consequently, investigating the reliability, validity, equivalence and bias of work-related well-being measuring instruments would result in the standardisation of work wellness (consisting of burnout and engagement) and occupational well-being, suitable for use in the multicultural information technology industry setting. Moreover, the operationalisation of work wellness, as well as an inclusive model regarding the work-related wellness of information technology professionals that includes work wellness and occupational well-being are lacking in the South African literature.

The objectives of this research were to standardise the measurement of work wellness for information technology professionals in South Africa, to develop and test a model of occupational well-being for information technology professionals in South Africa, to develop and test a comprehensive model of work-related wellness for information technology professionals in South Africa (consisting of work wellness and occupational well-being), and to test for moderating effects of affectivity in the experience of work-related well-being of information technology professionals in South Africa.

The research consists of three separate articles, each consisting of a brief literature overview and an empirical study. A cross-sectional survey design with a snowball sample ($n = 214$) of information technology professionals in South Africa was used. Adapted versions of the Maslach Burnout Inventory – General Survey (MBI-GS) and Utrecht Work Engagement Scale (UWES), as well as the Satisfaction with Life Scale (SWLS), Affectometer 2 (AFM-2), Life Orientation Test – Revised (LOT-R), Organisational Commitment Questionnaire (OC-Q), Information Technology Job Characteristics Inventory (ITJCI), as well as the Health scale of the Organisational Screening Evaluation Tool (ASSET) and a biographical questionnaire were used. Descriptive statistics, analysis of variance, correlations, exploratory factor analysis and structural equation modelling were used.

Exploratory factor analysis confirmed a two-factor model for the MBI-GS consisting of a combined Burnout factor and Professional Efficacy, while a one-factor model was found for the UWES, namely Engagement, with acceptable internal consistencies. Exploratory second-order factor analysis confirmed a two-factor, culturally fair model of work wellness for information technology professionals in South Africa, consisting of burnout and work engagement. Item bias analysis revealed no evidence of bias for the MBI-GS, while uniform bias was found for two items (Items 7 and 12) of the UWES. Construct equivalence in terms of work wellness was obtained for the different language groups in the sample.

The results confirmed a four-factor model of occupational well-being for information technology professionals in South Africa, namely negative and positive work wellness, organisational commitment and general psychological well-being. The model of occupational well-being was found to be equivalent across language groups, except for general psychological well-being, which seemed to differ for the non-mother-tongue English language speakers.

In terms of work-related wellness, a model consisting of work wellness and occupational well-being was constructed and successfully tested. Structural equation analysis confirmed main effects for negative affectivity in terms of burnout and engagement, while main effects were confirmed for burnout, ill-health and engagement in terms of positive affectivity. Interaction effects for affectivity were not confirmed in the model of work-related wellness of information technology professionals in South Africa.

Recommendations for the organisation and future research were made.

OPSOMMING

Onderwerp: Beroepsgesondheid van inligtingstegnologie-beroepslui in Suid-Afrika

Sleutelterme: Uitbranding, werksbegeestering, positiewe sielkunde, inligtingstegnologie-beroepslui, beroepsgesondheid, werksverwante welstand, lewensteveredenheid, affektiwiteit, optimisme, organisasiegebondenheid, poseienskappe, verskeidenheid, verhouding met toesighouer, vergoeding, onafhanklikheid, werks hulpsbronne, werksverwante eise, spanning, betroubaarheid, konstruktiewe, sydigheid, ekwivalensie, verligtingseffekte.

Die inligtingstegnologiebedryf word beskou as een van die mees veeleisende beroepe ter wêreld, wat beduidende sosiale, fisiese en psigologiese gevolge vir die welstand van inligtingstegnologie-beroepslui inhou. Beroeps- en algemene psigologiese gesondheid speel 'n belangrike rol in die welstand van die inligtingstegnologie-beroepslui. Die meting van werksverwante welstand vereis geldige, betroubare en kultureel regverdigde meetinstrumente. Navorsing rakende beroepsgesondheid en werksverwante welstand in Suid-Afrika in die inligtingstegnologiebedryf is egter gebrekkig.

'n Gebrek aan norme rakende werksverwante welstand binne Suid-Afrika bemoeilik die identifisering van werksverwante welstand binne die inligtingstegnologiebedryf. Gevolglik sal ondersoeke rakende die betroubaarheid, geldigheid, ekwivalensie en sydigheid van meetinstrumente vir werksverwante welstand lei tot die standaardisering van werkwelstand (bestaande uit uitbranding en begeestering) en beroepsgesondheid wat geskik is vir gebruik in die multikulturele inligtingstegnologiebedryf. Inligting rakende die operasionalisering van werkwelstand, asook 'n inklusiewe werksverwante welstandsmodel (bestaande uit werkwelstand en beroepsgesondheid) van inligtingstegnologie-beroepslui, is 'n leemte in die Suid-Afrikaanse literatuur.

Die doelstellings van die studie was om die meting van werkwelstand vir inligtingstegnologie-beroepslui in Suid-Afrika te standaardiseer, om 'n beroepsgesondheidsmodel vir inligtingstegnologie-beroepslui in Suid-Afrika te ontwikkel en te toets, om 'n inklusiewe model vir werksverwante welstand (bestaande uit werkwelstand en beroepsgesondheid) te ontwikkel en te toets vir inligtingstegnologie-beroepslui in Suid-Afrika, asook om die modereringseffek van

affektiwiteit in die beleving van werksverwante welstand van inligtingstegnologie-beroepslui te bepaal.

Die navorsing bestaan uit drie afsonderlike artikels wat elk uit 'n kort literatuuroorsig en empiriese ondersoek bestaan. 'n Deursnee-opnameontwerp met 'n sneeubalsteekproef is gebruik wat uit inligtingstegnologie-beroepslui in Suid-Afrika ($n = 214$) bestaan. Aangepaste weergawes van die Maslach-uitbrandingsvraelys – Algemene Opname en Utrecht-werksbegeesteringsvraelys, asook die Lewenstevredenheidskaal, Affektometer-2, Lewensoriëntasietoets – Hersiene Weergawe, Organisasiegebondenheidskaal, Inligtingstegnologie-poseienskapvraelys sowel as die Gesondheidskaal van die Organisatoriese Siftingsevaluering-vraelys (ASSET) en 'n biografiese vraelys is gebruik. Beskrywende statistiek, variansie-analise, korrelasies, eksplorerende faktoranalise en strukturele vergelykingsmodellering is gebruik.

Eksplorerende faktoranalise het 'n tweefaktormodel vir die MBI-GS, bestaande uit 'n gekombineerde Uitbrandingsfaktor en Professionele Doeltreffendheid bevestig, terwyl 'n eenfaktormodel vir die UWES bevind is, naamlik Begeesting, met bevredigende interne konsekwentheid. Eksplorerende tweedeorde-faktoranalise het 'n kultureel regverdigde tweefaktor-werkswelstandmodel vir inligtingstegnologie-beroepslui in Suid Afrika bevestig wat uit uitbranding en werksbegeesting bestaan. Itemsydigheidsanalise het geen sydigheid vir die MBI-GS aangedui nie, terwyl eenvormige sydigheid vir twee items (Items 7 en 12) van die UWES gevind is. Konstrukewivalensie ten opsigte van werkwelstand is vir die verskillende taalgroepe in die ondersoekgroep bevestig.

Die resultate het 'n vierfaktor-beroepsgesondheidsmodel vir inligtingstegnologie-beroepslui in Suid-Afrika bevestig, naamlik negatiewe en positiewe werkwelstand, organisasiegebondenheid en algemene psigologiese welstand. Die beroepsgesondheidsmodel is ekwivalent bevind vir verskillende taalgroepe, behalwe vir algemene psigologiese welstand, wat blyk asof dit vir niemoedertaal Engelssprekendes verskil.

Wat betref werksverwante welstand is 'n model wat uit werkwelstand en beroepsgesondheid bestaan, ontwikkel en suksesvol getoets. Strukturele vergelykingsmodellering het onafhanklike effekte vir negatiewe affektiwiteit ten opsigte van uitbranding en begeesting bevind, terwyl onafhanklike effekte vir uitbranding, ongesondheid en begeesting ten opsigte van positiewe affektiwiteit bevestig is.

Interaksie-effekte vir affektiwiteit is nie in die model van werksverwante welstand van inligtingstechnologie-beroepslui in Suid-Afrika bevestig nie.

Aanbevelings vir die organisasie en toekomstige navorsing is aan die hand gedoen.

CHAPTER 1

INTRODUCTION

This thesis is about work-related wellness of information technology professionals in South Africa.

In this chapter, the problem statement is discussed. Research objectives are set out, including general and specific objectives. The research method is explained and a division of chapters is given.

1.1 PROBLEM STATEMENT

Technology is an integral part of our lives. A particularly challenging feature of the information technology profession is constantly to innovate new products or consistently to exceed the service expectations of demanding customers. Depending on the job, this often requires personal capabilities such as multi-tasking, collaboration, new idea generation, psychological engagement, cross-organisational support and integration with complex systems while dealing with too few people, the need to be smart, the most economic way of doing things and global competition (Morisson, 2002; Huarng, 2001; Thamos & Thomason, 1997).

This could often meant that a professional could experiencing some sort of restructuring and/or downsizing of information technology departments, apparent obsolescence of skills, stringent user deadlines and lack of management support (Thamos & Thomason, 1997). Furthermore, the pace at which things are changing in the information technology field may have a negative psychological and physiological effect on information technology professionals (Khosrowpour & Culpan, 1990). Research on the effects of computer-aided technologies has shown that exposure to technology influences users' mental health and well-being (Bohlin & Hunt 1995; Jones & Wall, 1990; Kalimo & Lepeen 1985; Kay, 1990; Okebukola, Sumampouw & Jegede, 1992 ; Todman & Managhan, 1994)

During the last 20 years information technology has experienced rapid growth as a result of the intense competition in this industry. This growth has led to more complex and specialised jobs for information technology professionals, which could lead to professional burnout (Huarng, 2001). Burnout refers to the syndrome of physical and emotional exhaustion and builds negative job attitudes and loss of emotional concern and feeling for others. Burnout impacts on employees' absenteeism, staff turnover, reduced productivity and general health (Huarng, 2001). The effects of burnout on the ill-health of people is well known in stress literature. According to Idler and Kasl (1991) and Mossey and Saphiro (1982), employees suffering from high levels of burnout are three times more likely to suffer from chronic illness such as high blood pressure and frequent headaches. Burnout is a multifaceted index of wellbeing at work, because it affects the individual on the cognitive, affective (motivational), physical and behavioural levels (Brill, 1984).

According to Snyder and Lopez (2002) the field of psychology has started to question many strongly held beliefs and premises at an individual, group and meta-theoretical level. The emergence of a new thinking-set or paradigm, which is now known as "positive psychology", takes into account these strengths and resources, enabling the studying of "normal" or superhuman functioning which could previously not be understood in a problem-focused framework (Strümpfer, 2001).

According to Schaufeli and Bakker (2001) the need for a positive psychology in burnout research literature has long since been called for where empirical studies revealed that some employees, regardless of high job demands and long working hours, do not develop burnout in comparison to others but seem to find pleasure in hard work and dealing with high job demands. This phenomenon could not be understood from a negative "origin of unwellness" perspective (pathogenic paradigm). In line with the positive psychology, Schaufeli and Bakker (2001) state that these individuals could be described as engaged in their work. Consequently, theoretical and empirical studies commenced on the concept of engagement, theoretically viewed as the antithesis of the burnout construct. In fact, the literature now views wellness at work in both a positive and negative manner, namely burnout and engagement (Rothmann, 2003).

Engagement is characterised by energy, involvement and efficacy, originally viewed as the direct theoretical opposites of burnout, namely exhaustion, cynicism and lack of professional efficacy respectively. Job engagement can be defined as a positive, fulfilling, work-related state of mind characterised by vigour, dedication and absorption (Schaufeli, Salanova, Gonz  les-Rom  . & Bakker, 2002). Employees who have a sense of engagement have a sense of energy and effective connection with their jobs (Schaufeli, Salanova et al., 2002).

According to Barling, Kelloway and Iverson (2003) the positive psychology paradigm helps one understand the relationship between the individual and work more clearly, but more specifically goal-directed, structured activity, and well-being (Kelloway & Barling, 1992). In fact, work that is meaningful leads to eustress, which can promote engagement even in demanding conditions (Simmons & Nelson, 2001). Eustress reflects the extent to which cognitive appraisal of the situation is seen to benefit or enhance an individual's well-being. Furthermore, the focus on engagement as the positive antithesis of burnout promises to yield new perspectives on interventions to promote healthy perceptions, beliefs, and physical well-being (Salovey, Rothman, Detweiler & Steward, 2000) and to alleviate burnout (Maslach, Schaufeli & Leiter, 2001).

In terms of measurement, the UWES (Utrecht Work Engagement Scale) (Schaufeli, Salanova et al., 2002) and the MBI-GS (Maslach Burnout Inventory – General Survey) (Maslach & Jackson, 1996) have been developed to measure the constructs of engagement and burnout respectively. Even though burnout and engagement are theoretically viewed as constructs of a more comprehensive taxonomy of well-being at work, little information seems to be available in the South African context with regard to the psychometric properties of a combined measure of these constructs. A review of the literature yielded no information regarding the standardisation of work wellness for information technology professionals in South Africa. The fact that no norms are available in terms of the measurement of work wellness of information technology professionals in South Africa makes it difficult to assess the levels of work wellness of information technology professionals and to compare these levels for different demographic groups.

South Africa is a multi-cultural society. According to Van de Vijver and Leung (1997), equivalence and bias should be computed in a multicultural setting such as South Africa to enable valid and fair comparison of constructs between different cultural groupings. Whereas measurement equivalence is concerned with measurement and the comparability of scores, bias is concerned with factors that influence the validity of cross-cultural comparisons. Consequently, the first research problem was to standardise the measurement of work wellness for different cultural groups of information technology professionals in South Africa.

Another important variable regarding the levels of well-being at work is organisational commitment. Work engagement may be viewed as an antecedent to organisational commitment in those individuals who experience deep engagement in their jobs and who identify strongly with their organisations. According to White (1987) commitment to the company which the person works for can be defined as the belief in and acceptance of the organisation itself and its values, and the willingness to exert more effort than is expected of the person on behalf of the organisation. According to Houkes, Janssen, De Jonge and Nijhuis (2001), engaged workers have a low tendency to leave an organisation.

Organisational commitment can be linked to other general psychological indicators of well-being. From a study by Sui (2002) it is clear that organisational commitment and mental and psychological well-being (which includes optimism) are positively related. Optimism can be defined as a stable, trait-like construct characterised by positive expectations for the future, optimistic attributions, illusion of control and self-enhancing biases (Brenes, 2002; Ebert, Tucker & Roth, 2002; Scheier, Carver & Bridges, 1994). Optimism represents an individual's positive outlook towards life and work related events and can be related to positive mood (Penedo, 2003). Research has shown that optimism help individuals cope with major life stresses, adjusting to major life transitions and respond to more minor stresses (Hasan & Power, 2002). According to Chiara (2002), optimism plays a significant role in preventing physical and mental problems following periods of unwellness. Jackson, Weiss and Lunquist (2001) explain that optimistic people are better equipped to handle stress which leads to unwellness because these optimists use strategies that may help control aspects that could contribute to occupational well-being.

General psychological well-being, however, also does include state-like personality characteristics, for example general well-being (affectivity). Affectivity could be described as a sense of well-being that is the balance of positive and negative feelings (affectivity) in recent experience (Kamman & Flett, 1983). Research indicates that high levels of negative affectivity increase susceptibility to the experience of psychological strain and other negative outcomes of stress such as negative emotions and adversarial social relationships.

According to Wissing and Van Eeden (2002) life satisfaction and affectivity are strong indicators of psychological well-being. Positive affectivity is associated with increased life satisfaction and the tendency to experience negative affectivity with decreased life satisfaction. According to the literature, job satisfaction and life satisfaction are related (Rice, Frone & McFarlin, 1992). Moreover, life satisfaction could be regarded as a perfect match between the degree of importance attached to various life dimensions and the level of satisfaction associated with each. Diener, Lucas, Oishi and Suh (2002) found that health, finances, family, friends, recreation, religion, self and education are the eight most important domains for individual experience of life satisfaction. Furthermore, research indicates that the experience of positive or negative affectivity are important personality determinants of life satisfaction (Wissing & Van Eeden, 2002). Despite the importance of general psychological well-being and work wellness in the context of occupational health, a review of the literature did not yield any studies in the information technology context incorporating general psychological well-being and work wellness in a model of occupational well-being of information technology professionals in South Africa. Consequently, the second research question is the need for a model of occupational well-being of information technology professionals in South Africa.

According to Schaufeli and Bakker (2001) and Jones and Fletcher (1996) any occupation can be analysed in terms of two descriptive elements regarding the work environment, namely job demands and job resources. *Job demands* are those physical, psychological, social or organisational aspects of the job which require sustained physical and/or psychological strain (i.e. cognitive or emotional effort), the consequences of which are associated with physiological or psychological costs, e.g.

work overload, personal conflicts and emotional demands, such as demanding clients. Although these demands are not necessarily negative, they can turn into job stressors when meeting these high demands requires sustained effort, so that they are consequently associated with negative responses in the long run, such as depression, anxiety, or burnout.

Job resources on the other hand, refer to those physical, psychological, social or organisational aspects of the job that (1) reduce the job demands and therefore the associated physiological and psychological costs, or (2) are functional in the achievement of work goals, or (3) stimulate personal growth, learning and development, e.g. social support, autonomy, feedback and job security. However, no studies could be found that relate the characteristics of the information technology professional environment with indicators of occupational well-being in South Africa. Moreover, it is clear that variables such as work wellness, organisational commitment, ill health, dispositional optimism, affectivity and satisfaction with life might be relevant for the description of work-related wellness of information technology professionals in South Africa.

A review of the literature revealed no studies which included work wellness and occupational well-being in a model of work-related wellness for information technology professionals in South Africa. Therefore, the third research problem is that no model could be found of work-related wellness, inclusive of work wellness and occupational well-being, that could be used to predict the work-related wellness of information technology professionals in South Africa.

International research on occupational well-being is increasingly focusing on the aspects that buffer or exacerbate job demands in the occupational setting (Cooper, Dewe & O'Driscoll, 2001). According to Dewe, Cox and Ferguson (1993), the buffer effect can be best described in a transactional framework where an ongoing transaction between individuals and their environment exists and individuals make appraisals of the environment in an attempt to manage the consequences of this interaction. These so-called moderator or mediating constructs can be categorised as dispositional, situational or social variables (Cooper et al., 2001). Many possible moderators or mediating variables have been identified in the literature i.e. type A-

personality, self-esteem, hardiness, self-efficacy, affectivity, dispositional optimism, social support, locus of control and coping strategies. In the research leading to this thesis, affectivity was investigated as a possible moderator of the interaction between the characteristics of the information technology professionals' work environment and their work-related well-being. The identification of moderating variables could have significant implications for a better understanding of how information technology professionals interact with their environment and could aid in the prevention of the negative impact of the environment on the wellness of information technology professionals.

General well-being (Affectivity) can be seen as the balance of positive and negative feelings (affectivity) in recent experience (Kamman & Flett, 1983). Research indicates that high levels of negative affectivity can increase an individual's inclination to the experience of psychological strain and other negative outcomes of stress, such as negative emotions and social relationships, whereas positive affectivity is associated with high generalised self-efficacy, subjective well-being and positive social relationships (Church, 1994; Spielberger, Gorsuch & Lushene, 1970).

It is clear from the above-mentioned discussion that job characteristics, work wellness (burnout, engagement), ill-health and organisational commitment might be related to the work-related well-being of information technology professionals. Yet these variables might be influenced by moderating variables such as affectivity. However, studies with regard to the possible moderating effects of affectivity on the work-related wellness of information technology professionals in South Africa are lacking. Therefore, the fourth research problem is that a lack exists studies in regard to the possible moderating effects of affectivity in terms of the work-related wellness of information technology professionals in South Africa.

Consequently, this study will make the following contributions to Industrial Psychology as a science:

- A standardised measuring instrument for work wellness of information technology professionals in South Africa will have been established, which will have been proven reliable, valid and culturally fair;

- A model of occupational well-being across different cultural groups for the information technology professional in South Africa will have been established;
- A model of work-related well-being, inclusive of work wellness and occupational well-being will have been established, which could be used to predict the work-related well-being of information technology professionals in South Africa;
- Information will have been gathered regarding the moderating effects of occupational affectivity on the work-related wellness of information technology professionals in South Africa.

1.2 RESEARCH OBJECTIVES

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

1.2.1 General objective

The general objective of this research is to determine the work-related well-being of information technology professionals in South Africa.

1.2.2 Specific objectives

The specific research objectives were as follows:

- To determine the reliability and validity of the MBI-GS and UWES for information technology professionals in South Africa;
- To determine the construct equivalence and item bias of the MBI-GS and UWES for information technology professionals in South Africa;
- To develop and test a model of occupational well-being across different cultural groups of information technology professionals in South Africa;
- To develop and test a model of work-related well-being, inclusive of work wellness and occupational well-being of information technology professionals in South Africa;

- To make recommendations with regard to the possible moderating effects of occupational affect on the work-related wellness of information technology professionals in South Africa.

1.3 RESEARCH METHOD

The research method for each of the three articles which are submitted for the purposes of this thesis consisted of a brief literature review and an empirical study. In the following paragraph, relevant aspects regarding the empirical studies conducted for this thesis are discussed.

1.3.1 Research design

A survey design was used to achieve the research objectives. A cross-sectional design was used, where a sample was drawn from a population at one time (Shaughnessy & Zechmeister, 1997). Information collected was then used to describe the population at that time; this information is appropriate for studying various groups at different stages of development (Burns & Grove, 1993). This design can also be used to assess interrelationships among variables within a population. According to Shaughnessy and Zechmeister (1997) this design is ideally suited to the descriptive and predictive functions associated with correctional research.

Structural equation modelling will be used to address the problems associated with this type of design (Byrne, 2001). In this study structural equation modelling was used to test for the possible moderating effects of affectivity on the work-related wellness of information technology professionals in South Africa. As such, structural equation modelling is a statistical methodology that takes a confirmatory (i.e. hypothesis-testing) approach to the analysis of a structural theory bearing on some phenomenon (Byrne, 2001). The term "structural equation modelling" (SEM) or covariance analysis conveys two important aspects of the procedure:

- the causal processes being studied are represented by a series of structural (i.e. regression) equations, and

- these structural relations can be pictorially represented or modelled to enable a clear conceptualisation of the theory being studied .

1.3.2 Study population

The total population of 2500 information technology professionals on the database of a leading South African information technology recruitment, training and consulting company was targeted. The sample was gathered by means of a snowball sampling method where the participants were purposefully selected (screened) only when the requirements of professional registration were satisfied. The questionnaires were administered via the internet where participants had to register on-line before they were able to take part in the survey.

1.3.3 Measuring battery

Six questionnaires were used in the empirical study, namely adapted versions of the Maslach Burnout Inventory – General Survey (MBI-GS) (Maslach & Jackson, 1986) and Utrecht Work Engagement Scale (UWES) (Schaufeli, Martinez et al., 2002), as well as the Satisfaction with Life Scale (SWLS) (Diener, Suh, Lucas, & Smith, 1999), Affectometer 2 (AFM-2) (Kammann & Flett, 1983), Life Orientation Test – Revised (LOT-R), (Scheier et al., 1994), Organisational Commitment Questionnaire (OC-Q) (Allen & Meyer, 1990), the health scale of the Organisational Screening Evaluation Tool (ASSET) (Cartwright & Cooper, 2002), the Information Technology Job Characteristics Inventory (ITJCI) and a biographical questionnaire.

The *Maslach Burnout Inventory – General Survey (MBI-GS)* (Maslach & Jackson, 1986) measured the respondents' relationships with their work on a continuum from engagement to burnout. The MBI-GS has three subscales: Exhaustion (Ex) (five items, e.g. "I feel used up at the end of the workday"), Cynicism (Cy) (five items, e.g. "I have become less enthusiastic about my work") and Professional Efficacy (PE) (six items, e.g. "In my opinion, I am good at my job"). Together the subscales of the MBI-GS provide a three-dimensional perspective on burnout. All items are scored on a 7-point frequency rating scale ranging from 0 ("never") to 6 ("daily"). High scores on Ex and Cy, and low scores on PE are indicative of burnout.

Internal consistencies (Cronbach coefficient alphas) reported by Schaufeli et al. (1996) varied from 0,87 to 0,89 for Exhaustion, 0,73 to 0,84 for Cynicism and 0,76 to 0,84 for Professional Efficacy. Test-retest reliabilities after one year were 0,65 (Exhaustion), 0,60 (Cynicism) and 0,67 (Professional Efficacy) (Schaufeli et al., 1996). Alpha coefficients of 0,89 (Exhaustion); 0,76 (Cynicism); and 0,85 (Professional Efficacy) were reported by Malan and Rothmann (in press). Jackson and Rothmann (2003) reported alpha coefficients of 0,79 for Exhaustion, 0,78 for Cynicism and 0,73 for Professional Efficacy. A three-factor model was also supported by Enzmann, Schaufeli & Girault, (1994); Leiter and Schaufeli, (1996); and Schaufeli and Enzmann, (1998). However, support for a two-factor structure (Bakker, Killmer, Siegrist & Schaufeli, 2000; Winstanley & Whittington, 2002) is also found in the literature.

The *Utrecht Work Engagement Scale (UWES)* (Schaufeli, Martinez et al., 2002) measures levels of engagement. Initially engagement was viewed as the positive antithesis of burnout, but according to the scale developers, it can be operationalised in its own right (Schaufeli, Martinez et al., 2002). The UWES was scored on a 7-point frequency scale, ranging from 0 (*never*) to 6 (*every day*). Three dimensions of engagement can be distinguished, namely Vigour (7 items, e.g. “I am bursting with energy in my work”), Dedication (5 items, e.g. “I find my work full of meaning and purpose”) and Absorption (5 items, e.g. “When I am working, I forget everything else around me”). Engaged individuals are characterised by high levels of Vigour and Dedication as well as elevated levels of Absorption. In terms of internal consistency, reliability coefficients for the three subscales have been determined between 0,68 and 0,91. It seems possible to improve the alpha coefficient (ranging from 0,78 to 0,89) without adversely affecting the internal consistency of the scale (Storm & Rothmann, 2003).

The *Satisfaction with Life Scale (SWLS)* was used to measure satisfaction with life. The SWLS is a five-item instrument which was developed by Diener et al. (1999) to measure global cognitive judgements of one’s life. According to Diener et al. (1985) the SWLS is designed around the idea that one should ask respondents about the overall judgement of their life in order to measure the concept of life satisfaction.

Participants were asked to indicate their degree of agreement or disagreement on a seven-point Likert scale (1 = strongly disagree to 7 = strongly agree). Scores on the SWLS range from 5 to 35, with higher scores indicating greater life satisfaction. Diener et al. (1985) reported a two month test-retest correlation coefficient of 0,82 and a Cronbach alpha coefficient of 0,87.

The *Affectometer 2 (AFM-2)* (Kammann & Flett, 1983) was used to measure negative and positive affectivity. It is a 40-item self-report scale measuring the balance of positive and negative feelings during recent experience. The overall level of well-being is conceptualised as the extent to which good feelings predominate over bad feelings, which is reflected in the balanced formula for calculating the total score: PA – NA. The Affectometer 1 shows correlations of 0,74 with General Well-being Schedule; -0,62 with an ad hoc list of somatic complaints; -0,70 with EPI Neuroticism; and 0,74 with 7-Step Happiness, which support the concurrent validity of the scale (Kammann & Flett, 1983). Naudé (2003) confirmed a 2-factor structure of the AFM 2 and found the internal consistency of the two scales satisfactory (Positive Affectivity, $\alpha = 0,84$ and Negative Affectivity, $\alpha = 0,83$).

The *Life Orientation Test – Revised (LOT-R)* (Scheier et al., 1994) is a ten item measure which was used to measure dispositional optimism. The original Life Orientation Test (Scheier & Carver, 1985) yielded a two-factor structure (optimism and pessimism), which was questioned (Harju & Bolen, 1998). Follow-up analyses demonstrated a one-factor structure, indicating that the LOT-R is measuring a continuum of high, average and low optimism/pessimism (Scheier et al., 1994). The LOT-R is measured on a five-point Likert scale, ranging from 5 = I strongly agree, to 1 = I strongly disagree. The LOT-R was found to have adequate internal consistency (Cronbach's $\alpha = 0,78$) and excellent convergent and discriminate validity (Scheier et al., 1994). Harju and Bolen (1998) reported a Cronbach alpha coefficient of 0,75 in their sample of 204 college students.

The *Organisational Commitment Questionnaire (OC-Q)* (Allen & Meyer, 1990) consists of 18 items rated on a 5-point Likert-type scale with 1 = strongly disagree and 5 = strongly agree. Allen and Meyer (1990) stated that inter-correlations between

different samples were often above 0,90, which indicates that the combined factor is congruent. Cronbach alpha coefficients were consistently above 0,80 for every one of these sub-scales (Suliman & Iles, 2000). Meyer and Allen (1997) reported median reliabilities for the affective, normative and continuance scales respectively as 0,85; 0,73 and 0,79. Internal reliabilities of 0,80 and 0,72 have been reported on affective and continuance commitment respectively (Meyer & Allen, 1997). Jackson and Rothmann (2003) reported a one factor solution, which explained 60,68% of the total variance of item-loadings, which varied from 0,63 to 0,88.

The *Information Technology Job Characteristics Survey* (ITJCS) consisting of 102 items was developed for the purpose of this study. Respondents are required to rate their responses to the prevalence of various characteristics at work on a 4-point Likert-type scale where 1 = never and 4 = always. The ITJCS assesses various characteristics at work which could lead to the experience of strain in the information technology context, namely Mental Load (e.g. "Do you feel that you have too much work to do?"), Emotional Load (e.g. "Are you confronted in your work with things that affects you personally?"), Lack of Variety (e.g. "In your work, do you have to repeatedly do the same things?"), Opportunities to Learn (e.g. "In your work, are you encouraged to develop yourself further?"), Relationship with your Immediate Supervisor (e.g. "If necessary, can you ask your immediate supervisor for help?"), Relationship with Colleagues (e.g. "Can you rely on your colleagues to assist you when you need help?"), Information (e.g. "Do you feel that in your job you have to deal with too much information?"), Communication (e.g. "Do you know who to approach within your department with specific problems?"), Participation (e.g. "Do you experience all your team members functioning as part of a team?"), Contact Possibilities (e.g. "Do you feel that you have enough interpersonal contact with your colleagues at work?"), Remuneration (e.g. "Do you feel that you receive enough money for the work that you do?"), Uncertainty about the Future (e.g. "Do you need to be more secure that you will still be working in this company in one year's time?"), Role Clarity (e.g. "Do you know exactly what other people expect of you in your work?"), Home-worklife Balance (e.g. "Do you feel that you have enough time to spend with your family?"), Technological changes (e.g. "Do you feel that technological advancements have made your job easier?"), Career Possibilities (e.g. "Does your job give you the opportunity to be promoted?"), Independence in your

Work (e.g. “Do you feel that you have the authority to carry out your responsibilities as you see fit?”).

The health subscales of the ASSET (An Organisational Screening Evaluation Tool) was used to measure physical and psychological health (Cartwright & Cooper, 2002). The health subscales consist of 19 items arranged into two subscales, namely physical health and psychological well-being. Both are scored on a scale varying from 1 (*never*) to 4 (*often*). All items on the physical subscale relate to symptoms of stress that give insight into physical health. The symptoms listed on the psychological well-being subscale are ill-health symptoms induced by stress. Johnson and Cooper (2003) found a Guttman split-half reliability coefficient of 0,74 and 0,91 for the physical and psychological health subscales respectively. They also showed that the psychological well-being subscale has good convergent validity with a widely used measure of psychiatric disorders, namely the General Health Questionnaire (Goldberg & Williams, 1988).

1.3.4 Statistical analysis

The statistical analysis was carried out by means of the SPSS program (SPSS Inc., 2003). Cronbach alpha coefficients, inter-item correlation coefficients and exploratory factor analysis were used to assess the reliability and validity of the measuring instruments (Clark & Watson, 1995). Descriptive statistics (e.g., means, standard deviations, skewness and kurtosis) were used to analyse the data.

The construct equivalence of the dimensions of work wellness and occupational well-being was determined by means of factor analysis. Construct equivalence can be investigated with several techniques, such as factor analysis, cluster analysis and multidimensional scaling or other dimensionality-reducing techniques (Van de Vijver & Leung, 1997). However, factor analysis is the most frequently employed technique for studying construct equivalence and was the method used in the current study.

The basic idea behind the application of all these techniques is to obtain a structure in each culture, which can then be compared across all cultures involved. Exploratory factor analysis was used to examine the factorial structure of occupational well-being

on the construct level. A principal components analysis was conducted to determine the number of factors of the dimensions of well-being in the total sample. Subsequently, direct oblimin and varimax rotations were used to determine the solution for each language group. Factors obtained in each group were compared (after target rotation) for factorial agreement and evaluated by a factor congruence coefficient, Tucker's phi (Van de Vijver & Leung, 1997). Values above 0,90 were taken to point to essential agreement between cultural groups, while values above 0,95 point to very good agreement. A high level of agreement means that the factor loadings of the lower and higher level are equal up to a multiplying constant. (The latter is needed to accommodate possible differences in eigenvalues of factors for the race groups.)

Spearman product-moment correlations were used to specify the relationships between the variables. Statistical significance was set at the 99% confidence interval level ($p = 0,01$). A cut-off point of 0,30 (medium effect) (Cohen, 1988) was set for the practical significance of correlation coefficients. Exploratory second-order factor analysis was used to test the model of work wellness and occupational well-being on the construct level.

In order to determine main effects of independent variables (affectivity) on dependent variables (work wellness, organisational commitment, ill-health, job characteristics), MANOVAs were conducted using the Wilk's Lambda statistic. MANOVA tests whether mean differences among groups on a combination of dependent variables are likely to have occurred by chance (Tabachnick & Fidell, 2001). In MANOVA a new dependant that maximises group differences is created from the set of dependent variables. A one-way analysis is performed on the newly created dependent variable. Wilk's lambda was used to test the significance of the effects. Wilk's lambda is a likelihood ratio statistic of the data under the assumption of equal population mean vectors for all groups against the assumption that the population mean vectors are identical to those of the sample mean vectors for the different groups.

Structural equation modelling, as implemented by AMOS (Arbuckle, 1997), was used to compare models of work-related well-being (including work wellness and occupational well-being) of information technology professionals in South Africa for

possible interaction (moderating) effects of affectivity on work wellness. Hypothesised relationships regarding variables were determined empirically by means of goodness of fit to the data. The χ^2 and several other goodness-of-fit indices summarise the degree of correspondence between the implied and observed covariance matrices (Byrne, 2001). However, because the χ^2 statistic equals $(N - 1) F_{min}$, this value tends to be substantial when the model does not hold and the sample size is large (Byrne, 2001). The following goodness-of-fit indices were used as adjuncts to the χ^2 statistics: a) The Goodness of- Fit Index (GFI); b) The Adjusted Goodness-of-Fit Index (AGFI); c) The Normed Fit Index (NFI); d) The Comparative Fit Index (CFI); e) The Tucker-Lewis Index (TLI), and f) The Root Mean Square Error of Approximation (RMSEA).

1.4 OVERVIEW OF CHAPTERS

In Chapter 2 the work wellness, as well as the construct equivalence and bias in terms of work wellness (burnout and engagement) for different language groups of information technology professionals in South Africa is measured. In Chapter 3 the focus is on the occupational well-being of information technology professionals in the multicultural information technology context of South Africa. In Chapter 4 a model of work-related well-being, inclusive of work wellness and occupational well-being for information technology professionals in South Africa is developed and tested. Finally, Chapter 5 deals with conclusions, shortcomings and recommendations.

1.5 CHAPTER SUMMARY

This chapter discussed the problem statement and research objectives. The measuring instruments and research method that were used in this research were also explained, followed by a brief discussion of the chapter outline of this thesis.

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WORK WELLNESS OF INFORMATION TECHNOLOGY PROFESSIONALS IN SOUTH AFRICA*

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ABSTRACT

The objective of this research was to determine the construct validity and internal consistency of work wellness for information technology professionals of different language groups in South Africa. A cross-sectional survey design was used. A snowball sample ($N = 214$) of information technology professionals in South Africa was taken. An adapted version of the MBI-GS and UWES as well as a biographical questionnaire were administered. Exploratory factor analysis confirmed a 2-factor model of burnout, consisting of a combined Burnout factor and Professional Efficacy, as well as a 1-factor model of engagement, namely Work Engagement with acceptable internal consistencies. Exploratory factor analyses with target rotations showed equivalence of the scales for different language groups. The results confirmed a model of work wellness comprising both positive and negative indicators of well-being, namely Burnout and Work Engagement.

OPSOMMING

Die doelstelling van hierdie navorsing was om die konstruk geldigheid en interne konsekwentheid van beroepswelstand vir inligtingstechnologie-beroepslui van verskillende taalgroepe in Suid-Afrika te bepaal. 'n Deursnee-opnameontwerp is gebruik. 'n Sneebalsteekproef ($N = 214$) van IT-beroepslui in Suid-Afrika is geneem. Aangepaste weergawes van die MBI-GS en UWES sowel as 'n biografiese vraelys is aangewend. Eksplorerende faktoranalise het 'n 2-faktormodel van uitbranding, bestaande uit 'n gemeenskaplike Uitbrandingsfaktor en Professionele Doeltreffendheid, asook as 'n 1-faktormodel vir begeestering, naamlik Werksbegeestering, met aanvaarbare interne konsekwentheid bevestig. Eksplorerende faktoranalises met teikenrotasies het ekwivalensie van die skale vir die verskillende taalgroepe getoon. Die resultate het 'n model van

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werkwelstand bevestig wat bestaan uit beide positieve en negatieve aanduiders van welstand, naamlik Uitbranding en Werksbegeestering.

During the past 20 years, information technology has experienced exponential growth and intense competition in the industry. This growth changed the face of the information technology profession and has led to more complex and specialised jobs for information technology professionals. Organisations continue to strive for efficiency in the new economy and put high premiums on standardisation, controls and most of all, production. Consequently, human variance should be eliminated as far as possible and people are forced to adhere to clear standards and predictability in heavily scripted roles (Morisson, 2002). Although information technology has been an integral part of people's lives for many years it has become increasingly associated with various forms of stressors. Studies have shown that occupational stressors may result in mental, physical and behavioural stress reactions, such as burnout, depression and psychosomatic diseases (Houkes, Janssen, de Jonge & Nijhuis, 2001).

The link between unmanaged stress and the negative impact on health and well-being are well-demonstrated in stress research and are linked to severe physical consequences, some of which may be fatal (Winefield, Gillispie, Stough, Dua & Hapuararchi, 2002). According to Winefield et al. (2002) there is significant evidence to suggest that chronic and high levels of occupational stress, if left monitored, can be associated with lowered mental and physical well-being, burnout, job dissatisfaction, absenteeism, stress-related injury turnover and intention to quit the profession. The relationship between higher levels of psychological strain and incidences of self-reported stress-related health symptoms, which are often associated with burnout, are clear from the stress literature. Furthermore these symptoms are significantly associated with stress-related medical conditions reported by employees, such as migraines, hypertension and coronary heart disease.

According to Cordes and Dougherty (1993) burnout can be defined as a persistent, negative work-related state of mind in "normal" individuals, primarily characterised by emotional exhaustion and accompanied by distress, a sense of reduced effectiveness, decreased motivation and the development of dysfunctional attitudes and behaviours at work. Originally restricted to helpful professions, burnout is now recognised as a

phenomenon found in a variety of occupational groups (Cordes & Dougherty, 1993). It is a cumulative process that leads to emotional exhaustion and withdrawal. Studies by Etzion (2001) and Jackson, Schwab and Schuler (1986) show that little or no social support by friends, family or colleagues is a contributor to burnout as well as work overload (Ivancevich & Matteson, 1990; Landsbergis, 1998; Rantanen, 1998), role conflict and role ambiguity (Melzer & Nord, 1981; Miller, Ellis, Zook & Lyles, 1990), poor collegial support (Golembiewski & Munzenrider, 1988) and career concerns such as lack of career progress (Ivancevich & Matteson, 1990).

Maslach and Leiter (1997) redefined burnout as an “erosion of engagement with the job”. Subjective experience of work that started out as important, meaningful and challenging becomes unpleasant, unfulfilling and meaningless. Burnout can be described as a specific type of job stress that influences job-related affective well-being (Schaufeli & Buunk, 2002). Although mainly psychological in nature, the prevalence of physical symptoms is not uncommon. More specifically, burnout affects the individual on a cognitive, affective (motivational), physical and behavioural level as a result of a general breakdown in defences against prolonged job-stress (Brill, 1984). This breakdown occurs gradually and often remains unnoticed for a long time, perpetuated by ineffective coping strategies and frustrated intentions brought about by the subjective experience of work reality. The gradual depletion of emotional resources results in a sense of reduced effectiveness, decreased motivation and the development of dysfunctional behaviours and attitudes at work (Schaufeli & Enzmann, 1998).

According to Snyder and Lopez (2002), the field of psychology has started to question many strongly held beliefs and premises at an individual, group and meta-theoretical level. The emergence of a new thinking-set or paradigm, which is now known as “positive psychology”, takes into account these strengths and resources, enabling the studying of “normal” or superhuman functioning which could previously not be understood in a problem-focused framework (Strümpfer, 2001). “Positive psychology” initiates a move from a preoccupation with the worst things in life towards also building and investigating positive qualities. For this reason psychology is not just the study of

pathology, weakness and damage, but also the study of strength and virtue (Seligman & Csikszentmihalyi, 2000). Consequently, wellness at work can be viewed in both a positive and a negative manner, namely burnout and engagement (Rothmann, 2003). Originally, viewed from a negative pathogenic paradigmatic perspective, wellness at work is now also viewed from a positive paradigmatic perspective. According to Schaufeli and Bakker (2001) the need for a positive psychology in burnout research literature has long since been called for where empirical studies revealed that some employees, regardless of high job demands and long working hours, do not develop burnout in comparison with others but seem to find pleasure in hard work and dealing with high job demands. This phenomenon could not be understood from a negative 'origin of unwellness' perspective (pathogenic paradigm).

In line with the positive psychological framework, Schaufeli and Bakker (2001) state that these individuals could be described as engaged in their work. Consequently, theoretical and empirical studies commenced on the concept of engagement, theoretically viewed as the antithesis of the burnout construct. Engagement, initially viewed as the opposite of burnout by some, is characterised by energy, involvement and efficacy, the direct opposites of burnout. Job engagement can be defined as a positive, fulfilling, work-related state of mind characterised by vigour, dedication and absorption (Schaufeli, Salanova, Gonz  les-Rom   & Bakker, 2002). Vigour relates to high levels of energy and mental resilience, whereas dedication relates to a sense of significance, enthusiasm, inspiration, pride and challenge. Finally, absorption refers to a state where a person is completely concentrated and consumed by his/her job and at the same time staying interested and fulfilled. Engagement is therefore not focused on any specific object, event, individual or behaviour but it is an enduring state of consciousness.

Employees who have a sense of engagement, have a sense of energy and effective connection with their jobs (Schaufeli, Salanova et al., 2002). According to Kelloway and Barling (2003) the positive psychology paradigm helps in understanding the relationship between the individual and work more clearly, but more specifically goal-directed, structured activity, and well-being (Kelloway & Barling, 1992). In fact, work that is

meaningful leads to eustress, which can promote engagement even in demanding conditions (Nelson & Simmons, 2003). Eustress reflects the extent to which cognitive appraisal of the situation is seen to benefit or enhance an individual's well-being. The focus on engagement as the positive antithesis of burnout promises to yield new perspectives on interventions to promote healthy perceptions, beliefs and physical well-being (Salovey, Rothman, Detweiler & Steward, 2000) and to alleviate burnout (Maslach, Schaufeli & Leiter, 2001).

The objectives of this study is to determine the construct validity and internal consistency of work wellness and to test whether this model holds for different language groups of information technology professionals in South Africa.

Measurement of Work Wellness

In the latter part of the 1990s, there seemed to be disagreement in the burnout literature regarding the measurement of engagement. Maslach and Leiter (1997) stated that engagement could adequately be measured by reversing the scores on the Maslach Burnout Inventory (MBI). However, ample evidence in the literature seems to suggest that positive and negative aspects of work-related well-being have their own pathways and contingencies (Schaufeli, Salanova et al., 2002). In line with the argument that positive and negative aspects of work-related well-being are not necessarily each other's opposites, Schaufeli, Salanova et al. (2002) proposed to measure positive and negative work-related well-being independently with different instruments.

Probably the most influential development in terms of scientific exploration of the burnout construct was the development of the Maslach Burnout Inventory (MBI) (Maslach & Jackson, 1986). Three versions of the MBI were developed, namely the MBI-GS (General Survey), MBI-ED (Educator Survey) and MBI-HSS (Human Services Survey). Whereas the MBI-GS measures Exhaustion, Cynicism and Professional Efficacy, the latter two measures Emotional Exhaustion, Depersonalisation and Personal Accomplishment.

The apparent need for an instrument that measures burnout in non-contactual professional contexts was met by the introduction of the Maslach Burnout Inventory – General Survey (Schaufeli, Leiter, Maslach & Jackson, 1996). The MBI-GS assesses parallel dimensions to those contained in the original MBI, except that the items do not explicitly refer to working with people. The MBI-GS comprises of three subscales: Exhaustion (Ex), Cynicism (Cy) and Professional Efficacy (PE). Contrary to the MBI-HSS, the exhaustion items of the MBI-GS are generic; they refer to fatigue, but without direct reference to people as the source of those feelings. Cynicism reflects indifference or a distant attitude towards one's work in general. Unlike previous versions, the MBI-GS items refer to work itself rather than to the recipients of one's service or personal relationships at work. Finally, Professional Efficacy covers a broader scope than personal accomplishment as measured by the MBI-HSS by including both social and non-social accomplishments at work. Also, a person is not classified as "burned out" or "not burned out" but is rather placed on a continuum from "more burned out" to "less burned out".

With the publication of the MBI-GS (Schaufeli et al., 1996), burnout became a broader research phenomenon outside the human service sector and comparisons among different occupational groups became possible. A growing body of research during the last two decades has subjected the MBI-GS to rigorous psychometric scrutiny in different occupational settings. The majority of studies seem to support the three-factor model of burnout, namely Exhaustion, Cynicism and Professional Efficacy (e.g. Storm & Rothmann, 2003a; Jackson & Rothmann, 2003; Naudé & Rothmann, 2004b). Despite these results, Rothmann and Essenko (2005) confirmed a two-factor core of burnout structure, namely exhaustion and cynicism for support staff in a higher-education institution in the North West Province of South Africa.

Similarly, other studies also reported two-factor structures, namely Winstanley and Whittington (2002) (Exhaustion and Depersonalisation) in a general hospital staff sample, Rothmann, Steyn and Mostert (2005) (Exhaustion and Cynicism) in a sample of engineers, technicians and electricians in an electricity supply organisation, and

Demetouri, Bakker, Nachreiner and Schaufeli (2000) (Exhaustion and Disengagement) in a sample of German nurses. Consequently, it seems reasonable to expect that a two-factor structure will be found consisting of Vigour/Dedication and Absorption for burnout in the present study.

Empirical findings over the last two decades have indicated that exhaustion and mental distancing differ in various ways from a lack of professional efficacy in work-related well-being. Firstly, relatively low correlations of professional efficacy are observed with exhaustion and mental distancing, while the latter two burnout dimensions are found to correlate relatively strongly (Lee & Ashforth, 1996) or even to collapse into a single factor (Green, Walkey & Taylor, 1991). Secondly, mental distancing is found to develop in response to exhaustion, whereas professional efficacy seems to develop independently (Leiter, 1993). Thirdly, professional efficacy is the burnout dimension which shows the weakest relationship with external variables (Lee & Ashforth, 1996). Several researchers have indeed argued that professional efficacy reflects a personality characteristic rather than a genuine burnout component (Cordes & Dougherty, 1993; Shirom, 1989). Consequently, exhaustion and cynicism are regarded as the so-called core of the burnout construct (Green, Walkey & Taylor, 1991; Maslach, 1993). In terms of engagement, similar arguments have been posited for the absorption construct (Schaufeli, Martinez, Pinto, Salanova & Bakker, 2002).

With the introduction of the positive psychological framework, burnout and engagement were conceptualised as two prototypes of employee well-being that are part of a more comprehensive taxonomy constituted by the two independent dimensions of activation and identification. Activation ranges from exhaustion to vigour, while identification ranges from cynicism to dedication. According to this framework (the so-called COBE model), burnout is characterised by a combination of exhaustion (low activation) and cynicism (low identification), whereas engagement is characterised by vigour (high activation) and dedication (high identification) (Schaufeli & Bakker, 2001). The findings of this study confirmed the theoretical contention that engagement is the theoretical opposite of burnout, and that it cannot be measured effectively by the MBI-GS, but has to

be measured with its own survey, the Utrecht Work Engagement Scale (UWES) (Schaufeli, Salanova et al., 2002). Consequently, it is clear that engagement can be distinguished but not divorced from burnout in terms of its structure and operationalisation (Naudé & Rothmann, 2004, a).

Since the development of engagement, the literature seems to have supported a three-factor structure of engagement, namely Schaufeli, Salanova et al. (2002) (Vigour, Dedication and Absorption) and Schaufeli, Martinez et al. (2003) (Vigour, Dedication and Absorption). Only one local study could be found that confirmed the three-factor structure of engagement (Storm & Rothmann (2003b) (Vigour, Dedication and Absorption). However, other recent local studies seem to confirm a two-factor structure, namely Rothmann et al. (2005) (Vigour/Dedication/Absorption and Professional Efficacy) in a sample of engineers, technicians and electricians in an electricity supply organisation, and Naudé and Rothmann. (2004a) (Vigour/Dedication and Absorption) in a sample of emergency workers in Gauteng. Consequently, it seems reasonable to expect that a two-factor structure consisting of Vigour/Dedication and Absorption will be found for engagement in the present study.

South Africa is a multicultural society. According to Van de Vijver and Leung (1997), measurement equivalence and bias should be computed for measuring instruments in any multicultural setting where individuals from different cultural groups are compared in terms of a specific construct. This is particularly relevant where no norms exist for the different cultural groups, which is often the case in cross-cultural research.

In line with recommendations of Poortinga (1989) and Van de Vijver and Leung (1997) measurement equivalence and bias should be tested for in a multicultural context where differences in scores could be attributed to cultural influences in terms of item meaning and understanding, rather than differences resulting from the measuring of the constructs by the measuring instruments. If cultural influences are not accounted for, invalid conclusions regarding the constructs under study could be drawn, with serious implications for culturally diverse settings, such as South Africa. This fact becomes

specifically relevant when the psychometric properties of measuring instruments for the South African context are investigated, such as in the present study. Whereas measurement equivalence is concerned with measurement and the comparability of scores, bias is concerned with factors that influence the validity of cross-cultural comparisons. Equivalence cannot be assumed but should be established and reported in multicultural studies (Van de Vijver & Leung, 1997).

Construct equivalence is the most frequently studied type of equivalence. Although no studies of construct equivalence regarding the MBI and UWES for information technology professionals in South Africa were found, it was expected that its construct equivalence would be acceptable. Because item bias lowers the equivalence of a construct, it is important to calculate item bias before testing for the equivalence of the respective measuring instruments. An item is considered to be an unbiased measure of a theoretical construct, for example engagement, if persons from different cultural groups who are equally engaged have the same average score on a specific item (Van de Vijver & Leung, 1997). Persons with an equal standing on the theoretical construct underlying the instrument should have the same expected score on the item, irrespective of group membership. This does not mean, however, that the averages of cultural groups should be identical, but only that these averages should be identical across cultural groups for persons who are equally burnout or engaged.

Item bias can be produced by sources such as incidental differences in appropriateness of the item content and inadequate item formulation. Bias is important because it lowers the equivalence of a measuring instrument and the subsequent comparisons between individuals from different language groups as well. Two types of item bias are distinguished, namely uniform bias and non-uniform bias (Van de Vijver & Leung, 1997). Uniform bias refers to influences of bias on scores that are more or less the same for all score levels. Non-uniform bias refers to influences that are not identical for all score levels.

The importance of establishing a reliable and valid instrument to assess the work wellness of information technology professionals is not only important from an empirical point of view, but also for pragmatic, standardised applications in the individual assessment setting. In terms of South African studies, there seems to be an apparent paucity of research regarding the validity, reliability and establishment of norms for various occupational settings of work wellness. Some studies in South Africa focused on the standardisation of burnout and engagement separately (e.g. Naudé & Rothmann, 2004a, 2004b; Storm & Rothmann, 2003a, 2003b), but very little research has been undertaken regarding the application of these constructs in an inclusive theoretical model.

Consequently, the hypotheses of this study can be formulated as follows:

H1 : Burnout, as measured by the MBI-GS, can be defined as a two-dimensional construct with acceptable levels of internal consistency for each of its subscales, namely Exhaustion/Cynicism and Professional Efficacy.

H2 : Engagement, as measured by the Utrecht Work Engagement Scale (UWES), can be identified as a two-dimensional construct with acceptable levels of internal consistency, namely Vigour/Dedication, and Absorption.

H3 : The MBI-GS and the UWES are equivalent and unbiased measuring instruments for the different language groups of information technology professionals in South Africa.

H4 : Work Wellness for information technology professionals in South Africa can be conceptualised as a comprehensive construct, consisting of both negative (Burnout) and positive (Engagement) constructs.

METHOD

Research design

A cross-sectional survey design was used. Cross-sectional designs are appropriate where groups of subjects at various stages of development are studied simultaneously, whereas the survey technique of data collection gathers information from the target population by means of questionnaires (Burns & Grove, 1993).

Study population

The total population of 2500 IT professionals on the database of a leading South African IT recruitment, training and consulting company were targeted. The sample was gathered by means of a snowball sampling method where the participants were purposefully selected (screened) only when the requirements of professional registration were satisfied. The questionnaires were administered via the internet where participants had to register on-line before being able to take part in the survey. A response rate of 19% was achieved, of which 214 responses could be utilised (9%). The low response rate could be attributed to the fact that participants were required to register on the website before proceeding with completing the questionnaires. Descriptive information of the sample is given in Table 1.

Table 1
Characteristics of the Sample

Item	Category	Percentage
Language	English	52,69
	Afrikaans/African	47,31
Job Category	Consulting	10,22
	Engineering	2,69
	Management	15,59
	Marketing/Sales	2,15
	Software/Development	27,41
	Technical Administration	24,73
	Training/Education	2,15
	Other	15,05
Education	Matric & Diploma	63,44
	Matric & Higher Diploma/Bachelor's degree	23,66
	Matric & Honours degree	9,68
	Matric & Master's degree	3,23
Employment Status	Permanent	64,40
	Contract	35,60
Gender	Male	27,42
	Female	72,58
Information Technology Experience (years)	0-5	59,14
	6-10	29,03
	11-15	9,68
	16-20	5,38
	20+	1,29

The sample consisted mainly of English-speaking (52,69%) males (27,42%) with a postgraduate qualification (diploma) (63,44%) in a permanent position (64,40%) as software developers (27,41%) with an average of 7,77 years' experience in the field.

Measuring battery

Adapted versions of both the Maslach Burnout Inventory – General Survey (MBI-GS) (Schaufeli et al., 1996), as well as the Utrecht Work Engagement Scale (UWES) (Schaufeli, Salanova et al., 2002) were used in this study. Also, biographical information

was gathered regarding language, gender, job category, education, employment status and years' experience in the information technology field.

The *Maslach Burnout Inventory – General Survey (MBI-GS)* of Maslach & Jackson (1986) measures respondents' relationships with their work on a continuum from engagement to burnout. The MBI-GS has three subscales: Exhaustion (Ex) (five items; e.g. "I feel used up at the end of the workday"), Cynicism (Cy) (five items; e.g. "I have become less enthusiastic about my work") and Professional Efficacy (PE) (six items; e.g. "In my opinion, I am good at my job"). Together the subscales of the MBI-GS provide a three-dimensional perspective on burnout. All items are scored on a 7-point frequency rating scale ranging from 0 ("never") to 6 ("daily"). High scores on Ex and Cy, and low scores on PE are indicative of burnout. Internal consistencies reported by Schaufeli et al. (1996) varied from 0,87 to 0,89 for Exhaustion, 0,73 to 0,84 for Cynicism, and 0,76 to 0,84 for Professional Efficacy. Test-retest reliabilities after one year were 0,65 (Exhaustion), 0,60 (Cynicism) and 0,67 (Professional Efficacy) (Schaufeli et al., 1996).

Malan and Rothmann (in press) reported alpha coefficients of 0,89 (Exhaustion), 0,76 (Cynicism) and 0,85 (Professional Efficacy). Jackson and Rothmann (2003) reported alpha coefficients of 0,79 for Exhaustion, 0,78 for Cynicism and 0,73 for Professional Efficacy. A three-factor model was also supported by Enzmann, Schaufeli & Girault (1994); Leiter & Schaufeli (1996); and Schaufeli & Enzmann (1998). However, support for a one-factor model (e.g. Storm & Rothmann, 2003a), as well as a two-factor structure (Bakker, Killmer, Siegrist & Schaufeli, 2000; Winstanley & Whittington, 2002) is also found in the literature.

The *Utrecht Work Engagement Scale (UWES)* (Schaufeli, Salanova et al., 2002) measures levels of engagement. Initially engagement was viewed as the positive antithesis of burnout, but Schaufeli, Salanova et al. (2002) argued that it can be operationalised in its own right. The UWES is scored on a 7-point frequency scale, ranging from 0 (*never*) to 6 (*every day*). Three dimensions of engagement can be distinguished, namely Vigour (7 items; e.g. "I am bursting with energy in my work"),

Dedication (5 items; e.g. "I find my work full of meaning and purpose") and Absorption (5 items; e.g. "When I am working, I forget everything else around me"). Engaged individuals are characterised by high levels of Vigour and Dedication and also elevated levels of Absorption. In terms of internal consistency, reliability coefficients for the three subscales have been determined between 0,68 and 0,91. Improvement of the alpha coefficient (ranging from 0,78 to 0,89) seems possible without adversely affecting the internal consistency of the scale (Storm & Rothmann, 2003b). Naudé and Rothmann (2004a) confirmed the 2-factor structure of the UWES and reported acceptable internal consistencies of 0,87 (Vigour/Dedication) and 0,61 (Absorption).

Because most items on the UWES are framed in a positive manner and the MBI-GS in a negative manner, it was decided to include and mix the MBI-GS items in one questionnaire in order to guard against the creation of possible response sets.

Statistical analysis

The statistical analysis was carried out with the help of the SPSS-program (SPSS Inc., 2003). Cronbach alpha coefficients, inter-item correlation coefficients and exploratory factor analysis were used to assess the reliability and validity of the measuring instruments (Clark & Watson, 1995). Descriptive statistics (e.g., means, standard deviations, skewness and kurtosis) were used to analyse the data.

Item level analysis (item bias analysis) was performed by using analysis of variance (ANOVA) for the MBI-GS and the UWES (yielding interval-level scores). The assumption is that an item is unbiased if persons from different race groups with an equal standing on the theoretical construct underlying the instrument have the same expected score on the item (e.g. Van de Vijver & Leung, 1997). Although several statistical techniques are available for analysing item bias, analysis of variance has the advantage of computational simplicity, robustness and the possibility to study both uniform and non-uniform bias (Mellenbergh, 1982). Therefore, analysis of variance was used in the

present study. The item score was the dependent variable, while race and score levels were the independent variables.

Construct equivalence of the MBI-GS and the UWES was also performed. Construct equivalence can be investigated with several techniques, such as factor analysis, cluster analysis and multidimensional scaling or other dimensionality-reducing techniques (Van de Vijver & Leung, 1997). The basic idea behind the application of these techniques is to obtain a structure in each culture, which can then be compared across all cultures involved. Factor analysis is the most frequently employed technique for studying construct equivalence. In the current study both exploratory and confirmatory models could have been used. Given that there is information about the composition of the instruments (on the basis of previous studies), the choice of confirmatory factor analysis may seem obvious. However, the authors decided to use exploratory factor analysis for a pragmatic reason.

The UWES is a recently developed measuring instrument, and very little research regarding the validity of work wellness in South Africa was found, especially in the information technology context. Also, the authors had negative experiences with the use of confirmatory models in studying the construct validity of the MBI-GS and the UWES respectively. The reason for this is that the application of confirmatory models in terms of model fit is almost always very bad. Consequently, it is usually not clear whether the reasons for the poor fit are serious and should lead to a reformulation of the model or are trivial and do not challenge the underlying model.

Exploratory factor analysis was therefore used to examine construct equivalence. A principal components analysis was conducted to determine the number of factors of the MBI-GS and the UWES in the total sample. Subsequently, direct oblimin or oblique rotations were used to determine the solution for each race group. Factors obtained in each group were compared (after target rotation). The agreement was evaluated by a factor congruence coefficient, Tucker's phi (Van de Vijver & Leung, 1997). Values above 0,90 are taken to point to essential agreement between cultural groups, while

values above 0,95 point to very good agreement. A high agreement implies that the factor loadings of the lower and higher level are equal up to a multiplying constant. (The latter is needed to accommodate possible differences in eigenvalues of factors for the race groups.)

Spearman product-moment correlations were used to specify the relationships between the variables. A cut-off point of 0,30 (medium effect, Cohen, 1988) was set for the practical significance of correlation coefficients. Second-order exploratory factor analysis was used to test the theoretical structure of work wellness on dimensional level for both language groups.

RESULTS

Due to the composition of the sample, it was decided to conduct the analyses on language groups rather than race groups. Firstly, bias analysis was conducted to identify items (in the case of both the MBI-GS and the UWES) which show either uniform or non-uniform bias for the respective language groups in the current sample.

In the case of the MBI-GS, no significant eta square (η^2) value was obtained from any item, which means that this could be regarded as unbiased. Regarding the UWES, significant eta square (η^2) values were obtained for item 7 (main effect, medium effect size) and item 12 (main effect, medium effect size). Item 7 ("My job inspires me.") and item 12 ("In my job, I can continue working for very long periods at a time.") could therefore be regarded as uniformly biased. Consequently, these items were removed from subsequent exploratory factor analyses.

A simple principal components analysis was conducted on the 16 items of the MBI-GS on the total sample of IT professionals. Analysis of the eigenvalues (greater than 1) and scree plot indicated that two factors could be extracted. Next, principal component analysis with a varimax rotation was used in carrying out factor analyses per language

group. The pattern matrices for the English-speaking and Afrikaans/African language groups are reported in Table 2.

Table 2

Pattern Matrix of the MBI-GS

ENGLISH				AFRIKAANS/AFRICAN			
Item	1	2	3	Item	1	2	3
MBI1	-.274	0,65	0,28	MBI1	0,33	0,47	0,59
MBI2	0,03	-0,07	0,84	MBI2	0,15	0,86	0,09
MBI3	0,40	-0,10	0,57	MBI3	-0,30	0,77	-0,04
MBI4	0,39	-0,28	0,47	MBI4	-0,12	0,56	-0,51
MBI5	-0,03	0,56	0,44	MBI5	0,84	-0,05	0,03
MBI6	0,19	-0,00	0,78	MBI6	-0,01	0,80	-0,17
MBI7	-0,44	0,57	-0,01	MBI7	0,75	0,01	0,37
MBI8	0,56	-0,22	0,33	MBI8	0,03	0,40	-0,49
MBI10	0,17	0,90	-0,04	MBI10	0,88	0,01	-0,19
MBI11	0,20	0,81	-0,32	MBI11	0,88	-0,05	-0,04
MBI12	-0,07	0,77	-0,16	MBI12	0,85	-0,01	0,09
MBI13	0,72	0,49	0,08	MBI13	0,38	0,31	-0,36
MBI14	0,85	-0,05	0,10	MBI14	0,12	0,03	-0,85
MBI15	0,81	-0,12	0,08	MBI15	-0,06	0,24	-0,74
MBI16	-0,00	0,87	-0,04	MBI16	0,85	-0,06	-0,05

The pattern matrices of the two-factor solutions for the English-speaking and the Afrikaans/African language groups were then used as input for an exploratory factor analysis with target rotations. The two-factor structure was compared across groups by rotating one solution to the other. After target rotation, the following Tucker's phi coefficients were obtained: a) Factor 1 = 0,96 and b) Factor 2 = 0,95. Although the Tucker's phi coefficients compared favourably with the guideline of 0,90, inspection of Table 2 revealed that two items were complex and problematic, namely Item 1 "I feel emotionally drained from my work." and 13 "I just want to do my work and not be bothered."

Items 1 and 13 either had significant cross-loadings on more than one factor, or their loadings on specific factors did not make sense. After removal of these items, a simple factor analyses was conducted again. The scree plot and eigenvalues showed two-factors

which explained 61,12% of the total variance. The pattern matrices for the two language groups are reported in Table 3.

Table 3

Pattern Matrix of the MBI-GS

ENGLISH			OTHER		
Item	1	2	Item	1	2
MBI2	0,66	-0,05	MBI2	0,65	0,32
MBI3	0,79	-0,10	MBI3	0,70	-0,08
MBI4	0,70	-0,32	MBI4	0,83	-0,12
MBI5	0,04	0,62	MBI5	0,00	0,79
MBI6	0,78	0,04	MBI6	0,79	0,16
MBI7	-0,46	0,63	MBI7	-0,21	0,85
MBI8	0,78	-0,21	MBI8	0,78	0,03
MBI9	0,80	-0,09	MBI9	0,86	-0,05
MBI10	0,00	0,90	MBI10	0,22	0,84
MBI11	-0,21	0,77	MBI11	0,09	0,81
MBI12	-0,30	0,76	MBI12	-0,01	0,86
MBI14	0,76	-0,16	MBI14	0,68	0,09
MBI15	0,71	-0,23	MBI15	0,71	-0,07
MBI16	-0,15	0,86	MBI16	0,02	0,89

The two-factors were labelled as follows: Factor 1: Burnout and Factor 2: Professional Efficacy. A target rotation was subsequently carried out on the two-pattern matrices, which resulted in Tucker's phi coefficients of 0,96 (Burnout), and 0,95 (Professional Efficacy). These coefficients can be regarded as highly acceptable. These results do not provide support for hypothesis 1.

Next, a simple principal components analysis was conducted on the 15 items of the UWES on the total sample of IT professionals. Analysis of the eigenvalues (larger than 1) and scree plot indicated that one factor could be extracted. Next, principal component analysis was used in carrying out factor analyses per language group. The pattern matrices for the English and the Afrikaans/African language groups are reported in

Table 4.

Table 4

Pattern Matrix of the UWES

ENGLISH		AFRIKAAS/AFRICAN	
Item	1	Item	1
UWES1	0,72	UWES1	0,57
UWES2	0,88	UWES2	0,86
UWES3	0,72	UWES3	0,77
UWES4	0,87	UWES4	0,84
UWES5	0,83	UWES5	0,83
UWES6	0,46	UWES6	0,50
UWES8	0,67	UWES8	0,62
UWES9	0,73	UWES9	0,74
UWES10	0,78	UWES10	0,81
UWES11A	0,87	UWES11A	0,80
UWES13	0,80	UWES13	0,76
UWES14	0,60	UWES14	0,70
UWES15	0,63	UWES15	0,66

The pattern matrix of the one-factor solution for the English and the Afrikaans/African language groups was then used as input for an exploratory factor analysis with target rotations. The one-factor structure was compared across groups by rotating one group to the other. After target rotation, the following Tucker's phi coefficient was obtained: Factor 1 = 1,00. The Tucker's phi coefficient could be regarded as highly acceptable, demonstrating a high degree of similarity of the factor structures between the two language groups. This factor was labelled Work Engagement. The scree plot and eigenvalues showed that 54,38% of the total variance could be explained by the one-factor solution. These results provide support for hypothesis 1, while hypothesis 2 is rejected and hypothesis 3 is only partially supported. Storm and Rothmann (2003b) also found that a one-factor model including a specification of correlated errors to account for the shared domain-specific variances fitted the data better. This is evident from the lower

χ^2 value and goodness-of-fit indices that indicated better fit, as well as better construct equivalence for the proposed one-factor model.

The descriptive statistics and alpha coefficients of the MBI-GS and the UWES are given in Table 5.

Table 5

Descriptive Statistics, Alpha Coefficients and Inter-Item Correlations of the MBI-GS and the UWES

Item	Mean	SD	Skewness	Kurtosis	$r(\text{mean})$	α
Burnout	19,32	12,19	0,26	-0,65	0,51	0,89
Professional Efficacy	24,60	9,23	-1,22	1,009	0,60	0,90
Engagement	46,34	18,27	-0,81	0,17	0,50	0,93

Table 5 indicates that the three factors of the MBI-GS and the UWES are normally distributed, with the exception of Professional Efficacy. With regard to the internal consistency of the scales, all the scales seem to demonstrate acceptable coefficient alphas above the 0,70 guideline provided by Nunnally and Bernstein (1994). In terms of this guideline, the MBI-GS and the UWES seems to satisfy the requirements of homogeneity. Regarding unidimensionality, the range of inter-item correlations is not within the guideline of $0,15 < r < 0,50$ (Clark & Watson, 1995). However, the distribution of the inter-item correlations around the mean inter-item correlation could be regarded as satisfactory, indicating the unidimensionality of the scales.

Next, the Spearman correlation coefficients for the work wellness dimensions are given in Table 6.

Table 6

Spearman Correlation Coefficients of the Work Wellness Dimensions

Item	1	2	3
1. Burnout	-	-	-
2. Professional Efficacy	-0,29*	-	-
3. Engagement	-0,32*++	0,82*++	-

* $p \leq 0,01$ – statistically significant+ $r > 0,30$ – practically significant (Medium effect)++ $r > 0,50$ – practically significant (Large effect)

Inspection of Table 6 indicates that Burnout is significantly negatively related to Engagement (large effect), while Professional Efficacy is significantly positively related to Engagement (large effect). Burnout is significantly negatively related to Professional Efficacy.

Next, a second-order principal component analysis was conducted on the dimensions of work wellness. The eigenvalues indicated that two factors could be extracted, which explained 96,05% of the total variance. Consequently, a principal component extraction with a varimax rotation was used to extract the two factors. The results of the second-order factor analysis of the work wellness dimensions are given in Table 7.

Table 7

Second-Order Factor Analysis of the Work Wellness Dimensions

Dimension	Factor 1	Factor 2
Burnout	-0,09	0,99
Professional Efficacy	0,97	-0,03
Work Engagement	0,96	-0,14

Accordingly, the first factor was labelled Burnout and the second factor Work Engagement. These results provide support for hypothesis 4.

DISCUSSION

The objectives of this research were to determine the construct validity and internal consistency of work wellness for information technology professionals of different language groups in South Africa. Firstly, the psychometric properties of the MBI-GS and the UWES were tested. Reliability analyses revealed sufficient internal consistency of the subscales. Multiculturality analyses indicated evidence of item bias for the UWES, but not for the MBI-GS.

In the case of the MBI-GS, item 13 ("I just want to do my work and not be bothered") and item 1 ("I feel emotionally drained from my work.") were eliminated from the original MBI-GS on conceptual and empirical grounds, resulting in a 14-item scale. Schutte et al. (2000) also excluded item 13 in a cross-national study on the factorial validity of the MBI-GS. According to these authors problems might be caused by the ambivalent nature of this item. On the one hand, a high score may indicate disengagement and social isolation by closing oneself off from contacts with others at work. On the other hand, a higher score may indicate strong motivation and engagement: one concentrates on the task and does not want to be interrupted. The deletion of item 13 seems to be consistent with other research, showing consistent low factor loadings on item 13 (e.g. Rothmann & Jansen van Vuuren (in press), Malan & Rothmann (in press)). No literature findings could be found in support of the elimination of item 1. The problem with this item could possibly be attributed to the wording of the item for the non-English mother tongue speakers (nearly half of the sample), which could have influenced their interpretation of the question.

The results of the study showed that the MBI-GS, can be defined as a two-dimensional construct, namely Burnout (Exhaustion/Cynicism) and Professional Efficacy. The literature seems to support the contention that the core of burnout consists of exhaustion and cynicism (Green, Walkey & Taylor, 1991; Rothmann & Essenko, 2005; Rothmann et al., 2005), with professional efficacy as a separate factor (Rothmann et al., 2005).

Evidence of uniform bias was found for item 7 ("My job inspires me.") and item 12 ("In my job, I can continue working for very long periods at a time.") of the UWES. *Uniform bias* refers to the main effects of cultural differences, in other words the influence of bias on an item is consistent for all the score levels of that particular item. The results predispose somebody from a particular culture group to obtain higher or lower scores, not because they represent real differences, but because they are members of a particular cultural group (Van de Vijver & Leung, 1997). Other studies in SA did not confirm these findings (e.g. Naudé & Rothmann, 2004a; Storm & Rothmann, 2003b). Items such as these might be problematic because they could be either sample-specific or country-specific. Also, problems with these items may be related to difficult wording in a second, third or even fourth language for some of the respondents in the sample, which could have made it difficult to understand and/or interpret.

Contrary to expectations, a one-factor structure of engagement with acceptable levels of internal consistency was found in this study. This finding is consistent with the findings of Rothmann et al. (2005) in a sample of engineers, technicians and electricians in an electricity supply organisation in South Africa. This finding should be further investigated in the local context in light of the fact that other reports in the literature suggest findings to the contrary. Since no suitable literature could be found in support of this finding, it may be viewed as unique to the South African information technology environment. Furthermore, a strong association was found between professional efficacy and engagement. The literature seems to support these findings (e.g. Rothmann et al., 2005). Also, it has been argued that professional efficacy could reflect a personality characteristic rather than a genuine burnout component (Cordes & Dougherty, 1993; Shirom, 1989). Furthermore, exhaustion and cynicism are regarded as the so-called core of the burnout construct, with professional efficacy only being added later on during scale development (Green, Walkey & Taylor, 1991; Maslach, 1993).

The results showed that work-related affective well-being can be measured with both positive and negative constructs, i.e. burnout (negative) and work engagement (positive).

Also, professional efficacy were found to constitute positive affective well-being at work. These findings suggests that effective well-being should also be measured by work engagement and not only from the negative perspective, namely burnout. Also, professional efficacy should be viewed as an element of positive and not negative affective work-related well-being. This finding is also confirmed by Rothmann et al. (2005) in their sample of engineers, technicians and electricians in an electricity supply organisation in South Africa. It should be noted that despite the positive framing of the items of this scale (which is similar to the engagement scale items), the creation of response sets was controlled for by combining the positive and negative items of the different scales into a single measure. These findings are consistent with reports in the literature which view burnout and engagement as two prototypes of occupational wellness that are part of a more comprehensive taxonomy constituted by two independent dimensions of pleasure and activation (e.g. Schaufeli & Bakker, 2001; Watson & Tellegen, 1985).

A limitation of this study was that it relied exclusively on self-report measures. This causes a particular problem in validation studies that use self-report measures exclusively because at least part of the common variance of the measures has to be attributed to method variance (Schaufeli et al., 1996). Another limitation is the size of the sample, specifically the sampling procedure in the present study, which has significant limitations in terms of the generalisation of the findings. Future studies could benefit in terms of a stratified random-sample design, which would ensure sufficient representation of the different groups in the total population of the information technology industry. Furthermore, the impact of a registration procedure of information technology professionals in the current study on a website should be reconsidered in future studies. In terms of the research design, future studies should focus on longitudinal designs where inferences in terms of cause and effect could be made. Future studies conducted in this manner would confirm whether bias and equivalence do indeed exist for the different language groups of information technology professionals regarding their levels of work wellness as measured by the MBI-GS and UWES. Finally, the sample should be extended

to include more information technology professionals in various sectors in the industry in South Africa as well as in other countries.

RECOMMENDATIONS

Based on the results of this study, it is recommended that the MBI-GS and the UWES be used together to assess work wellness in the information technology industry in South Africa. However, the following items should be omitted when administering the questionnaires: items 1 and 13 of the MBI-GS, and items 7 and 12 of the UWES. This research confirms the measurement of wellness at work (consisting of burnout and work engagement) for different language groups of information technology professionals in South Africa.

Although this study provided support for the culturally fair, reliable and valid measurement of work wellness, more research is needed to determine the reliability, validity and cultural fairness of work wellness in other samples in South Africa. Future studies should use larger samples and adequate statistical techniques (e.g. exploratory factor analysis, structural equation modelling, etc.). It is also recommended that larger samples with a more powerful sampling method be utilised to enable generalisation of the findings. Translation of the measurement of work wellness in other South African languages should also be considered. Future research should focus on the use of both positively and negatively phrased items to measure work wellness in information technology professionals.

Due to the limitations associated with the sampling procedure, it cannot be ascertained beyond reasonable doubt that the influence of the "healthy worker effect" (Karasek & Theorell, 1990) contaminated the current findings, because those seriously affected by the possible prevalence of illness and disabling syndromes could have been excluded from the sample by chance, leaving the so-called "healthy worker" to be included in the sample. Furthermore, even if these recipients formed part of the present study, identification could be difficult since no clinical guidelines for the identification of work

wellness has been developed for the South African labour force in different occupational settings. This is furthermore compounded by the non-probability sampling procedure used in the present study. Future research should therefore focus on the development of clinical guidelines in terms of work wellness in various occupational settings to enable comparison and identification across occupations according to national guidelines.

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THE STRUCTURE OF OCCUPATIONAL WELL-BEING OF INFORMATION TECHNOLOGY PROFESSIONALS IN SOUTH AFRICA^{*}

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ABSTRACT

The objective of this research was to test a model of occupational well-being for information technology professionals of different language groups in South Africa. A cross-sectional survey design was used. A snowball sample ($N = 214$) of information technology professionals in South Africa was taken. Various measures of affective occupational well-being were used, namely adapted versions of the Maslach Burnout Inventory – General Survey and Utrecht Work Engagement Scale, as well as the Satisfaction With Life Scale, Affectometer-2, Life Orientation Test – Revised, Organisational Commitment Questionnaire and the Health Scale of the ASSET. The results confirmed a four-factor model of occupational well-being consisting of negative and positive work wellness, organisational commitment and general psychological well-being. Occupational well-being was equivalent across language groups, except for general psychological well-being.

OPSOMMING

Die doelstelling van hierdie navorsing was om 'n model vir beroepsgesondheid vir inligtingstechnologie-beroepslui uit verskillende taalgroepe in Suid-Afrika te toets. 'n Deursnee-opnameontwerp is gebruik. 'n Sneebalsteekproef ($N = 214$) van inligtingstechnologie-beroepslui in Suid-Afrika is geneem en aangepaste vorme van die Maslach-uitbrandingsvraelys – Algemene Weergawe en Utrecht-werksbegeesteringsvraelys, asook die Lewenstevredenheidskaal, Affektometer-2, Lewensorientasietoets – Hersiene Weergawe, Organisasiegebondenheidskaal en die Algemene Gesondheidskaal is gebruik. Die resultate dui op 'n vierfaktormodel vir beroepsgesondheid bestaande uit negatiewe en positiewe beroepsaffek, organisasiegebondenheid en algemene psigologiese gesondheid. Behalwe vir algemene psigologiese gesondheid blyk beroepsgesondheid ekwivalent oor die verskillende taalgroepe heen te wees.

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It is becoming increasingly evident that we do not yet possess all the tools to fully describe and predict human health, more particularly positive health or wellness in the information technology industry. The literature seems to support the notion that prolonged exposure to stressful events could lead to physical and emotional stress in any industry (Phipps, 1988; Whitley, Gallery, Allison, & Revicki, 1989; Young & Cooper, 1995). Many models have been developed in an effort to better understand the naturally occurring variability in health. According to Ryff and Singer (1989) the key elements in having good psychological health or wellness of the mind is having purpose in life, quality interpersonal relationships, self regard and self-mastery. They further found that psychological well-being is a multi-dimensional, dynamic process which involves physical, emotional and intellectual components. Consequently, health could be viewed as the presence of a positive mind and body. A positive mind refers to psychological wellness or the general perception that one will experience positive outcomes to the events and circumstances of life (Scheier & Carver, 1985).

The literature is quite clear on the process of becoming ill. According to Maslach, Schaufeli, and Leiter (2001) perceived stressors may lead to emotional reactions, which in turn may lead to ill health. In order to conceptualise the multi-faceted nature of health, Wilson and Cleary (1995) integrated several components into a model, including biological and physiological variables, symptom status, functional status, and general health perceptions. Measurement of wellness and other indicators of health and well-being have traditionally included clinical variables such as blood pressure and cholesterol, physiological variables such as muscular strength, as well as behavioral variables such as smoking and dietary habits. This could probably be attributed to the available selection of measurement tools (e.g. skinfold calipers, blood pressure equipment, etc.), which are only capable of detecting disease risk factors or the lack thereof.

Emphasis was placed on the detection, treatment, and prevention of disease in what is often called “wellness practice”. In addition, research that is limited to a pathogenic perspective due to the use of such measures is sometimes mislabelled as ‘health

promotion' where it could literally be labelled as 'disease prevention' research instead (Depken, 1994; Travis 1993). Practitioners have relied and often continue to rely heavily on clinical physiological and behavioural measures to plan individual and community interventions, and to predict various health outcomes. Although these types of variables are valuable indicators of bodily wellness, they provide little information about the wellness of the mind (Eysenck, 1993; Idler & Kasl, 1991; Mossey & Saphiro, 1982).

Over the last couple of decades several broader conceptualisations of well-being have been proposed, including not only general well-being, but also behaviour and motivation (Ryff, 1989; Ryff & Keyes, 1995; Warr, 1987, 1994). Ryff and her colleagues developed a context-free model of well-being which they built on the positive psychological functioning model of Erikson (Erikson, 1959; Ryff, 1989; Ryff & Keys, 1995). According to these authors well-being consists of a six-dimensional model, namely 1) *Self-acceptance*: a positive evaluation of the self in the past experienced life; 2) *Environmental mastery*: the capacity to effectively manage one's life and the surrounding world he/she functions in; 3) *Autonomy*: to have a sense of self-determination and the ability to resist social pressures; 4) *Positive interpersonal relations*: to have a genuine concern for others, for instance; 5) *Personal growth*: to have a sense of continued individual growth and development and to be open to all experiences; 6) *Purpose of life*: to have the belief that your life is purposeful and meaningful. Confirmatory factor analyses confirmed the distinction among these concepts. The relations among them could be accounted for by one latent super-factor, namely psychological well-being (Ryff & Keys, 1995).

Generally speaking, psychological well-being conceptualisations should include the various elements of well-being in general in order to understand psychological well-being in different contexts. The holistic model of psychological well-being of Ryff and Singer (1989) for instance consists of six dimensions of health-wellness, namely *emotional*, *intellectual*, *spiritual*, *social*, *physical* as well as *occupational well-being*. Two of the strongest predictors of psychological well-being are emotional and intellectual wellness. *Emotional wellness* refers to the possession of a secure self-identity and a positive sense

of self-regard, both of which are aspects of self-esteem. Self-esteem is a major component of emotional wellness (Burckhardt, 1985, Dirksen, 1989, Kozma & Stones, 1996). *Intellectual well-being* is the perception of being internally energised by an optimal amount of intellectually stimulating activity. Researchers have suggested that intellectual overload and/or underload can adversely affect health, while moderate amounts of intellectually enriching activity also seem to be optimal (Aronson, 1989; Mossey & Shapiro, 1982).

Spiritual wellness is as a belief in a unifying, integrative force between the mind and body relating to a positive perception of meaning and purpose in life. These positive perceptions of purpose in life have been empirically supported by associations with positive health outcomes and well-being. Even though limited research has been done since its development, the life purpose construct has demonstrated negative associations with loneliness and depression, and positive associations with self-esteem, family togetherness, social skills, coping beliefs and connectedness (Reker, Peacock & Wong, 1987; Zika & Chamberlain, 1992). These interactive constructs are directly linked to *social wellness* and can be defined as the perception of having support available from family or friends in times of need and the perception of being a valued support provider (Cohen & Wills, 1985).

Researchers have identified four key associations between social support and health in order to explain *physical wellness*. Firstly, the perception of available support is the most important health-protecting feature. Secondly, the quality of available support is more important than the quantity. Thirdly, support from family and friends vary in importance depending on situational support needs from the parties involved, and finally the support relationship is healthiest when it is reciprocal (Cohen, Sherrod & Clark, 1988; Cohen & Wills, 1985; Wethington & Kessler, 1986). In terms of physical health, Cassidy (1996) identified optimism as an essential factor in maintaining good physical health, especially for those individuals who may experience high levels of stress. Furthermore, optimism predicts psychological well-being and subsequent adjustment (Roth, 2002). Finally,

occupational well-being is constructed as a positive evaluation of various aspects of a job.

According to Warr (1987, 1994) well-being is job-specific rather than a context-free phenomenon and succeeds in offering a better understanding of how particular job-related work characteristics affect employee well-being at work. From the literature, this conceptualisation can be taken one step further by stating that there are also distinct differences between four primary dimensions for occupational well-being, namely affective well-being, aspiration, autonomy, competence, and a secondary fifth dimension called “integrated functioning”. The integrated functioning construct encompasses the preceding four primary dimensions and together these reflect the functioning of the person as a whole (Warr, 1987, 1994). Consequently, in order to understand occupational well-being, one would need to consider the extent to which integration of the individual in his/her totality has taken place in the workplace, an important component of which is cognitive-affective well-being.

Occupational well-being

Research on the structure of emotions and mood has shown that affective well-being consists of several different major classes of affective experience, such as anxiety-comfort, depression-pleasure, boredom-enthusiasm, tiredness-vigour and anger-placidity (Daniels, 2000). A number of underlying dimensions may account for the relationship between these dimensions, but in the context of occupational well-being, empirical evidence indicates that the pleasure-displeasure axis accounts for most of the covariance between aspects of affective well-being (Daniels, 2000). Many current instruments for measuring occupational well-being (e.g., job satisfaction, organizational commitment, tension at work, fatigue, etc.) primarily tap the affective dimension of well-being. These measurements include emotional reactions to events as well as cognitive judgments of satisfaction and fulfilment (Maslach & Jackson, 1981, 1986, 1996). It is these emotional reactions that plays an important role in the selection of suitable coping mechanisms.

One approach to coping is the dispositional point of view, in other words considering personality variables of a more stable nature in the individual that influence the process of coping strategy selection (Stone, Greenberg, Kennedy-Moore & Newman, 1991). One such a disposition is optimism, which predicts psychological well-being and subsequent adjustment (Roth, 2002). Optimism can be referred to as a stable, trait-like construct characterised by positive expectations for the future, optimistic attributions, illusion of control and self-enhancing biases (Brenes, 2002; Ebert, Tucker & Roth, 2002; Scheier, Carver & Bridges, 1994).

Other affective reactions to work include positive or negative evaluations of life circumstances (affectivity). Although it can be conceptualised as a state or trait, positive and negative affectivity are examples of a momentary, changing state (Watson, 2002). Both positive and negative affectivity capture how one feels at given points in time, whereas the trait (affect) represents stable individual differences in the level of affect generally experienced (George & Brief, 1992; Watson & Pennebaker, 1989). Watson (2002) explains that, viewed as a short-term fleeting state of emotions, these constructs are typically referred to as positive and negative "affectivity", as opposed to "affect", which refers to a long-term, stable emotional trait.

The tendency of individuals to display stable dispositions and traits can be related to general subjective well-being according to the literature. A person with a positive disposition will have positive recall and interpretation of his/her job-life satisfaction and past life events within any working environment (Bower, 1981). In similar fashion, the experience of positive affectivity can be related to higher life satisfaction, while negative affectivity is associated with lower life satisfaction (Costa & McCrae, 1980). In their two multi-national studies of subjective well-being, Diener, Lucas, Oishi and Suh (2002) found that happy individuals weighted their best life domains (e.g. health, finances, family, friends, recreation, religion, self and education) more heavily than did unhappy individuals. Unhappy individuals weighted their worst domains more heavily than happy individuals. Furthermore, individuals with an optimistic outlook of the future are also likely to experience positive moods (Penedo, 2003).

Another important aspect regarding well-being at work is the extent to which people identify affectively with their jobs. Meyer and Allen (1987) developed a model of commitment where they outlined three approaches, namely affective (an emotional attachment to, identification with and involvement in the organization), continuance (recognizing the perceived costs associated with leaving the organization) and normative commitment (a perceived obligation to remain in the organization). Common to these elements is a link between the individual and the organization, but the nature of that link differs between both people and organizations. When individuals do not identify affectively with the organisation, well-being is adversely affected. Schaufeli and Enzmann (1998) found that organisational commitment consistently correlates negatively with burnout, namely emotional exhaustion and depersonalisation.

When an individual is experiencing a lack of organisational commitment and personal identification with the values of the organization that he/she works for, it is known as disengagement, a state conducive to the development of burnout (Schaufeli & Bakker, 2001). Maslach, Jackson and Leiter (1997) describe burnout as an “erosion of engagement with the job”, in other words a subjective experience of work that started out as important, meaningful and challenging which becomes unpleasant, unfulfilling and meaningless. Burnout affects the individual on a cognitive, affective (motivational), physical and behavioural level as a result of a general breakdown in defences against prolonged job-stress (Brill, 1984). This breakdown occurs gradually and often remains unnoticed for a long time, perpetuated by ineffective coping strategies and frustrated intentions brought about by the subjective experience of work-reality.

However, empirical studies revealed that some employees, regardless of high job demands and long working hours, do not develop burnout in comparison to others but seem to find pleasure in hard work and dealing with job demands. In positive psychological terms, this could be attributed to engagement or a persistent, pervasive affective-cognitive state that is not focused on a specific object, event, individual, or behaviour (Schaufeli, Martinez, Pinto, Salanova & Bakker, 2002). Theoretically, burnout

and engagement have been considered two prototypes of employee well-being that are part of a more comprehensive taxonomy constituted by the two independent dimensions of pleasure and activation (Schaufeli & Bakker, 2001; Watson & Tellegen, 1995). Furthermore, engagement and burnout are regarded as related but independent components of work wellness (Schaufeli & Bakker, 2001; Westerman & Naudé, in press).

According to Van de Vijver and Leung (1997) equivalence needs to be determined in any multicultural setting where individuals from different cultural groups are compared in terms of a specific construct. This is particularly relevant where no norms exist for the different cultural groups, which is often the case in cross-cultural research. If cultural influences are not accounted for, invalid conclusions regarding the constructs under study could be made, with serious implications for culturally diverse settings such as South Africa. A review of the literature did not reveal a model of occupational well-being for information technology professionals, especially in the multicultural South African context. The objective of the present study is therefore to develop and test a model of occupational well-being for information technology professionals in South Africa.

METHOD

Research design

A cross-sectional survey design was used. Cross-sectional designs are appropriate where groups of subjects at various stages of development are studied simultaneously, whereas the survey technique of data collection gathers information from the target population by means of questionnaires (Burns & Grove, 1993).

Study population

The total population of 2500 information technology professionals on the database of a leading South African information technology recruitment, training and consulting

company were targeted. The sample was gathered by means of a snowball sampling method where the participants were purposefully selected (screened) only when the requirements of professional registration were satisfied. The questionnaires were administered via the internet, where participants had to register on-line before being able to take part in the survey. A response rate of 19% was achieved, of which 214 responses could be utilised (9%). The high attrition rate could be attributed to the fact that participants were required to register on the website before proceeding with completing the questionnaires. Descriptive information of the sample is given in Table 1.

Table 1
Characteristics of the Sample

Item	Category	Percentage
Language	English	52,69
	Afrikaans/African	47,31
Job Category	Consulting	10,22
	Engineering	2,69
	Management	15,59
	Marketing/Sales	2,15
	Software/Development	27,41
	Technical Administration	24,73
	Training/Education	2,15
	Other	15,05
Education	Matric & Diploma	63,44
	Matric & Higher Diploma/Bachelor's degree	23,66
	Matric & Honours degree	9,68
	Matric & Master's degree	3,23
Employment Status	Permanent	64,40
	Contract	35,60
Gender	Male	27,42
	Female	72,58
Information Technology Experience (years)	0-5	59,14
	6-10	29,03
	11-15	9,68
	16-20	5,38
	20+	11,29

The sample consisted mainly of English-speaking (52,69%) males (27,42%) with a postgraduate qualification (diploma) (63,44%) in a permanent position (64,40%) as software developers (27,41%), with an average of 7,77 years experience in the field.

Measuring battery

Adapted versions of the Maslach Burnout Inventory – General Survey (MBI-GS) (Maslach & Jackson, 1986) and the Utrecht Work Engagement Scale (UWES) (Schaufeli et al., 2002), as well as the Satisfaction with Life Scale (SWLS) (Diener et al., 1999), the Affectometer 2 (AFM-2) (Kammann & Flett, 1983), the Life Orientation Test – Revised (LOT-R) (Scheier, Carver, & Bridges, 1994), the Organisational Commitment Questionnaire (OC-Q) (Allen & Meyer, 1990), the Organisational Screening Evaluation Tool (ASSET) (Cartwright & Cooper, 2002) and a biographical questionnaire were used in this study.

The *Maslach Burnout Inventory – General Survey (MBI-GS)* of Maslach and Jackson, (1986) measures respondents' relationships with their work on a continuum from engagement to burnout. The MBI-GS has three subscales: Exhaustion (Ex) (five items, e.g. "I feel used up at the end of the workday"), Cynicism (Cy) (five items, e.g. "I have become less enthusiastic about my work") and Professional Efficacy (PE) (six items, e.g. "In my opinion, I am good at my job"). Together the subscales of the MBI-GS provide a three-dimensional perspective on burnout. All items are scored on a 7-point frequency rating scale ranging from 0 ("never") to 6 ("daily"). High scores on Ex and Cy, and low scores on PE are indicative of burnout. Internal consistencies (Cronbach coefficient alphas) reported by Schaufeli, Leiter, Maslach & Jackson (1996) varied from 0,87 to 0,89 for Exhaustion, 0,73 to 0,84 for Cynicism and 0,76 to 0,84 for Professional Efficacy. Test-retest reliabilities after one year were 0,65 (Exhaustion), 0,60 (Cynicism) and 0,67 (Professional Efficacy) (Schaufeli et al., 1996).

In a sample of senior managers in a manufacturing industry, Rothmann and Jansen van Vuuren (in press) found satisfactory reliability coefficients: Exhaustion = 0,79; Cynicism = 0,84 (after item 13 had been omitted); and Professional Efficacy = 0,84. Malan and Rothmann (in press) reported Cronbach alphas of 0,89 (Exhaustion); 0,76 (Cynicism); and 0,85 (Professional Efficacy), while Rothmann, Jackson, Kruger and Veldman (in

press) reported Cronbach alphas of 0,72 (Cynicism) and 0,69 (Professional Efficacy). Westerman and Naudé (in press) found a one-factor solution for an adapted MBI-GS with an internal consistency of $\alpha = 0,90$.

The Utrecht Work Engagement Scale (UWES) (Schaufeli et al, 2002) measures levels of engagement. Initially engagement was viewed as the positive antithesis of burnout, but according to the scale developers, it can be operationalised in its own right (Schaufeli et al., 2002). The UWES is scored on a 7-point frequency scale, ranging from 0 (*never*) to 6 (*every day*). Three dimensions of engagement can be distinguished, namely Vigour (7 items, e.g. “I am bursting with energy in my work”), Dedication (5 items, e.g. “I find my work full of meaning and purpose”) and Absorption (5 items, e.g. “When I am working, I forget everything else around me”). Engaged individuals are characterised by high levels of Vigour and Dedication, and also by elevated levels of Absorption. In terms of internal consistency, reliability coefficients for the three subscales have been determined between 0,68 and 0,91. Improvement of the alpha coefficient (ranging from 0,78 to 0,89) seems possible without adversely affecting the internal consistency of the scale (Storm & Rothmann, 2003). Westerman and Naudé (in press) found a two-factor solution for an adapted UWES with an internal consistency of $\alpha = 0,90$ for Professional Efficacy and $\alpha = 0,93$ for Engagement.

The Satisfaction with Life Scale (SWLS) (Diener et al., 1999) was used to measure satisfaction with life. The SWLS is a five-item instrument which was developed by Diener et al. (1999) to measure global cognitive judgements of one’s life. The SWLS is designed around the idea that one should ask respondents about the overall judgement of their life in order to measure the concept of life satisfaction. Participants are asked to indicate their degree of agreement or disagreement on a seven-point Likert scale (1 = strongly disagree to 7 = strongly agree). Scores on the SWLS range from 5 to 35, with higher scores indicating greater life satisfaction. Diener et al. (1999) reported a two month test-retest correlation coefficient of 0,82 and an internal consistency of 0,87.

The *Affectometer 2 (AFM-2)* (Kammann & Flett, 1983) was used to measure negative and positive affectivity. It is a 40-item self-report scale measuring the balance of positive and negative feelings during recent experience. The overall level of well-being is conceptualised as the extent to which good feelings predominate over bad feelings, which is reflected in the balanced formula for calculating the total score: $PA - NA$. The Affectometer 1 showed correlations of 0,74 with the General Well-being Schedule, -0,62 with an ad hoc list of somatic complaints, -0,70 with EPI Neuroticism, and 0,74 with 7-Step Happiness, which indicate the concurrent validity of this scale (Kammann & Flett, 1983).

The *Life Orientation Test – Revised (LOT-R)* (Scheier et al., 1994) is a ten item measure that was used to measure dispositional optimism. The Original life Orientation Test (Scheier & Carver, 1985) yielded a two-factor structure (optimism and pessimism), which was questioned (Harju & Bolen, 1998). Follow-up analyses demonstrated a one-factor structure, indicating that the LOT-R is measuring a continuum of high, average and low optimism/pessimism (Scheier et al., 1994). The LOT-R is measured on a five point Likert scale, ranging from 5 = I strongly agree, to 1 = I strongly disagree. The LOT-R was found to have adequate internal consistency (Cronbach's $\alpha = 0,78$) and excellent convergent and discriminate validity (Scheier et al., 1994). Harju and Bolen (1998) reported a Cronbach alpha coefficient of 0,75 in their sample of 204 college students.

The *Organisational Commitment Questionnaire (OC-Q)* (Allen & Meyer, 1990) consists of 18 items rated on a 5-point Likert-type scale with 1 = strongly disagree, 5 = strongly agree. Allen and Meyer (1990) stated that inter-correlations between different samples were often above 0,90, which indicates that the combined factor is congruent. Cronbach alpha coefficients were consistently above 0,80 for every one of these sub-scales (Suliman & Iles, 2000). Meyer and Allen (1997) reported median reliabilities of 0,85; 0,73, and 0,79 for the affective, normative and continuance scales respectively. Internal reliabilities of 0,80 and 0,72 have been reported on affective and continuance commitment respectively (Meyer & Allen, 1997). Jackson and Rothmann (2003) reported a one-factor

solution, which explained 60,68% of the total variance of the loadings which varied from 0,63 to 0,88.

The health subscales of the ASSET (An Organisational Screening Evaluation Tool) were used to measure physical and psychological health (Cartwright & Cooper, 2002). The health subscales consist of 19 items arranged in two subscales, namely physical health and psychological well-being. Both are scored on a scale varying from 1 (*never*) to 4 (*often*). All items on the physical subscale relate to symptoms of stress that give insight into physical health. The symptoms listed on the psychological well-being subscale are ill-health symptoms induced by stress. Johnson and Cooper (2003) found a Guttman split-half reliability coefficient of 0,74 and 0,91 for the physical and psychological health subscales respectively. They also showed that the psychological well-being subscale has good convergent validity with a widely used measure of psychiatric disorders, namely the General Health Questionnaire (Goldberg & Williams, 1988).

Statistical analysis

The statistical analysis was carried out by means of the SPSS program (SPSS Inc., 2003). Cronbach alpha coefficients, inter-item correlation coefficients and exploratory factor analysis were used to assess the reliability and validity of the measuring instruments (Clark & Watson, 1995). Descriptive statistics (e.g., means, standard deviations, skewness and kurtosis) were used to analyse the data.

The construct equivalence of the dimensions of occupational well-being was determined by means of factor analysis. Construct equivalence can be investigated with several techniques, such as factor analysis, cluster analysis and multidimensional scaling or other dimensionality-reducing techniques (Van de Vijver & Leung, 1997). Factor analysis is the most frequently employed technique for studying construct equivalence and was the method used in the current study. The basic idea behind the application of all these techniques is to obtain a structure in each culture, which can then be compared across all cultures involved. Exploratory factor analysis was used to examine the factorial structure

of occupational well-being on the construct level. A principal components analysis was conducted to determine the number of factors of the dimensions of well-being in the total sample. Subsequently, direct oblimin rotations were used to determine the solution for each race group. Factors obtained in each group were compared (after target rotation). The agreement was evaluated by a factor congruence coefficient, Tucker's phi (Van de Vijver & Leung, 1997). Values above 0,90 are taken to point to essential agreement between cultural groups, while values above 0,95 point to very good agreement. A high level of agreement implies that the factor loadings of the lower and higher levels are equal up to a multiplying constant. (The latter is needed to accommodate possible differences in eigenvalues of factors for the race groups).

Spearman product-moment correlations were used to specify the relationships between the variables. A cut-off point of 0,30 (medium effect) (Cohen et al., 1988) was set for the practical significance of correlation coefficients. Exploratory second-order factor analysis was used to test the model of occupational well-being on the construct level.

RESULTS

The descriptive statistics and alpha coefficients of the dimensions of occupational well-being are given in Table 2.

Table 2

Descriptive Statistics, Alpha Coefficients and Inter-Item Correlations of the Dimensions of Occupational Well-being

Item	Mean	SD	Skewness	Kurtosis	$r(\text{mean})$	α
Burnout	19,32	12,19	0,26	-0,65	0,51	0,89
Professional Efficacy	24,60	9,22	-1,22	1,01	0,60	0,90
Engagement	46,34	18,27	-0,81	0,17	0,50	0,93
Life Satisfaction	20,22	6,87	-0,07	-0,43	0,57	0,86
Positive Affectivity	37,18	6,25	-0,33	0,18	0,36	0,85
Negative Affectivity	24,26	7,33	1,00	1,78	0,44	0,88
Optimism	17,72	4,28	-0,45	0,38	0,44	0,80
Organisational Commitment	25,04	8,20	0,58	0,39	0,40	0,87
Ill-Health	34,03	17,48	-0,50	-0,32	0,66	0,97

The information in Table 2 indicates that the scales are normally distributed, with the exception of Professional Efficacy and Negative Affectivity. With regard to the internal consistency of the scales, all the scales seem to demonstrate acceptable internal consistencies above the 0,70 guideline provided by Nunnally and Bernstein (1994). In terms of this guideline, all the subscales seem to satisfy the requirements of homogeneity. Regarding unidimensionality, the range of inter-item correlations are within the guideline of $0,15 < r < 0,50$ (Clark & Watson, 1995), except for Burnout, Professional Efficacy, Work Engagement, Life Satisfaction and ill-Health. However, the distribution of inter-item correlations around the means seem to be satisfactory, indicating the unidimensionality of the scales.

Next, the Spearman correlation coefficients for the work wellness dimensions are given in Table 3.

Table 3

Spearman Correlation Coefficients of the Dimensions of Occupational Well-being

Item	1	2	3	4	5	6	7	8
1. Burnout	-	-	-	-	-	-	-	-
2. Professional Efficacy	-0,29*	-	-	-	-	-	-	-
3. Engagement	-0,32**	0,82***	-	-	-	-	-	-
4. Life Satisfaction	-0,37**	0,42**	0,44**	-	-	-	-	-
5. Positive Affectivity	-0,36**	0,44**	0,44**	0,51***	-	-	-	-
6. Negative Affectivity	0,44**	-0,38**	-0,38**	-0,49**	-0,45**	-	-	-
7. Optimism	-0,24*	0,31**	0,32**	0,45**	0,43**	-0,50***	-	-
8. Organisational Commitment	-0,25*	0,25	0,30**	0,28*	0,11	-0,12	0,03	-
9. Ill-Health	0,58***	-0,28	-0,30**	-0,38**	-0,47**	0,37**	-0,28	-0,17*

* $p \leq 0,01$ – statistically significant

+ $r > 0,30$ – practically significant (Medium effect)

++ $r > 0,50$ – practically significant (Large effect)

Inspection of Table 3 indicates that Burnout is significantly positively related to Ill-Health (large effect), while Professional Efficacy is significantly positively related to Engagement (large effect). Life Satisfaction is significantly positively related to Positive Affectivity (large effect), while Negative Affectivity is significantly negatively related to Optimism (inverse) (large effect).

Burnout is also significantly positively related to Negative Affectivity and significantly negatively related to Engagement (medium effect), Life Satisfaction (medium effect) and Positive Affectivity (medium effect). Professional Efficacy showed significantly positive relationships of medium effect with Life Satisfaction, Positive Affectivity, Negative Affectivity (inverse) and Optimism. Engagement showed significant relationships of medium effect with Life Satisfaction, Positive Affectivity, Negative Affectivity (inverse), Optimism, Organisational Commitment and Ill-Health. Significant relationships of medium effect were found for Life Satisfaction with Negative Affectivity (inverse), Optimism and Ill-Health (inverse). Positive Affect showed significant relationships of medium effect with Negative Affectivity (inverse), Optimism, and Ill-Health (inverse). Negative Affectivity is significantly related to Ill-Health (medium effect).

Next, a second-order principal components analysis was conducted on the dimensions of occupational well-being for the total sample of information technology professionals. Analysis of the eigenvalues (larger than 1) and scree plot indicated that four factors could be extracted. Next, principal component analysis with a direct oblimin rotation was used in carrying out factor analyses on the dimensional level per language group. The pattern matrices for the English and the Afrikaans/African language groups are reported in Table 4.

Table 4

Pattern Matrix of the Dimensions of Occupational Well-being

Dimension	ENGLISH				AFRIKAANS/AFRICAN			
	1	2	3	4	1	2	3	4
Burnout	-0,90	-0,13	-0,01	0,03	-0,46	0,38	0,31	0,33
Professional Efficacy	-0,02	-0,01	1,00	-0,03	0,07	0,94	-0,02	-0,01
Engagement	0,00	0,07	0,95	0,01	0,05	0,90	-0,13	-0,06
Life Satisfaction	0,11	0,18	0,05	0,71	0,56	0,12	-0,21	-0,19
Positive Affectivity	0,21	-0,29	0,21	0,50	0,46	0,17	0,02	-0,44
Negative Affectivity	-0,45	-0,12	0,00	-0,47	-0,90	-0,04	0,05	-0,08
Optimism	-0,12	-0,03	0,00	0,95	0,93	0,03	0,14	0,07
Organisational Commitment	0,02	0,94	0,08	0,04	-0,07	0,11	-0,98	0,07
Ill-Health	-0,90	0,12	-0,05	0,02	0,10	-0,02	-0,04	1,01

The pattern matrix of the four-factor solution for the English and Afrikaans/African language groups were then used as input for an exploratory factor analysis with target rotations. The four-factor structure was compared across groups by rotating one group to the other. After target rotation, the following Tucker's phi coefficients were obtained: Factor 1 = 0,93; Factor 2 = 0,98; Factor 3 = 0,96; Factor 4 = 0,82. Overall, the Tucker's phi coefficients are well above acceptable levels, with the exception of Factor 4. Consequently, the first three factors could be regarded as highly acceptable, demonstrating a high degree of similarity of the factor structures at construct level between the two language groups. However, this is not the case with factor 4, demonstrating a degree of dissimilarity in terms of this specific factor between the two language groups in the sample. The factors were labelled as follows: Negative Work Wellness (Factor 1); Organisational Commitment (Factor 2), Positive Work Wellness (Factor 3), and General Psychological Well-being (Factor 4), which explained 77,08 % of the total variance present in this solution.

DISCUSSION

It was the objective of this study to construct and test a model of occupational well-being for information technology professionals in South Africa. The results confirmed a four-factor model of occupational well-being consisting of negative and positive work wellness, organisational commitment, and general psychological well-being.

A high level of agreement between the language groups were found for the occupational well-being model, in particular the first three factors, which means that the experience of occupational well-being in these instances could be described as similar for the different language groups in the sample. A possible reason behind this finding could be attributed to cultural integration in a young democracy, which refers to the bringing together of cultural elements, resulting in a harmonious, collective whole. Literature in this regard is limited and the only study found which looked at the multicultural aspects of well-being was done by Wissing & Van Eeden (2001), where the assumption was made that in a well-integrated culture various norms, customs and values will support one another and fit together well. This could be the case in the broader context of the young democracy of South Africa as well.

Another aspect to consider is the lack of research in this context. Very little research has been conducted regarding the occupational well-being of information technology professionals and many studies only focused on isolated aspects of occupational well-being in the information technology environment, e.g. self-efficacy, locus of control, burnout, etc. Salanova and Schaufeli (2000) for instance investigated time and frequency exposure to and appraisal of technology and burnout (exhaustion, cynicism, and professional efficacy). Others measured computer anxiety and its effects on the users of technology (Bohlin & Hunt, 1995; Carlson & Wright, 1993; Chua, Chen & Wong, 1999). Colley, Brodzinski, Scherer and Jones (1994) studied the impact of cognitive appraisal, locus of control and level of exposure on computer anxiety, while Korunka and Vitouch (in press) measured the impact of cognitive appraisal, locus of control and level of

exposure on computer anxiety of users. Deng, Doll and Truong (2004) investigated computer self-efficacy in a user context.

General psychological well-being, however, was not expressed in a similar fashion by the language groups, pointing to the possibility of differences in the experience of this factor for the two language groups in this sample. It is important to consider the influence of language differences here because the instruments were only administered in English and nearly half of the sample were second, third and even fourth language users of English. A possible explanation could be that individuals' meaning in life and the constructs of optimism and affectivity are experienced in a different manner due to cultural differences in the use of language. Pritchard (1991) argued that because of the experience of cultural differences, individuals would find it easier to read and comprehend culturally familiar information than culturally unfamiliar information. In the process of comprehension of language individuals would use cultural awareness, accepting ambiguity and background knowledge of a specific culture and language. Consequently, individuals from the different cultures use different strategies in processing the written information that was culturally familiar or unfamiliar to them.

It is also possible that, considering the lack of norms for occupational well-being of information technology professionals in the South African context, the expression of psychological well-being could be different for cultural groupings in a more collective culture as opposed to a more individualistic culture. Studies in South Africa have found some of the measurements of occupational well-being to be culturally fair, i.e. Storm and Rothmann (2003) in their study on engagement in the South African Police services, Naudé and Rothmann (2004a) in their study on the burnout of emergency workers in South Africa, and Wissing and Van Eeden (2002) in their study on the nature of psychological well-being (affectivity, general well-being, generalized self-efficacy and self-concept). Furthermore, norms of occupational well-being do not exist for the information technology context in South Africa, only perhaps for the individual components of occupational well-being in different settings, e.g. work wellness (Westerman & Naudé, in press), organisational commitment (Mahomed & Naudé, 2005),

optimism (Rothmann & Essenko, 2005) and affectivity (Wissing & Van Eeden, 2002). According to Lightsey (1996), more research is needed in order to compare results across cultures, race, ethnicity and development periods, in order to fully understand the nature of psychological well-being.

The results showed that information technology professionals with elevated levels of burnout could also demonstrate lowered levels of general psychological well-being and ill-health problems. This means that information technology professionals who suffer from elevated levels of burnout are likely to demonstrate low satisfaction with their life in general, tend to evaluate the events in their recent experience as negative, and suffer from both physical and psychological complaints. These results are in line with reports in the literature, as research has shown that individuals with high levels of negative affectivity tend to consistently report more burnout symptoms than those with low negative affectivity, and that positive affectivity is associated with reports of higher levels of well-being (Hellgren et al., 1999; Roskies et al., 1993). The link between burnout and ill-health is quite clear from the literature (Maslach & Jackson, 1986; Maslach et al., 1997).

Information technology professionals who have positive energetic identification with their jobs are likely to evaluate their professional competence positively, be satisfied with their lives in general, would evaluate the events in recent experience as positive, would tend to be more optimistic regarding the possibilities that the future might hold, are more likely to be committed to the organisation and are less likely to express ill-health complaints. These findings are consistent with reports in the literature that high levels of professional efficacy could be associated with engagement (Maslach & Leiter, 1997; Rothmann, Steyn & Mostert, 2005; Westerman & Naudé, in press). Also, employees who have a sense of engagement have a sense of energy and affective connection with their jobs (Schaufeli & Bakker, 2004). Furthermore, Rice, Frone and McFarlin (1992) found that employees who are happy with their jobs (job satisfaction) also tend to be satisfied with their life (job-life satisfaction). Finally, negative affectivity is a strong predictor of mental health complaints (Brief et al., 1988; Roskies et al., 1993, Underwood, 2005).

A limitation of this study was that it relied exclusively on self-report measures. Another limitation is the size of the sample as well as the sampling procedure used in the present study, which have significant limitations in terms of the generalisation of the findings. Future studies could benefit in terms of a stratified random-sample design, which would ensure sufficient representation of the different groups in the total population of the information technology industry. Also, the impact of a registration procedure of information technology professionals in the current study on a website should be reconsidered in future studies. Future studies should focus on longitudinal designs, where inferences in terms of cause and effect could be made. Future studies conducted in this manner would confirm whether bias and equivalence do indeed exist for the different language groups of information technology professionals regarding their levels of work wellness as measured by the measuring instruments used in the present study.

RECOMMENDATIONS

This study proposes a model for understanding and managing the occupational well-being of information technology professionals, consisting of positive and negative work wellness, organisational commitment and general psychological well-being. The information technology manager in South Africa should be wary of the differences in the expression of general psychological well-being between different cultural groups of information technology professionals in South Africa.

Future research should include longitudinal investigation regarding the elements of occupational well-being as suggested in this study. Also, future studies incorporating other cognitive-affective indicators (e.g. situational sense of coherence, learned optimism, coping strategies, etc.) of well-being in the work context could provide further insight into the experience of the well-being of information technology professionals at work. More specifically, the relationship between cognitive-affective variables of occupational well-being and objective work outcomes (e.g. work wellness, performance, commitment) could be described in a causal manner. Furthermore, it is recommended that larger samples with a more powerful sampling method be utilised to enable generalisation

of the findings to other similar groups. Also, the use of confirmatory statistical analysis, such as structural equation modelling, is recommended. The possibility of translating these measuring instruments into other South African languages should also be considered.

Finally, the influence of the “healthy worker effect” (Karasek & Theorell, 1990) could have contaminated the current findings. This phenomenon is further complicated by the absence of clinical guidelines for the identification of occupational well-being for the South African labour force in different occupational settings. Future research should focus on the development of clinical guidelines in terms of occupational well-being in various occupational settings to enable comparison and identification across occupations according to national guidelines.

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A MODEL OF WORK-RELATED WELLNESS OF INFORMATION TECHNOLOGY PROFESSIONALS IN SOUTH AFRICA*

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ABSTRACT

The objectives of this study were to develop a model of work-related wellness of information technology professionals in South Africa. A cross-sectional survey design with an accidental sample ($N = 214$) of information technology professionals in South Africa was used. Adapted versions of the Maslach Burnout Inventory – General Survey and Utrecht Work Engagement Scale, the Satisfaction With Life Scale, Affectometer-2, Life Orientation Test – Revised, Organisational Commitment Questionnaire, the Information Technology Job Characteristics Inventory and the Health Scale of the ASSET were used. The results showed the main effects for negative affectivity in terms of burnout and engagement, while burnout, ill-health and engagement were found for positive affectivity. Interaction effects for affectivity was not confirmed.

OPSOMMING

Die doelstelling van hierdie navorsing was om 'n beroepsgesondheidsmodel vir inligtingstegnologie-beroepslui in Suid Afrika te ontwerp. 'n Deursnee-opnameontwerp is gebruik. 'n Sneebalsteekproef ($N = 214$) van inligtingstegnologie-beroepslui in Suid Afrika is geneem en aangepaste vorme van die Maslach-uitbrandingsvraelys – Algemene Weergawe en Utrecht-werksbegeesteringsvraelys, die Lewenstevredenheidskaal, Affektometer-2, Lewensoriëntasietoets – Hersiene Weergawe, Organisasiegebondenheidskaal, die Inligtingstegnologie-poseienskapvraelys en die Algemene Gesondheidskaal van die ASSET-vraelys is gebruik. Die resultate toon die hoofeffekte van negatiewe affektiwiteit ten opsigte van uitbranding en begeestering, terwyl uitbranding, ongesondheid en begeestering in die geval van positiewe affektiwiteit bevind is. Geen interaksie-effekte vir affektiwiteit is bevestig nie.

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During the last 20 years information systems have experienced rapid growth in almost all industries as a result of intense competition. This has led to more specialised jobs for information technology professionals (Huang, 2001). Besides these factors, information technology professionals have to deal with scarce resources, global competition and the need for efficiency. Furthermore, the information technology environment is known for re-structuring and/or downsizing of departments, apparent obsolescence of skills, stringent user deadlines, lack of management support and inadequate participation in decision-making (Morisson, 2002). Information technology is associated with long office hours, endless responsibilities and deadlines and the constant juggling of having too much work to do with too little time, resources and energy (Huang, 2001). Changes take place very quickly and are necessary, but the costs associated with this type of environment is high (Khosrowpour & Culpan, 1990). In the United States alone the overall business and industry costs associated with burnout is estimated to be in the range of \$150–\$180 billion per annum (Wright & Smye, 1996).

Many models have been developed in an effort to gain a better understanding of the naturally occurring variability in health. Ryff and Singer (1989) indicated that the psychological side of work-related well-being involves physical, emotional and intellectual components. Individuals who experience psychological well-being or wellness of the mind experience purpose in life, quality interpersonal relationships, self-regard and self-mastery. In the literature, several broader conceptualisations of well-being have been proposed, including affect, behaviour and motivation (Warr, 1987, 1994; Ryff, 1989; Ryff & Keyes, 1995). Ryff and her colleagues developed a context-free model of well-being which they built on the positive psychological functioning model of Erikson and Maslow (Ryff, 1989; Ryff & Keys, 1995) consisting of *self-acceptance*, *environmental mastery*, *autonomy*, *positive interpersonal relations*, *personal growth* and *purpose of life*. Confirmatory factor analyses confirmed the distinction among these concepts. The relations among them could be accounted for by a latent super-factor, namely psychological well-being (Ryff & Keys, 1995).

Ryff and Singer (1989) proposed a holistic model of psychological well-being consisting of *emotional, intellectual, spiritual, social and physical* and *occupational well-being*. Two of the strongest predictors of psychological well-being are emotional and intellectual wellness. Others, however, argue that well-being should be studied in a particular context which would offer a better understanding of how particular work characteristics affect employee well-being (Warr, 1987, 1994). Accordingly, four primary dimensions (affective well-being, aspiration, autonomy and competence) and a secondary fifth dimension (integrated functioning), which encompasses the four primary dimensions and reflects a person as a whole, can be distinguished. In this regard, Westerman and Naudé (in press) conducted a study in the information technology environment in South African and found that occupational well-being can be represented by positive and negative work wellness, general psychological well-being and organisational commitment.

Negative work wellness (burnout) can be described as an “erosion of engagement with the job”, in other words, a subjective experience of work that started out as important, meaningful and challenging which becomes unpleasant, unfulfilling and meaningless (Lee & Ashforth, 1996; Maslach, Jackson & Leiter, 1997). The literature indicates that some employees do not develop burnout in comparison to others but seem to find pleasure in hard work and dealing with job demands, regardless of high job demands and long working hours. In positive psychological terms, this could be attributed to engagement or a persistent, pervasive affective-cognitive state which is not focused on a specific object, event, individual or behaviour (Schaufeli, Martinez, Pinto, Salanova & Bakker, 2002). According to the literature, burnout and engagement can be linked to a comprehensive taxonomy constituted by the two independent dimensions of pleasure and activation (Schaufeli & Bakker, 2001; Watson & Tellegen, 1995). Furthermore, engagement and burnout are regarded as related but independent components of work wellness (Schaufeli & Bakker, 2001; Westerman & Naudé, in press).

An important outcome of work wellness is the extent to which the individual identifies affectively with the organisation. Research has shown that disengagement, a state linked

to the development of burnout, can be related to psychological commitment of the individual with the organisation (Schaufeli & Enzmann, 1998). According to Schaufeli and Bakker (2001), disengagement occurs when an individual experiences a lack of organisational commitment and personal identification with the values of the organisation that he/she works for. Organisational commitment can be defined as the relative strength of an individual's identification with and involvement in an organisation (Mowday, Porter & Steers, 1982). Meyer and Allen's (1991) model of commitment outlines three approaches, namely affective commitment (emotional attachment to, identification with and involvement in the organisation), continuance commitment (recognizing the perceived costs associated with leaving the organisation) and normative commitment (perceived obligation to remain in the organisation).

According to the literature, the experience of momentary psychological states, such as positive affectivity, can be related to higher life satisfaction, while negative affectivity is associated with lower life satisfaction (Costa & McCrae, 1980). In their two multinational studies of subjective well-being Diener, Lucas, Oishi and Suh (2002) found that happy individuals weighted their best life domains (e.g. health, finances, family, friends, recreation, religion, self and education) more heavily than did unhappy individuals. Unhappy individuals weighted their worst domains more heavily than happy individuals. According to the literature, individuals with an optimistic outlook of the future are likely to experience positive mood states (Penedo, 2003). Optimism is indicated in the literature as a good predictor of psychological well-being and subsequent adjustment (Roth, 2002). A person with a positive disposition will have positive recall and interpretation of his/her job-life satisfaction and past life events within any working environment (Bower, 1981). Optimism and positive affect seem to be related in the information technology environment in South Africa (Westerman & Naudé, in press)

In the literature, certain aspects can be identified which buffer or exacerbate the demands individuals face in the occupational setting (Cooper, Dewe & O'Driscoll, 2001). In the literature, affectivity could be identified as a possible moderator of the interaction between the characteristics of information technology professional's work environment

and their work-related well-being. General well-being (affectivity) can be seen as the balance of positive and negative feelings (affectivity) in recent experience (Kamman & Flett, 1983). Research indicates that high levels of negative affectivity can increase an individual's inclination to the experience of psychological strain and other negative outcomes, such as negative emotions and social relationships, whereas positive affectivity could be associated with high generalised self-efficacy, subjective well-being and positive social relationships (Church, 1994; Spielberger, Gorsuch & Lushene, 1970).

Work-related wellness

In the literature, viewed from the interactional perspective, any job can be analysed in terms of two elements, namely job demands and job resources (Jones & Fletcher, 1996; Schaufeli & Bakker, 2001). "Job resources" constitute the motivational process which could be linked to organisational outcomes (e.g., turnover intention) (Baumeister & Leary, 1995) via engagement. Stated differently, engagement mediates the relationship between job resources and a low tendency to leave (Houkes, Janssen, De Jonge, & Nijhuis, 2001). Job resources may play either an intrinsic motivational role because they foster employees' growth, learning and development, or they may play an extrinsic motivational role because they are instrumental in achieving work goals. Job resources refer to those physical, psychological, social or organisational aspects of the job that (1) reduce job demands and the associated physiological and psychological costs; (2) are functional in achieving work goals; and/or (3) stimulate personal growth, learning and development. Hence, resources are not only necessary to deal with job demands and to 'get things done,' but they also are important in their own right (Hobfoll, 2002).

According to self-determination theory (Deci & Ryan, 1985), work contexts that support psychological autonomy, competence and relatedness enhance well-being (i.e., vitality) and increase intrinsic motivation (Ryan & Frederick, 1997). The intrinsic motivational potential of job resources is also recognised by the Job Characteristics Theory (Hackman & Oldham, 1980). According to this theory, every job has a specific motivational potential that depends on the presence of five core job characteristics, namely skill

variety, task identity, task significance, autonomy and feedback. Furthermore, these job characteristics are linked through so-called critical psychological states with positive outcomes such as high-quality work performance, job satisfaction, and low absenteeism and turnover.

Job demands on the other hand are often linked to ill-health and include strain symptoms such as being unable to concentrate, becoming less communicative and feeling tense and uptight, tired, excessively fatigued, and job dissatisfaction. A lack of resources can best be illustrated by the Effort-Recovery model (Meijman & Mulder, 1998), which states that work environments that do not offer many resources would not succeed in fostering the willingness to dedicate one's efforts and abilities to the work task. Effort exerted in this type of environment does not provide enough resources and recovery cannot take place. If this is the case, it is unlikely that tasks will be completed successfully and that the work goal will be attained. Basic needs are not satisfied and because work goals are not achieved, burnout occurs, which leads to higher turnover. Research shows that job demands and ill-health are mediated by burnout (Schaufeli & Bakker, 2004).

The relationship in the literature between the characteristics of the job and work-related wellness of individuals is demonstrated by research on the Job Demands-Resources (JD-R) model (Demerouti, Bakker, Nachreiner, & Schaufeli, 2001). According to this model, job demands (i.e. physical demands, time pressure, shift work) could be associated with negative work wellness (exhaustion), whereas lacking job resources (i.e. performance feedback, job control, participation in decision-making, social support) is associated with positive work wellness (engagement). Theoretically speaking, the JD-R model assumes two processes: (1) an energetic process of over-taxing and wearing out in which high job demands exhaust the employee's energy stores; and (2) a motivational process in which resources foster affective connection and engagement with the job.

The occupational health literature is interested in identifying variables that impact on the negative outcomes associated with the demands of the work. Dewe, Cox and Ferguson (1993) explain the buffer effect in a transactional framework, where an ongoing

transaction between individuals and their environment exists and individuals make appraisals of the environment in an attempt to manage the consequences of this interaction. These moderator or mediating constructs can be categorised as dispositional, situational or social variables (Cooper et al., 2001). Many possible moderator or mediating variables have been identified in the literature, i.e. type A personality, self-esteem, hardiness, self-efficacy, affectivity, dispositional optimism, social support, locus of control and coping strategies. However, no studies including these factors in a model of work-related wellness of information technology professionals in South Africa were found in the literature. Furthermore, there is a lack of studies with regard to the possible moderating effects of affectivity and situational variables in the South African information technology industry.

Consequently, the following hypotheses can be stated for this study:

- H 1: Job characteristics (demands and resources), as well as positive and negative affectivity, have main effects on burnout, work engagement, ill-health and organisational commitment.
- H 2: Positive and negative affectivity interact with job characteristics to influence burnout, work engagement, ill-health and organisational commitment.

METHOD

Research design

A cross-sectional survey design was used. Cross-sectional designs are appropriate where groups of subjects at various stages of development are studied simultaneously, whereas the survey technique of data collection gathers information from the target population by means of questionnaires (Burns & Grove, 1993). Although Schaufeli and Enzmann (1998) criticise the use of cross-sectional designs in the study of burnout research and recommend that experiments and longitudinal designs should be used as far as possible, the use of structural equation modelling addresses some of the limitations associated with

this type of design (Byrne, 2001).

Study population

The total population of 2500 information technology professionals on the database of a leading South African information technology recruitment, training and consulting company were targeted. The sample was gathered by means of a snowball sampling method where the participants were purposefully selected (screened) only when the requirements of professional registration had been satisfied. The questionnaires were administered via the internet, where participants had to register on-line before being able to take part in the survey. A response rate of 19% was achieved, of which 214 responses could be utilised (9%). The low response rate could be attributed to the fact that participants were required to register on the website before proceeding with completing the questionnaires. This could explain the high attrition rate. Descriptive information of the sample is given in Table 1.

Table 1
Characteristics of the Sample

Item	Category	Percentage
Language	English	52,69
	Afrikaans/African	47,31
Job Category	Consulting	10,22
	Engineering	2,69
	Management	15,59
	Marketing/Sales	2,15
	Software/Development	27,41
	Technical Administration	24,73
	Training/Education	2,15
	Other	15,05
Education	Matric & Diploma	63,44
	Matric & Higher Diploma/Bachelor's degree	23,66
	Matric & Honours degree	9,68
	Matric & Master's degree	3,23
Employment Status	Permanent	64,40
	Contract	35,60
Gender	Male	27,42
	Female	72,58
Information Technology Experience (years)	0-5	59,14
	6-10	29,03
	11-15	9,68
	16-20	5,38
	20+	1,29

The sample consisted mainly of English-speaking (52,69%) males (27,42%) with a postgraduate qualification (diploma) (63,44%) in a permanent position (64,40%) as software developers (27,41%), with an average of 7,77 years experience in the field.

Measuring Battery

Adapted versions of the Maslach Burnout Inventory – General Survey (MBI-GS) (Maslach & Jackson, 1986) and the Utrecht Work Engagement Scale (UWES) (Schaufeli et al., 2002), as well as the Satisfaction with Life Scale (SWLS) (Diener et al., 1999), the

Affectometer 2 (AFM-2) (Kammann & Flett, 1983), the Life Orientation Test – Revised (LOT-R) (Scheier, Carver, & Bridges, 1994), the Organisational Commitment Questionnaire (OC-Q) (Allen & Meyer, 1990), the Organisational Screening Evaluation Tool (ASSET) (Cartwright & Cooper, 2002), the Information Technology Job Characteristics Survey (ITJCS) and a biographical questionnaire were used in this study.

The *Maslach Burnout Inventory – General Survey (MBI-GS)* of Maslach and Jackson, (1986) measures respondents' relationships with their work on a continuum from engagement to burnout. The MBI-GS has three subscales: Exhaustion (Ex) (five items, e.g. "I feel used up at the end of the workday"), Cynicism (Cy) (five items, e.g. "I have become less enthusiastic about my work") and Professional Efficacy (PE) (six items, e.g. "In my opinion, I am good at my job"). Together the subscales of the MBI-GS provide a three-dimensional perspective on burnout. All items are scored on a 7-point frequency rating scale ranging from 0 ("never") to 6 ("daily"). High scores on Ex and Cy, and low scores on PE are indicative of burnout. Internal consistencies (Cronbach coefficient alphas) reported by Schaufeli, Leiter, Maslach & Jackson (1996), varied from 0,87 to 0,89 for Exhaustion, 0,73 to 0,84 for Cynicism and 0,76 to 0,84 for Professional Efficacy. Test-retest reliabilities after one year were 0,65 (Exhaustion), 0,60 (Cynicism) and 0,67 (Professional Efficacy) (Schaufeli et al., 1996)

In a sample of senior managers in a manufacturing industry, Rothmann and Jansen van Vuuren (in press) found satisfactory reliability coefficients: Exhaustion = 0,79; Cynicism = 0,84 (after item 13 had been omitted); and Professional Efficacy = 0,84. Malan and Rothmann (in press) reported Cronbach alphas of 0,89 (Exhaustion); 0,76 (Cynicism); and 0,85 (Professional Efficacy), while Rothmann, Jackson, Kruger and Veldman (in press) reported Cronbach alphas of 0,72 (Cynicism) and 0,69 (Professional Efficacy). Westerman and Naudé (in press, a) found a one-factor solution for an adapted MBI-GS with an internal consistency of $\alpha = 0,90$. Westerman and Naudé, (in press, b) confirmed an internal consistency of $\alpha = 0,89$.

The Utrecht Work Engagement Scale (UWES) (Schaufeli et al, 2002) measures levels of engagement. Initially engagement was viewed as the positive antithesis of burnout, but according to the scale developers, it can be operationalised in its own right (Schaufeli et al., 2002). The UWES is scored on a 7-point frequency scale, ranging from 0 (*never*) to 6 (*every day*). Three dimensions of engagement can be distinguished, namely Vigour (7 items, e.g. “I am bursting with energy in my work”), Dedication (5 items, e.g. “I find my work full of meaning and purpose”) and Absorption (5 items, e.g. “When I am working, I forget everything else around me”). Engaged individuals are characterised by high levels of Vigour and Dedication and also by elevated levels of Absorption. In terms of internal consistency, reliability coefficients for the three subscales have been determined between 0,68 and 0,91. Improvement of the alpha coefficient (ranging from 0,78 to 0,89) seems possible without adversely affecting the internal consistency of the scale (Storm & Rothmann, 2003). Westerman and Naudé (in press, a) found a two-factor solution for an adapted UWES with an internal consistency of $\alpha = 0,90$ for Professional Efficacy and $\alpha = 0,93$ for Engagement.

The *Satisfaction with Life Scale (SWLS)* (Diener et al., 1999) was used to measure satisfaction with life. The SWLS is a five-item instrument which was developed by Diener et al. (1999) to measure global cognitive judgements of one’s life. The SWLS is designed around the idea that one should ask respondents about the overall judgement of their life in order to measure the concept of life satisfaction. Participants are asked to indicate their degree of agreement or disagreement on a seven-point Likert scale (1 = strongly disagree to 7 = strongly agree). Scores on the SWLS range from 5 to 35, with higher scores indicating greater life satisfaction. Diener et al. (1999) reported a two-month test-retest correlation coefficient of 0,82 and an internal consistency of 0,87. Westerman and Naudé (in press, b) reported an internal consistency of $\alpha = 0,86$.

The *Affectometer 2 (AFM-2)* (Kammann & Flett, 1983) was used to measure negative and positive affectivity. It is a 40-item self-report scale measuring the balance of positive and negative feelings during recent experience. The overall level of well-being is conceptualised as the extent to which good feelings predominate over bad feelings, which

is reflected in the balanced formula for calculating the total score: PA – NA. The Affectometer 1 showed correlations of 0,74 with the General Well-being Schedule, -0,62 with an ad hoc list of somatic complaints, -0,70 with EPI Neuroticism, and 0,74 with 7-Step Happiness, which indicate the concurrent validity of this scale (Kammann & Flett, 1983). Westerman and Naudé (in press, b) reported an internal consistency of $\alpha = 0,85$ for Positive Affectivity and $\alpha = 0,88$ for Negative Affectivity.

The *Life Orientation Test – Revised (LOT-R)* (Scheier et al., 1994) is a ten item measure that was used to measure dispositional optimism. The Original Life Orientation Test (Scheier & Carver, 1985) yielded a two-factor structure (optimism and pessimism), which was questioned (Harju & Bolen, 1998). Follow-up analyses demonstrated a one-factor structure, indicating that the LOT-R is measuring a continuum of high, average and low optimism/pessimism (Scheier et al., 1994). The LOT-R is measured on a five-point Likert scale, ranging from 5 = I strongly agree, to 1 = I strongly disagree. The LOT-R was found to have adequate internal consistency (Cronbach's alpha = 0,78) and excellent convergent and discriminate validity (Scheier et al., 1994). Harju and Bolen (1998) reported a Cronbach alpha coefficient of 0,75 in their sample of 204 college students. Westerman and Naudé (in press, b) reported an internal consistency of $\alpha = 0,80$.

The *Organisational Commitment Questionnaire (OC-Q)* (Allen & Meyer, 1990) consists of 18 items rated on a 5-point Likert-type scale with 1 = strongly disagree and 5 = strongly agree. Allen and Meyer (1990) stated that inter-correlations between different samples were often above 0,90 which indicates that the combined factor is congruent. Cronbach alpha coefficients were consistently above 0,80 for every one of these subscales (Suliman & Iles, 2000). Meyer and Allen (1997) reported median reliabilities of 0,85; 0,73, and 0,79 for the affective, normative and continuance scales respectively. Internal reliabilities of 0,80 and 0,72 have been reported on affective and continuance commitment respectively (Meyer & Allen, 1997). Jackson and Rothmann (2003) reported a one-factor solution, which explained 60,68% of the total variance of the loadings, which varied from 0,63 to 0,88. Westerman and Naudé (in press, b) reported an internal consistency of $\alpha = 0,87$.

The health subscales of the ASSET (An Organisational Screening Evaluation Tool) were used to measure physical and psychological health (Cartwright & Cooper, 2002). The health subscales consist of 19 items arranged in two subscales, namely physical health and psychological well-being. Both are scored on a scale varying from 1 (*never*) to 4 (*often*). All items on the physical subscale relates to symptoms of stress to give insight into physical health. The symptoms listed on the psychological well-being are ill-health symptoms induced by stress. Johnson and Cooper (2003) found a Guttman split-half reliability coefficient of 0,74 and 0,91 for the physical and psychological health subscales, respectively. They also showed that the psychological well-being subscale has good convergent validity with a widely used measure of psychiatric disorders, namely the General Health Questionnaire (Goldberg & Williams, 1988). Westerman and Naudé (in press, b) reported an internal consistency of $\alpha = 0,97$.

The *Information Technology Job Characteristics Survey* (ITJCS), consisting of 102 items, was developed for the purpose of this study. Respondents are required to rate their responses to the prevalence of various characteristics of their work on a 4-point Likert-type scale where 1 = never and 4 = always. The ITJCS characteristics are ones that could lead to the experience of strain in the information technology context, namely Mental Load (e.g. “Do you feel that you have too much work to do?”), Emotional Load (e.g. “Are you confronted in your work with things that affect you personally?”), Lack of Variety (e.g. “In your work, do you have to repeatedly do the same things?”), Opportunities to Learn (e.g. “In your work, are you encouraged to develop yourself further?”), Relationship with your Immediate Supervisor (e.g. “If necessary, can you ask your immediate supervisor for help?”), Relationship with Colleagues (e.g. “Can you rely on your colleagues to assist you when you need help?”), Information (e.g. “Do you feel that in your job you have to deal with too much information?”), Communication (e.g. “Do you know whom to approach within your department with specific problems?”), Participation (e.g. “Do you experience all your team members functioning as part of a team?”), Contact Possibilities (e.g. “Do you feel that you have enough interpersonal contact with your colleagues at work?”), Remuneration (e.g. “Do you feel that you

receive enough money for the work that you do?”), Uncertainty about the Future (e.g. “Do you need to be more secure that you will still be working in this company in one year’s time?”), Role Clarity (e.g. “Do you know exactly what other people expect of you in your work?”), Home-worklife Balance (e.g. “Do you feel that you have enough time to spend with your family?”), Technological changes (e.g. “Do you feel that technological advancements have made your job easier?”), Career Possibilities (e.g. “Does your job give you the opportunity to be promoted?”), Independence in your Work (e.g. “Do you feel that you have the authority to carry out your responsibilities as you see fit?”).

A biographical questionnaire was also developed. Participants were given the option of providing their names and contact details in the case of feedback. Furthermore, biographical information was gathered regarding language, gender, job category, education, employment status and years of experience in the information technology field.

Statistical analysis

The statistical analysis was carried out by means of the SPSS program (SPSS, 2003). Descriptive statistics (means, standard deviations, skewness and kurtosis) were computed to describe the data. Chronbach alpha coefficients and inter-item correlations were used to determine the internal consistency, homogeneity and unidimensionality of the measuring instruments (Clark & Watson, 1995). Alpha coefficients contain important information regarding the proportion of variance of the items of a scale in terms of the total variance explained by that particular scale. According to Clark and Watson (1995), the mean inter-item correlation (which is a straightforward measure of internal consistency) provides useful information in conjunction with the alpha coefficient of a scale (which is an indication of homogeneity of a scale), but as such cannot ensure unidimensionality of a scale.

In terms of statistical significance, it was decided to set the value at a 99% confidence interval level ($p \leq 0,01$). Effect sizes (Steyn, 1999) were used to decide on the practical

significance of the findings. Spearman product-moment correlation coefficients were used to specify the relationship between the variables. A cut-off point of 0,30 (medium effect, Cohen, Sherrod & Clark, 1988) was set for the practical significance of correlation coefficients.

In order to determine the main effects of independent variables (occupational affectivity) on dependent variables (work wellness, organisational commitment, ill-health, job characteristics), MANOVAs were conducted using the Wilk's lambda statistic. MANOVA tests whether mean differences among groups on a combination of dependent variables are likely to have occurred by chance (Tabachnick & Fidell, 2001). In MANOVA a new dependent that maximises group differences is created from the set of dependent variables. A one-way analysis is performed on the newly created dependent variable. Wilk's lambda was used to test the significance of the effects. Wilk's lambda is a likelihood ratio statistic of the data under the assumption of equal population mean vectors for all groups against the assumption that the population mean vectors are identical to those of the sample mean vectors for the different groups. Consequently, the significance of differences in job characteristics (job demands and job resources), burnout, work engagement, ill-health and organisational commitment scores were established with MANOVA between low and high (positive and negative) affectivity groups.

Structural equation modelling (SEM) methods as implemented by AMOS (Arbuckle, 1997) was used to test hypothesised models for interaction effects in respect of high and low groups regarding positive and negative affectivity. In the first step, multi-group structural models, which distinguish between individuals scoring high and low on positive and negative affectivity respectively were constructed. In the second step, the structural paths between job characteristics on the one hand and burnout, work engagement, ill-health, and organisational commitment on the other hand were constrained equally across groups. The χ^2 statistic and degrees of freedom provide the basis for comparison with the initial multi-group model in which no equality constraints

were imposed, indicating in each instance whether or not interaction effects occurred for the different models.

RESULTS

Regarding the Information Technology Job Characteristics Inventory (ITJCI), exploratory factor analysis revealed that five factors could be extracted, namely mental load, lack of variety, relationship with supervisor, remuneration, role clarity and independence, which accounted for 69,83% of the variance.

The descriptive statistics of the measuring instruments are given in Table 2.

Table 2

Descriptive Statistics, Alpha Coefficients and Inter-Item Correlations of the Dimensions of Work-Related Wellness

Item	Mean	SD	Skewness	Kurtosis	$r(\text{mean})$	α
Burnout	19,32	12,19	0,26	-0,65	0,51	0,89
Professional Efficacy	24,60	9,23	-1,22	1,009	0,60	0,90
Engagement	46,34	18,27	-0,81	0,17	0,50	0,93
Life Satisfaction	20,22	6,87	-0,07	-0,43	0,57	0,86
Positive Affectivity	37,18	6,25	-0,33	0,18	0,36	0,85
Negative Affectivity	24,26	7,33	1,00	1,78	0,44	0,88
Optimism	17,72	4,28	-0,45	0,38	0,44	0,80
Organisational Commitment	25,04	8,20	0,58	0,39	0,40	0,87
Ill-Health	34,03	17,48	-0,50	-0,32	0,66	0,97
Mental Load	11,65	2,32	-0,38	0,41	0,45	0,76
Lack of Variety	7,50	2,05	0,26	-0,14	0,44	0,70
Relationship with Supervisor	8,76	1,96	-0,34	0,02	0,63	0,83
Remuneration	8,51	2,82	0,47	0,28	0,59	0,85
Role Clarity	8,24	1,99	0,09	-0,01	0,45	0,71
Independence	8,04	2,02	-0,18	0,21	0,56	0,79

Table 2 indicates that the MBI-GS, UWES, AFM, SWLS, ASSET, OC-Q, LOT-R, AFM-2 and ITJCI are relatively normally distributed (skewness and kurtosis are smaller than one), except maybe for the Negative Affectivity, Career Possibilities, Exhaustion, Life Satisfaction, Ill-health and Independence subscales. Regarding the Chronbach alpha coefficients, all subscales of the measuring instruments are considered acceptable in terms of the guideline of Nunnally and Bernstein (1994).

It appears that the MBI-GS, UWES, AFM, SWLS, ASSET, OC-Q, LOT-R, AFM-2 and ITJCI have acceptable levels of internal consistency and could therefore be viewed as suitable for use in the current research. Furthermore, the mean inter-item correlation indicates that the scales are unidimensional in nature, despite the relatively high scores of some of the dimensions according to the guideline of Clark & Watson (1995).

The product-moment correlation coefficients between the MBI-GS, UWES, AFM, SWLS, ASSET, OC-Q, LOT-R, AFM-2 and ITJCI are reported in Table 3.

Table 3

Spearman Correlation Coefficients of the Dimensions of Work-Related Wellness

Item	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Burnout	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2. Professional Efficacy	-0,29*	-	-	-	-	-	-	-	-	-	-	-	-	-
3. Engagement	-0,32**	0,82***	-	-	-	-	-	-	-	-	-	-	-	-
4. Life Satisfaction	-0,37**	0,42**	0,44**	-	-	-	-	-	-	-	-	-	-	-
5. Positive Affectivity	-0,36**	0,44*	0,44*	0,51***	-	-	-	-	-	-	-	-	-	-
6. Negative Affectivity	0,44**	-0,38*	-0,38**	-0,49**	-0,45**	-	-	-	-	-	-	-	-	-
7. Optimism	-0,24*	0,31**	0,32**	0,45**	0,43**	-0,50***	-	-	-	-	-	-	-	-
8. Organisational Commitment	-0,25*	0,25*	0,30**	0,28*	0,11	-0,12	0,03	-	-	-	-	-	-	-
9. Ill-Health	0,58***	-0,28*	-0,30**	-0,38**	-0,47**	0,37**	-0,28*	-0,17	-	-	-	-	-	-
10. Mental Load	0,24*	0,11	0,12	-0,06	-0,04	0,16	-0,01	0,04	0,27*	-	-	-	-	-
11. Lack of Variety	0,47**	-0,39*	-0,50**	-0,38**	-0,28*	0,37**	-0,34**	-0,21*	0,25*	-0,06	-	-	-	-
12. Relationship with Supervisor	-0,41**	0,31**	0,35**	0,32**	0,41**	-0,28*	0,28*	0,25*	-0,27*	-0,13	0,39**	-	-	-
13. Remuneration	-0,15	0,08	0,18	0,33**	0,19*	-0,11	0,21*	0,27*	-0,16	-0,12	0,17	0,25*	-	-
14. Role Clarity	-0,39**	0,42**	0,34**	0,16	0,42**	-0,24*	0,12	0,12	-0,31**	-0,08	0,22*	0,41**	0,11	-
15. Independence	-0,31**	0,28*	0,33**	0,28*	0,32**	-0,13	0,25*	0,28*	-0,14	0,08	0,34**	0,50***	0,27*	0,48**

* $p \leq 0,01$ – statistically significant
+ $r > 0,30$ – practically significant (medium effect)
++ $r > 0,50$ – practically significant (large effect)

Inspection of Table 3 indicates that significant relationships of large effect are found for Burnout and Ill-Health, Professional Efficacy and Engagement, Engagement and Lack of Variety, Life Satisfaction and Positive Affectivity, Negative Affectivity and Optimism (inverse), and Relationship with Supervisor and Independence.

In terms of Burnout significant relationships of medium effect were found with Engagement (inverse), Life Satisfaction (inverse), Positive Affectivity (inverse), Negative Affectivity, Lack of Variety, Relationship with Supervisor (inverse), Role Clarity (inverse) and Independence (inverse). Regarding Professional Efficacy, significant relationships of medium effect are found with Life Satisfaction, Positive Affectivity, Negative Affectivity (inverse), Optimism, Lack of Variety (inverse), Relationship with Supervisor and Role Clarity. Significant relationships of medium effect are found between Engagement and Life Satisfaction, Positive Affectivity, Negative Affectivity (inverse), Optimism, Organisational Commitment, Ill-Health (inverse), Relationship with Supervisor, Role Clarity and Independence.

In terms of Life satisfaction, significant relationships of medium effect are found with Negative Affectivity (inverse), Optimism, Ill-Health (inverse), Lack of Variety (inverse), Relationship with Supervisor and Remuneration. Significant relationships of medium effect exist between Positive Affectivity and Negative Affectivity (inverse), Optimism, Ill-Health (inverse), Relationship with Supervisor, Role Clarity and Independence. Negative Affectivity is significantly positively related to Ill-Health and Lack of Variety (medium effect), while Optimism is significantly negatively related to Lack of Variety (medium effect). Significant relationships of medium effect between Ill-Health and Role Clarity (inverse), Lack of Variety and Relationship with Supervisor, Lack of Variety and Independence, Relationship with Supervisor and Role Clarity, and Role Clarity and Independence are reported.

Next, the main and interaction effects of affectivity (positive and negative) and optimism on burnout, work engagement, ill-health and organisational commitment were tested. In order to prepare the data for the analyses of main and interaction effects, the negative and

positive affectivity groups as well as the optimism group were each divided into two groups, on the basis of scores lower than the 50th percentile and scores higher than the 50th percentile. Before testing for the main and interaction effects of affectivity on work-related well-being, the job characteristics subscales were subjected to a second-order exploratory factor analysis. The result revealed two distinct factors to be extracted, namely job demands and job resources, which explained 58,50% of the variance.

Table 4

MANOVA of Job Demands and Resources, Burnout, Professional Efficacy, Work Engagement, Ill-Health, Organisational Commitment with Positive and Negative Affectivity

Variable	Value	<i>F</i>	<i>df</i>	Error <i>df</i>	<i>p</i>	Partial eta squared
Negative affectivity	0.82	6,53	7	204	0,000*	0,18
Positive affectivity	0.79	7,99	7	204	0,000*	0,22

* Statistically significant difference: $p < 0.01$

Table 4 indicates that there was a significant effect of negative affectivity on the combined dependent variables of job demands and job resources, burnout, professional efficacy, work engagement, ill-health and organisational commitment ($F_{(7, 204)} = 6,53$, $p < 0,01$; Wilk's lambda = 0,82; partial $\eta^2 = 0,18$). This effect was large (18% of the variance was explained). Analysis of each individual dependent variable showed that the groups differed in terms of the level of burnout ($F_{(1, 212)} = 16,76$, $p < 0,01$, partial $\eta^2 = 0,07$), professional efficacy ($F_{(1, 212)} = 29,34$, $p < 0,01$, partial $\eta^2 = 0,12$) and work engagement, ($F_{(1, 212)} = 22,73$, $p < 0,01$, partial $\eta^2 = 0,10$). Job resources and demands, ill-health and organisational commitment were not significant. Employees who scored low on negative affectivity (compared to those with high scores) experienced significantly less burnout and professional efficacy, and higher levels of work engagement. Therefore, a main effect of negative affectivity on burnout and work engagement was confirmed.

Table 4 also shows that there was a significant effect of positive affectivity on the combined dependent variables job demands and job resources, burnout, professional efficacy, work engagement, ill-health and organisational commitment ($F_{(7, 204)} = 7,99, p < 0,01$; Wilk's Lambda = 0,79; partial $\eta^2 = 0,22$). This effect was large (22% explained variance). Analysis of each individual dependent variable showed that the groups differed in terms of the level of job resources ($F_{(1, 212)} = 25,90, p < 0,01$, partial $\eta^2 = 0,11$), burnout, ($F_{(1, 212)} = 20,54, p < 0,01$, partial $\eta^2 = 0,09$), work engagement ($F_{(1, 212)} = 10,94, p < 0,01$, partial $\eta^2 = 0,05$), and ill-health ($F_{(1, 212)} = 24,26, p < 0,01$, partial $\eta^2 = 0,10$). Job demands, organisational commitment and professional efficacy were not significant. Employees who scored high on positive affectivity (compared to those with low scores) experienced significantly less burnout and ill-health, and more job resources and work engagement. Therefore, a main effect of positive affectivity on burnout, ill-health and work engagement was confirmed. These results do not provide support for hypothesis 1.

Next, the hypothesised structural model (unconstrained) for low and high negative affectivity groups was tested, using structural equation modelling as implemented by AMOS (Arbuckle, 1997).

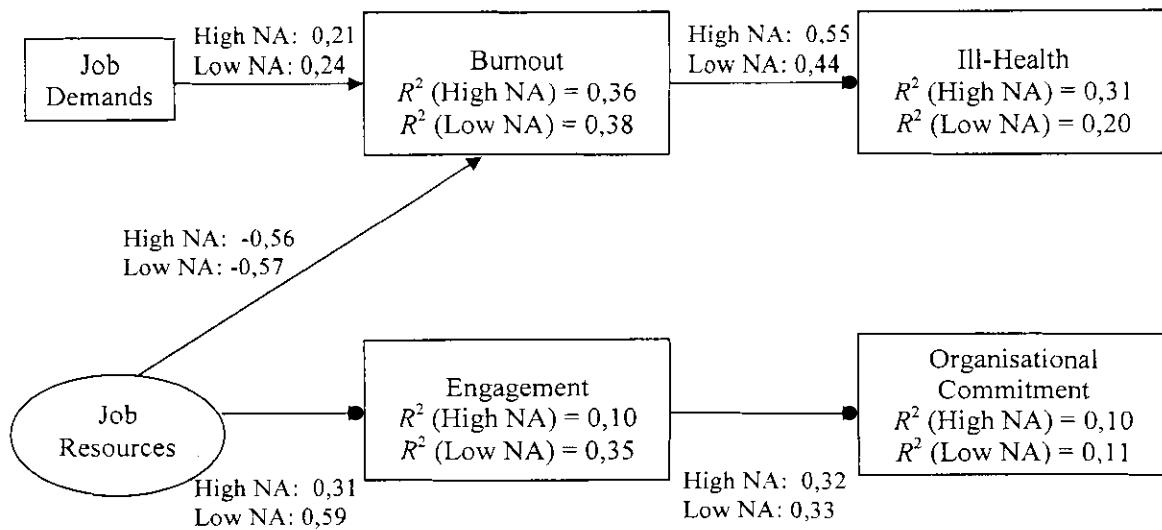


Figure 1. Structural model of work-related wellness for low and high negative affectivity groups

Inspection of the path coefficients in Figure 1 shows that those individuals with low negative affectivity did not seem to experience work-related wellness any differently from those individuals with high negative affectivity. The standardised regression coefficients between job demands and burnout, burnout and ill-health, job resources and burnout, job resources and engagement, engagement and organisational commitment were very similar for the low and high negative affectivity groups. This means that the relationship between job demands, burnout and ill-health, as well as the relationship between job resources, engagement and organisational commitment, and the relationship between job resources and burnout are not very different for those with high and low negative affectivity.

In the unconstrained model (see Figure 1) job demands and job resources predicted 36% of the variance in burnout and burnout predicted 31% of the variance in ill-health, while job resources predicted 10% of the variance in engagement and engagement predicted 10% of the variance in organisational commitment for the high negative affectivity

group. In the low negative affectivity group job demands and resources predicted 38% of the variance in burnout and burnout predicted 20% of the variance in ill-health, while job resources predicted 35% of the variance in engagement and engagement predicted 11% of the variance in organisational commitment ($\chi^2 = 288,85$, $df = 105$, $p = 0,00$).

In order to test for the possible interaction effects of negative affectivity on work-related wellness, a three-step process of constraining path coefficient relationships for low and high negative affectivity groups in the model were adopted. Firstly, the path from job demands to burnout was constrained equally, then the path from job resources to burnout, and finally the relationship between job resources and engagement. The first constrained model (job demands and burnout), as well as the second model (job resources and burnout) and third model (job resources and engagement) did not differ statistically significantly from the unconstrained model ($\Delta\chi^2_{\text{Model 1}} = 1,50$; $\Delta df = 2$; $p > 0,05$; $\Delta\chi^2_{\text{Model 2}} = 2,80$; $\Delta df = 4$; $p > 0,05$; $\Delta\chi^2_{\text{Model 3}} = 4,40$; $\Delta df = 6$; $p > 0,05$). Consequently, negative affectivity did not interact with job characteristics to influence work-related well-being.

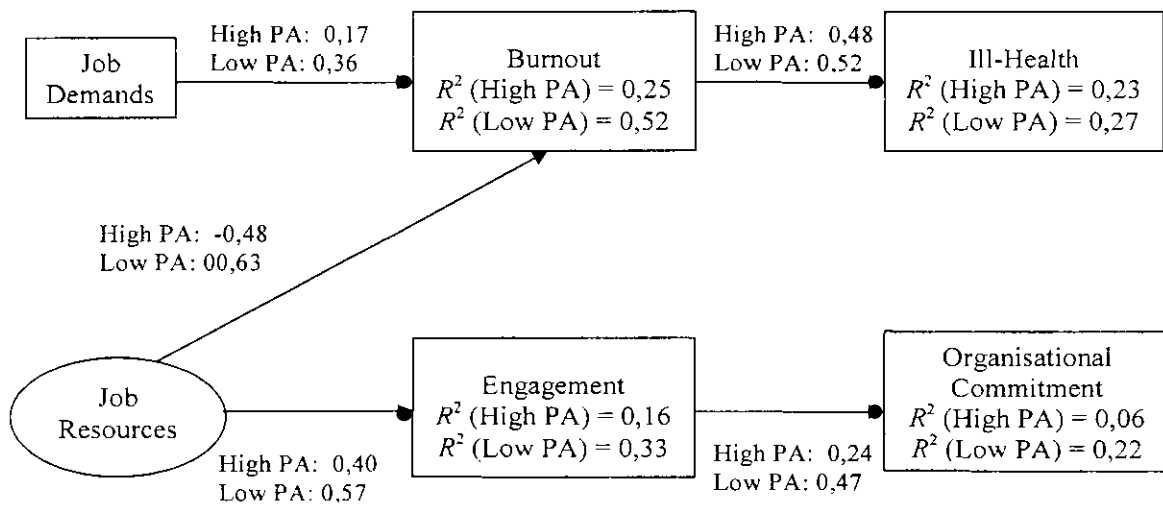


Figure 2. Structural model of work-related wellness for low and high positive affectivity groups

In Figure 2 the standardised regression coefficients appear to be different for the low and high groups of positive affectivity groups. Therefore, it is possible that the experience of work-related well-being could be quite different for individuals scoring low and those scoring high on positive affectivity. In the unconstrained model (Figure 2), job demands and job resources predicted 25% of the variance in burnout and burnout predicted 23% of the variance in ill-health, while job resources predicted 16% of the variance in engagement and engagement predicted 6% of the variance in organisational commitment for the high positive affectivity group. In terms of the low positive affectivity group, job demands and resources predicted 52% of the variance in burnout and burnout predicted 27% of the variance in ill-health, while job resources predicted 33% of the variance in engagement and engagement predicted 22% of the variance in organisational commitment.

Next, testing for the interaction effects of positive affectivity on work-related wellness was conducted by constraining the path coefficients for low and high positive affectivity groups in the model, namely the paths between job demands and burnout, job resources and burnout, as well as job demands and engagement. The results showed that the first constrained model (job resources and engagement), as well as the second (job resources and burnout) and third model (job resources and engagement) did not differ significantly from the unconstrained model ($\Delta\chi^2_{\text{Model 1}} = 2,50; \Delta df = 2; p > 0,05; \Delta\chi^2_{\text{Model 2}} = 5,50; \Delta df = 4; p > 0,05; \Delta\chi^2_{\text{Model 3}} = 5,50; \Delta df = 6; p > 0,05$). Consequently, no interaction effect was found for positive affectivity in terms of job characteristics and work-related well-being. These results do not provide support for hypothesis 2.

DISCUSSION

It was the objective of this study to construct and test a model of work-related wellness for information technology professionals in South Africa. Contrary to the expectations of the study, no interaction effects were found for affectivity in terms of job characteristics and work-related well-being. This is contrary to reports in the literature that high levels of negative affectivity can increase an individual's inclination to experience psychological

strain in the work environment, which subsequently leads to other negative outcomes, such as negative emotions, ill-health and negative social relationships. Positive affectivity, on the other hand, is associated with high generalised self-efficacy, subjective well-being and positive social relationships (Church, 1994; Spielberger, Gorsuch & Lushene, 1970).

A possible explanation for these results is that affectivity does not intervene significantly in the work environment of information technology professionals in South Africa to buffer or protect these individuals against the development of negative work-related well-being consequences, e.g. ill-health, and their commitment to the organisation. Consequently, in their transaction with the working environment, affectivity does not seem to play a significant role in protecting or buffering information technology workers against the effects of the demands from the environment. However, studies with regard to the moderating effects of affectivity on the work-related wellness of information technology professionals in South African are lacking and further research in this regard is needed.

The MANOVA showed the main effects of negative affectivity on burnout and work engagement. This is an indication that individuals on the higher levels of negative affectivity (compared to those on the lower levels) displayed significantly more burnout symptoms and higher levels of work engagement. Furthermore, positive affectivity had a large and significant independent effect on the combined variables (burnout, ill-health and work engagement). Individuals in the high positive affectivity category (compared to those with low scores) experienced significantly less burnout and ill health, but more work engagement. Because no statistically significant interaction effects were found for either positive or negative affectivity, it seems unlikely that the structure of work-related well-being differs for information technology professionals measuring high or low on positive and/or negative affectivity in the South African context. However, more research in this regard is needed, especially if one considers the limitations of the present study.

The findings showed that information technology professionals with negative work wellness (high burnout levels) are likely to report a lack of variety in their work. In the literature, burnout is associated with low satisfaction, a lack of variety and overload (Armstrong-Stassen, 1994; Scheafer & Moos, 1993). Information technology professionals with high burnout levels are also likely to experience a greater need for role clarity, less independence and poor relationships with their supervisor. Whitehead (1987) reported that a lack of role clarity and a level of independent-decision making contribute to ambiguity (a contributor to burnout), which has been associated with the development of dysfunctional attitudes and behaviours at work.

If one considers the strong associations between burnout and the development of cynical and detached attitudes and behaviours at work (Maslach et al., 1996) it is possible to understand that relationships would also be compromised at work. Furthermore, information technology professionals suffering from burnout are also likely to demonstrate low affective connection with their work, which goes hand in hand with low levels of satisfaction with their life in general, as well as negative evaluations of their experiences in their recent past and ill-health complaints. According to the literature, burnout is a subjective experience of work that started out as important, meaningful and challenging but becomes unpleasant, unfulfilling and meaningless (Lee & Ashforth, 1996; Maslach et al., 1997). Furthermore, negative emotional states have a negative affect on behaviour, which in turn affects physical health (Underwood, 2005).

The results showed that information technology professionals with positive work wellness (high engagement and professional efficacy) are likely to experience greater satisfaction in life, as well as a positive evaluation of recent experiences and positive physical and psychological health, which could contribute to a positive relationship with the supervisor, role clarity, independence and variety in their work. According to the literature, professional efficacy can be associated with positive affectivity (Spielberger et al., 1970) and engagement (Westerman & Naudé, in press a). Furthermore, optimism can be linked to positive psychological well-being and the utilisation of personal resources (Cherniss, 1990; Leiter, 1990). Positive work wellness has a definite positive influence

on ill-health and engagement, which leads to higher levels of life satisfaction and optimism (Rothmann, Steyn & Mostert, 2005, Maslach & Leiter, 1997; Westerman & Naudé, in press b). Furthermore, the literature reports positive associations between positive work wellness, identification with the goals and values of the organisation, and relationships at work (Church, 1994; Houkes et al., 2001; Ryff & Singer, 1989).

According to the results, information technology professionals who are experiencing high levels of life satisfaction will more than likely experience positive affectivity about their environment, they are generally more optimistic about the future and are less likely to suffer from ill-health complaints. Rice, Frone and McFarlin (1992) found that employees who are satisfied in their jobs (job satisfaction) also tend to be satisfied with their life (job-life satisfaction). Furthermore, individuals with an optimistic outlook on the future are also likely to experience positive mood states and generally experience higher levels of life satisfaction (Penedo, 2003; Bower, 1981). According to Wissing and Van Eeden (2002) life satisfaction is a strong indicator of general psychological well-being.

The results further indicate that information technology professionals with good psychological health are likely to prefer variety in their work, and are likely to maintain good relationships with their supervisor. These findings are consistent with reports in the literature that satisfaction at work, especially in the early career stage, can be linked to variety and supervisory support (Menguc & Bhuian, 2002). The results further indicate that remuneration plays an important role for these individuals in experiencing job/life satisfaction. The literature supports the notion that financial reward and satisfaction with work are related to career progression and satisfaction with life in general (Menguc & Bhuian, 2004; Rice et al., 1992).

There are various limitations to this study. Firstly, the study relied exclusively on self-report measures. Secondly, the sample size as well as the sampling procedure used are further limitations, which have significant impact in terms of the generalisation of the findings. In this regard, the impact of a registration procedure of information technology professionals in the current study on a website should be reconsidered in future studies.

Future studies could benefit in terms of a stratified random-sample design, which would ensure sufficient representation of the different groups in the total population of the information technology industry.

Future studies should also focus on longitudinal designs, where inferences in terms of cause and effect could be made. Furthermore, regarding the interaction effects findings, it could be useful to conduct a phenomenological assessment of the constructs and their relationships in this context. Studies conducted in this manner in future would serve to explain the interrelationships among the variables in a causal manner, but also enhance our understanding of the manner in which states such as affectivity manifest in the information technology setting.

RECOMMENDATIONS

The results of this study suggest a model of work-related wellness, inclusive of job characteristics, occupational well-being and work wellness. No evidence of the moderating effect of affectivity could be found, but main effects were confirmed for positive and negative affectivity in terms of work wellness and ill-health.

Future research regarding models of work-related wellness could include other aspects regarding the well-being of employees, e.g. cognitive weariness (intellectual well-being), other momentary states and attributions (e.g. situational sense of coherence, learned optimism, etc.), occupational stress issues in combination with characteristics of the job (consequently certain stressors could be related to specific aspects of the work environment), and coping strategies which could enhance our understanding of how employees deal with strain and the resultant stress, as well as the strategies that they use in this regard.

Due to the cross-sectional nature of the present study, no casual inferences can be made. Future research should further investigate the findings concerning the mediating effect of affectivity in the terms of occupational well-being. Furthermore, the measures of well-

being could be supplemented by more objective indicators, such as company files, in order to gain additional information on the work-related well-being of information technology professionals, and qualitative interviews (Salanova & Schaufeli, 2000).

Considering the problems associated with cross-cultural research in South Africa, translation of work-related measurement instruments should be considered in future research. Limitations of the "healthy worker effect" associated with the sampling procedure could have an influence on the current findings (Karasek & Theorell, 1990). Another aspect is the fact that identification of information technology professionals with debilitating syndromes is difficult since no clinical guidelines for the identification of work wellness has been developed for the South African labour force in different occupational settings. The non-probability sampling procedure used in the present study is another limitation in this case. Finally, longitudinal designs could be employed in further studies in order to confirm or refute the model in this study.

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CHAPTER 5

CONCLUSIONS, LIMITATIONS AND RECOMMENDATIONS

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

5.1 CONCLUSIONS

The first objective of this study was to determine the reliability and validity of work wellness (MBI-GS and UWES) for information technology professionals in South Africa. Exploratory factor analyses confirmed a two-dimensional factor structure of an adapted version of the MBI-GS and a one-dimensional factor structure for an adapted UWES with acceptable internal consistencies. Regarding the MBI-GS, support was found in the literature for a two-factor structure (Bakker, Killmer, Siegrist & Schaufeli, 2000; Winstanley & Whittington, 2002).

In terms of the UWES, support in the literature regarding the factor structure seems to be lacking. Consequently, the finding in this study could be viewed as unique to the South African information technology environment. On both conceptual and empirical grounds, items 1 and 13 were deleted from the MBI-GS. Whereas the omission of item 13 is consistent with reports in the literature (Schutte, Toppinen, Kalimo & Schaufeli, 2000; Rothmann & Jansen van Vuuren, in press; Malan & Rothmann, in press) the literature did not seem to support the findings of the elimination of item 1. The problem with this item could be attributed to the wording of the item for the non-English mother tongue speakers (nearly half of the sample), which could have influenced their interpretation of the meaning of the item.

The second objective of this study was to determine the construct equivalence and item bias of work wellness (MBI-GS and UWES) for information technology professionals in South Africa. The results showed that work wellness can be defined as a two-dimensional construct, namely burnout and work engagement (consisting of

engagement and professional efficacy). The literature seems to support the contention that the core of burnout consists of exhaustion and cynicism, with professional efficacy as a separate factor (Green, Walkey, & Taylor, 1991).

Furthermore, a strong association was found between the professional efficacy and engagement subscales in the present study. The literature seems to support these findings by arguing that professional efficacy reflects a personality characteristic rather than a genuine burnout component, which is framed in a positive manner (Cordes & Dougherty, 1993; Shirom, 1989). Furthermore, exhaustion and cynicism are regarded as the so-called core of the burnout construct (Green, Walkey & Taylor, 1991; Maslach, 1993), while similar arguments have been posited for the absorption construct (Schaufeli, Martinez, Pinto, Salanova and Bakker, 2002).

Evidence of uniform bias was found for items 7 and 12 of the UWES. The results suggest that a member of a particular cultural group would be predisposed to consistently obtain higher or lower scores, not because of real differences, but because they are members of a particular cultural group (Van de Vijver & Leung, 1997). This means that systematic differences in mean scores of members of different language groups were obtained that are not reflective of valid differences between groups, but rather as a function of differences due to language group membership. These results were not confirmed by other studies in South Africa (e.g. Naudé & Rothmann, 2004; Storm & Rothmann, 2003). Despite the fact that this finding could represent a unique sample-specific characteristic, more research is needed in the information technology context. In other words, for these items, valid comparisons across language and cultural groups cannot be made and they need to be excluded when this instrument is used in this particular context.

Consequently, with regard to the measurement of work wellness in the multilingual South African information technology setting, deletion of items 1 and 13 for the MBI-GS and items 7 and 12 for UWES is recommended. Possible explanations of these findings include the influence of semantic differences in terms of the understanding of the meaning of the items by different language/cultural groups. For this reason, translation of the work wellness questionnaire into other languages seems to be warranted. Furthermore, the sample size also proved to be problematic, more

specifically, subgroup sample sizes were not large enough to reach the $N = 50$ criterion for every scoring level of an item, which could have influenced the findings significantly on a statistical level. However, it is more likely that these findings are reflective of semantic differences in terms of item conception, especially if one considers the composition of the sample. Moreover, the creation of response sets in this study was guarded against by including both the positive and negative subscales of work wellness in one questionnaire (see Naudé & Rothmann, 2004).

The third objective was to develop and test a model of occupational well-being across different cultural groups of information technology professionals in South Africa. The results confirmed a four-factor model of occupational well-being consisting of negative and positive work wellness, organisational commitment and general psychological well-being. A high level of agreement between the language groups was found for the occupational well-being model, in particular the first three factors, which means that the experience of occupational well-being in these instances could be described as similar for the different language groups in the sample. A possible explanation for this finding could be cultural integration in a young democracy in South Africa, which refers to the bringing together of cultural elements, resulting in a harmonious, collective whole. Literature in this regard is limited and the only study which investigated the multicultural aspects of well-being was done by Wissing and Van Eeden (2001). The assumption was made that in a well-integrated culture various norms, customs and values will support one another and fit together well. This could also be the case in the broader context of the young democracy of South Africa.

General psychological well-being, however, was not expressed in a similar fashion by the language groups, pointing to the possibility of differences in the experience of this factor for the two language groups in this sample. It is important to consider the influence of language differences here because the instruments were only administered in English and nearly half of the sample were second, third and even fourth language English users. A possible explanation could be that individuals' meaning in life and the constructs of optimism and affectivity are experienced in a different manner due to cultural differences in the use of language (Pritchard, 1991).

It is also possible that, considering the lack of norms for occupational well-being of information technology professionals, the expression of psychological well-being could be different for cultural groupings in a more collective culture as opposed to a more individualistic culture. However, occupational well-being norms do seem to exist for the individual components of occupational well-being in different settings, e.g. self-efficacy, locus of control, burnout, etc.

Salanova and Schaufeli (2000) for instance investigated time and frequency of exposure to and appraisal of technology and burnout (exhaustion, cynicism and professional efficacy). Others measured computer anxiety and its effects on the users of technology (Bohlin & Hunt, 1995; Carlson & Wright, 1993; Chua, Chen & Wong, 1999). Colley et al. (1994) studied the impact of cognitive appraisal, locus of control and level of exposure on computer anxiety, while Korunka and Vitouch (in press) measured the impact of cognitive appraisal, locus of control and level of exposure on computer anxiety of users. Deng, Doll and Truong (2004) investigated computer self-efficacy with ongoing users.

The results suggest that information technology professionals who suffer from high levels of burnout are likely to demonstrate low satisfaction with their life in general and tend to evaluate the events in their recent experience as negative. They also suffer from both physical and psychological complaints. Literature reports have shown that individuals with high levels of negative affectivity tend to consistently report more burnout symptoms than those with low negative affectivity, and that positive affectivity is associated with reports of higher levels of well-being (Hellgren et al., 1999; Roskies et al., 1993). The link in the literature between burnout and ill-health is quite clear (Maslach et al., 1997; Maslach & Jackson, 1986).

Information technology professionals who find positive energetic identification with their jobs are likely to evaluate their professional competence positively, be satisfied with their live in general, would evaluate the events in recent experience as positive, would tend to be more optimistic regarding the possibilities that the future might hold, are more likely to be committed to the organisation and less likely to express ill-health complaints. These findings are consistent with reports in the literature that employees with high levels of engagement have a sense of energy and affective connection with

their jobs and are less likely to leave the organisation (Schaufeli & Bakker, 2004). Furthermore, Rice, Frone and McFarlin (1992) found that employees who are happy with their jobs (job-satisfaction) also tend to be satisfied with their life (job-life satisfaction). Finally, negative affectivity is a strong predictor of mental health complaints (Brief, Burke, George, Robinson & Webster, 1988; Roskies et al., 1993, Underwood, 2005).

The fourth objective was to develop and test a model of work-related wellness, inclusive of work wellness and work-related well-being of information technology professionals in South Africa. The results showed main effects of negative affectivity on burnout and work engagement, which means that individuals with higher levels of negative affectivity (compared to those on lower levels) displayed significantly more burnout and lower levels of work engagement. Furthermore, it was shown that positive affectivity had a large and significant independent (main) effect on burnout, ill-health and work engagement. Consequently, individuals in the high positive affectivity category (as opposed to individuals in the low negative affectivity category) experienced significantly less burnout, ill-health and more work engagement. These results are in line with reports in the literature regarding the relationship between burnout and affectivity (Hellgren et al., 1999; Roskies, Louis-Guerin & Fournier, 1993). Positive affectivity is a strong predictor of good mental health (Brief et al., 1988; Roskies et al., 1993, Underwood, 2005) and engagement (Rothmann, Steyn & Mostert, 2005).

The fifth objective was to make recommendations with regard to the possible moderating effects of work-related well-being on the work-related wellness of information technology professionals in South Africa. The results of the structural equation modelling showed no statistically significant interaction effects for the work-related wellness of information technology professionals in South Africa. Consequently, despite the main effects that have been confirmed in the present study, it seems very unlikely that the structure of work-related well-being differs for information technology professionals who are high or low on positive and/or negative affectivity in the South African context. Bosman, Rothmann and Buitendach (in press) found that negative affectivity interacted with job insecurity to affect burnout and

engagement. However, more research in this regard is needed, especially if one considers the limitations of the present study.

According to the findings of this study, information technology professionals experiencing negative work wellness (high burnout levels) are likely to report a lack of variety in their work. In the literature, burnout is associated with low satisfaction, a lack of variety and overload (Armstrong-Stassen, 1994; Scheafer & Moos, 1993). Information technology professionals with high burnout levels are also likely to experience a greater need for role clarity, less independence and experience poor relationships with their supervisor.

Whitehead (1987) reported that a lack of role clarity and a level of independent decision-making contribute to ambiguity, which could be associated with the development dysfunctional attitudes and behaviours at work. Considering that burnout is often associated with the development of cynical and detached attitudes and behaviours at work (Maslach et al., 1996) it is possible to understand that interpersonal relationships would also be compromised at work.

Information technology professionals suffering from burnout are also likely to experience a low affective connection with their work, which can be associated with low levels of satisfaction with their life in general, as well as ill-health complaints and negative evaluations of their experiences in their recent past. The literature makes it clear that burnout is a subjective experience of work that started out as important, meaningful and challenging, but that has become unpleasant, unfulfilling and meaningless (Lee & Ashforth, 1996; Maslach et al., 1997). Negative emotional states affect behaviour negatively, which in turn affects physical health (Underwood, 2005).

The results showed that information technology professionals with positive work wellness (high engagement and professional efficacy) are likely to experience a positive evaluation of recent experiences, positive physical and psychological health and greater satisfaction in life, which could contribute to a positive relationship with the supervisor, role clarity, independence and variety in their work. The literature confirms that professional efficacy can be associated with positive affectivity (Spielberger et al., 1970) and engagement (Rothmann et al., 2005). Furthermore,

optimism can be linked to positive psychological well-being and the utilisation of personal resources (Cherniss, 1990; Leiter, 1990). According to (Rothmann et al., 2005, Maslach & Leiter, 1997) positive work wellness has a definite positive influence on ill-health and engagement, which leads to higher levels of life satisfaction and optimism. The literature reports positive associations between positive work wellness, identification with the goals and values of the organisation, and relationships at work (Church, 1994; Houkes et al., 2001; Ryff & Singer, 1989).

According to the results, information technology professionals who are experiencing high levels of life satisfaction will more than likely also experience positive affectivity in terms of their environment, they are generally more optimistic about the future and are less likely to suffer from ill-health complaints. The literature confirms that employees who are satisfied in their jobs (job satisfaction) also tend to be satisfied with their life (job-life satisfaction) (Rice et al., 1992). Individuals with an optimistic outlook on the future are also likely to experience positive mood states and experience higher levels of life satisfaction (Bower, 1981; Penedo, 2003).

Wissing and van Eeden (2002) confirm that life satisfaction is a strong indicator of general psychological well-being. The results also show that information technology professionals with good psychological health are likely to prefer variety in their work, and are likely to enjoy positive relationships with their supervisor. This is consistent with reports in the literature that satisfaction at work, especially in the early career stage, can be linked to variety and supervisory support (Menguc & Bhuian, 2002). The results further indicate that remuneration plays an important role for these individuals in experiencing job/life satisfaction. According to the literature, financial reward and satisfaction with work are related to career progression and satisfaction with life (Menguc & Bhuian, 2004; Rice et al., 1992).

5.2 LIMITATIONS OF THIS RESEARCH

The first limitation of this research was the use of a cross-sectional research design. Consequently, despite the use of advanced statistical techniques, such as structural equation modelling, no causal inferences could be made with regard to the

relationships between the constructs used in the present study. At best, these relationships could only be analysed and described, not established. The identification of relationships in the present study serves only to establish certain patterns consistent with previous theoretical research regarding the chronological relationships of the different variables under study. Future longitudinal and quasi-experimental designs are needed to validate hypothesised causal relationships between the various antecedents and possible consequences of work-related well-being, and also to expand our knowledge in terms of the inclusion of other variables in the study of well-being in the occupational context.

A second limitation of the present study is the sampling method adopted in the design of this research. The sample was gathered by means of a snowball method, where the participants were purposefully selected (screened) only when the requirements of professional registration had been satisfied. The questionnaires were administered via the internet, where participants had to register on-line before being able to take part in the survey. This resulted in the under-representation of relevant sub-groupings in the sample. This aspect became especially pertinent in the bias analysis where the analysis of variance could not include significant representation of the language groups in the different scoring groups of an item. Consequently, statistical power was sacrificed and the possibility of ascribing the findings to pure chance unfortunately exists.

Furthermore, the use of a probability sample does not allow for inferences to be made regarding the characteristics of the total population. Limitations in this regard could be addressed by the utilisation of a stratified randomised sampling method where adequate subgroup representation in the sample could be ensured. This will significantly increase the likelihood of describing the characteristics of a valid sub-sample of the total population, and meaningful inferences could be made with regard to the characteristics of the total population.

The third limitation of the current research is the fact that it is relying solely on self-report measures. Problems with this aspect are often associated with method variance where the shared variance between measures could at least partly be attributed to the use of self-report measures (Schaufeli, Enzmann & Girault, 1993). However, in a

review of self-report measures regarding perceptions and affective reactions to jobs and work environments, it became evident that little evidence of common method variance could be found (Spector, 1987). Other researchers have demonstrated that even if interactions between the constructs are found, it poses no real threat relating to the findings obtained (Dollard & Winefield, 1998; Wall, Jackson, Mullarkey & Parker, 1996).

Another dimension to this argument is the relatively small amount of alternative methods available for the use of self-report measures. Research should be aiming to develop more objective means of measuring job characteristics and occupational well-being, for example. Alternative recommendations as proposed by Dolan (1995) is noted here. Accordingly, a multivariate approach should be taken in the study of work-related wellness by including numerous associated variables inherent to the job, the environment and the individual (e.g. individual traits, states, attributions, characteristics of the environment, etc.).

Fourthly, the current research was conducted in a sample of information technology professionals across organisations and sectors in South Africa. The unique characteristics of the information technology industry such as organisational culture, and specifically how it manifests in each organisational setting, could have played a significant role in the participants' responses to items. The implications are that the results of the current research could be unique to the information technology profession in only a selection (at best a chance selection) of South Africa and generalisation to other contexts or professions therefore cannot be made. The replication of this study in other occupational settings is therefore a necessity.

Distrust in confidentiality could be another limitation of this study as there is a possibility that some participants in this research did not totally trust the confidentiality statement set out in the covering letter that accompanied the questionnaires on the website. This could have had an influence on some of the results. Another aspect to mention in this regard is the possibility of time-outs when completing a questionnaire at a remote location.

5.3 RECOMMENDATIONS

Next, recommendations are made for the organisation, as well as suggestions for future research.

5.3.1 Recommendations for the organisation

A particularly challenging feature of the information technology profession is the constant innovation of new products or the consistent exceeding of the service expectations of demanding customers. This often requires personal capabilities such as multi-tasking, collaboration, new idea generation, psychological engagement, cross-organisational support and integration with complex systems while dealing with too few people, the need to be smart, the most economic way of doing things and global competition. Increasingly, information technology professionals are exposed to obsolescence of skills, stringent user deadlines, a lack of management support, and the frantic pace at which things keep changing in the industry. Research has demonstrated that these challenges often lead to unwellness in the information technology industry.

Work-related wellness should be part of the strategic alignment of any company in the information technology industry and could indeed be seen as a competitive advantage in this new economy. If this indeed takes place, the possibility of creating a wellness culture could exist in the industry. Wellness practice should indeed form part of the company's values and empowerment structures.

On a more practical level, the role of ergonomics in information technology should be considered as fundamental in creating an environment where engagement and organisational commitment are fostered. Job resources that foster the development of engagement (which would lower the tendency to leave the organisation), should be put into place. Resources in this regard could include job re-evaluation exercises to create a better fit between the individual and the job, as well as individual profile analysis and review of structures in order to facilitate effective succession planning.

Intervention research also showed that increasing the job resources (e.g. through participative management, increasing social support, recognition structures as well ensuring employee and job fit) could lead to more work engagement. In the literature, support is given to the strategy of decreasing the job demands rather than to increasing resources because its effect on the reduction of burnout is greater if one were to compare solitary strategies with one another. In this regard, Golembiewski, Hiles and Rick (1987) recommended an organisational development approach where participatory consensus for change could be facilitated with the strengthening of social networks, problem confrontation and group consolidation around problems. According to Karasek and Theorell (1990), this approach essentially reduces job demands and increases employee control over outcomes affecting employees' lives. In any wellness intervention, unconditional buy-in from management is non-negotiable as the success of these programmes will be determined largely by management's own participation in it (the top-down approach).

Given the pervasive nature of work wellness, the information technology industry should design and implement planned interventions to combat the prevalence of unwellness by managing the work-related wellness of professionals in their employ. According to Lee and Ashforth (1993), interventions should be designed for the long term in order to deal with the root cause of unwellness, rather than just its symptoms. Consequently, focusing on the elimination of demands alone is not enough in ensuring work-related wellness of information technology professionals.

Schaufeli and Bakker (2002) recommended that individual programmes be supported by organisationally based programs. There should be a focus on developing the positive aspects of work wellness, such as job resources and engagement, as well as the elimination of negative aspects of work wellness, such as burnout and ill-health complaints. Among these interventions, techniques such as self-monitoring, self-assessment, didactic stress management, promotion of a healthy life-style and relaxation techniques can be used (Schaufeli & Enzmann, 1998, pp. 146-168). Organisational development interventions in general, but also interventions aimed at influencing the values and culture of the organisation regarding perceptions about work-related wellness could be considered. Furthermore, psycho-educational

programmes should be developed to combat burnout and the management of demands at work, as well as the capitalisation on resources which would foster engagement.

Another recommendation regarding interventions is that information technology professionals should be coached in terms of how to attend to strain as well as making management aware of the consequences to the organisation if this were to be ignored. Many successful programmes integrated the assessment and development of coping strategies in their programmes. Secondary interventions for individuals who already show signs of ill-health in order to help them increase their coping strategies (i.e. dealing with change, relaxation techniques, physical activity, self-monitoring, self-assessment, stress management, promotion of a healthy lifestyle, conflict resolution, and emotional support).

Intervention programmes should be developed for individuals who are already suffering from negative work wellness symptoms by means of a cognitive-appraisal approach as recommended by Schaufeli & Enzmann (1998). However, considering the central role of job demands in work wellness, the best way to address the issue of work wellness seems to be the reduction of organisational and environmental strain, preferably in combination with a resource-development identification and utilisation component in some kind of pro-active, preventative framework. Some tertiary intervention strategies could include the allocation of health professionals (e.g. psychologists and medical practitioners on 24-hour call).

5.3.2. Recommendations for future research

The findings of the present study might have important implications for future research and practice, despite the various limitations already mentioned. Firstly, the work wellness concept could stimulate future research into a wide range of occupations (Schutte, Toppinen, Kalimo & Schaufeli, 2000). Future South African research needs to determine the levels of work wellness in various occupational groups in order to enable comparisons between norm-groups. Furthermore, there should be a drive from researchers to investigate the constructs of general psychological well-being in the occupational context, e.g. work wellness and

occupational well-being. The challenge, however, is to investigate the role of more momentary indicators of well-being, e.g. situational sense of coherence and learned optimism. Furthermore, norms regarding work wellness in different occupations, professional groups and even organisation and industry could be generated to enable meaningful comparisons within the South African context. Consequently, target groups could be identified to facilitate intervention research.

In terms of psychometrics, the lack of validated clinical cut-off points with regard to the measurement of work wellness is due to insufficient South African norms for various indicators of work-related wellness used in this study. This problem makes the early detection of work unwellness very difficult, as well as the distinction between work-related wellness and clinical conditions. Therefore, research aimed at determining a clinical profile for work-related well-being with validated cut-off points in various occupational settings in South Africa is needed.

Another psychometrical recommendation stems from the inherent problems of measurement in multicultural settings, such as South Africa. South African studies in the work-related well-being domain should include the detection of multiculturalism (equivalence and bias analysis). Furthermore, research design selection significantly influences the robustness of findings and it is recommended that large, stratified random samples be considered as far as possible, facilitating the use of advanced statistical methods such as exploratory factor analysis with target rotations (equivalence), analysis of variance to detect item bias, as well as exploratory and confirmatory factor analysis, and structural equation modelling analyses in the determination of the validity of measuring instruments in a multicultural setting such as South Africa. Finally, more research is needed with regard to the conceptualisation and operationalisation of work wellness, especially if one considers the problems with regard to difficult item phrasing and the effects thereof on the administration of surveys in a largely non-English first language user context. Perhaps the recommendation more pertinent in this regard is the translation of the measures of work-related well-being in the other official languages of South Africa.

To date, very little is known with regard to the sequential dynamics of work-related wellness and its various antecedents and consequences in the South African context. It

is recommended that causal models with longitudinal designs be utilised with the inclusion of various dispositional, situational and social variables. Future research should also focus on the identification of momentary indicators of work-related wellness in a continuous assessment setting, e.g. diary studies. Existing theoretical models seem to be relevant here, e.g. situational sense of coherence (Artinian, 1997) and learned optimism (Seligman, 1991) in the context of existing models of occupational well-being, such as Ryff and Singer (1989), Warr (1987, 1994) and the Job Demand – Resources Model (Demerouti et al., 2001).

In terms of the study of work wellness, it is recommended that researchers rather consider the use of a combination of both positively and negatively phrased items to measure work-related well-being. Furthermore, more research is needed to determine to what extent work-related wellness can be related to organisational outcomes such as the taking of sick leave, productivity, job satisfaction, quality of goods and services, retention and turnover. A lack of research in this area seems to exist in the South African research literature, especially if one considers the operationalisation of work-related wellness in the positive psychology context.

Further to the studying of factors that contribute to the development of work-related wellness in information technology professionals in South Africa, it is necessary to further explore the extent to which certain dispositional, situational or social aspects buffer or exacerbate the interaction between the information technology professional environment and work-related well-being outcomes, e.g. sickness absenteeism, in future research. It is possible that the influence of these aspects could either predispose the information technology professionals to experience work wellness, or alternatively interact to buffer (or even exacerbate) work-related wellness. Future research should include various other dispositional, situational and social variables, such as personality dispositions (e.g. locus of control, sense of coherence, hardiness, dispositional optimism, self-esteem and self-efficacy), momentary psychological states (e.g. situational sense of coherence, learned optimism, etc.), social support and perceived control over job outcomes. Furthermore, more information would be gleaned to better understand the relationships between various work-related factors pertinent to the work-related well-being of information technology professionals.

Future studies should also focus on the study of work-related wellness interventions in South Africa. The following aspects need to be considered in future research in this regard:

- Investigating the effects of individual and organisational work-related wellness interventions
- Use of intervention mapping or action research principles in the planning, research and implementation of the effects of these interventions (Bartholomew, Parcel & Kok, 1998)
- Use of appropriate research designs, such as probability sampling methods with acceptable sample sizes when measuring work-related wellness.
- Considering the practical significance of findings in addition to statistical significance.
- Incorporating different types of change (alpha, beta and gamma) in terms of the effectiveness of implemented interventions (Vandenberg & Self, 1993).
- Using methods towards defining and determining the clinical significance of work-related wellness treatment effects (Jacobson et al., 1999) on work-wellness.
- Conducting both etiological and prevention effectiveness studies (Skov & Kristensen, 1996).
- Considering the multicultural issues inherent to research in South Africa by considering the translation of the various work-related wellness measuring instruments into the official languages of South Africa as part of intervention-based studies.

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