

# **CORPORATE WELLNESS IN A CHEMICAL INDUSTRY IN SOUTH AFRICA**

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## **CHAPTER 1**

### **INTRODUCTION**

This thesis is about corporate wellness and more specifically the assessment thereof from a psychological perspective in a chemical factory environment in South Africa.

In Chapter 1 the background to this study, culminating in a problem statement for this study is discussed. The objectives of this study are presented, the research methodology explained and lastly an overview of the chapters is presented

#### **1.1 PROBLEM STATEMENT**

The nature of work is, perhaps now more than ever, changing at a whirlwind speed (Sauter et al., 2003), and driving the changes in the workplace at an unprecedented rate (Colteryaahn & Davis, 2004). The workplace has changed from relatively stable, simple, ordered, predictable and local, to being characterised by discontinuous change, complexities, chaos, ambiguity and globalisation, with success measured in terms of relentless responsiveness, innovation, speed, flexibility, cost-effectiveness and value-added (Veldsman, 2003). The white water analogy (Vaill, 1989; 1996) is a good description of the workplace situation; a situation out of which we will never get (Chalofsky, 2003), or simply a situation with more challenges than promises (Du Preez, 2003).

Amidst being involved in mergers, acquisitions, new markets, products, income, growth, and many more similar business activities, it has dawned on companies and even governments that economic and social sustainability cannot be achieved by technology alone and attention has to be given to human needs (Edwards, 2006; Hillier, Fewell, Cann, & Shephard, 2005; Ho, 1997; Shelley, 2001). The importance of people is realised as being the single biggest expense that not only contributes to the success of the company but also has detrimental effects if neglected (Keeling, 2005). According to Hillier et al. (2005), there is a growing interest and call for wellness and well-being efforts by employers. It is also becoming evident that economists and politicians are making an effort to find out just how happy people are (Wagner, 2006). Over the last few decades this increased attention to the well-being of people has resulted in numerous studies on subjective well-being, life satisfaction or happiness being

reported from various disciplines, for example economists, social scientists, politicians as well as among the general public (Frey & Stutzer, 2006; Frijters, Geishecker, Haisken-DeNew, & Shields, 2004).

Although scientists from different domains have previously treated measurements of well-being with scepticism, the situation has changed (Frey & Stutzer, 2006). The 100% improvement of life satisfaction among Russians following the post-transition years (Frijters et al., 2004), the reported benefits following wellness efforts in Canada (Shelley, 2001) and the reported successes in Bhutan where the focus is on measuring gross national happiness (GNH) in addition to gross national product (GDP) with remarkable GDP and GNH results (Edwards, 2006) did not go unnoticed.

Following the promise and excitement of GNH and corporate wellness many employers began asking questions regarding wellness (that is how to attain wellness and how to measure levels of wellness). Despite the reported successes about life satisfaction and gross national happiness, perusing recent literature it is evident that the concepts GNH, satisfaction, well-being, wellness or happiness are not interpreted similarly and often quite confusingly as synonyms, for example well-being and happiness; and life satisfaction and quality of life. Comparing Shelley's (2001) explanation, that corporate wellness is employee health contributing to higher production at a lower cost, and the Bhutan notion of a happy worker being a productive worker (Edwards, 2006), demonstrate how the seemingly same state of good people experience is described using different terminology.

It seems that there is a lack of common understanding regarding the corporate wellness concept. In various publications, corporate wellness is generally explained in terms of preventative programmes. The focus of these programmes is on fitness, rehabilitation and relaxation with the aim of assisting employees to be healthier, more energetic, and to find enjoyment in life and work (Hillier et al., 2005; Schettler, 2003; Shelley, 2001). These efforts are all presumably based on how Shelley (2001) explains corporate wellness as it relates to healthier employees who produce more at a lower cost. In addition to aspects generally associated with sound business practices, namely safety, brand reputation, turnover, profitability, stakeholder relationships and legal compliance the well-being and productivity of people also receive attention (Hillier et al., 2005). Wellness and well-being is also linked

when Hillier et al. (2005) stated that maximising the well-being and productivity of all people working for an organisation as the most significant point of their study.

In the absence of a general definition for corporate wellness and in line with the explanation given by Hillier et al. (2005), corporate wellness is henceforth considered a general state of good related to the workplace, and not a single definable or measurable unit. Since companies and even different divisions in an organisation can differ in terms of focus, culture, strategy etc, the definition of corporate wellness can differ significantly between different organisations. This description or definition of what an organisation sees as wellness can be compared to Veenhoven's (2004) assertion that well-being is in the eye of the beholder, or to satisfaction that is the result of a cognitive judgemental process, which is based on criteria that are important to the individual (Pavot, Diener, Colvin, & Sandvik, 1991; Sempene, Rieger, & Roodt, 2002).

According to Veenhoven (2004), well-being denotes something being in a good state, or more specifically in terms of people, well-being is synonymous with life being in a good state and therefore "quality of life". Two areas highlighted by Veenhoven (2004) as important in understanding well-being are the specific area and criteria depicting what the state of good is. Wellness, well-being, satisfaction, and happiness, not excluding other similar terms frequently used, are therefore all denoting a state of good. In the absence of a specified area and relevant criteria the terms could, as Veenhoven (2004) suggested for well-being, be generic for all the good in general. Most of these states of good terms are somehow used inter alia. Although Hillier et al. (2005) did not specifically define wellness, they did describe wellness as comprising a number of sub-related topics of which one contributing factor is well-being. Subjective well-being is also used inter alia with happiness (Biswas-Diener, Vitterso, & Diener, 2005; Kim-Prieto, Diener, Tamir, Scollon, & Diener, 2005), and happiness is used inter alia with satisfaction (Frijters et al., 2004; Peiró, 2006), and satisfaction is linked again back to subjective well-being (Kim-Prieto et al., 2005).

People's perceptions of their world and how they thus manage change according to their worldview differ significantly. While some people seem to be better off amidst uncertainty, others struggle to find meaning, experience control and take cognisance of what is happening. Measuring wellness in any area will depend on what is predetermined and defined as areas that will sufficiently indicate the state of good in that area.

With the apparent lack of a common definition for wellness (Veenhoven, 2004) and subjective well-being, except that is a state of good affected by numerous business related variables, the aim with this study is to examine measurable variables in the chemical factory environment in order to develop a model and related measurements of the state of good or wellness in the company.

Basset (1994) says that a satisfied employee will not necessarily be more productive and high performance does not necessarily result in job satisfaction, but is according to Murray (1999) generally regarded as important to the overall enjoyment of life, and good for physical and mental health (Waddell & Burton, 2006). Job satisfaction measurements usually provide valuable information about individuals' well-being and different workplace aspects, that is participation, and to stay or to resign (Clark, 1996).

Job satisfaction is defined as a pleasurable or positive emotional state resulting from the appraisal of one's job or job experience (Locke, 1976) and is the result of a cognitive-judgemental comparison between *actual* work outcomes and the *expected* outcomes because of the work done (Cranny, Smith, & Stone, 1992), or simply how positive or negative an individual feels about his/her job (Locke, 1976; Yousef, 2000). Job satisfaction can therefore, following Veenhoven's (2004), assertion, be equated to a state of good regarding the individual's work situation.

How people evaluate their lives or different aspects of their lives as satisfied and their subjectively assessed ability to cope in life, is reciprocal. The framework against which many of later life situations are assessed and dealt with develops in early adulthood and coincides with the first years of employment. In this period young adults commit themselves to marriage, a career, a particular lifestyle and social roles as well as form an idea of what the world is like (Feldt, Kivimäki, Rantala, & Tolvanen, 2004). This coincides with greater psychological stability, independence and a sense of identity (Antonovsky, 1987; Antonovsky & Sagy, 2001). This acquired ability, which is sense of coherence, is an enduring person and view-of-the-world-related characteristic that influence appraisals of meaning in different situations (Flannery, Perry, Penk, & Flannery, 1994; Larsson & Kallenberg, 1996, 1999). This experience gained early in life contributes to the criteria according to which an individual view the world as organised, meaningful, and with sufficient resources to meet life's demands (Lindsfors, Lundberg, & Lundberg, 2005).

A fundamental assumption to the conceptualisation of a sense of coherence is the complexities of daily living and being confronted with various contradictory stimuli (Lindfors et al., 2005) which can also be compared to the cognitive-judgemental process of determining satisfaction (Cranny et al., 1992). Sense of coherence and the three subcomponents, namely comprehensibility, manageability and meaningfulness are reportedly important to deal successfully with everyday stimuli and in promoting health (Geyer, 1997; Antonovsky, 1993; Larsson & Kallenberg, 1999; Lundberg & Nyström Peck, 1994). Beazant (2006) and Edwards (2006) linked satisfaction and sense of coherence when reporting about the need to enable employees to enjoy (satisfaction) and to find meaning (sense of coherence) in their work as a more effective way to improve performance.

With the quality of working life having been studied by social scientists for more than 50 years (Dolan & Gosselin, 2000), and now also receiving attention from economists and politicians (Edwards, 2006), the importance of employees' satisfaction as paramount for future profits is stressed (Keeling, 2005). This is echoed by citizens emphasising the need to make people happier rather than wealthier (Wagner, 2006).

A question about what constitutes happiness (Wagner, 2006), or wellness (Shelley, 2001) or well-being (Veenhoven, 2004) evokes different answers although a general relationship with economic benefits for the employer are frequently reported (Edwards, 2006; Pritchard, Potter, & Franlel, 1990; Ueckermann, 2006).

The inter-relationships reported for the constructs indicate a hierarchical structure, which could be explained in terms of specificity and time. At the short-term and specific end of the scale is happiness followed by domain specific satisfaction in a somewhat wider and more enduring area, for example marriage, job, role, etc. An individual's ultimate state of good is, according to Saris, Veenhoven, Scherpenzeel, and Bunting (1996), life satisfaction or quality of life. Veenhoven (2004) equates this quality of life in terms of a good state of something in the context of people to their well-being.

This study will focus on three different aspects contributing to the understanding of wellness in the chemical factory environment. The first aspect that will be looked at is job satisfaction in the chemical factory environment. The relevance of job satisfaction to well-being is clear from Kim-Prieto et al. (2005) who assert that well-being is a collective of satisfaction in

different domains that culminate as life satisfaction or quality of life, as the highest level of an individual's state of mind (Saris et al., 1996). The Minnesota Satisfaction Questionnaire (Spector, 1997) will be used to examine job satisfaction. Locke's (1976) definition of job satisfaction as a pleasurable or positive emotional state as a result of experiencing one's job, supported by Murray's (1999) notion that work, and presumably then satisfaction with the work engaged in is important to the overall enjoyment of life, are key to this part of the study.

Secondly, sense of coherence in the chemical factory environment will be examined and the psychometric properties of the Orientation to Life Questionnaire (OLQ) will be validated. Sense of coherence is linked to satisfaction in the need expressed to enable employees to enjoy (satisfaction) and to find meaning (sense of coherence) in their work to improve performance (Beazant, 2006; Edwards, 2006). Sense of coherence and satisfaction also share similar areas in which young adults commit during their early employment years that are later associated with satisfaction, namely marriage, career, lifestyle and social roles (Feldt et al., 2004). This uniquely acquired world experience as a sense of coherence, influences criteria applied later to assess and view the world as organised, meaningful, and with sufficient resources to meet the demands of life (Lindsfors et al., 2005).

Thirdly, a model will be developed to assess the general state of good, or wellness in the chemical factory environment. In developing the model the three subcomponents of subjective well-being reported by Andrews and Withey (1976), namely positive affect, negative affect and life satisfaction together with the results from the first two parts of this study regarding job satisfaction and sense of coherence will be taken into account. The relationship between these subcomponents of subjective well-being is evident in the conflict between work and life roles and how it affects job and marital satisfaction, while different levels of job satisfaction and marital satisfaction affects the individual's life satisfaction (Chiu, 1998; Chiu, Man, & Thayer, 1998).

The following research questions are deduced from the aforementioned problem statement:

- What is the construct equivalence of the Minnesota Satisfaction Questionnaire (MSQ) for use in multi-language samples?
- Do different levels of satisfaction exist for different demographic groups?
- What are the psychometric properties of the Orientation to Life Questionnaire (OLQ)?

- Is it possible to construct a short version of the OLQ within Antonovsky's theoretical model and to comply with accepted psychometric properties?
- Does sense of coherence, affect and work locus of control predict satisfaction and health?
- Is it possible to develop a model to assess wellness, namely corporate wellness in the chemical factory environment?

This study will contribute to Industrial Psychology as a science in the following manner: Firstly, subordinate constructs related to wellness in the chemical industry are systematically reviewed and a model is presented, explaining the hierarchical structure of subjective well-being on which future studies, as well as interventions in the chemical industry can be based. Secondly, empirical information will be available to the chemical industry regarding job satisfaction and sense of coherence among various demographic groups in the industry. Thirdly, with the use of English questionnaires often being criticized in a multilingual setting where English is often the respondents' second language, two questionnaires, namely the Minnesota Satisfaction Questionnaire (MSQ) and the Orientation to Life Scale (OLQ) will be validated for use in a multilingual environment.

## **1.2 RESEARCH OBJECTIVES**

The research objectives consist of a general objective and specific objectives.

### **1.2.1 General objective**

The general objective of this study is to investigate corporate wellness from a psychological perspective as deduced from different areas of satisfaction (job satisfaction, marriage satisfaction, and life satisfaction), together with self-reported health and influenced by affect, sense of coherence and work locus of control.

### **1.2.2 Specific objectives**

The specific objectives of this study are:

- To assess the construct equivalence of the Minnesota Satisfaction Questionnaire (MSQ) for use in multi-language samples.

- To assess the different levels of satisfaction for different demographic groups.
- To test the psychometric properties of the Orientation to Life Questionnaire (OLQ).
- To construct a short version of the OLQ within Antonovsky's theoretical model and to comply with accepted psychometric properties.
- To test if sense of coherence, affect and work locus of control mediates (moderates) wellness as deduced from levels of satisfaction and health.
- To develop a model to assess wellness, namely corporate wellness in the chemical factory environment.

## **1.3 RESEARCH METHOD**

### **1.3.1 Literature review**

The literature review focussed on previous research done about job satisfaction, sense of coherence and well-being. The knowledge gathered from previous research done aided in conceptualising these constructs as well as the measurement thereof and how it relates to life satisfaction, well-being and corporate wellness.

### **1.3.2 Research design**

The research was done using a cross sectional survey design to collect data for all three articles. The different questionnaires in conjunction with a biographical questionnaire were compiled in the format of a single booklet and presented to the respondents in a series of efforts, applying various methods, for example group sessions and a general mail effort to ensure a sufficiently represented sample. The respondents came from all hierarchical layers and different demographic groups in the organisation. The survey design approach followed made it possible to collect large volumes of data economically despite it being time-consuming. The limitations of this approach to data collection are mainly of an administrative and a workload nature. The number of sessions held, while attendance varied significantly complicated the administration and each session had to be planned for maximum attendance making it labour intensive. Because of multiple sessions on different occasions, and inviting employees based on their availability required special care to reduce the possibility of inviting the same respondents twice, yet ensuring at the same time maximum participation, making it quite a tedious task. Lastly, the aim was to collect as much data as possible in an as

short a period as possible, and for the benefit of a large number of respondents it took more than two months to collect the data.

### **1.3.3 Participants**

The sample drawn is from the employee population from a number of sub-businesses in the host chemical organisation in South Africa. The sample comprised 583 employees, representing various demographic sub-groups, namely *race, gender, age, job levels and language groups* in the organisation. The data was collected in a series of efforts, applying various methods, for example group sessions, focussed efforts in different areas and a general mail effort to ensure a sufficient sample. The sample is a fair representation of the actual workforce distribution in the chemical factory environment. A 58% response rate was achieved after distributing 1000 questionnaires in booklet form ( $N = 583$ ).

### **1.3.4 Measuring instruments**

The importance of valid and reliable measurements for research purposes is obvious. Existing measuring instruments were administered and tested for validity and reliability in each of the three sub-research topics. The questionnaires were administered in a battery comprising six questionnaires and a biographical questionnaire. The questionnaires are the Minnesota Satisfaction Questionnaire (Spector, 1997), the Satisfaction with Life (Diener, Emmons, Larsen, & Griffin, 1985), the Orientation to life questionnaire (Antonovsky, 1987), the Affectometer (Kammann & Flett, 1983), the Health Questionnaire (Cartwright & Cooper, 2002), and the Work Locus of Control scale (Spector, 1988). A *biographical questionnaire* was used to collect demographic related data regarding the participants, which is age, gender, language, qualification, tenure, job level etc.

The *Minnesota Satisfaction Questionnaire* (MSQ) was used to gather data about the job satisfaction of participants. The MSQ is a 20-item questionnaire with a 5-point scale ranging from 1 (*very dissatisfied*) to 5 (*very satisfied*) (Spector, 1997). Two distinct components are measured by the MSQ; Intrinsic job satisfaction measures feelings about the nature of the job tasks for example question 15 “The freedom to use my own judgement”, and extrinsic job satisfaction measures feelings about situational job aspects, external to the job for example question 13 “My pay and the amount of work I do” (Spector, 1997). Test-retest reliabilities of

between 0,70 and 0,80 are reported (Cook, Hepworth, Wall, & Warr, 1981), with an alpha coefficient of 0,96 (Rothmann, Scholtz, Fourie, & Rothmann, 2000) and an acceptable mean inter-item correlation of 0,22 which falls within the limits of 0,15 to 0,50 proposed for inter-item correlations by Clark and Watson (1995).

The *Satisfaction with Life Scale* (SWLS) is used to measure general satisfaction with life as a global evaluation by a person of his/her life (Diener et al., 1985). The SWLS is a 5-item instrument with the respondents required to indicate their degree of agreement or disagreement on a 7-point scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). Scores range from 5 to 35, with higher scores indicating greater life satisfaction. The SWLS is designed to assess general satisfaction with life and no specific domains, for example health or finance, but allows respondents to integrate and weight these domains in whatever way they choose (Diener et al., 1985; Pavot & Diener, 1993). Test-retest correlation coefficient after two months resulted in  $r = 0,82$  and alpha coefficient of 0,87 (Diener et al., 1985). Factor analysis also confirmed a single factor (Diener et al., 1985), and the SWLS is reported with sufficient discriminant validity from emotional well-being measures (Pavot & Diener, 1993).

The *Orientation to Life Questionnaire* (OLQ) (Antonovsky, 1987) has 29 items and measures on 7-point scale semantic differentials anchored by wordings related to the contents of each item measuring the three subcomponents of sense of coherence, namely comprehensibility, manageability and meaningfulness. A high overall score is indicative of a strong sense of coherence and a consequential sense of well-being (Naidoo & Le Roux, 2003). Antonovsky (1993) recommended that OLQ rather be used as a single construct because item construction followed a facet analysis design, varying the content systematically along a number of dimensions and any factor analysis of the OLQ is therefore likely to produce a single factor solution not reflecting the three components. Alpha coefficients reported for the OLQ in 29 research studies varying between 0,85 and 0,91 and test-retest reliability produced coefficients between 0,41 and 0,97 (Antonovsky, 1993).

The *Affectometer* (Kammann & Flett, 1983) is a 20-item questionnaire with 5-point scale ranging from 1 (*not at all*) to 5 (*all the time*). The Affectometer measures Positive Affect, Negative Affect and Positive-Negative Affect-Balance indicating the general wellness or

sense of well-being related to recent experiences. The general level of well-being or happiness is conceptualised as the extent to which positive feelings dominate over negative feelings. Alpha coefficients of 0,88 to 0,93 (Kammann & Flett, 1983), and between 0,86 and 0,91 for Positive Affect, and between 0,83 and 0,90 for Negative Affect (Wissing & Van Eeden, 1994) are being reported.

The *Health Questionnaire* (Cartwright & Cooper, 2002) consists of 18 items with a 5-point scale ranging from 1 (*never*) to 5 (*always*) supposedly arranged on two subscales: physical health and psychological health. The physical health items relate to known physical symptoms of stress and the psychological health items are known symptoms of stress-induced mental ill health. The GHQ does not provide a clinical diagnosis but merely insight into the respondents self-assessed general physical and psychological health. The psychological subscale has reportedly good convergent validity with other measures of psychiatric disorders, for example the General Health Questionnaire (GHQ-12; Goldberg & Williams, 1988). An alpha coefficient of 0,92 is reported in this study for the 18-item Health Questionnaire.

The *Work Locus of Control scale* (WLCS) (Spector, 1988) comprise 16 work-related items (for example job effort, getting a job, promotions) with a 5 point scale varying from 1 (*disagree strongly*) to 5 (*agree strongly*). An external locus of control item, item 6 reads: "Making money is primarily a matter of good fortune." An internal locus of control item, item 1 reads: "A job is what you make of it." Internal and external locus of control worded items are equal in number. Alpha coefficients are reported at 0,89 for internal locus of control and 0,85 for external locus of control, which are in accordance with other studies reporting similar alpha coefficients (Blau, 1993).

### **1.3.5 Statistical analyses**

The statistical analysis was carried out with the SPSS program (SPSS Inc., 2003). After testing the normality of the data (means, standard deviations, skewness and kurtosis), the three different research parts of this study followed different statistical analyses. To assess the validity of the Minnesota Satisfaction Questionnaire (MSQ) for use with multi-language samples a structural equation model (SEM) was performed, using the maximum likelihood methods of AMOS (Arbuckle, 1997). A covariance matrix was used as source for data input.

The data was tested for specific measurement and structural models and according to recommended fit indices, a mixture of fit indices was used (Arbuckle, 1997; Hanse & Engström, 1999).

To determine if a significant difference exists between demographic groups' levels of self-reported satisfaction, a series of standard multiple regressions was done with demographic variables as independent variables and intrinsic and extrinsic job satisfaction dependent variables. The predictability of job satisfaction as deduced from the percentage of variance explained by different demographic variables was also done.

In validating the Orientation to Life Questionnaire use was made of the structural equation model (SEM), using the maximum likelihood methods of AMOS (Arbuckle, 1997) to test the fit of proposed models. A covariance matrix was used as the source for input data. The data was tested for specific measurement and structural models and according to recommended fit indices, a mixture of fit indices were used (Arbuckle, 1997; Hanse & Engström, 1999).

In developing a model to determine wellness in a chemical factory environment from a psychological perspective, the focus was on the correlation between different constructs related to subjective well-being as well as the percentage of variance in satisfaction as explained in successive hierarchical domains by the satisfaction in the subordinate domains. After testing and conforming the psychometric validity of the questionnaires administered to assess the different variables, the same variables were tested in a factor analysis (pattern matrix), confirming a two-factor structure. After computing the correlation between the different variables, a series of standard multiple regressions was done to test the extend of satisfaction in different subordinate domains which can explain a percentage of the variance in satisfaction in higher order domains. Using the structural model method (AMOS, Arbuckle, 1997) a model with the hypothesised constructs was tested in a path model to determine the relationships between the dispositional wellness, job satisfaction, health and satisfaction with life.

## **1.4 CHAPTER DIVISION**

The thesis is divided into five chapters. Chapter 1 serves as an introduction to the study. Chapter 2 assesses job satisfaction in a chemical factory environment and tests the construct equivalence of the Minnesota Satisfaction Questionnaire (MSQ) for multi-language groups. Chapter 3 deals with the psychometric properties of the Orientation to Life Questionnaire (OLQ) and a shortened version of the OLQ. Chapter 4 focuses on wellness in a chemical factory environment from a psychological perspective as determined by satisfaction in different areas and moderated (mediated) by life antecedents, namely sense of coherence, affect and work locus of control. Chapter 5 concludes with a discussion and recommendation to the organisation and for future studies.

## **1.5 CHAPTER OVERVIEW**

Chapter 1 gave an overview of the problem addressed in this study. The research objectives, importance of the study, and research methodology were presented as backdrop against which the study was done.

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## **CHAPTER 2**

### **RESEARCH ARTICLE 1**

## **JOB SATISFACTION IN A CHEMICAL FACTORY**

### **ABSTRACT**

The objectives of this study were to evaluate the use of the Minnesota Satisfaction Questionnaire (MSQ) for different language groups working in a chemical factory, and to investigate the relationship between job satisfaction and demographic variables. The study was carried out in a chemical factory with a sample ( $N = 583$ ) representing a cross-cut of all different job levels in the organisation. The 20-item MSQ was used with a biographical questionnaire. The construct equivalence of the MSQ was confirmed for the African languages and Afrikaans and English group. Significant differences in either or both intrinsic and extrinsic job satisfaction are reported for language groups, between certain age groups, as well as for different employee levels. Intrinsic job satisfaction increases with age and job level, while extrinsic job satisfaction decreases with the level of education.

### **OPSOMMING**

Die doel van die studie was om die gebruik van die Minnesota Werkstevredenheidsvraelys (MSQ) vir verskillende taalgroepe in 'n chemiese fabriek asook die verwantskap tussen werkstevredenheid en verskillende biografiese veranderlikes te ondersoek. Die studie is in 'n chemiese fabriek gedoen met 'n steekproef ( $N = 583$ ) wat 'n kruissnit van alle posvlakke in die organisasie verteenwoordig. Die 20-item MSQ is saam met 'n biografiese vraelys gebruik. Die konstrukekwivalensie van die MSQ is vir die Afrikatale, en Afrikaanse- en Engelsegroep bevestig. Betekenisvolle verskille in beide, of intrinsieke of ekstrinsieke werkstevredenheid vir die verskillende taalgroepe, tussen sommige ouderdomsgroepe, asook posvlakke word gerapporteer. Intrinsieke werkstevredenheid styg met ouderdom en posvlak, terwyl ekstrinsieke werkstevredenheid afneem teenoor vlak van opvoeding.

Work is important to an individual's overall enjoyment of life (Murray, 1999) as it is generally considered good for both physical and mental health and general well-being (Waddell & Burton, 2006). Affective well-being comprises, according to Diener and Larsen (1993), frequent positive affect experiences and less negative affect experiences. Affective well-being can be either domain specific, as feelings concerned when a person is at work, or more wide-ranging, context free or general, for example life satisfaction (Warr, 2006). Daniels, Brough, Guppy, Peters-Bean, and Weatherstone (1997) noted that work-related affective well-being is often operationalised as job satisfaction.

Warr (1990) argued that affective well-being is more than mere job satisfaction (Sevastos, Smith, & Cordery, 1992). The relationship between job satisfaction and general satisfaction with life is reported to be reciprocal, with life satisfaction having the larger effect. General well-being or affective well-being unavoidably influences an individual's behaviour, decision-making, and people interaction as it spills over between work, family and social life (Warr, 2006). This is summarised by Daniels et al. (1997), who pointed to the multidimensional nature of affective well-being.

Work is a pervasive and influential part of the individual and the community's well-being (Harter, Schmidt, & Keyes, 2002). People spend a significant amount of their time at work for one of two reasons, to do work that is satisfying enough regardless of the monetary rewards, or to earn a sufficient income so it can be spent later doing something more satisfying (Buitendach & De Witte, 2005). Warr (2006) indicates that job-related well-being is often measured in terms of the "pleasure" axis of his model. Locke (1976) referred to job satisfaction in terms of it being a pleasurable or positive emotional state. This "pleasure-scale" in Warr's model indicates the level of job satisfaction related to conditions at work that in turn influences affective well-being. Although job satisfaction does not take in account differences in mental arousal as required by Warr's (2006) multidimensional affective well-being model, job satisfaction contributes significantly to affective well-being.

Individuals experience different levels of job satisfaction when doing dreadful work that is rewarded substantially, and doing something very satisfying without monetary reward. Different perspectives, from the psychological contract (McDonald & Makin, 1999), to economics and compensation earned (Sloane & Williams, 2000), have been looked at by various researchers in order to determine what people derive from working. The question that

arises is what is it that people derive from their jobs (Hamermesh, 2001). Dolan and Gosselin (2000) emphasised the need to examine the way people behave as part of the work-life relationships, which is an important consideration for companies that want to survive in an ever-changing world. People's behaviour, how it influences and affects performance, and managing these behaviours to the benefit of the organisation, is critical. Ultimately, what is important is the knowledge about the level and nature of satisfaction an individual derives from what he or she is doing.

During the last few decades, a great effort has been to correct inequalities in the workplace (Greenhaus, Parasuraman, & Wormley, 1990; Harrison, Price, & Bell, 1998, Weil, 2003). The workplace is renowned for a history of inequities. Not everyone who enters the workplace is offered the same career opportunities and employment benefits. These discrepancies are largely true for gender and racial criteria, where black people and women were as a rule positioned at the lower end of the hierarchy. In recent years, significant efforts have been made with the majority of new entrants being from previously disadvantaged groups (Greenhaus et al., 1990; Harrison et al., 1998, Weil, 2003). Major changes within the workforce of many of the leading industrial nations have seen members of ethnic minorities making up increasingly larger proportions of the workforce (Keita, 2006).

The chemical industry where the study was done is a major economic contributor in South Africa that has expanded globally over the last two decades with ventures in a number of countries in Europe, the Middle East, and the USA and recently also China. The company employs more than 20,000 people in South Africa and has since its inception in the early 1950s been dominated by white males. Since 1994, the demographics have changed significantly and a large number of blacks and females are now in positions previously filled by white males, thus bringing the demographic representation much closer to the South African demographics. The new incumbents, who had been previously disadvantaged, find themselves in a better position than before, with better opportunities, more equality and greater prospects. They should be happy, satisfied and content, but are they?

Although the corporate ladder is now more open to all demographic groups, the process is incomplete. This is evident from the representation percentage still reported for different demographic groups on different job levels (Chemical Industry Specific Report, 2006), as well as continued disparities these groups face in the workplace (for example regarding

compensation, respect, and on-the-job treatment) (Weil, 2003). The chemical factory environment in South Africa is no different from the rest of the world. Certain demographic groups, for example gender, racial and age groups were previously restricted by inequality in the workplace. Recently, the work arena that had for decades been dominated by white males opened up for previously disadvantaged groups. Women and black people can now be found in all ranks and levels in the workplace. Qualifications have also affected career advancement as more young individuals can be found in senior positions that were till recently occupied by incumbents who only reached those positions after years of service, and who had not necessarily been qualified for the positions. Workplace equity appears to have been corrected – but is it true and will it be reflected by the level of job satisfaction reported by different demographic sub-groups in the workplace?

Although Basset (1994) says a more satisfied employee does not mean a more productive employee and that job satisfaction is not necessarily the result of high job performance, work is still regarded as important to the overall enjoyment of life (Murray, 1999) and generally considered good for both physical and mental health (Waddell & Burton, 2006). Knowledge about job satisfaction, either through research about job satisfaction antecedents or general surveys about job satisfaction in specific areas, provides valuable information about individuals' well-being as well as insight into different aspects of the workplace, for example workplace participation, the decision to stay or to resign (Clark, 1996), the effort they are willing to devote to their work and work performance (Christen, Iyer, & Soberman, 2006).

Basset (1994) pointed out that the literature presents both results confirming and disproving the relevance of job satisfaction as a variable to be considered in research. On the one hand it is deemed a throwaway variable by some researchers, and on the other hand its relevance in business is accepted with clear evidence of relationships between dissatisfied workers and their effectiveness as well as job satisfaction and worker disputes, supervisor-worker relationship, and workers' health.

The first objective of this study was to determine if measures of job satisfaction can be used in a multilingual setting to determine their self-reported level of job satisfaction. The second objective was to investigate whether perceived levels of job satisfaction for employees in a chemical factory environment differ in terms of demographic variables such as, age, language, gender, and job level.

## **Job satisfaction**

The importance of job satisfaction in the workplace is well known and has been studied thoroughly by social psychologists (Sloane & Williams, 2000). There is an extensive body of research in organisational psychology that considered the role of job satisfaction in the workplace (Christen et al., 2006; Heywood, Siebert, & Wie, 2002).

References, dating back to Locke (1976) indicate the interest in job satisfaction, workers' subjective well-being and ideas on scientific management and fatigue reduction. Locke (1976) defined job satisfaction as a pleasurable or positive emotional state resulting from the appraisal of one's job or job experience. Job satisfaction can be understood as a cognitive reaction to work, resulting from the incumbent's comparison of the *actual* work outcomes with the *expected* outcomes because of the work done (Cranny, Smith & Stone, 1992), or simply as the extent to which an employee feels positive or negative towards his/her job (Locke, 1976; Yousef, 2000).

Job satisfaction is in essence an interactive evaluative process between the individual and the environment. During this evaluation, the worker weighs all job aspects, and compares the current job to what is offered by labour-market opportunities (Hamermesh, 2001). The result of this evaluated process will influence other aspects regarding the individual, for example the intention to change work or to leave the company (Sumner & Niederman, 2003). According to Sempane, Rieger, and Roodt (2002), people will evaluate their jobs using factors, which they regard as important to them. This evaluation process is complicated by the individual's perceptions and unique circumstances, for example needs, values, and expectations (Buitendach & De Witte, 2005), which can ultimately influence the individuals subjective evaluation of the job. The evaluation process is a cognitive process that will also differ among individuals depending on their unique criteria for satisfaction, with a similar situation being evaluated both as favourable and simultaneously less favourable for different individuals.

The theoretical basis for job satisfaction can be found in Herzberg's dual factor theory of job satisfaction, identifying both an intrinsic and an extrinsic component, which can also be equated to situational (extrinsic) and dispositional (intrinsic) factors (Hirshfeld, 2000; Spector, 1997).

According to Faubion, Palmer, and Andrew (2001), the intrinsic component of job satisfaction includes variables such as recognition, the work itself, achievement, and professional growth; to work in line with personal values (Randolph, 2005); sense of accomplishment, challenge in the work, level of autonomy, job variety and ability to work efficiently (Kacel, Millar, & Norris, 2005). Malka and Chatman (2002) refer to this intrinsic orientation as an expressive orientation. Intrinsic factors were also found to correlate with Herzberg, Mausner, Peterson and Capwell's (1957) motivators or satisfiers (Faubion et al., 2001). According to Beswick (2002), people whose job satisfaction is more intrinsically motivated, tend to be more aware of a wide range of phenomena and will be inclined to be more tentative to complexities, inconsistencies, novel events and unexpected possibilities. Intrinsic driven satisfaction requires both the time and the freedom to make decisions, gather and process information with an appreciation of an integrated and finished product. The result of intrinsic driven satisfaction may, according to Beswick (2002), lead to deeper learning and higher levels of creativity, as well as intellectual fulfilment, and the enjoyment of job mastery (Malka & Chatman, 2002).

The extrinsic component of job satisfaction's primary value is remuneration and work is principally viewed as a means to attain such remuneration (Malka & Chatman, 2002). Extrinsic driven job satisfaction has to do with variables such as working conditions, compensation, co-workers (Faubion et al., 2001), remuneration and continuous education (Randolph, 2005) as well as time to serve on professional forums, reward structures, research involvement, monetary bonuses, and compensation for additional work done (Kacel et al., 2005). This relates to Herzberg et al.'s (1957) hygiene factors or dissatisfiers, and can also, according to Wright and Terrian (1987), be linked to Maslow's lower order needs. Beswick (2002) also points out that an extrinsic focus of satisfaction will lead to a narrower attention focus, with shorter time perspectives, which will ultimately contribute to more efficient production, and predefined or standardised products – all affecting job satisfaction, and long term commitment to a task (Beswick, 2002).

Whether job satisfaction is based primarily on intrinsic or extrinsic factors or both, it is agreed that job satisfaction has a beneficial relationship with such factors as hardiness, commitment, challenge, change (Kobasa, 1979), reduced stress, less anxiety, fewer physical symptoms, meaning in life (Witmer, Rich, Barcikowski, & Margue, 1983; Witmer, Sweeney, & Myers

1998), longevity and greater productivity (Pelletier, 1994). Employees experience job satisfaction if they feel that their individual capacities, experience and values are utilised in their work environment and that the work environment offers opportunities and rewards (Dawis, 1992; Roberts & Foti, 1998). However, Basset (1994) indicates that a more satisfied employee does not mean a more productive employee, and job satisfaction is not necessarily the result of high job performance.

Despite the fact that job satisfaction has received relatively little focus in some areas, for example economics, and industrial relations, there does exist a body of knowledge relating individual characteristics (demographic) with job satisfaction (Clark, 1996). Results on the relationship between job satisfaction and different demographic variables are spread across the spectrum with strong indications in both directions.

### **Background variables and job satisfaction**

Reports on job satisfaction levels of men and women vary significantly in literature, from no difference being reported between men and women to both genders being reported as being more satisfied with their jobs (Greenhaus et al., 1990; Muhonen & Torkelson, 2004; Nesbit, Inglehart, & Sinkfort, 2001; Sloane & Williams 2000; Sousa-Poza & Sousa-Poza, 2003; Spector, 1997). Being a woman despite a disadvantaged history in the workplace is seen as an important characteristics associated with high levels of job satisfaction (Clark, 1996; Gallup, 2001; Oswald, 2002; Sousa-Poza & Sousa-Poza, 2000; Sloane & Williams, 2000). It is especially younger, professional women with higher qualifications who are reportedly more satisfied with their jobs than men are (Clark, 1996). Souza-Poza and Souza-Poza (2000) attribute this to the rather positive experience of the improved and perceived equal opportunities in the workplace.

Souza-Poza and Souza-Poza (2000) posit however, that women's job satisfaction will level off at a point in future equal to that for men as workplace job equity is established. In a study among academics, Bilimoria, Perry, Liang, Higgins, Stroller, and Taylor, (2006) found that women construct their job satisfaction on internal relational support (respectful collegial interactions) while men structure their job satisfaction on internal academic resources (research-supportive workloads). Clark (1996), also attributed gender job satisfaction differences to: (1) men and women's generally different jobs and qualifications and working

hours, (2) why work are valued, (3) women who find it culturally easier to leave a job when dissatisfied than men, resulting in more satisfied than unsatisfied women working, and (4) different work expectations for men and women that they also compare to different reference groups resulting in similar questions being considered differently (Clark, 1996).

Different levels of job satisfaction have also been reported for racial and socio-economic groups (Bessokirnaia & Temnitskii 2001; Riley, 1997; Muhonen & Torkelson, 2004; Utsey, Ponterotto, Reynolds, & Cancelli, 2000; Weil, 2003). Results on job satisfaction differences also vary from black people (African-Americans) reporting lower levels of job satisfaction (Clark, 1996; Greenhaus et al., 1990) to black people reporting higher levels of satisfaction compared to their white counterparts (Jones, James, Bruni, & Sells, 1977). Keita (2006) reported that although the factors determining job satisfaction are basically the same, black people tend to report lower job satisfaction scores than their white counterparts because they are less likely to be in situations conducive to job satisfaction. Keita (2006) further said that job satisfaction for blacks is more likely to be increased by extrinsic rewards, but that black people are disadvantaged relatively to white people on these variables.

Population ageing in the workforce has led to a growing interest in the differences between younger and older workers (Warr & Fay, 2001). The age-job satisfaction relationship has received frequent attention, resulting in significant variations across age being reported (Clark, Oswald, & Warr, 1996). Generally, a U-shaped age-job satisfaction relationship is reported (Clark, 1996; Hertzberg, Mausner, Peterson, & Capwell, 1957; Oswald, 2002; Rossheim, 2006). Age related differences in job satisfaction are reportedly greater than gender, qualifications, income or race. The U-shaped phenomenon is attributed to the high morale of young workers, a decline in job satisfaction during middle years of employment due to a loss of the novelty, perception of decreased opportunities, unmet expectations, as well as boredom, and then an increase again in job satisfaction in later years with the setting in of reality and an acceptance of the individual's occupational role (Clark et al., 1996).

Higher job satisfaction with old age is attributed to: (1) over time and through development people move onto jobs with the desirable characteristics they expect, (2) age brings specific work values that are different and frequently less desirable to younger people, (3) with age expectations are lowered (more realistic), (4) older people could also have been more satisfied with their jobs (cohort phenomena), (5) older people, still working misrepresent

generally satisfied people who will still work in their later years, and lastly (6) other non-job variations as possible spill-over results from their general life, family life etc. The job satisfaction-age pattern is however changing with generations. In the 1970s the 30 year olds' job satisfaction increased as they moved from their twenties to their thirties, with nearly half of the 30-40 year age group reported being "very satisfied" with their jobs, while more recent results indicated no difference in job satisfaction between the 30-49 year age group and the 18-29 age groups (Chalofsky, 2003). This can possibly be attributed to job equity also being applicable to age groups and generations, with job level now less indicative of age than in the past. People seem to reach much higher job levels much earlier in their careers. Age has also been linked to career stages and job satisfaction (Lindstrom, 2006), with the age group 20-34 seen as the early career stage, 35-50 as mid-career and 50-65 as the late career stage. Various aspects related to job satisfaction, for example work commitment increases with age (career stage), intention to leave the employer reduces with age, and job involvement is lowest in the mid-career stage (Lindstrom, 2006).

A higher qualification correlates with better opportunities in the workplace (Oswald, 2002), for example higher earnings, quicker promotions and better positions (Clark, 1996). However the relationship between qualification and job satisfaction is according to Theodossiou (2006) varying and best described as uncomfortable. Clark (1996) also reported that while qualifications are assumed to be positively correlated with job satisfaction, the strong relationship is however negative and that qualification correlates better with workers' expectations of what jobs they should have. The relationship between qualification and job satisfaction is of an inverse nature with higher qualifications being associated with relative lower job satisfaction (Clark, 1996).

The relationship between job level and job satisfaction is not well reported on, but Oswald (2002) mentioned the correlation between supervision and a higher level of job satisfaction, and the relationship with management and management recognition in relation with job satisfaction (Incentive, 2005).

### **Aims and hypotheses**

The objectives of this study were firstly to evaluate the use of the Minnesota Satisfaction Questionnaire (MSQ) for different language groups working in the chemical factory

environment and secondly to investigate the relationship between job satisfaction and demographic variables of employees in a chemical factory.

The hypotheses for this study are as follows:

H1: Job satisfaction, as measured by the MSQ consists of two factors, each with acceptable levels of internal consistency.

H2: The MSQ is a construct equivalent measuring instrument for multilingual samples.

H3: Men and women experience similar levels of job satisfaction.

H4: African language speakers experience lower levels of job satisfaction than their Afrikaans and English-speaking colleagues.

H5: Job satisfaction is positively related to job level.

H6: Age is positively related to job satisfaction.

H7: Job satisfaction is negatively related to qualification.

## METHOD

### Participants

The sample drawn is from the employee population from a number of businesses in the Chemical Industry in South Africa. The sample comprised 583 employees, representing various demographic sub-groups, namely race, gender, age, job levels and language groups in the organisation. The data was collected in a series of efforts, applying various methods, for example group sessions, focussed efforts in different areas and a general mail effort to ensure a sufficient sample. The sample as presented in Table 1 is a fair representation of the actual workforce distribution in the chemical factory environment. A 58% response rate was achieved after distributing 1000 questionnaires in booklet form ( $N = 583$ ). The characteristics of the participants are reported in Table 1.

Table 1

*Participants Characteristics (N = 583)*

	Category	Frequency	Percentage
Age	<30	99	16,98%
	30-39	198	33,96%
	40-49	182	31,22%
	50+	91	15,61%
	Missing	13	2,23%
Gender	Male	385	66,04%
	Female	173	29,67%
	Missing	25	4,29%
Language	Afrikaans/English	431	73,93%
	African ( <i>Sotho/Xhosa/Zulu</i> )	144	24,70%
	Missing	8	1,37%
Qualification	School	321	55,06%
	Diploma	143	24,53%
	Degree	70	12,01%
	Postgraduate	23	3,95%
	Missing	26	4,46%
Tenure	<5 years	134	22,98%
	5-14 years	166	28,47%
	15-24 years	205	35,16%
	25+ years	59	10,12%
	Missing	19	3,26%
Job Level	Employees (<L7)	229	39,28%
	Supervisor (L7-L6C)	180	30,87%
	Middle Managers (L5B-L5A)	40	6,86%
	Senior Managers (L4-L3)	13	2,23%
	Missing	124	21,27%

The average age of the respondents in the sample falls in the 40 years of age category. The gender distribution is 66,04% males and 29,67% females. This compares well with the demographics of the general workforce in the chemical industry, being predominantly male. The language representation of the sample also corresponds to the demographics of the area, with 73,93% of the respondents reporting either Afrikaans or English as their home language irrespective any racial category, and 24,70% of the respondents reported Sotho, Zulu or Xhosa (African language) as their first language. The participants also represented the

different job levels with 39,28% from non supervisory (employee) level, 30,87% from the supervisor level, 6,86% from middle management level and 2,23% from senior management.

### **Measuring instruments**

The *Minnesota Satisfaction Questionnaire* (MSQ) was used to gather data about the job satisfaction of participants. The MSQ consists of 20 items (Spector, 1997) and uses a 5-point Likert-type response format. The MSQ comprises of two distinct components: intrinsic job satisfaction measures feelings about the nature of the job tasks for example question 15 “The freedom to use my own judgement”, and extrinsic job satisfaction measures feelings about situational job aspects, external to the job for example question 13 “My pay and the amount of work I do” (Spector, 1997). Test-retest reliabilities of between 0,70 and 0,80 are reported (Cook, Hepworth, Wall, & Warr, 1981), with an alpha coefficient of 0,96 (Rothmann, Scholtz, Fourie, & Rothmann, 2000) and an acceptable mean inter-item correlation of 0,22 which falls within the limits of between 0,15 and 0,50 proposed for inter-item correlations by Clark and Watson (1995).

### **Statistical analysis**

The statistical analysis was carried out with the SPSS program (SPSS Inc., 2003). In the first step, means, standard deviations, skewness and kurtosis were determined to describe the data. To assess the hypothesised fit of a proposed model, for the MSQ for the two language groups, namely the Afrikaans/English-speaking group and the African-speaking group (*Sotho/Xhosa/Zulu*), a structural equation model (SEM) was performed, using the maximum likelihood methods of AMOS (Arbuckle, 1997). A covariance matrix was used as the source for input data. The data was tested for specific measurement and structural models and according to recommended fit indices, a mixture of fit indices were used (Arbuckle, 1997; Hanse & Engström, 1999).

The hypothesised relationships between demographic variables and job satisfaction and the differences between the levels of job satisfaction for different demographic groups are tested with a series of standard multiple regressions (Table 4). The standard multiple regressions were done with demographic variables as independent variables and intrinsic and extrinsic job satisfaction dependant variables to determine if significant differences exist between

demographic groups regarding their self-reported levels of job satisfaction. It was further done to determine if demographic variables could be used to predict job satisfaction as deduced from the percentage of variance explained by different demographic variables.

## RESULTS

The structural equation modelling (SEM) method from the AMOS package was used to test the factorial models (Arbuckle, 1997) of the MSQ for different language groups, namely the Afrikaans/English and African languages. Data analysis was done in a series of consecutive steps building models by allowing error correlations between item pairs to continue and restrict item loading until a best fit model could be achieved. First, the default model was tested for fit, considering the  $\chi^2$  values, degrees of freedom and probability value. Additional goodness fit statistics (IFI, CFI, and RMSEA) were considered further to assess the global fit of each different model (Hanse & Engström, 1999). The initial poor fit of the default model for the MSQ, resulted in further explorative analysis. The modification indices (MI) were considered as indicating possible misspecifications and item pairs with high MI-values were allowed to correlate in subsequent models. The full 20-item MSQ was used and tested. Table 2 presents the sequential models as tested to find the best fit.

Table 2  
*MSQ Construct Equivalence for Language Groups*

Model	Description	CMIN	df	CMIN/df	IFI	CFI	RMSEA
Default	1 factor	1425,08	340	4,19	0,75	0,75	0,08
I	2 factors	1228,84	338	3,64	0,80	0,80	0,07
II	2 factors, errors allowed to correlate, items 15 and 16	973,15	336	2,90	0,86	0,85	0,06
III	2 factors, errors allowed to correlate, items 15 and 16, and 5 and 6	864,77	334	2,59	0,88	0,88	0,05*
IV	2 factors, errors allowed to correlate, items 15 and 16, 5 and 6, and 13 and 14	811,53	332	2,44	0,89	0,89	0,05*
V	2 factors, errors allowed to correlate, items 15 and 16, 5 and 6, 13 and 14, and 19 and 20	715,20	330	2,17	0,91*	0,91*	0,05*
VI	2 factors, errors allowed to correlate, items 15 and 16, 5 and 6, 13 and 14, and 19 and 20, all item loading constrained	739,99	348	2,13	0,91*	0,91*	0,05*

\* Significant fit; IFI  $\geq$  0,90; CFI  $\geq$  0,90; RMSEA  $\leq$  0,05 (AMOS, Arbuckle, 1997)

The first step in testing for construct equivalence was to use all the data in a one-factor model. The default model rendered a  $\chi^2$  value of 1425,08 ( $df = 340$ ;  $p = 0,00$ ). With the large  $\chi^2$  value relative to the degrees of freedom together with an IFI value and CFI value lower than 0,90 and a RMSEA value higher than 0,05 the model's fit to the data for different language groups could not be confirmed. The same data was also tested in a two-factor model for the MSQ (Model I). The fit values remained unsatisfactory ( $\chi^2 = 1228,84$ ,  $df = 338$ ; IFI = 0,80; CFI = 0,80; RMSEA = 0,07), although it was better than the fit of the one-factor model. Possible sources compounding the poor fit was identified from the modification indices (MI) in the covariance analysis that indicated, for example a high correlation between items 15 and 16 (MI = 184,09).

Different models were subsequently structured to improve the fit. The modified indices (MI), from the covariance analysis indicated 4 item pairs where possible misfit occurred, namely items pairs 15 and 16, 5 and 6, 13 and 14, and 19 and 20. These items in pairs load on the same construct that could account for a significant misspecification, hence the low fit values. In AMOS such item pairs can be allowed to correlate in further models to minimise the misspecification and so increase the overall fit of a model.

#### *Further analysis (post hoc)*

Following the poor fit achieved with the initial two models (default model and model I) item pairs as identified from their MI-values that could account for a significant misspecification were allowed to correlated in further models (models II to IV). First, the error between items 15 and 16 was allowed to correlate, followed by items 5 and 6, and then items 13 and 14. With every next model the degrees of freedom decreased by 2, and the  $\chi^2$  values improved from  $\chi^2 = 973,15$  ( $df = 336$ ) (model II), to  $\chi^2 = 864,77$  ( $df = 334$ ) (model III) to  $\chi^2 = 811,53$  ( $df = 332$ ) (model IV). The fit statistics (IFI, CFI and RMSEA) remained through the successive models II to IV however, still outside the fit parameters. The change in  $\chi^2$  ( $\Delta\chi^2$ ) and degrees of freedom ( $\Delta df$ ) between successive models were statistically significant.

In model V, items 19 and 20, were also identified as possible areas of misfit and were allowed to correlate resulting in fit statistic values within range ( $\chi^2 = 715,20$ ;  $df = 330$ ; IFI = 0,91, CFI = 0,91, and RMSEA = 0,05). In model VI, with all errors previously indicated and allowed to correlate and constraining all items for loading, the fit was still achieved ( $\chi^2 =$

739,99;  $df = 348$ ), and the fit statistics remained within the acceptable fit parameters (IFI = 0,91; CFI = 0,91; RMSEA = 0,05). Through allowing error item pairs to correlate and achieving a fit, it is accepted that no specific individual items did contribute to the initial fit problem. Achieving a fit confirms the construct equivalence of the MSQ for multilingual study groups. The study data was analysed for normality, and the descriptive statistics, alpha coefficients, skewness and kurtosis of the two factors of the MSQ are presented in Table 3.

Table 3

*Descriptive Statistics of the MSQ*

Variable	Demographic group	Valid N	Mean	Std.Dev.	Skewness	Kurtosis	$\alpha$
MSQ_Intrinsic		563	45,72	6,86	-0,95	2,40	0,86*
MSQ_Extrinsic		563	23,09	5,44	-0,57	0,15	0,83*

\* Acceptable internal consistency:  $\alpha > 0,70$  (Nunnally & Bernstein, 1994)

With the exception of the kurtosis of the intrinsic job satisfaction data (MSQ Intrinsic), indicating a rather similar positive response by most of the respondents in the study, the normal distribution of the MSQ data is confirmed and presented in Table 3. Both MSQ-scales presented satisfactory levels of internal consistency (intrinsic  $\alpha = 0,86$ ; extrinsic  $\alpha = 0,83$ ) with Cronbach alphas  $> 0,70$  (Nunnally & Bernstein, 1994), confirming the MSQ's two-factor structure. The correlation between intrinsic and extrinsic job satisfaction is  $r = 0,68$  ( $p = 0,00$ ).

Standard multiple regression analysis was used to investigate whether demographic variables could predict intrinsic or extrinsic job satisfaction and if there were significant differences between different demographic sub-groups and their levels of self-reported job satisfaction.

The results of standard multiple regression analysis with demographic variables as independent variables, and intrinsic and extrinsic job satisfaction (as measured by the MSQ) as dependent variables, are reported in Table 4.

Table 4

*Standard Multiple Regression Analysis*

Variable	Unstandardised Coefficients		Standardised Coefficient	<i>t</i>	<i>p</i>	<i>F</i>	<i>R</i> <sup>2</sup>	<i>R</i>
	B	SE	Beta					
<b>Extrinsic Job Satisfaction</b>					0,00	2,35*	0,06	0,24
(Constant)	25,89	1,29		20,14	0,00			
Gender	-0,70	0,54	-0,06	-1,30	0,20			
Language group	-2,08	0,57	-0,16	-3,63	0,00*			
Age <30 vs. >50	1,27	1,02	0,08	1,24	0,22			
Age <30 vs. 40-49	1,44	0,83	0,12	1,74	0,08			
Age <30 vs. 30-39	0,77	0,70	0,07	1,10	0,27			
Secondary vs. Postgraduate	-1,05	1,31	-0,04	-0,81	0,42			
Secondary vs. Degree	0,17	0,87	0,01	0,19	0,85			
Secondary vs. Diploma	-1,38	0,58	-0,11	02,36	0,02*			
Tenure <5 vs. >24 yrs	-0,26	1,10	-0,01	-0,24	0,81			
Tenure <5 vs. 15-14 yrs	-0,50	0,73	-0,04	-0,68	0,50			
Tenure <5 vs. 5-15 yrs	-0,34	0,65	-0,03	-0,52	0,61			
Employees vs. Senior Managers	1,14	1,31	0,04	0,87	0,39			
Employees vs. Middle Managers	1,44	1,14	0,07	1,27	0,20			
Employees vs. Supervisors	0,79	0,58	0,07	1,36	0,17			
<b>Intrinsic Job Satisfaction</b>					0,00	2,55*	0,06	0,25
(Constant)	46,86	1,59		29,42	0,00			
Gender	-0,55	0,67	-0,04	-0,83	0,41			
Language group	-2,26	0,71	-0,14	-3,19	0,00*			
Age <30 vs. >50	2,47	1,27	0,13	1,95	0,05*			
Age <30 vs. 40-49	2,17	1,03	0,15	2,12	0,03*			
Age <30 vs. 30-39	1,46	0,87	0,10	1,68	0,09			
Secondary vs. Postgraduate	0,27	1,62	0,01	0,17	0,87			
Secondary vs. Degree	0,95	1,08	0,05	0,88	0,38			
Secondary vs. Diploma	0,31	0,72	0,02	0,42	0,67			
Tenure <5 vs. >24 yrs	-0,45	1,37	-0,02	-0,33	0,74			
Tenure <5 vs. 15-14 yrs	0,25	0,91	0,02	0,28	0,78			
Tenure <5 vs. 5-15 yrs	0,18	0,80	0,01	0,22	0,82			
Employees vs. Senior Managers	-0,64	1,63	-0,02	-0,39	0,70			
Employees vs. Middle Managers	1,44	1,41	0,06	1,02	0,31			
Employees vs. Supervisors	1,38	0,72	0,10	1,91	0,06*			

\**p* < 0,01 statistically significant

Table 4 shows that extrinsic job satisfaction is best predicted by a combination of language and qualification (secondary versus diploma), explaining 6% of the variance in extrinsic job satisfaction. Intrinsic job satisfaction is best predicted by a combination of language, age (<30 vs. 50+; <30 vs. 40-49), and job level (employer vs. supervisor), explaining 6% of the variance in intrinsic job satisfaction. In Table 5 the job satisfaction item averages are presented for different demographic groups that differed significantly.

Table 5

*Levels of Job Satisfaction for Different Demographical Groups*

Source		Mean			
Intrinsic satisfaction		<30 years	30-39 years	40-49 years	50+ years
	Age	43,93 <sup>ab</sup>	45,56	46,40 <sup>b</sup>	46,74 <sup>a</sup>
		Afrikaans/English	Africa		
	Language	46,21 <sup>c</sup>	44,02 <sup>c</sup>		
		Secondary	Diploma	Degree	Post degree
Qualification		45,36	45,99	47,25	46,42
	Employee	Supervisor	Manager	Senior manager	
Job Level		44,97 <sup>d</sup>	47,11 <sup>d</sup>	48,04	43,86
Extrinsic satisfaction		<30 years	30-39 years	40-49 years	50+ years
	Age	22,13	22,82	23,53	23,86
		Afrikaans/English	Africa		
	Language	23,51 <sup>e</sup>	21,63 <sup>e</sup>		
		Secondary	Diploma	Degree	Post degree
Qualification		23,28	22,08 <sup>f</sup>	24,13 <sup>f</sup>	23,30
	Employee	Supervisor	Manager	Senior manager	
Job Level		22,19	23,57	24,76	23,37

a, b, c, d, e, f, = practical significant

For all the sub-groups presented in Table 5, intrinsic job satisfaction scores are higher than the extrinsic job satisfaction scores. Both language groups also had higher levels of intrinsic job satisfaction, while the African-speaking group scored the lowest on both job satisfaction scales. Intrinsic job satisfaction increases with age. Higher education levels correlate negatively with extrinsic job satisfaction, with the diploma having a significantly lower level of extrinsic job satisfaction than the degree group. Lastly, employees and supervisors differ with employees having significantly less intrinsic satisfaction with their jobs than the supervisors have.

## DISCUSSION

The objectives of this study were to evaluate the use of the Minnesota Satisfaction Questionnaire (MSQ) for different language groups working in the chemical factory, and to determine if the self-reported levels of job satisfaction for employees in a chemical factory environment differ against various demographic sub-groups for example, gender, language, age, qualification, tenure and job level.

Hypotheses 1 posited a two-factor structure for the MSQ, each with acceptable levels of internal consistency. The two-factor structure of the MSQ was confirmed (Hirschfeld, 2000; Buitendach & De Witte, 2005), with sufficient internal consistency, rendering the 20-item MSQ suitable to be used in multilingual groups in the chemical factory environment.

Hypothesis 2 dealt with the construct equivalence of the MSQ for multilingual groups. The structural equivalence of the MSQ for different language groups was confirmed, with AMOS (Arbuckle, 1997), confirming hypothesis 2. Only four item pairs had to be allowed to correlate as they loaded on the same construct and it was not necessary to eliminate any MSQ-items to obtain suitable fit values within acceptable parameters (see Buitendach & Rothmann, 2003).

Using standard multiple regression analysis, it was found that only a few demographic variables contributed significantly to intrinsic and extrinsic job satisfaction. Language was the only demographic variable which contributed significantly to intrinsic and extrinsic job satisfaction. Language together with qualification (secondary and diploma) explained 6% of the variance in intrinsic satisfaction. Language combined with age and job level (employee vs. supervisor) also explained 6% of the variance in extrinsic job satisfaction.

The hypothesised similarity in their self-reported level of job satisfaction for men and women was corroborated (Hypothesis 3). Statistically the level of self-reported job satisfaction for men and women did not differ significantly and results by Sloane and Williams (2000) and Sousa-Poza and Sousa-Poza (2003) of women being more satisfied with their jobs than men were not confirmed. However, both genders scored high on intrinsic job satisfaction with women's job satisfaction scores much closer than expected to that of men. This can possibly be attributed to women in the sample being younger and higher qualified (professional), and because they probably experience equal opportunities in the workplace (Clark, 1996). No significant gender differences being reported on job satisfaction does not imply that there are no differences in how men and women experience job satisfaction. The assumed similar experience of job satisfaction between women and men should be qualified as the number of female employees remains rather limited in a predominantly male engineering environment and women are generally represented by younger, professionally qualified individuals, and the benefits and conditions for female and male employees working in the same area are

equal. The assumption is therefore that either women's job satisfaction is improving or that it is levelling off equal to that for men as the workplace becomes more equitable for both genders (Souza-Poza & Souza-Poza, 2000).

The posited difference between the self-reported levels of job satisfaction reported by African, and Afrikaans and English-speaking groups (Hypothesis 4), was confirmed. Language is the only demographic variable that contributed significantly to explain the variance in both intrinsic and extrinsic job satisfaction. Although both language groups also reported higher intrinsic job satisfaction the African-speaking group's mean item scores were lower than the Afrikaans/English-speaking group as also reported by Greenhaus et al. (1990), and Clark (1996). According to Keita (2006), black and white groups essentially use the same criteria to determine job satisfaction; black people (African-speakers) though tend to be in situations not conducive to job satisfaction, while they are also disadvantaged to extrinsic rewards and as a result they generally report lower on job satisfaction.

The relationship between job satisfaction and job level as posited in hypothesis 5 was corroborated. A steady increase in job satisfaction is reported with escalating job levels up to middle management. Although senior managers also reported higher intrinsic job satisfaction, their mean item score reported was below that of the employee and supervisor groups. For the job levels up to middle management job satisfaction increases steadily with the most significant job satisfaction difference on intrinsic job satisfaction scale between employees and supervisors and the latter being the highest.

As posited in hypothesis 6, job satisfaction was found to increase steadily with age. All age groups consistently reported higher intrinsic job satisfaction. Although job satisfaction increases with age, and assuming that age correlates with years of service, employees with 25 years of service or more reported both lower intrinsic and extrinsic job satisfaction than the groups with shorter service.

No significant difference was found between the job satisfaction levels of those younger than 30 and those between 30-39 years of age as also reported by Chalofsky (2003). The difference between the younger than 30 and 40 and older age groups differs significantly. Why the U-shaped distribution was not reported again, can possibly be explained as the individuals relevant to the U-shaped distribution reported 10 to 15 years ago (Clark et al.,

1996), is now between 10 to 15 years older and in an older age category. The whole group back then characterised as generally satisfied with their jobs (cohort phenomena) has moved on and now represents the older age category. A question would then be what happened to the unsatisfied middle group of the initial U-distribution, and why are their unsatisfied characteristics not reflected in the current older than 50 years of age group? Clark et al. (1996) provide a possible explanation describing the effect of age on job satisfaction. People's expectations generally become more realistic with age, and as people develop over time they also move into jobs characterised by what they expect from a job, resulting in a higher level of job satisfaction among them.

Qualifications and job satisfaction are generally reported to correlate negatively (Clark, 1996; Oswald, 2002). The results in this study showed however increasingly higher levels of intrinsic job satisfaction with consecutive higher levels of qualifications up to degree level but a lower level of intrinsic job satisfaction for the postgraduate group. Although the mean intrinsic job satisfaction increased with level of qualification, the only statistically significant level of job satisfaction difference were found between the extrinsic job satisfaction of the degree group and the diploma qualified group, with the latter group scoring statistically significant lower (less satisfied) than the degree qualified group. Although not statistically significant, this phenomenon was also found between the degree and postgraduate groups and their levels of extrinsic job satisfaction with the latter group again reporting lower extrinsic job satisfaction. The lower extrinsic job satisfaction reported for the higher qualified groups in both comparisons indicates their dissatisfaction with the extrinsic rewards they receive compared to their expectations relative to their qualifications. Only the mean intrinsic and extrinsic job satisfaction scores of the postgraduate group were lower than the rest of the qualification groups mean levels of job satisfaction, supporting a negative correlation between qualification and job satisfaction as posited by Clark (1996), only partly supporting hypothesis 7. Clark (1996) explained that although higher qualifications generally imply better jobs; education correlates rather with workers' expectations of what jobs they should have. The lower job satisfaction of postgraduate qualified individuals could therefore be indicative of a discontentment due to the disparity between their expectations and experience rather than mere job dissatisfaction because of the limited opportunities to exercise their specialist faculty.

Similar to what Oswald (2002) has reported the relationship between job level and job satisfaction was also found to be positive. The mean intrinsic and extrinsic job satisfaction item scores for the senior management group decreases similarly to the phenomenon found in the qualification-job satisfaction relationship. In a highly technical and scientific environment, a suitable higher qualification becomes a prerequisite for career progression. With the evident relationship between qualifications and job level as also reported by Clark (1996) and Oswald (2002), the compounding effect of qualification and job level on job satisfaction cannot be excluded.

The intrinsic job satisfaction means for different demographical categories in this study were consistently higher than the extrinsic job satisfaction means. This probably represents an employee characteristic in the chemical factory environment. It is taken that employees are led by dispositional (intrinsic) factors as influenced by their individual attitudes and actions (Roberts & Foti, 1998) in forming perceptions about their jobs and the satisfaction derived from it rather than extrinsic factors (for example working conditions, compensation and co-workers). Intrinsic satisfaction as it relates to the work itself – content, variety and autonomy (Buitendach & De Witte, 2005), can therefore be assumed to be key in influencing the job satisfaction of employees working in the chemical factory environment. This corresponds with the notion that most people engage in work because they enjoy doing so (Malka & Chatman, 2002).

This study contributes to better the understanding of job satisfaction in the chemical factory environment, but does present some limitations. The first difficulty relates to the width of the study scope encompassing both a validation duplication of the MSQ while simultaneously also exploring job satisfaction differences between different demographic groups. A further limitation was the restricted sampling as evident from the number of participants represented in the different demographic groups. Lastly, the limited focus on one primary geographical area can be limiting the results in terms of generalisation to other geographical areas where there are also chemical factories in the same group of companies.

## RECOMMENDATIONS

In a changed workplace, now multicultural, where integrations have probably taken effect as much as it will ever, the question was how satisfied are people working in that environment with their jobs. Opportunities are better than ever before for all and discrimination is presumably at an all time low. Although differences regarding their levels of job satisfaction were found between some demographic groups, these differences are less and smaller than expected. The similarity between the levels of job satisfaction for men and women are attributed to the rather positive experience by women of the improved and perceived equal opportunities in the workplace. Souza-Poza and Souza-Poza (2000) posited that women's job satisfaction would level off at a point in time equal to that for men as workplace job equity is established. The very similar levels of job satisfaction being reported for women and men in this study could indicate that in the chemical factory environment workplace equity between men and women has been established. In anticipation of any possible reality shock when previously disadvantaged groups realise that they are not better off than, but merely equal to the previously advantaged it is necessary to understand what underpins the perceived levels of job satisfaction and what can be done by employers to provide a conducive environment to afford workers the opportunity to experience better job satisfaction?

This research has indicated differences between some of the demographic groups, yet the sample size for sub-groups should be larger. Munsey (2006) suggested more comprehensive sampling to include sufficient representation of race, ethnic, language and small ethnic groups. These group numbers should be bolstered as they are frequently found to be poorly represented in the study samples.

The two-factor structure of job satisfaction was confirmed with each factor having its own distinctive characteristics. Job satisfaction with these two sub-factors, intrinsic and extrinsic job satisfaction should be studied further in the chemical factory environment using a longitudinal study approach to determine the relationship between job satisfaction and general satisfaction with life, which is reported to be reciprocal, with life satisfaction having the larger effect. Work related variables should be included, for example sick leave, absenteeism, intention to quite, generation groups, personality, and urbanisation to name a few in order to reach a deeper understanding of the antecedents (structure and dynamics) of job satisfaction and well-being.

A challenge in the workplace is to take due note of the differences between intrinsic and extrinsic job satisfaction and the effect it could have on the workplace. While both have its pros and cons, thorough consideration is necessary to provide a workforce that is aligned with the strategic intent of the business. Misalignment between the motivators provided and business strategy could see huge personnel turnovers.

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**CHAPTER 3**

**RESEARCH ARTICLE 2**

# THE VALIDATION OF THE ORIENTATION TO LIFE QUESTIONNAIRE IN A CHEMICAL FACTORY ENVIRONMENT

## ABSTRACT

The objectives of this study were to assess the psychometric properties of the Orientation to Life Questionnaire (OLQ), and to investigate the differences between the sense of coherence of demographic groups in a chemical factory environment. The OLQ and a biographical questionnaire were administered to chemical factory employees ( $N = 583$ ). A three-factor model (manageability, meaningfulness and comprehensibility) was confirmed through structural equation modelling. From the original 29-item OLQ an 11-item OLQ and a 6-item OLQ was first derived with good fit coefficients, that also correlated highly. With the 11-item OLQ, significant differences were confirmed between the sense of coherence of different qualification and job level groups.

## OPSOMMING

Die doel van hierdie studie was om die psigometriese eienskappe van die Lewensoriëntasievraelys (OLQ) te bepaal en om ondersoek in te stel na die mate van koherensieverskille tussen demografiese groepe in 'n chemiese fabrieksomgewing. Die OLQ en 'n biografiese vraelys is aan chemiese fabriekswerkers geadministreer ( $N = 583$ ). 'n Driefaktormodel (hanteerbaarheid, betekenisvolheid en verstaanbaarheid) is bevestig deur strukturele vergelykingsmodellering. Van die oorspronklike 29-item OLQ is eers 'n 11-item OLQ en ook 'n 6-item OLQ afgelei, beide met goeie passings en wat ook hoog korreleer. Met die 11-item OLQ is betekenisvolle verskille bevestig tussen die koherensiesin vir verskillende kwalifikasie en posvlak groepe.

Increasing complexity in the workplace and the resulting demands on employees have led to a significant volume of research on work-related distress and coping behaviour (Geyer, 1997). More recently, the research focus has changed to personal control and the relationship between social factors, health and illness (Lundberg & Nyström Peck, 1995), or the strengths that can be applied to protect people from falling ill under stressful conditions (Geyer, 1997). Various approaches can be found that are applied in an attempt to address this research issue, notably Kobasa's (1979) "hardy personality", Bandura's (1977) "self-efficacy" and Antonovsky's "sense of coherence" (Antonovsky, 1987, 1993). However, Antonovsky's salutogenetic model has drawn much attention in contemporary studies regarding the prevention and promotion of health (Lindfors, Lundberg, & Lundberg, 2005; Lundberg & Nyström Peck, 1995; Schumann, Hapke, Meyer, Rumpf, & John, 2003; Söderfeldt, Söderfeldt, Ohlson, Theorell, & Jones, 2000). Sense of coherence appears to covary strongly with health (Geyer, 1997; Larsson & Kallenberg, 1999), with consistent results regarding both validity and reliability (Lundberg & Nyström Peck, 1995).

The working environment is changing at an unprecedented speed (Sauter et al., 2003). The line between work and home as well as where and when it occurs is blurred. People are often expected to work or be available 24/7 and the number of dual-earner families have increased (Colter-Yahn & Davis, 2004). The result is an imbalance experienced by people between workplace demands and the resources they have in order to cope with these demands (Bennet, 2002). It is then also evident that amid similar stressful situations some individuals find it difficult to keep up with the pace while others tend to cope better (Ortlepp & Friedman, 2001).

The difference between people who cope and those who do not cope have been well researched in an attempt to identify the driving forces and strengths that enables a person to meet and handle life's adversities, while keeping or regaining health (Nygren, Aléx, Jonsén, Gustafson, Norberg, & Lundman, 2005). A common theme reported by Lundberg and Nyström Peck (1995) is that an individual's cognition, combined with his/her view on the environment, including the accompanying reaction to it, is important in coping with stress. Lindfors et al. (2005) expand this by explaining it as a difference in terms of how the world is viewed as unorganized, meaningless and without resources to deal with daily life (non-coping), or viewing the world as organised, meaningful, and with sufficient resources to meet life's demands (coping), which they then link to a stronger sense of coherence.

Sense of coherence develops during early adulthood (Feldt, Leskinen, Kinnunen, & Ruoppila, 2003), which coincides with the first employment years when greater psychological stability, independence and a sense of identity is established (Antonovsky, 1987; Antonovsky & Sagy, 2001). During this phase young adults commit themselves to life, marriage, a career, a particular lifestyle and social roles, as well as forming an idea of what the world is like (Feldt, Kivimäki, Rantala, & Tolvanen, 2004). From early middle age (30 years and older), what Larsson and Kallenberg (1999) call the formative years, the sense of coherence is accepted to be relatively stable onwards in life (Eriksson & Lindström, 2005; Nilsson, Holmgren, Stegmayer, & Westman, 2003).

Sense of coherence (Antonovsky, 1979) is defined as a global orientation expressing a person's pervasive and enduring feeling of confidence that: (1) the stimuli deriving from one's internal and external environments in the course of living are structured, predictable and explicable [*comprehensibility*]; (2) the resources available to one meet the demands posed by these stimuli [*manageability*], and (3) these demands are challenges, worthy of investment and engagement [*meaningfulness*]. An individual's sense of coherence is proposed to develop in relation to one's experience of the world as predictable and consistent, as well as the ability to shape life's outcomes (Ortlepp & Friedman, 2001). Sense of coherence is therefore a generalised orientation towards the environment, which serves as a source of general resistance resources for the individual to draw on in order to deal with the demands of life (Nilsson et al., 2003).

Sense of coherence is not a personality trait but rather an enduring person and view-of-the-world-related characteristic that influences appraisals of meaning ascribed to different situations (Flannery, Perry, Penk, & Flannery, 1994; Larsson & Kallenberg, 1996, 1999). Antonovsky (1987, 1993) described sense of coherence as a dispositional personality orientation that Hanse and Engström (1999) in turn highlighted as important in perceiving and controlling the environment for meaningful and appropriate action.

The importance of sense of coherence for an individual to cope with daily life demands is well documented. Lindfors et al. (2005) point out that the complexities of daily living and being confronted with various contradictory stimuli form a fundamental assumption to the conceptualisation of a sense of coherence. They stressed the importance of the three sense of coherence components, namely comprehensibility, manageability and meaningfulness for an

individual to deal successfully with everyday stimuli and in promoting health (Geyer, 1997). In addition, the relationship between sense of coherence and illness or health is well-documented (Antonovsky, 1993; Larsson & Kallenberg, 1999; Lundberg & Nyström Peck, 1994).

Research on sense of coherence has been criticised for three reasons, namely, the theoretical sense of coherence construct, the instruments and adherence to psychometric principles and lastly inadequate statistical techniques used in analysing the data. These criticisms stem primarily from an apparent lack of conceptual clarity about the sense of coherence construct and a lack of empirical evidence to support the theoretical three-factor structure (Larsson & Kallenberg, 1999; Schumann et al., 2003). This is evident from the psychometric properties of the OLQ (Lundberg & Nyström Peck, 1995; Schumann et al., 2003) where Antonovsky's theoretical three-factor sense of coherence construct is ignored resulting in some of the underlying constructs (factors) being discarded in favour of better fit statistics. This deviation from Antonovsky's theoretical sense of coherence construct occurs without an alternative theory or model being presented for sense of coherence. Finally, statistical inadequacies are reported with the interpretation of OLQ data as a multifaceted personality construct (Hittner, 2000). Despite these concerns, sense of coherence continues to interest researchers (Feldt et al., 2004) with various research attempts to test the stability of sense of coherence measures (Smith, Breslin, & Beaton, 2003). These include attempts to confirm the sense of coherence structure through structural equation modelling (SEM) (Larsson & Kallenberg, 1999), the revisiting of some conceptual considerations (Geyer, 1997), and the development of various forms of an OLQ questionnaire for different applications for example, paper and pen administration or in interview settings (Lundberg & Nyström Peck, 1995; Randall, 2006; Schumann et al., 2003).

Sense of coherence is conceptualised, based on three sub-constructs, namely comprehensibility, manageability, and meaningfulness (Antonovsky, 1987; 1993). Although Antonovsky (1987) linked comprehensibility as a cognitive dimension, manageability as an instrumental dimension and meaningfulness as a motivational dimension, he also stressed the high interdependence of the three sense of coherence components and cautions against the separate use of the three subscales.

While widely used and recommended for inclusion in surveys, sense of coherence as a concept and the accompanying OLQ measurement tools are frequently criticised for various reasons. On the one hand the usefulness of the sense of coherence construct is widely supported. However, on the other hand when used there are frequent warnings against different aspects of the sense of coherence and the OLQ. In the more than three decades since Antonovsky has presented the sense of coherence concept and the OLQ, various attempts have been made to address at least some of the concerns. These attempts include specific psychometric alterations, for example item selection, and statistical efforts to increase the validity of the original OLQ, and shorter versions thereof. These efforts, although commendable do not seem to have brought any better prospects regarding the sense of coherence construct or the OLQ questionnaire than before.

Finding an answer to the problems associated with sense of coherence and the measurement of sense of coherence will require the focus to be on improving the psychometric properties of the OLQ formats as well as the statistical techniques applied to analyse sense of coherence scales, all within the ambit of Antonovsky's initial conceptual framework. The purpose of this study is to test the psychometric properties of the original OLQ-29 format in a multilingual setting and to construct a shortened version of the OLQ with more than one question for each of the three initial sense of coherence constructs.

### **Conceptual considerations**

Despite its wide acceptance and application, sense of coherence has been criticised for a lack of conceptual clarity (Larsson & Kallenberg, 1999), and a lack of empirical evidence to support the three-factor structure (Larsson & Kallenberg, 1999; Schumann et al., 2003). The uniqueness of the sense of coherence concept can also be questioned and Geyer (1997) points out the overlap between Antonovsky's sense of coherence and Kobasa's theory of "hardy personality", with both theorists using the same problem to formulate their concepts – "why some people fall ill under stress and some not". Sense of coherence and hardy personality share three similar core components; the belief that the individual can influence and control their environment (manageability), the availability and knowledge of resources to cope with the environment (comprehensibility), and the ability to make commitments and consider individual behaviour as meaningful.

A prominent dilemma with sense of coherence and the measurement thereof is the lack of conceptual clarity (Larsson & Kallenberg, 1999). While on a theoretical level Antonovsky's three-factor construct for sense of coherence is accepted, Antonovsky (Antonovsky, 1987, 1993) cautioned against using the three factors as subscales. This has taken effect in much research heeding Antonovsky's caution with the focus turned to a one-factor approach in constructing sense of coherence measurement scales (OLQ) for example Schumann et al. (2003).

To date several studies analysing the sense of coherence scale factors have failed to identify the three components of sense of coherence. According to Schumann et al. (2003), principle component analysis only produced a single factor solution (Antonovsky, 1993), and confirmatory factor analysis produced many more factors that can only be distantly equated to components posited by Antonovsky. Some researchers, namely Lundberg and Nyström Peck (1995) however maintained the three-factor construct by selecting one item per factor in constructing their 3-item OLQ. Hittner (2000) pointed at the highly inter-correlated nature of the three sense of coherence factors as a multifaceted personality construct with multiple subordinate constructs that are usually inter-correlated factors or subscales (super-ordinate constructs).

Although research further tends to focus primarily on a total sense of coherence (one factor) (Hittner, 2000), research about predicting suicidal ideation during different periods of hospitalisation using the factors as subscales hinted at the usefulness of the separate subscales in practice (Petrie & Brooks, 1992). Both theory (Antonovsky, 1987) and research (Petrie & Brooks, 1992) suggested that the three factors might yield differential predictive associations. There is thus support for the use of, or at least further research into the use of the three-factor sense of coherence structure. In the absence of an alternative theoretical model, the notion of sense of coherence as a single factor construct should be considered although a three-factor sense of coherence construct is theoretically posited and supported by practical research.

Another difficulty with Antonovsky's sense of coherence is the posited relative stability of sense of coherence after three decades. Snekkvik, Anke, Stanghelle, and Fugl-Meyer (2003) reported that although the median OLQ scores (sense of coherence levels) were found to be relatively stable over time, individual scores sometimes showed large variations. Furthermore, while Nygren et al. (2005) have found sense of coherence to be equivalent or

higher for older groups compared to their younger counterparts. Feldt et al. (2003) could not find the same stability in sense of coherence in older subjects compared to younger ones. The development of sense of coherence is a result of new life experiences (Sjöström, Langius-Eklof, & Hjertberg, 2004). Life experiences, however, do not end at the age of 30, and although the relative stability of sense of coherence after 30 years of age is accepted, Feldt et al. (2004) posited that sense of coherence could be expected to change if it coincides with major life changes. These significant life changes are equated to the initiation of new life experiences for the individual, for example first time birth (Nilsson et al., 2003). Women who were about to give birth a second time reportedly had higher levels of sense of coherence than women expecting a first child, supporting the notion that new life experiences contribute to sense of coherence (Sjöström et al., 2004). They further posited the possibility that although an occasional life-event might alter the sense of coherence strength, it might be temporarily and the subject is likely to return in time to their original sense of coherence level. This supports Antonovsky's (1987) findings that sense of coherence is relatively stable in adulthood provided the absence of radical life events. Feldt et al. (2003) did not find age to play any significant role in the stability, level or mean changes in sense of coherence and suggested that Antonovsky's theory be revised as far as stability of sense of coherence in adulthood is concerned.

It can therefore be assumed that although one major life event will change the strength of sense of coherence, the sense of coherence level can return to a previous level in the absence of more major events in close proximity. Depending on the nature, intensity and frequency of these life events, which cannot be unlearned or un-experienced, this collective experience should contribute to the individuals' overall sense of coherence strength.

According to Lundberg and Nyström Peck (1995), sense of coherence is important in any investigation into the social determinants of health and ill health. Sense of coherence has been reported as an important contributing component to one's general health and well-being (Lundberg & Nyström Peck, 1995). Sense of coherence has been found to mediate the effect stress has on personal efficacy, and while job stress impacts on exhaustion, a strong sense of coherence moderates the effect of job stress on exhaustion (Rothmann, Jackson, & Kruger, 2003), enabling individuals to make the necessary adjustments in life in order to be stable and productive individuals (Strauser & Lustig, 2003). Petrie and Brook (1992) reported on the usefulness of sense of coherence and more specific the usefulness of sense of coherence

subscales (factors) in predicting initial suicide ideation and re-attempting suicide ideation. Anderson and Riger (1991) make reference of the strong association between the sense of coherence manageability factor and depression, highlighting the relationship between expectations of personal control and depression.

Sense of coherence has also been used successfully in various intervention settings, for example counselling (Strauser & Lustig, 2003; Olsson & Hwang, 2002), understanding group dynamics (Cilliers, 2001), and has also been linked to psychological and psychosocial constructs, for example well-being and satisfaction with life (Schumann et al., 2003; Volanen, Lahelma, Silventoinen, & Suominen, 2004), burnout and work engagement (Rothmann, Steyn, & Mostert, 2005), coping with stressors and also maintenance of health (Agardh et al., 2003), stress, physical and psychological health and well-being, such as job control, general living conditions, and social support (Holmberg, Thelin, & Stiernström, 2004), and ill health and disease (Antonovsky, 1993; Hanse & Engström, 1999; Javtokas, Lindström, & Zagminas, 2004; Larsson & Kallenberg, 1996; Lundberg & Nyström Peck 1994; Söderfeldt et al., 2000).

Contradictory findings are also reported regarding the relationship between sense of coherence and demographic variables and the different sense of coherence means for different demographic groups. Earlier, correlations were reported between sense of coherence and demographic variables for example gender, age, tenure, education, work function, employment status (Antonovsky & Sagy, 2001; Hanse & Engström, 1999; Tuomi, Seitsamo, & Huuhtanen, 1999; Larsson & Kallenberg, 1996). Holmberg et al. (2004), however, indicated sense of coherence as independent from socio-demographic factors with low correlations between sense of coherence and socio-demographic variables. Despite the apparent usefulness and general acceptance of the sense of coherence concept and related instrument (Orientation to Life Questionnaire - OLQ) and the reported relationship to other psychosocial measures, sense of coherence has drawn debate since its inception (Holmberg et al., 2004).

### **Psychometric and statistical considerations**

The lack of conceptual clarity mentioned by Larsson and Kallenberg (1999) find effect in failure of multivariate statistical techniques such as factor analysis to identify the supposedly

three factors (components) of sense of coherence. Despite correlation studies validating Antonovsky's sense of coherence scale (Flannery et al., 1994), different multivariate analysis resulted in significantly different results. Principle component analysis resulted in single factor solutions, while confirmatory factor analysis resulted in many more factor structures that only distantly equated Antonovsky's conceptualised components (Schumann et al., 2003). In practice this problematic psychometrics of OLQ, results in various attempts to test and manipulate data using for example structural equivalence modelling (SEM) through AMOS (Arbuckle, 1997) to find a more suitable model fit that complements the sense of coherence concept. With the lack of conceptual clarity, some researchers have also opted to ignore Antonovsky's three-factor construct in favour of better fit statistics with a single factor approach (Schumann et al., 2003).

Another relic of the lack of conceptual clarity and the resulting freedom in research is that item numbers are sacrificed, to such an extent that sense of coherence instruments are reduced to as little as three items only (Lundberg & Nyström Peck, 1995; Schumann et al., 2003). Lundberg and Nyström Peck (1995) retained Antonovsky's three-factor construct for sense of coherence for the 3-item OLQ they developed for interviewing purposes. The three questions each represent a sub-factor. They, however, noted the impossibility of single questions to grasp every detail of the theoretical intensions behind each of the dimensions (Lundberg & Nyström Peck, 1995) although they could still capture the essence of sense of coherence in a large survey, while maintaining the three-factor construct with one item per component. In answer to Lundberg and Nyström Peck (1995), Schumann et al. (2003) used three original OLQ-29 items, namely items 12 and 19 loading on the comprehensibility factor and item 14 loading on the meaningfulness factor, while discarding the manageability factor in favour of better fit statistics and ultimately reporting only what Hittner (2000) referred to as the total sense of coherence (one-factor construct).

Sense of coherence correlates strongly with health and wellness (Schumann et al., 2003; Lundberg & Nyström Peck, 1995), despite the apparent lack of conceptual clarity (Larsson, & Kallenberg, 1999), and the reported psychometric problems. This is also evident from Holmberg et al. (2004) who said that the sense of coherence scale and its relation to other psychosocial measures has been the subject of lively debate, that confirms the originality and usefulness of the sense of coherence construct or OLQ measurements in psychosocial studies.

Research indicates a preference to use original items from the 29-item OLQ questionnaire when constructing alternative versions of the OLQ. The OLQ-13 elected 13 items from the OLQ-29, and Schumann et al. (2003) also used three original OLQ-29 items for their version of a 3-item OLQ. New items created by Lundberg and Nyström Peck (1995) for interview application and the additional items Randall (2006) developed in her study need to be tested in multiple research scenarios to confirm validity and reliability in different settings. On face value, some of the new items do not comply with basic psychometric requirements, for example multiple phrased items, and complex language syntax, namely parenthesis, pleonasm and double negatives.

Hittner (2000) also used sense of coherence as an example, explaining the problems with interpreting multifaceted personality constructs, which usually contain multiple correlated subscales. These multifaceted personality constructs, present a unique problem for statistical analysis because of the linearity or significant dependence among subscales. Researchers have, according to Hittner (2000), a problem understanding the association between the individual subscales, and making strong statements about the individual or unique effects associated with each subscale. Despite general agreement as to the versatility and usefulness of multiple regressions for analysing multifaceted personality scales, a number of important issues, for example handling of multivariate outliers that affect the validity of the multiple regression results are rarely understood (Hittner, 2000).

The theoretical three-factor structure for sense of coherence is widely accepted but it is often negated in favour of a one-factor approach in an attempt to better the statistical properties of the sense of coherence measurement scales. No challenge for or alternative theory could be found to replace Antonovsky's theoretical conceptualisation of sense of coherence except Bandura's (1977) "self-efficacy" and Kobasa's (1979) "hardy personality". Both these researchers preceded Antonovsky (1987). The similarities between the latter and sense of coherence have been mentioned earlier. In the absence of an alternative theoretical model to replace Antonovsky's theory and with research failing to confirm the three-component structure of the sense of coherence, further research should treat the OLQ as a single factor instrument while all attempts should be made to ensure that all three theoretical factors are covered with items.

The need to develop a shorter version of the OLQ is apparent for three reasons. The original 29-item version (Antonovsky, 1987), was designed to be a paper and pencil test and Lundberg and Nyström Peck (1995) found the questions to be unsuitable for interview use. Also, the 29-item version was found to be too long for inclusion in multipurpose surveys already congested with many other questions, resulting in a choice between excluding a sense of coherence measurement or to capture the essence of sense of coherence with as few items as possible (Lundberg & Nyström Peck, 1995). Lastly, the debate about the conceptual structure of sense of coherence prevails, without more clarity about a multi or mono structure. As a result, the underlying theoretical three-component structure is often negated, resulting in fewer items in favour of better statistical coefficients.

### **Measurement of sense of coherence**

The most commonly found way to measure sense of coherence is with the 29-item Orientation to Life Questionnaire (OLQ-29) (Antonovsky, 1987) developed with a 7-point scale. Several versions of the OLQ are available, varying from Antonovsky's (1987) original 29-item scale to scales with as little as 3-items (Schumann et al., 2003; Lundberg & Nyström Peck, 1995). The general interest in the sense of coherence construct is also evident from the fact that the OLQ is available in at least 33 languages, in more than 30 countries and at least 15 versions (Eriksson & Lindström, 2005; Lundberg & Nyström Peck, 1995). Five variations of the OLQ were considered for this study. The first being the 29-item version originally designed by Antonovsky (1987), the second a shortened 13-item version derived from the original 29-item version, a 23-item version (Randall, 2006), and two 3-item versions, one by Lundberg and Nyström Peck (1995) and one by Schumann et al. (2003). The reason for shorter versions is generally given as being more suitable for large population surveys or where questionnaire batteries are already compounded (Lundberg & Nyström Peck, 1995; Schumann et al., 2003).

The importance of the three different factors contributing to the sense of coherence structure described by Antonovsky (1987) is essential in developing a sense of coherence. The same three factors are also repeatedly highlighted in the literature as important for the individual to be able to deal with daily demands in life (Lindfors et al., 2005). The use of sense of coherence measures across different languages, and cultures have also been reported to produce similar results regarding validity and reliability (Antonovsky, 1993, Lundberg &

Nyström Peck, 1995). However, repeated factor analyses of the OLQ scale fail to identify distinctive separate factors representing the three sense of coherence components (Schumann et al., 2003). Different analytical attempts, for example, principle components factor analysis, repeatedly confirmed a single factor structure as indicated earlier by Antonovsky (1993) (Schumann et al., 2003), or a multi substructure of sense of coherence with various new factors only remotely comparable to Antonovsky's original components. Two distinct opinions state that sense of coherence is either only a one dimensional construct (Schumann et al., 2003) as the three component structure cannot be statistically confirmed, or the OLQ instruments are restricted in their design and so limited to extract the theoretically supposed three-component structure of sense of coherence because other statistical methods are inadequately applied to confirm the three-factor structure for sense of coherence.

The purpose of this study was to analyse the original OLQ-29 items, and to test the items using AMOS (Arbuckle, 1997) in different models to come up with a shortened version of the OLQ instrument that complies with the three-factor sense of coherence structure as conceptualised by Antonovsky with more than one question per factor and good psychometric properties. The second purpose was to explore the differences of sense of coherence means for different demographic sub-groups in a sample taken from the chemical factory environment.

## METHOD

### Participants

The sample drawn is from the employee population from a number of businesses in the chemical factory environment in South Africa. All employees in this specific population were targeted and as many employees as possible were accommodated during the administration of the questionnaires. The sample comprised 583 employees, representing various demographic sub-groups, namely *race, gender, age, job levels and language groups* in the organisation.

The data was collected in a series of efforts, applying various methods, for example group sessions, focussed efforts in different areas and a general mail effort to ensure a sufficient sample. A 58% response rate was achieved after distributing 1000 booklets ( $N = 583$ ). The characteristics of the participants are reported in Table 1.

Table 1

*Participant Characteristics (N = 583)*

	Category	Frequency	Percentage
<b>Age</b>	<30	99	16,98%
	30-39	198	33,96%
	40-49	182	31,22%
	50+	91	15,61%
	Missing	13	2,23%
<b>Gender</b>	Male	385	66,04%
	Female	173	29,67%
	Missing	25	4,29%
<b>Language</b>	European	431	73,93%
	African	144	24,70%
	Missing	8	1,37%
<b>Qualification</b>	School	321	55,06%
	Diploma	143	24,53%
	Degree	70	12,01%
	Postgraduate	23	3,95%
	Missing	26	4,46%
<b>Tenure</b>	<5 years	134	22,98%
	5-14 years	166	28,47%
	15-24 years	205	35,16%
	25+ years	59	10,12%
	Missing	19	3,26%
<b>Job Level</b>	Employees (<L7)	229	39,28%
	Supervisor (L7-L6C)	180	30,87%
	Middle Managers (L5B-L5A)	40	6,86%
	Senior Managers (L4-L3)	13	2,23%
	Missing	124	21,27%

The mean age of the respondents in the sample falls in the 40 years category. The gender distribution is 66,04% males and 29,67% females. This compares well with the demographics of the general workforce in the chemical industry, being predominantly male. The language representation of the sample also corresponds with the demographics of the area, with 73,93% of the respondents reporting either Afrikaans or English (European language) as their home language irrespective of racial category, and 24,70% of the respondents reported Sotho, Zulu or Xhosa (African language) as their first language. The participants also represented the different job levels well with 39,28% from the below supervisory level, 30,87% from the

first line supervisory level, 6,86% from middle management level and 2.23% from senior management.

### **Measuring instrument**

*The 29-item Orientation to Life Questionnaire (OLQ-29)* (Antonovsky, 1987) measures the three components of the sense of coherence construct, namely comprehensibility (for example "Do you have the feeling that you are in an unfamiliar situation and don't know what to do?"), manageability (for example "Do you think that there will always be people whom you'll be able to count on in the future?"), and meaningfulness (for example "Life is: ... 1: full of interest... 7: completely routine"). Antonovsky (1993) suggested that the three theoretical components should not be considered as subscales since the items were first constructed using a facet analysis design in order to vary the content systematically along a number of dimensions and secondly, from his review of studies Antonovsky concluded that factor analysis of the scale is likely to produce a single factor solution which will not reflect the three components. Antonovsky (1993) reported alpha coefficients of the OLQ-29 in 29 research studies varying between 0,85 and 0,91. Test-retest reliability studies found coefficients between 0,41 and 0,97 (Antonovsky, 1993). Responses are on 7-point semantic differentials anchored by wordings related to the contents of each item.

### **Statistical analysis**

The statistical analysis was carried out with the SPSS program (SPSS Inc., 2003). In the first step, means, standard deviations, skewness and kurtosis were determined to describe the data. An analysis of variance (ANOVA) was also performed to determine the variance in levels of sense of coherence in identified demographic sub-groups. To assess the fit of a proposed model the structural equation model (SEM) was performed, using the maximum likelihood methods of AMOS (Arbuckle, 1997). A covariance matrix was used as the source for input data. The data was tested for specific measurement and structural models and according to recommended fit indices, a mixture of fit indices were used (Arbuckle, 1997; Hanse & Engström, 1999).

## RESULTS

The structural equation modelling (SEM) method from the AMOS package was used to test the factorial models (Arbuckle, 1997) of the OLQ for the total group of respondents. Data analysis was done in a series of consecutive steps building models by allowing error correlations between item pairs to continue and restrict item loading until a best fit model could be achieved.

The default model comprised 27 of the original OLQ items, excluding items 5 and 25 identified for their low standard regression weights and testing a one-factor model. Items 5 and 25 presented grammatical problems. Item 5 *“Has it happened in the past that you were surprised by the behaviour of people whom you thought you know well?”* is a grammatically poorly constructed question. Except for the tense error “know” that should be “knew” the question could be simplified to *“Were you ever surprised by the behaviour of people you thought you knew well?”* Item 25 is equally problematic as it is a double item with a statement followed by a question. The statement part of the item is written in a parenthesis format and the question is complicated as a pleonasm – a word indicating the past tense “felt” is repeated by an extension “...in the past?”

Model I comprised the same 27 items as in the default model also excluding items 5 and 25 but was tested for a three-factor model. Taking cognisance of previously reported results on the OLQ-29, from Model II onwards: the OLQ-13 (Antonovsky, 1987) was used which initially included items 5 and 25 previously identified to have low standard regression weights. In Model III and IV, items 5 and 25 were excluded resulting respectively first in a 12-item version and later in an 11-item version of the OLQ. Model III and Model IV, with first item 25 (Model III) and then item 5 (Model IV) removed were tested as single factor models. In Model V with items 5 and 25 being removed, items 28 and 29 were also allowed to correlate ( $r = 0,263$ ) as these items were identified with possible misspecifications and loading on the same construct. A possible reason for the strong correlation between items 28 and 29 can be found in the first part of both items which presents a strong emotional hint “How often do you have the feeling...”, while the core of the question is only found in the latter part of the item. With the position of the two items at the end of the questionnaire, the similarity between the items and the quick succession could result in a transfer from item 28 to item 29, evoking a similar response. Models VI and VII comprised six items, two items

each selected for the three sense of coherence constructs, resulting in an OLQ-6 questionnaire. The 6-item OLQ was tested as a 1-factor model (Model VI) and a 3-factor model (Model VII).

The construct equivalence for the successive models ranging from the OLQ-29, OLQ-13, OKQ-12, OLQ-11 and OLQ-6 were tested for fit, considering the  $\chi^2$  values, degrees of freedom and probability value. Additional goodness fit statistics (IFI, CFI, and RMSEA) were considered further in order to assess the global fit of each different model (Hanse & Engström, 1999). The initial poor fit of the default model for the OLQ-29, resulted in further explorative analysis. The modification indices (MI) were considered as indicating possible misspecifications and item pairs with high MI-values were allowed to correlate in subsequent models. Only items from the original OLQ-29 were used. Table 2 presents the sequential models as tested in an attempt to find the best possible fit.

Table 2  
*Orientation to Life Questionnaire Construct Validity*

Model	Description	CMIN ( $\chi^2$ )	df	CMIN/df	IFI	CFI	RMSEA
Default	OLQ-29 1 factor (minus items 5 and 25)	1452,94	324	4.48	0.67	0.67	0,08
I	OLQ-29 3 factors (minus items 5 and 25)	1167,78	321	3.64	0.75	0.75	0,07*
II	OLQ-13 1 factor (all items)	304,88	65	4.69	0.80	0.80	0,08
III	OLQ-12 1 factor (minus item 25)	286,95	54	5.31	0.79	0.79	0,09
IV	OLQ-11 1 factor (minus items 5 and 25)	145,98 <sup>a</sup>	44	3.32	0.89	0.89	0,06*
V	OLQ-11 1 factor (minus items 5 and 25) errors allowed to correlate, items 28 and 29	120,77 <sup>b</sup>	43	2.81	0.92*	0.92*	0,06*
VI	OLQ-6 1 factor (items 8, 28 (mean) 12, 19 (comp) and 9, 29 (man))	39,20 <sup>c</sup>	9	4.36	0.95*	0.95*	0,08
VII	OLQ-6 3 factors (items 8, 28 (mean) 12, 19 (comp) and 9, 29 (man)) errors allowed to correlate between items 9 and 12	23,95 <sup>d</sup>	8	3,00	0.97*	0.97*	0,06*

\* Significant fit; IFI  $\geq$  0.90; CFI  $\geq$  0.90; RMSEA  $\leq$  0.05 (AMOS, Arbuckle, 1997)

Note: CFI = comparative fit index, IFI = independent fit index, RMSEA = root mean squared error of approximation

a, b, c, d = significant change in  $\chi^2$  ( $p = 0,000$ )

The first step in testing for construct equivalence was to use all the data in a one-factor model. The default model comprising the original OLQ-29 minus items 5 and 25 identified from their low standard regression weights. The default model described rendered a  $\chi^2$  value of 1452,94 ( $df = 324$ ;  $p = 0,000$ ). With the large  $\chi^2$  value relative to the degrees of freedom together with an IFI value and CFI value lower than 0.90, and a RMSEA value higher than

0,05 the model had a poor fit. According to Arbuckle (1999) and Byrne (2001) a rule of thumb for RMSEA is that a value of 0,05 and lower indicate a close fit, values between 0,06 and 0,08 a reasonable fit, while the upper RMSEA fit limit is 0,10. The same data was also tested in a three-factor model for the OLQ (Model I). The fit values remained unsatisfactory ( $\chi^2 = 1167,78$ ,  $df = 321$ ; IFI = 0,67; CFI = 0,67; RMSEA = 0,07), again showing a poor fit for the model. The change in  $\chi^2$  is not significant between the default model and Model 1.

Following the poor fits achieved and the negative variance reported, it was opted to use the tested 13-item model, using items 4, 5, 6, 8, 9, 12, 16, 19, 21, 25, 26, 28 and 29. Model II with all 13 items included still yielded unsatisfactory fit parameters ( $\chi^2 = 304,88$ ,  $df = 65$ ; IFI = 0,80; CFI = 0,80; RMSEA = 0,08). Analysing standard regression weights in Model II pointed towards item 25 with a negative coefficient, indicating a negative covariance that could affect the fit statistics. In the next model (Model III) item 25 was excluded based on the negative variance, but the model still yielded unsatisfactory fit statistics ( $\chi^2 = 286,95$ ,  $df = 54$ ; IFI = 0,79; CFI = 0,79; RMSEA = 0,09). The degrees of freedom changed from 65 in Model II to 54 in Model III after only removing one item (item 25). This indicated the variance effect item 25 had on the other items, confirming the decision to remove item 25. Considering the standardised regression weights achieved in Model III, item 5 was also identified with a low coefficient, and so item 5 was also excluded in the next model. In Model IV the fit statistics with items 5 and 25 removed resulting in an 11-item OLQ, that in turn resulted in near sufficient fit parameters ( $\chi^2 = 145,98$ ,  $df = 44$ ; IFI = 0,89; CFI = 0,89; RMSEA = 0,06). Analysing the correlation coefficients, item 28 and item 29 ( $r = 0,263$ ) were identified as possible misspecifications that correlated moderately, loading on the same construct and could influence the fit statistics negatively. In Model V, with the same items as in Model IV, the errors between items 28 and 29 were allowed to correlate in Model V yielding acceptable fit statistics ( $\chi^2 = 120,77$ ,  $df = 43$ ; IFI = 0,92; CFI = 0,92; RMSEA = 0,06). Model V resulted in an 11-item questionnaire with four items representing the comprehension factor, four items representing the manageability factor and three items representing the meaningfulness factor. The change in  $\chi^2$  ( $\Delta \chi^2$ ) against the change in degrees of freedom ( $\Delta df$ ) is significant in subsequent model from Model III to Model VII.

In line with other research (Lundberg & Nyström Peck, 1995; Schumann et al., 2003), further models were explored seeking to reduce the number of items further while still maintaining Antonovsky's three-factor structure of sense of coherence and complying with basic

psychometric principles, for example to measure each factor with more than one question. Analysing the standard regression coefficients obtained with the previous model (Model V), the items with the highest regression weights per factor were identified to be included in a 6-item OLQ model, Model VI was designed then with items 8 and 28 (comprehension), items 12 and 19 (manageability) and items 9 and 29 (meaningfulness). Model VI yielded acceptable fit statistics ( $\chi^2 = 32,20$ ,  $df = 9$ ; IFI = 0,95; CFI = 0,95; RMSEA = 0,08). The modification indices (MI) were considered as indicating possible misspecifications and items 9 and 12 were allowed to correlate in the next model, yielding better fit statistics in Model VI1 ( $\chi^2 = 23,95$ ,  $df = 8$ ; IFI = 0,97; CFI = 0,97; RMSEA = 0,06), confirming the fit of a 6-item OLQ with two questions per factor (Antonovsky, 1987, 1993).

The study data was analysed for normality, and the descriptive statistics, alpha coefficients, skewness and kurtosis of the different factors and different OLQ models are presented in Table 3.

Table 3

*Descriptive Statistics of the Orientation to Life Questionnaire (OLQ)*

Orientation to Life Questionnaires (OLQ)	Valid N	Mean	Std.Dev.	Skewness	Kurtosis	$\alpha$
Orientation to Life Questionnaire (11 items)	561	49,97	9,46	-0,27	0,19	0,75*
Orientation to Life Questionnaire (6 items)	561	27,63	5,35	-0,54	0,52	0,72*

\* Significant internal consistency > 0,70 (Nunnally & Bernstein, 1994)

The normal distribution of the OLQ data is confirmed and presented in Table 3. Both OLQ-models presented satisfactory levels of internal consistency (OLQ-11 items  $\alpha = 0,75$ ; OLQ-6 items  $\alpha = 0,72$ ) with Cronbach alpha coefficient > 0,70 (Nunnally & Bernstein, 1994). The Cronbach alpha coefficient is influenced by the number of items, hence partially explaining the reduction of the alpha coefficient value. Maintaining an alpha coefficient above the 0,70 with less than half the original items indicate the model's consistency. A strong correlation was found between the OLQ-11 and the OLQ-6 ( $r = 0,93$ ;  $p = 0,00$ ).

Table 4

*Analysis of Variance – Orientation to Life Questionnaire (11-items)*

Source	Sum of Squares (Type III)	df	F	p	Mean			
Age	932,48	3	3,52	0,02	<30 years 48,08 <sup>a</sup>	30-39 years 49,23	40-49 years 51,55 <sup>a</sup>	50+ years 50,56
Language	432,54	1	4,86	0,03	Afrikaans/English 50,44	Africa 48,33		
Gender	21,02	1	0,232	0,63	Male 50,13	Female 49,71		
Qualification	2055,53	3	7,89	0,00*	Secondary 48,54 <sup>a</sup>	Diploma 51,00	Degree 53,28 <sup>a</sup>	Post degree 54,65
Tenure	195,06	3	0,73	0,53	<5 years 49,15	5-14 years 50,05	15-24 years 50,70	25+ years 50,23
Job Level	2829,03	3	11,34	0,00*	Employee 47,78 <sup>a,b</sup>	Supervisor 51,92 <sup>a</sup>	Manager 55,10 <sup>b,c</sup>	Senior manager 48,23 <sup>c</sup>

\*  $p < 0,00$  statistically significant

a b c = practical significant comparisons

In Table 4, the five demographic variables considered in terms of the variance in sense of coherence means are presented. The variance reported only for qualification and job level were on a statistically significant level ( $p < 0,00$ ). The variance of the other demographic variables were not statistically significant (language,  $p = 0,03$ ; age,  $p = 0,02$ ; gender,  $p = 0,63$ ; and tenure (years of service)  $p = 0,53$ ). The difference in mean sense of coherence between the Afrikaans/English and African language groups is not significant ( $p = 0,03$ ). The African language group's sense of coherence mean is lower than that of the Afrikaans/English group. The difference between the mean sense of coherence for various periods of service with the employer (tenure) does not differ significantly and it appears that the number of working years alone does not contribute to sense of coherence differences. The sense of coherence means for gender did not differ statistically significant although the sense of coherence mean for the female group was lower than that of the male group. The sense of coherence means for age also did not differ on a statistically significant level, yet the sense of coherence means was found to increase marginally with age up to 50 years whereafter the sense of coherence mean decreased to between the sense of coherence means of the 30 and 40 year olds. Practical significant differences between age sub-groups were found, for example between the younger than 30 year old group compared to the 40-49 year old group. The sense

of coherence means increased with qualification level and statistical significant differences were reported between the sense of coherence mean for the secondary school group *versus* the sense of coherence means for both the graduate and the postgraduate groups. The most significant differences between the sense of coherence means for sub-groups were reported for different job levels, where the sense of coherence means was found to increase with job level, with significant differences between all the job level sub-groups. The mean sense of coherence for the senior management group was, however, lower and in order between the sense of coherence mean of the employee group and the supervisor group. The differences between the sense of coherence means for the employees and their seniors (both supervisors and managers) were significant ( $p = 0,00$ ) with the latter reporting successively stronger levels of sense of coherence. The difference between the means for the managers and the senior managers was also statistically significant, although the latter scored a lower mean sense of coherence than the managers' group.

## DISCUSSION

The objectives of this study were to evaluate the construct of the Orientation to Life Questionnaire (OLQ) in the chemical factory environment, to develop a shortened version of the OLQ adhering to Antonovsky's three-factor sense of coherence theory, and to analyse the mean sense of coherence levels for various demographic groups in a chemical factory environment.

The structure validity of the OLQ as applied to a sample of employees working in a chemical factory was confirmed with AMOS (Artbuckle, 1997). The original OLQ-29 initially presented with poor fit statistics. Analysis of the data pointed to two problematic items, namely items 5 and 25 and after removing items 5 and 25 the fit statistics improved slightly but remained outside the set fit parameters. Based on previous research findings (Rothmann, 2000) the OLQ-13 was pursued for further model analysis. The OLQ-13 with items 6, 9, 25, 29 (manageability); 4, 8, 16, 28 (meaning), and 5, 12, 19, 21, 26 (comprehension) subsequently produced better fit statistics than the original OLQ-29 but the fit statistics were still outside the acceptable set fit parameters. Excluding the identified problematic items, 5 and 25 rendered an 11-item OLQ which still resulted in unsatisfactory fit statistics but with sufficient internal consistency ( $\alpha = 0,75$ ) for sense of coherence as a one-factor construct. To design an even shorter OLQ version than the OLQ-13 for possible inclusion in for example

corporate culture surveys, six items from the original OLQ-29 with the highest regression weights per factor were selected with two items each per factor (OLQ-6) – items 8, 28 (meaning), 12, 19 (comprehension) and 9, 29 (manageability). Testing the construct validity of the OLQ-6 as a single factor model (Model VI), still with two questions per theoretical factor according to Antonovsky's (1987) theory resulted in a satisfactory level of internal consistency ( $\alpha = 0,72$ ) and the fit statistics at most reasonable (RMSEA = 0,08). The OLQ-6 tested as a three factor model (Model VII), with the same question structure as in Model VI did however resulted in both a satisfactory level of internal consistency ( $\alpha = 0,72$ ) and adequate fit statistics (RMSEA = 0,06). The OLQ-6 also correlated highly with the OLQ-11 ( $r = 0,93$ ) confirming that these two abbreviated OLQ versions could be used alternatively and would render statistically comparable results. The construct validity for the OLQ, and specifically the shortened versions (OLQ-6, and OLQ-11) were confirmed with sufficient levels of internal consistency and adequate fit statistics. The OLQ in the shorted formats is therefore confirmed to be statistically valid and reliable to be used for different demographic groups in a chemical factory environment. Both the shortened OLQ versions can also be used within a theoretical three-factor model, supporting Antonovsky's (1987) theoretical conceptualisation of sense of coherence.

Another problem reported in literature pertains to the relationship between sense of coherence and demographic variables. Results reported either confirmed the relationship (Hanse & Engström, 1999; Tuomi, Seitsamo, & Huurtanen, 1999; Larsson & Kallenberg, 1996; Antonovsky & Sagy, 2001), or refuted the relationship with Holmberg et al. (2004) pointing to the low correlations between sense of coherence and socio-demographic variables indicating the independence of sense of coherence from socio-demographic factors.

An analysis of OLQ data in this study did point out statistically significant differences between some demographic variables. The mean sense of coherence for different qualification levels and job levels were found to increase progressively, and on statistically significant levels. Two exceptions are the 50 years and older age group and the senior management group where the mean sense of coherence level regressed to a point somewhere between that of the means of the supervisor group and manager group (job level) and to below the mean of the 40-49 years of age group. In the theoretical ambit of Antonovsky's theorem (1987), life experiences and especially the successes experienced, contribute to higher levels of understanding, a sense of being in control and understanding the impact, and

as a result developing a stronger sense of coherence. Ortlepp and Friedman (2001) explained sense of coherence as the experience of the world as predictable, consistent, and able to be shaped and managed. Since level of qualification and job level are at the core the result of progressive and time related mastering of work and life complexities, the sense of coherence differences are affected by more complex experiences of a higher order over time.

The reported stability of sense of coherence from the age of 30 and beyond could not be confirmed. In line with sense of coherence as associated with progressive and time related mastering of work and life complexities although not statistically significant ( $p = 0,02$ ), the mean level of sense of coherence was found to increase steadily with 10 year intervals from the younger than 30 years of age, up to the 40-49 year old group. The mean sense of coherence however levelled off beyond 50 years of age. This phenomenon is similar to recent findings regarding job satisfaction and age, and the inability to duplicate results from for example two decades ago (Van Schalkwyk & Rothmann, 2007). The 30 year old age group from two decades ago represents now, twenty years later, the 50 year old group. This point to sense of coherence, as a result of the mastering of work and life complexities as a generation phenomenon rather than a chronological age phenomenon, which concurs with Antonovsky's (1987) theory about sense of coherence being as a result of young adults' learning early in life.

The sense of coherence means for demographic variables where equity is expected, namely language, gender and tenure did not differ statistically on a significant level. The difference in the mean sense of coherence for the African-speaking groups was lower than for the Afrikaans/English-speaking group but not statistically significant. This could be attributed to historical reasons where despite language differences, with the predominant languages spoken in the area being either Sotho (African language) or Afrikaans all language groups in the same area experienced similar learning experiences over time, thus contributing to their sense of coherence. The sense of coherence means between sub groups with different years of service did not differ significantly; this despite tenure also being time related does not necessarily coincide with or imply significant progressive mastering of work and life complexities.

The results from this study did not just confirm the inconclusive nature of reports in literature regarding the relationship between sense of coherence and demographic variables, but also

presented a possible answer to the dilemma. Differences or no differences in sense of coherence means for different variables could be explained considering the nature of the variables related to, or not related to the progressive mastering of work and life complexities over time. Where the variables were related to the progressive mastering of work and life complexities over time it presented statistically significant different sense of coherence means, for example level of qualification and job level. Variables where equity was presumed, for example language (implying race or culture) and gender did not present a statistically significant different sense of coherence means.

This study contributes with an abbreviated version of the OLQ suitable for multilingual groups in the chemical factory environment, but does present some limitations. The first difficulty relates to the restricted scope of the measurements that did not include other versions of the OLQ, or measurements of Kobasa's (1979) "hardy personality" or Bandura's (1977) "self-efficacy" constructs. Comparisons were done based on other research published regarding the OLQ. The original OLQ-29 items were used in the format available as used in previous research. In hindsight and with the quality of the language found in some of the items it is necessary to re-look the wording of some of the items. The rather limited sample size, with not equal numbers represented from all relevant demographic groups should have been bolstered to ensure a larger representation from the African-speaking subgroup.

## **RECOMMENDATIONS**

Gaining comprehension about the world around us, and building confidence require exposure to increasing levels of work and life complexities. This exposure does not always require being successful as long as the situation is constructive and building (enduring) with the individual being able to comprehend, and experience meaning and control of the situation.

This study concerned tested the validity of the original OLQ-29 as well as validated two abbreviated OLQ versions, as well as explored the mean sense of coherence levels for different demographic groups in a chemical factory environment. Although both the construct validity and internal consistency of the shortened versions of the OLQ-11 and OLQ-6 were confirmed, a longitudinal study is recommended to assess the reliability and validity of the abbreviated OLQ formats. The psychometric results were satisfactory, confirming that even if it is just on a theoretical level, it is possible to maintain Antonovsky's (1987) original three-

factor structure conceptualised for sense of coherence with items representing the three factors. From a psychometric point, the OLQ items must be revisited in terms of the quality of language used. At least on face value a number of the items are plagued by language problems, namely semantic, syntax and grammar, making it difficult for an English Second Language speaker to comprehend.

The results could not provide support for some of the findings cited in literature, for example that sense of coherence levels off for the 30 years of age group, and the findings only provide a possible explanation as to why the same phenomenon is now reported for the 50 year and older group. This levelling off phenomenon can possibly be a generation related rather than chronological age phenomena, as the 30 years of age subjects in previous studies (two decades ago), now comprise the 50 years and older age group. Similarly, the senior management group's lower level of sense of coherence can possibly be attributed to them largely being in the 50 years and older age group. As this study was a cross section design at a point in time with a single set of results, a follow up study is recommended to determine if the said phenomenon advances with the same generation group to be reported in 10 years for the 60 years and older group.

The importance of positive life experiences with all three components conceptualised by Antonovsky (1987) contributing to building a strong sense of coherence is fundamental to the conceptualisation of sense of coherence and is well reported in literature. The inconclusive results pertaining to gender and years of service and statistically significant differences in the mean sense of coherence for level of qualification and job level groups indicate the effect constructive life experiences have on sense of coherence regardless of gender or tenure. The implication for the chemical factory environment is that the development of personnel can be tailor-made to facilitate and enhance the development of sense of coherence. In practice, such sense of coherence enhancing experiences should be characterised by facilitated feedback to individuals, building a strong sense of coherence that can contribute to the well-being of the workforce. This hypothesised positive effect of work or life experience opportunities must be tested in a longitudinal or experimental setting. This notion can also be influential in individual development programmes where individuals are exposed, and guided through a facilitated progressive process (mentorship and coaching programmes) with ever increasing and more complex scenarios in order to grow a stronger sense of coherence.

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**CHAPTER 4**

**RESEARCH ARTICLE 3**

## **SUBJECTIVE WELL-BEING AMONG CHEMICAL FACTORY WORKERS**

### **ABSTRACT**

The objectives of this study were firstly, to examine the relationship between satisfaction, sense of coherence, affect and locus of control, contributing to subjective well-being as an indication of corporate wellness from a psychological perspective and secondly to propose a model to assess satisfaction with life as an indication of wellness in the chemical industry. This study was done in the chemical factory environment with a sample ( $N = 583$ ) representing a crosscut of all job layers in the organisation. The Minnesota Satisfaction Questionnaire, Satisfaction with Life Questionnaire, Work Locus of Control scale, Orientation to Life Questionnaire, Affectometer and Health questionnaire were administered along with a biographical questionnaire. The results of the study support the notion of a subordinate hierarchical structure for subjective well-being with a strong relationship between dispositional wellness, and both job satisfaction and satisfaction with life, but a weaker than anticipated relationship between satisfaction with life and both job satisfaction and health.

### **OPSOMMING**

Die doel van die studie was om eerstens om die verhouding tussen tevredenheid, koherensiesin, affek en lokus van beheer te ondersoek wat bydra tot subjektiewe welstand as 'n aanduiding van korporatiewe welstand vanuit 'n sielkundige perspektief, en tweedens om 'n model voor te stel om lewenstevredenheid te meet as 'n aanduiding van welstand in die chemiese industrie. Die studie is in 'n chemiese fabriek gedoen met 'n steekproef ( $N = 583$ ) wat 'n kruissnit van alle posvlakke in die organisasie verteenwoordig. Die Minnesota Werkstevredenheidvraelys, Lewenstevredenheidvraelys, Werklokus van Kontroleskaal, Lewensoriëntasievraelys, Affektometer en Gesondheidsvraelys is saam met 'n biografiese vraelys geadministreer. Die resultate van die studie ondersteun 'n ondergeskikte hierargiese struktuur vir subjektiewe welstand, met 'n sterk verband tussen disposisionele welstand, en beide werkstevredenheid en lewenstevredenheid en 'n swakker as verwagte verband tussen lewenstevredenheid, en beide werkstevredenheid en gesondheid.

Enabling employees to enjoy and find meaning in their work is increasingly being voiced by economists and politicians as a more effective way to improve performance than wage incentives are (Beazant, 2006; Edwards, 2006). From a scientific point of view, the quality of working life has already preoccupied the attention of social scientists for more than 50 years (Dolan & Gosselin, 2002), and has only recently caught the attention of people outside the academia (Murphy, 2006) like economists and politicians (Edwards, 2006). People's value is now being realised as probably the single biggest expense of any employer (Keeling, 2005). It is also beginning to make sense to survey the workforce and invest in their well-being as happy workers are reportedly more open-minded, tolerant, trustworthy, and contributing to team spirit and social harmony (Edwards, 2006).

The relationship between quality of life and benefits for the employer is frequently pointed out by quotes such as "...a happy worker is a productive worker" (Edwards, 2006). The relationship between happy and healthy workers, and healthy and productive companies, better profits, return on investments, and benefits for the company is often reported (Pritchard, Potter, & Franel, 1990) The importance of employees and especially their satisfaction as paramount for future profits are therefore evident (Keeling, 2005), and therefore keeping an eye on employee satisfaction is justified.

The importance of happiness or well-being has become prominent in the media and with dwindling levels of general happiness being reported in the UK (Blanchflower & Oswald, 2005), successes such as in Bhutan have not gone unnoticed, where since 1972, gross national happiness (GNH) rather than gross national product (GDP) has been pursued with 97% of the population reporting high to very high levels of happiness as well as the highest GDP in their region (Edwards, 2006). Economists and politicians are increasingly expressing a need to find out just how happy people are (Wagner, 2006), and this has led to comments in parliaments about there being more to life than just making money, indicating a shift in focus from GDP only to include general well-being (GWB) (Edwards, 2006).

Citizens also echoed this call for quality of life where more than 80% of the sample surveyed (in the UK) expressed the opinion that efforts should rather be directed at making people happier than wealthier (Wagner, 2006). Glenn (2005) however cautions that not all efforts to maximise happiness will or must always be pursued as it is sometimes consciously and

without regret sacrificed for other reasons, for example obligation to duty, to increase possessions, and for our children sake, etc.

Over the last 50 years, studies regarding quality of life have covered a variety of sub-constructs, for example subjective well-being, life satisfaction, domain specific satisfaction, for example job satisfaction and happiness. These constructs are also frequently used inter alia; subjective well-being and happiness (Biswas-Diener, Vitterso, & Diener, 2005; Kim-Prieto, Diener, Tamir, Scollon, & Diener, 2005), subjective well-being and life satisfaction or happiness (Kahnemann, Krueger, Schkade, Schwarz, & Stone, 2006), and satisfaction and happiness (Frijters, Haisken-DeNew, & Shields, 2004; Peiro, 2006). Frijters et al. (2004) does however, point out that satisfaction must not be confused with happiness, as the latter is an emotional state sensitive to mood changes. The three concepts rather represent different states of mind of the individual and they collectively influence the overall state of mind of an individual, a group, for example community, employee group, etc.

Following the relationships reported in literature the aforementioned constructs could be structured hierarchically (Diener, Scollon, & Lucas, 2003), explaining their relationship in terms of being specific and on a time line. Happiness is on the short-term and specific end of the scale followed by domain specific satisfaction in a somewhat wider and more enduring area, for example marriage, job, and role. General satisfaction, for example life satisfaction, represents a collective satisfaction, which combines satisfaction in various domain specific areas (Pavot, Diener, Covin, & Sandvik, 1991). The highest level of an individual's state of mind (Saris, Veenhoven, Scherpenzeel, & Bunting, 1996), is subjective well-being as a combination of different domain satisfactions that culminates as life satisfaction or quality of life (Kim-Prieto et al., 2005), which is again equated to happiness (Biswas-Diener et al., 2005; Kim-Prieto et al., 2005).

Veenhoven (2004) differentiated between objective measures and subjective measures, with the first focussing on measurable aspects, while the latter is concerned with matters characterised as "soft" issues, for example satisfaction, and perceptions. Veenhoven (2004) also describes well-being as denoting the good state of something, individual beings or social systems without defining the exact meaning of what is good. Four different concepts of well-being are also identified: *Quality of the environment*, that refers to the physical standard of living and equity; *Life-ability of a person*, that is the ability to cope with problems in life;

*Worth of the world*, represents the idea that a good life must be good for more than oneself; and *Enjoyment of life*, that is well-being in the eye of the beholder, or our subjective appreciation of life. In the context of research, focusing the well-being of people in an organisation, well-being can also be equated to quality of life (Veenhoven, 2004).

In the context of this study, the focus is on the latter of the four concepts of well-being as identified by Veenhoven (2004), namely enjoyment of life as subjectively appreciated by the individual. Subjective well-being encompasses a wide range of components and is either associated with or used *inter alia* with, namely happiness (Blanchflower, & Oswald, 2005; Biswas-Diener et al., 2005; Kim-Prieto et al., 2005), life satisfaction, hedonic balance, fulfilment, and holds at the core an affective and cognitive evaluation of one's life (Kim-Prieto et al., 2005). Andrews and Withey (1976) already identified three subcomponents of subjective well-being, which are positive affect, negative affect and life satisfaction, with the aforementioned being emotional, and the latter dealing with cognitive-judgemental aspects. The interplay between these subcomponents of subjective well-being is evident in the conflict between work and life roles and how it affects job and marital satisfaction, and different levels of job satisfaction and marital satisfaction affects the individual's life satisfaction (Chiu, 1998; Chiu, Man, & Thayer, 1998).

Satisfaction is the result of an individual's judgement of his/her circumstances compared to what he or she thinks an appropriate standard is (Pavot et al., 1991). Frijters et al. (2004) point out the difference between satisfaction and happiness, which should not be confused as happiness is an emotional state sensitive to mood changes. Satisfaction can be considered on two levels, namely general satisfaction with life, or domain specific satisfaction for example job, role or marriage satisfaction.

Life satisfaction is an individual cognitive-judgemental process (Diener, Emmons, Larsen, & Griffin, 1985; Pavot et al., 1991; Westaway, Maritz, & Golele, 2003), or an appraisal of something, or a state of mind, (Saris et al., 1996). The individual's appraisal of life is done against a personal self-established standard (Diener et al., 1985; Pavot et al., 1991). Life satisfaction is indicative of how an individual evaluates his/her general quality of life as positive (Saris et al., 1996). Life satisfaction is therefore defined as a global evaluation by the person of his/her life (Diener et al., 1985; Pavot et al., 1991), or how much the person enjoys the life he/she leads (Saris et al., 1996). Life satisfaction, despite being reported as a relative

stable construct, is influenced by life events. In South Africa, the first universal franchise election in 1994, has reportedly resulted in the doubling of levels of satisfaction with life among African South Africans from 1983 to 1994 (Westaway et al., 2003). It is also unlikely that all the domain specific areas will be weighed equally (Pavot et al., 1991). Although satisfaction in different domains will influence life satisfaction, the latter is more than the sum of the satisfactions in the different areas. Diener et al. (1985) therefore also suggest that it is advisable to measure overall life satisfaction rather than to view the scores of different areas of satisfaction as an indication of life satisfaction.

*Domain specific satisfaction* relates to various different specific areas, for example job, role, marriage, health, and wealth. Domain specific satisfaction is also an evaluation of a specific area, where the individual compares the experienced *actual* outcomes as a result of his/her efforts in that area to what the *expected* outcomes are (Cranny, Smith, & Stone, 1992), or simply the negative or positive feeling an individual has towards the specific area of concern, for example marriage (Locke, 1976; Yousef, 2000). As an example, job satisfaction as a domain specific area is the result of an interactive evaluative process where the individual compares the environment, for example current job aspects to labour-market opportunities (Hamermesh, 2001). Similar to Locke's (1976) definition of job satisfaction, any other domain specific area of satisfaction, for example satisfaction with marriage can be assessed as a pleasurable or positive emotional state resulting from the appraisal of one's marriage or marital experience. In this evaluative process people use criteria that are important to them (Sempane, Rieger, & Roodt, 2002), and it can be complicated by individual perceptions and unique circumstances (Buitendach & De Witte, 2005). The result of this cognitive process will also influence other aspects regarding the individual, for example life satisfaction (Diener et al., 1985) and actions to be taken (Sumner & Niederman, 2003). The importance of being satisfied with your job, affecting the quality of life or overall satisfaction with life is well reported (Pavot et al., 1991; Theodossiou, 2006; Urquhart, 2006; Yelamanchili, 2006).

According to Maja (2005), there are two types of happiness; short-term joy that is short-lived and immediate and long-term satisfaction (happiness) that becomes habitual. The emotional stirrings created by short-term pleasures create positive affect and a series of short-term pleasurable highs forms the basis for habitual happiness (Maja, 2005). The importance of happiness had been recorded long ago in history when the Greek philosopher Epicurus wrote to Menoceus saying, "...we must meditate on what brings happiness, since if we have that,

*we have everything. And if we have not, all our energies are directed at gaining it.*" (Research Headlines, 2007). Rader (1978) also points out that Tatarkiewicz (1976) linked happiness and satisfaction, in that happiness is not mere short-term joy or pleasure but rather satisfaction with life as a whole.

Happiness in the workplace is, according to Beazant (2006), similar things to different people, with trust and openness emphasised as essential to making a good start towards happiness. Biswas-Diener et al. (2005) define happiness as a natural state resulting from evolution rendering most people happy. Happiness is also reported to remain stubbornly unchanged despite concerted efforts in human development, what is called the happiness set point or the hedonic treadmill. Regardless the effort to improve the level of happiness it can be expected to be momentary and will resume an evolutionary set point once the effort is relaxed (Diener et al., 1985). From the aforementioned, the relationship between happiness and subjective well-being is evident. While happiness as a short-term pleasure is deemed necessary to create a positive affect necessary for habitual happiness (Maja, 2005), happiness is not only equated to satisfaction (Frijters et al., 2004; Peiro, 2006), but Rader (1978) also pointed out that Tatarkiewicz (1976) stressed that satisfaction with life as a whole, presumably implying long-term habitual satisfaction (life satisfaction), is also essential for happiness.

The extrinsic component of job satisfaction's primary value is remuneration and work is principally viewed as a means to attain such remuneration (Malka & Chatman, 2002). The relationship between subjective well-being and money (wealth), a situational or extrinsic job satisfaction factor (Hirshfeld, 2000; Spector, 1997) is also frequently reported in literature. While satisfaction is reported to have a strong association with income, the relationship between happiness and income is much weaker, pointing to happiness and satisfaction as two separate areas of well-being (Peiró, 2006). Wealth is seemingly unable to "buy" additional happiness (Blanchflower & Oswald, 2005). Glenn (2006) concurs, quoting Kimball from the University of Michigan, saying that it should not be assumed that happiness will trend upwards as societies and individuals become richer. Kahnemann et al. (2006) explains this, pointing out that amidst efforts to increase wealth; well-being has been neglected while the happiness levels remain largely unaffected by increased wealth.

The relationship between job satisfaction and well-being (Chiu, 1998; Urquhart, 2006; Yelamanchili, 2006), and job satisfaction and life satisfaction is also well studied and reported (Rain, Lane, & Steiner, 1991; The effects Of, 2001). The relationship between job satisfaction and life satisfaction is generally accepted to be reciprocal, with life satisfaction having the larger effect (The Effects Of, 2001). The relationship appears to be hierarchical (Diener et al., 2003) upwards with subordinate levels benefiting the higher levels of satisfaction (state of mind). Different descriptions are offered to explain the relationships between these different levels of satisfaction but researchers differ in their description of the nature of the relationships (Chiu, 1998).

Four basic forms of the relationship are described: spill over, compensation or segmented (Dolan & Gosselin, 2000) or disaggregating (Cramer, 1995). The spill over effect was already discussed in 1960 by Wilensky as a positive relation when interest in one area (work) spills over to another area (life) – and vice versa (Chiu, 1998). The compensation link proposes a negative relationship as it occurs when low satisfaction in one area is compensated for by finding high satisfaction or rewarding activities in another area (Rain et al., 1991). The segmented structure on the other hand postulates no relationship between job and life satisfaction and people will despite rewarding work activities, engage in leisure-time activities that are unrelated to their work but also rewarding (Gupta & Beehr, 1981). The disaggregating model asserts that the importance of work in a person's life moderates the relationship between job and life satisfaction and is more positive for those who value work (Cramer, 1995).

Greenhaus and Singh (2004) also refer to some more forms of the relationship between different areas where satisfaction is sought. The first of these relationships is conflict, resembling a negative spill over that occurs when demands in one area make it difficult to meet the demands in another area. The second relationship is accommodation when the involvement in one area is reduced to accommodate demands in another area and it can be behavioural, curtailing time devoted or psychological, restricting the ego level attached to a role, and it resembles the compensation link. The third relationship is enrichment that entails engaging in an activity with returns that is beneficial in another area, comparable to the spill over effect.

According to Dolan and Gosselin (2000), it is difficult to compare the results from different studies because of inconsistencies, which Barnett, Marshall, and Sayer (1992) specifies as inconsistent definitions and measurements of either conflict or enhancement between work and life. Despite the inconclusive nature, results in literature tend to support the spill over theory where interest in one area (work) spills over to another area (life) – and vice versa (Chiu, 1998). Similar to the spill over theory the emotional state on one level spills over to a next, and Maja (2005) describes it as short-term happiness contributing to positive effect. If this relationship is allowed to continue it results in long-term habitual happiness (Maja, 2005) leading to longer-term and sustainable satisfaction in specific areas, higher general satisfaction with life or an appraised quality of life and eventually subjective well-being.

The criteria or standard (Pavot et al., 1991) against which individuals evaluate different situations later in life is formed during early adulthood when young adults commits themselves, in marriage, a career, a particular lifestyle and social roles (Felt, Kivimäki, Rantala, & Tolvanen, 2004). Following the confusion and unpredictable changes of adolescence, psychological stability, independence and a sense of identity establishes in the individual (Antonovsky & Sagy, 2001) in relation to the individual's experience of the world as predictable and consistent, and life's outcomes being able to be shaped (Ortlepp & Friedman, 2001). The result of this real life experiences is a dispositional personality orientation that evolves as a sense of coherence (SOC) (Antonovsky, 1987).

Satisfaction is also a judgemental process where the individual evaluates his/her circumstances against what is considered an appropriate standard (Pavot et al., 1991). In these evaluation processes the areas listed as important to the development of sense of coherence are similar to areas of satisfaction; domain specific satisfaction, namely marriage satisfaction (Chiu, 1998; Lewis & Borders, 1995; Schmitt & Bedejan, 1982), role satisfaction (Chiu, 1998), job satisfaction (Chiu, 1998; Schmitt & Bedejan, 1982), family satisfaction (Chiu, 1998), mother-child satisfaction (Barnett et al., 1992) and general satisfaction, namely life satisfaction (Chiu, 1998; Schmitt & Bedejan, 1982).

Both sense of coherence and satisfaction is the result of a cognitive evaluative process where similar areas are evaluated, namely marriage, career, lifestyle social roles (Felt et al., 2004). Although sense of coherence is supposed to be rather stable after 30-years of age (Antonovsky, 1987) it can change provided that it will require significant life events to effect

the change (Felt et al., 2004). Such changes are reported as a result of the initiation of new life experiences, for example a first time birth (Nilsson, Holmgren, Stegmayer, & Westman, 2003) where sense of coherence is reported to be at higher levels for women just prior to her second birth (Sjöström, Langius-Eklof, & Hjertberg, 2004). It can therefore be postulated that sense of coherence, as it develops early in life will also affect the cognitive evaluative process later in life regarding domain specific satisfaction, life satisfaction and subjective well-being or happiness. Snekkvik, Anke, Stanghelle, and Fugl-Meyer (2003) confirm the association between sense of coherence and satisfaction specifically when measured at the same point in time.

Although different questionnaires exist to determine different forms of satisfaction for example job satisfaction (Minnesota Job Satisfaction Questionnaire – Spector, 1997) Satisfaction with Life (Diener et al., 1985) a few subjective well-being questionnaires are available. Blanchflower and Oswald (2005) reported using five questions to determine well-being in Australia, and if life satisfaction is accepted as being synonymous with subjective well-being then the Satisfaction with Life Scale (Diener et al., 1985) is another well-being questionnaire. Subjective well-being measurement instruments vary from appraising single events (for example a dinner, a holiday or any similar enjoyable moment) to specific wider segments of one's life (work, life, marriage, or relationships etc) to general and current prevailing moods or emotional states (Kim-Prieto et al., 2005).

While affective (subjective) well-being is more than mere job satisfaction (Sevastos, Smith, & Cordery, 1992) and all domains are not weighed equally (Diener et al., 1985; Pavot et al., 1991), life satisfaction or quality of life (Saris et al., 1996), is more than the sum of any domain specific satisfactions. Diener et al (1985) therefore suggested that overall life satisfaction be measured rather than using the sum of satisfaction in different areas to indicate life satisfaction. Furthermore, while subjective well-being is used inter alia with happiness (Biswas-Diener et al., 2005; Kim-Prieto et al., 2005), and satisfaction with happiness (Frijters et al., 2006), it can be postulated that satisfaction, albeit then specifically general satisfaction with life, can also be equated with subjective well-being. While domain specific satisfactions can be measured as detached areas of satisfaction, life satisfaction must not be deducted from the sum of different domain specific satisfactions measures. There seems to be sufficient measurement tools for domain specific satisfaction, for example job satisfaction (Minnesota Job Satisfaction Questionnaire) and life satisfaction (Satisfaction with Life Scale), but except

for Diener et al. (1985) satisfaction with life scale, only Blanchflower and Oswald's (2005) questionnaire could be found. While Diener's questionnaire asks specific questions about the respondents' evaluation of life, that is life being ideal, conditions, satisfaction, goals, achievement, and possible changes if any, Blanchflower and Oswald's (2005) questions are more specifically focussed on different aspect of one's life, that is life in general, family life, one's job, psychological health (stress) and physical health (tiredness).

Two schools of thought are evident: assessing overall life satisfaction according to Diener et al. (2003) or assessing different domain specific areas of satisfaction as done by Blanchflower and Oswald (2005). Amidst these different approaches to ascertain subjective well-being, an aggregation of multiple emotional reactions across time, a recollection of emotional experiences or to assess different aspects of life, albeit encompassing different aspects of life, it is also suggested by Pavot, Diener, and Suh (1998) that affective and cognitive (life satisfaction) components of subjective well-being be measured separately.

The concept subjective well-being is complex, encompassing a range of components, which are often use inter alia with different constructs, for example happiness (Blanchflower & Oswald, 2005; Biswas-Diener et al., 2005; Kim-Prieto et al., 2005), and life satisfaction. The affective and cognitive subcomponents of subjective well-being are core to the judgemental process of one's life or subjective well-being (Kim-Prieto et al., 2005). There are not only inconsistencies in how subjective well-being is ascertained, as the sum of subordinate domain specific satisfactions, or as a measurement of overall life satisfaction, but also a lack of instruments to determine subjective well-being. With the interplay between different subcomponents, and how it affects life satisfaction (Chiu, 1998; Chiu et al., 1998) or subjective well-being known, the objectives of this study are to test the relationship between satisfaction, sense of coherence, affect and locus of control as an indication of subjective well-being, and to design an approach to assess subjective well-being in a chemical factory environment as an indication of corporate wellness from a psychological perspective. The model in Figure 1 represents the expected relationships between the different well-being factors contributing to satisfaction with life from where wellness in the chemical factory environment can be implied.

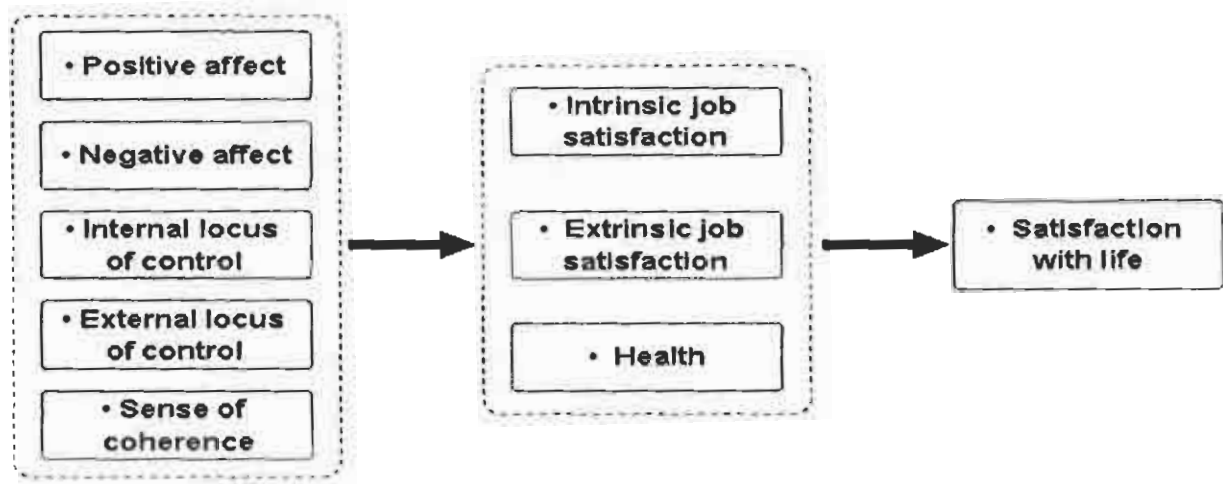


Figure 1. A model of the expected underlying structure of satisfaction with life

In Figure 1, the supposed underlying hierarchical structure of satisfaction with life is presented, indicating the direction and influence the dispositional wellness factors, namely affect, locus of control and sense of coherence have on job satisfaction and health, and the influence the latter two constructs has on satisfaction with life.

The following hypotheses are formulated for this study:

H1: Strong dispositional wellness through job satisfaction and health lead to a favourable evaluation of general satisfaction with life.

H2: Dispositional wellness relates strongly with satisfaction in specific domains (job satisfaction and health).

H3: Satisfaction in separate domains does not have a strong relationship with satisfaction with life.

## METHOD

### Participants

A sample of 583 participants was drawn from employees working in a chemical factory environment in South Africa. Initially all the employees in this specific population were targeted and as many employees as possible were accommodated during the administration of

the questionnaires. The sample represents various demographic sub-groups, namely *race, gender, age, job levels and language groups* in the chemical factory organisation.

The characteristics of the participants are reported in Table 1.

Table 1  
*Participant Characteristics (N = 583)*

	Category	Frequency	Percentage
<b>Age</b>	<30	99	16,98%
	30-39	198	33,96%
	40-49	182	31,22%
	50+	91	15,61%
	Missing	13	2,23%
<b>Gender</b>	Male	385	66,04%
	Female	173	29,67%
	Missing	25	4,29%
<b>Language</b>	European	431	73,93%
	African	144	24,70%
	Missing	8	1,37%
<b>Qualification</b>	School	321	55,06%
	Diploma	143	24,53%
	Degree	70	12,01%
	Postgraduate	23	3,95%
	Missing	26	4,46%
<b>Tenure</b>	<5 years	134	22,98%
	5-14 years	166	28,47%
	15-24 years	205	35,16%
	25+ years	59	10,12%
	Missing	19	3,26%
<b>Job Level</b>	Employees (<L7)	229	39,28%
	Supervisor (L7-L6C)	180	30,87%
	Middle Managers (L5B-L5A)	40	6,86%
	Senior Managers (L4-L3)	13	2,23%
	Missing	124	21,27%

Data collection was by means of, for example group sessions, focussed efforts in different areas and a general mail effort to ensure a sufficient sample. A 58% response rate was

achieved after distributing 1000 booklets ( $N = 583$ ). After assessing the data it became evident that a number of respondents did not complete all the questionnaires as required, resulting in nearly 120 of the respondents data to be omitted from this study.

The average age of the respondents is 40 years, with 66,04% males and 29,67% females being represented. The respondents also represented 73,93% either Afrikaans or English (European language), and 24,70% Sotho, Zulu or Xhosa (African language), which represents the general population demographics well. The hierarchical organisational structure is also well represented with 39,28% non-supervisory, 30,87% first line supervisor, 6,86% middle management and 2,23% senior management represented.

### **Measuring instruments**

The *Minnesota Satisfaction Questionnaire* (MSQ) (Spector, 1997) comprises 20 items with a 5-point Likert-type response format varying from 1 (*very dissatisfied*) to 5 (*very satisfied*) and two distinct components. Intrinsic job satisfaction measures feelings about the nature of the job tasks for example question 15 “The freedom to use my own judgement”, and extrinsic job satisfaction measures feelings about situational job aspects, external to the job for example question 13 “My pay and the amount of work I do” (Spector, 1997). Test-retest reliabilities of between 0,70 and 0,80 are reported (Cook, Hepworth, Wall, & Warr, 1981), with an alpha coefficient of 0,96 (Rothmann, Scholtz, Fourie, & Rothmann, 2000) and an acceptable mean inter-item correlation of 0,22 that is within the limits of 0,15 and 0,55 proposed (Clark & Watson, 1995).

The *Satisfaction with Life Scale* (SWLS) is used as a global evaluation to measure general satisfaction of a person with his/her life (Diener et al., 1985). The SWLS is a 5-item instrument with the respondents required to indicate their degree of agreement or disagreement on a 7-point scale varying from 1 (*strongly disagree*) to 5 (*strongly agree*). Scores range from 5 to 35, with higher scores indicating greater life satisfaction. The SWLS is designed to assess general satisfaction with life and no specific domains, for example health or finance, but allows respondents to integrate and weight these domains in whatever way they choose (Diener et al., 1985; Pavot & Diener, 1993). Test-retest correlation coefficient after two months resulted in  $r = 0,82$  and alpha coefficient of 0,87 (Diener et al., 1985). Factor analysis also confirmed a single factor (Diener et al., 1985), and the SWLS is

reported with sufficient discriminant validity from emotional well-being measures (Pavot & Diener, 1993).

The *Orientation to Life Questionnaire* (OLQ) (Antonovsky, 1987) has 29 items and measures on 7-point scale semantic differentials anchored by wordings related to the contents of each item measuring the three subcomponents of sense of coherence, namely comprehensibility, manageability and meaningfulness. A high overall score is indicative of a strong sense of coherence and a consequential sense of well-being (Naidoo & Le Roux, 2003). Antonovsky (1993) recommended that OLQ rather be used as a single construct because item construction followed a facet analysis design, varying the content systematically along a number of dimensions and any factor analysis of the OLQ is therefore likely to produce a single factor solution not reflecting the three components. Alpha coefficients reported for the OLQ in 29 research studies varying between 0.85 and 0.91 and test-retest reliability produced coefficients between 0,41 and 0,97 (Antonovsky, 1993).

The *Affectometer* (Kammann and Flett, 1983) is a 20-item questionnaire with a 5-point scale ranging from 1 (*not at all*) to 5 (*all the time*). The Affectometer measures Positive Affect, Negative Affect and Positive-Negative Affect-Balance indicating the general wellness or sense of well-being related to recent experiences. The general level of well-being or happiness is conceptualised as the extent to which positive feelings dominate over negative feelings. Alpha coefficients of 0,88 to 0,93 (Kammann & Flett, 1983), and between 0,86 and 0,91 for Positive Affect, and between 0,83 and 0,90 for Negative Affect (Wissing & Van Eeden, 1994) are being reported.

The *Health Questionnaire* (GHQ) (Cartwright & Cooper, 2002) consists of 18 items with a 5-point scale varying from 1 (*never*) to 5 (*always*) and supposedly arranged on two subscales: physical health and psychological health. The physical health items relate to known physical symptoms of stress and the psychological health items are known symptoms of stress-induced mental ill health. The GHQ does not provide a clinical diagnosis but merely insight into the respondents self-assessed general physical and psychological health. The psychological subscale has reportedly good convergent validity with other measures of psychiatric disorders, for example the General Health Questionnaire (GHQ-12; Goldberg & Williams, 1988). An alpha coefficient of 0,92 is reported in this study for the 18-item Health Questionnaire.

The *Work Locus of Control Scale* (WLOC) (Spector, 1988) comprises 16 work-related items (for example job effort, getting a job, promotions) with a 5-point scale varying from 1 (*disagree strongly*) to 5 (*agree strongly*). An external locus of control item reads: "Making money is primarily a matter of good fortune." An internal locus of control item reads: "A job is what you make of it." Internal and external locus of control worded items are equal in number. Alpha coefficients are reported at 0,89 for internal locus of control and 0,85 for external locus of control, which are in accordance with other studies reporting similar alpha coefficients (Blau, 1993).

## RESULTS

The descriptive statistics and Cronbach alphas of the measurement scales are presented in Table 2.

Table 2  
*Descriptive Statistics of the Measuring Instruments*

Questionnaire	Valid N	Mean	SD	Skewness	Kurtosis	$\alpha$
Health Questionnaire	445	2,25	0,73	0,42	-0,27	0,92*
Affectometer (Positive affect)	490	3,85	0,63	-0,37	0,31	0,75*
Affectometer (Negative affect)	481	2,02	0,73	0,72	0,13	0,79*
Work Locus of Control Questionnaire (External)	483	2,80	0,88	-0,03	-0,49	0,85*
Work Locus of Control Questionnaire (Internal)	488	4,06	0,63	-1,23	3,31	0,89*
Minnesota Satisfaction Questionnaire (Intrinsic)	482	3,82	0,58	-1,00	2,55	0,86*
Minnesota Satisfaction Questionnaire (Extrinsic)	488	3,29	0,79	-0,55	0,05	0,83*
Satisfaction with Life Questionnaire	495	4,87	1,26	-0,81	0,39	0,85*
Orientation to Life Questionnaire	485	4,53	0,87	-0,36	0,46	0,77*
Marriage Satisfaction (single item only)	476	4,25	1,06	-1,76	2,70	-

\* Significant internal consistency  $\alpha > 0,70$  (Nunnally & Bernstein, 1994)

The normal distribution of all the data sets is presented in Table 2. With the exception of the Work Locus of Control (Internal) and Minnesota Satisfaction Questionnaire (Intrinsic) data which proved to be negatively skewed and leptokurtic, the normal distribution of all the

questionnaires were confirmed. All the questionnaires presented with Cronbach alpha statistics  $> 0,70$  (Nunnally & Bernstein, 1994), confirming sufficient internal consistency for all the scales.

The correlations between the different psychological variables are presented in Table 3.

Table 3  
*Correlations*

Questionnaire	1	2	3	4	5	6	7	8	9
1 Marriage satisfaction									
2 Satisfaction with life	0,22*								
3 Sense of coherence	0,19*	0,45**							
4 Intrinsic job satisfaction	0,12*	0,40**	0,40**						
5 Extrinsic job satisfaction	0,06	0,35**	0,36**	0,68***					
6 Health	0,07	0,35**	0,43**	0,22*	0,22*				
7 Positive affect	0,13*	0,41**	0,40**	0,33**	0,25*	0,52**			
8 Negative affect	-0,17*	-0,41**	-0,49**	-0,26*	-0,18*	-0,45**	-0,36**		
9 External locus of control	-0,05	-0,20*	-0,35**	-0,27*	-0,32**	-0,22*	-0,15*	0,39**	
10 Internal locus of control	0,09	0,35**	0,31**	0,57***	0,35**	0,16*	0,29*	-0,25*	-0,20*

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

\*  $r \geq 0,30$  – practically significant (medium effect)

\*\*  $r \geq 0,50$  – practically significant (large effect)

In Table 3, the correlations between different variables in this study are presented. With the exception of marriage satisfaction that does not correlate on a statistically significant level with extrinsic job satisfaction, health, and both internal and external locus of control, all the other variables correlate on a statistically significant level ( $p = 0,00$ ).

The order of the health scale's responses is opposite to the response order of the other scales used and the polarity of the correlations was changed around. Health correlates positively with all variables, except negative affect ( $r = -0,45$ ) and external locus of control ( $r = -0,22$ ). Negative affect and external locus of control both correlate negatively with all other variables except with each other ( $r = 0,39$ ). Practically significant correlations with a large effect ( $r \geq 0,50$ ) exist between intrinsic job satisfaction and extrinsic job satisfaction ( $r = 0,68$ ) and

internal locus of control ( $r = 0,57$ ), and between positive affect and health ( $r = 0,52$ ). Practical significant correlations of medium effect ( $r > 0,30$ ) can also be reported for satisfaction with life and sense of coherence with all variables except for satisfaction with life and external locus of control ( $r = -0,22$ ). The correlations for satisfaction with life with negative affect ( $r = -0,41$ ) and sense of coherence with negative affect ( $r = -0,49$ ) and external locus of control ( $r = -0,35$ ) are practically significant with medium effect but negative.

All the variables were also tested together in a factor analysis and the results are presented in Table 4.

Table 4  
*Pattern Matrix of Wellness Constructs*

Variable (mean)	F <sub>1</sub>	F <sub>2</sub>
Marriage satisfaction	0,18	0,07
Satisfaction with life	<b>0,52</b>	0,21
Sense of coherence	<b>0,60</b>	0,19
Intrinsic job satisfaction	-0,09	<b>0,99</b>
Extrinsic job satisfaction	0,02	<b>0,71</b>
Health	<b>-0,77</b>	0,15
Positive affect	<b>0,68</b>	-0,01
Negative affect	<b>-0,78</b>	0,04
External locus of control	-0,27	-0,27
Internal locus of control	0,11	<b>0,53</b>

After testing all the variables in a factor analysis, two factors emerged. Positive affect, negative affect, external locus of control, health and sense of coherence as the first factor, and both intrinsic and extrinsic job satisfaction and internal locus of control as a second factor. Marriage satisfaction did not contribute to any of the factors. The first factor (F1) represents a restrictive disposition developed as a result of previous life experiences and the second factor (F2) is a personal orientation from which an individual will approach new life experiences or a unique dispositional perspective from where the individual will approach novel life situations. A series of standard multiple regressions was conducted to test the percentage of variance in satisfaction with life explained by different dispositional wellness factors

separately and in different combinations. The results of these standard multiple regressions are presented in Table 5.

**Table 5**  
*Multiple Regression Analysis with Satisfaction with Life as Dependent Variable (N = 495)*

Variable	Unstandardised Coefficients		Standardised Coefficient	t	p	F	R <sup>2</sup>
	B	SE					
(Constant)	1,79	0,38		4,69	0,00	40,51*	0,16
Intrinsic job satisfaction	0,57	0,13	0,26	4,30	0,00*		
Extrinsic job satisfaction	0,28	0,10	0,18	2,90	0,00*		
(Constant)	3,35	0,44		7,58	0,00	39,20	0,07
Intrinsic job satisfaction	0,49	0,13	0,22	3,81	0,00*		
Extrinsic job satisfaction	0,23	0,09	0,14	2,45	0,02*		
Health	-0,48	0,08	-0,28	-6,26	0,00*		
(Constant)	8,04	3,13		2,57	0,01	43,03*	0,34
Sense of Coherence	0,15	0,03	0,23	4,68	0,00*		
Positive Affect	0,22	0,07	0,16	3,32	0,00*		
Negative Affect	-0,26	0,06	-0,23	-4,66	0,00*		
External Locus of Control	0,00	0,04	0,00	0,04	0,97		
Internal Locus of Control	0,34	0,09	0,17	3,99	0,00*		
(Constant)	8,76	3,73		2,35	0,02	34,97*	0,34
Sense of Coherence	0,15	0,04	0,22	4,27	0,00*		
Positive Affect	0,21	0,08	0,14	2,73	0,01*		
Negative Affect	-0,26	0,06	-0,23	-4,36	0,00*		
External Locus of Control	0,02	0,04	0,02	0,49	0,63		
Internal Locus of Control	0,36	0,09	0,18	4,04	0,00*		
Health	-0,03	0,03	-0,05	-0,97	0,33		

\*  $p < 0,05$  – statistically significant

In Table 5, the results from a series of standard multiple regressions are presented with the percentage of variance in satisfaction with life explained by different combinations of the dispositional wellness factors, job satisfaction and health. The independent variables used in the series of regression analysis are sense of coherence, positive affect, and negative affect,

external locus of control and internal locus of control, intrinsic job satisfaction, extrinsic job satisfaction and health.

Intrinsic job satisfaction and extrinsic job satisfaction together contributed to explain 16% of the variance in satisfaction with life. Including health, together with intrinsic job satisfaction and extrinsic job satisfaction in a regression analysis reduced the percentage of variance explained in satisfaction with life to 7%. The inclusion of health thus restricted the ability of both intrinsic and extrinsic job satisfaction to explain the variance in satisfaction with life. Health also did not affect the percentage of variance in satisfaction with life explained by dispositional wellness factors, confirming so the mediating effect health has on job satisfaction to explain the variance in satisfaction with life. The mediation is only partial because although health was found to influence job satisfaction to explain satisfaction with life, health (mediator) could not be confirmed to mediate the relationship between job satisfaction and satisfaction with life completely (Kenny, 2006).

The dispositional wellness factors, namely sense of coherence, positive affect, negative affect, and external locus of control and internal locus of control were also tested to explain the variance in satisfaction with life. Although a combination of all the dispositional wellness factors explained 34% of the variance in satisfaction with life, external locus of control was found not to contribute significantly in combination with the rest of the dispositional wellness factors to explain the variance in satisfaction with life. Adding health to the dispositional wellness factors in a regression analysis could also not contribute to explain more than the 34% of variance in satisfaction with life already explained by the dispositional wellness factors alone.

The results of a standard multiple regression analysis is presented in Table 6 with the percentage of variance in intrinsic job satisfaction, extrinsic job satisfaction and health explained by the dispositional wellness factors. A combination of all the dispositional wellness factors, namely sense of coherence, positive affect and negative affect, internal locus of control and external locus of control as independent variables, explained 38% of the variance in intrinsic job satisfaction and health, and 24 % of the variance in extrinsic job satisfaction.

In Table 6, the statistically significant relationship between the dispositional wellness factors and job satisfaction and health results is presented. While negative affect does not contribute significantly to explain the variance in either intrinsic or extrinsic job satisfaction, external locus of control does not contribute to explain the variance in health.

Table 6

*Standard Multiple Regression Analysis with Intrinsic Job Satisfaction, Extrinsic Job Satisfaction and Health as Dependent Variables*

Variable	Unstandardised Coefficients		Standardised Coefficient	<i>t</i>	<i>p</i>	<i>F</i>	<i>R</i> <sup>2</sup>
	B	SE					
Intrinsic Job Satisfaction					0,00	53,90*	0,38
(Constant)	18,98	3,23		5,87	0,00		
Sense of Coherence	0,13	0,03	0,18	3,86	0,00*		
Positive Affect	0,16	0,07	0,10	2,27	0,03*		
Negative Affect	0,02	0,06	0,02	0,34	0,73		
External Locus of Control	-0,14	0,04	-0,15	-3,52	0,00*		
Internal Locus of Control	0,94	0,09	0,43	10,62	0,00*		
Extrinsic Job Satisfaction					0,00	27,11	0,24
(Constant)	9,50	2,95		3,22	0,00		
Sense of Coherence	0,11	0,03	0,19	3,67	0,00*		
Positive Affect	0,13	0,06	0,10	2,11	0,04*		
Negative Affect	0,07	0,05	0,07	1,29	0,20		
External Locus of Control	-0,19	0,04	-0,24	-5,23	0,00*		
Internal Locus of Control	0,38	0,08	0,21	4,66	0,00*		
Health					0,00	51,15*	0,38
(Constant)	62,75	5,80		10,83	0,00		
Sense of Coherence	-0,29	0,06	-0,23	-4,83	0,00*		
Positive Affect	-1,01	0,12	-0,37	-8,20	0,00*		
Negative Affect	0,41	0,10	0,20	4,02	0,00*		
External Locus of Control	0,05	0,07	0,03	0,71	0,48		
Internal Locus of Control	0,35	0,16	0,10	2,24	0,03*		

\*  $p < 0,05$  – statistically significant

### *A model of the hierarchical structure of satisfaction with life*

The aim of this study was ultimately also to produce a model for wellness in the chemical factory environment as it is deduced from the levels of satisfaction with life and the underlying dispositions and satisfactions.

In the structural model, two of the four dimensions namely dispositional wellness and job satisfaction were covered by at least two sub scales. Or each of these two dimensions, a latent variable was specified on which the corresponding scales loaded separating random measurement error from true score variance. The remaining two dimensions were measured by only one scale each, allowing no distinction in these cases between random error variance and true score variance in order to allow the correlations among these single-indicator latent variables and the other variables to be biased (Little, Cunningham, Shahar & Widaman, 2002).

The problem with single factor dimensions according to Ping (2006), is that a single construct measurement will very seldom render a data fit if items are not omitted, also called weeding, to better the model-to-data fit. The problem is that the correlated measurement errors that are characteristically of survey type data are usually not specified in covariant structure analysis (Ping, 2006). Little et al., (2002) says that there is usually no distinction drawn between random error variance and true score variance to allow the correlations between one-factor variables and other latent variables to be biased. The problem with these unspecified correlated measurement errors is that it dominate full measurement models with a single-constructs' model-to-data fit (Ping, 2006).

To overcome this problem, an item aggregation technique was applied (Bagozzi & Heatherton, 1994; Ping, 2006). Firstly, an exploratory one-factor analysis was done with the full set of items. Secondly two separate indicators or parcels were defined for each scale (dimension), and then items from the one-factor analysis with the full set of items were allocated to each parcel according to their loadings, alternating between high and low loadings. Through the parcelling process, two indicators for health, namely health 1 and health 2, and similarly two indicators for satisfaction with life, namely SWL1 and SWL2 were created (Figure 2). Since these parcels or indicators are artificial factors deduced from the original dimension, their correlation with the original dimensions is high. The model after

the parcelling process resulted in four dimensions, namely dispositional wellness, job satisfaction, health and satisfaction with life, each with at least two underlying factors or parcels. (Figure 2).

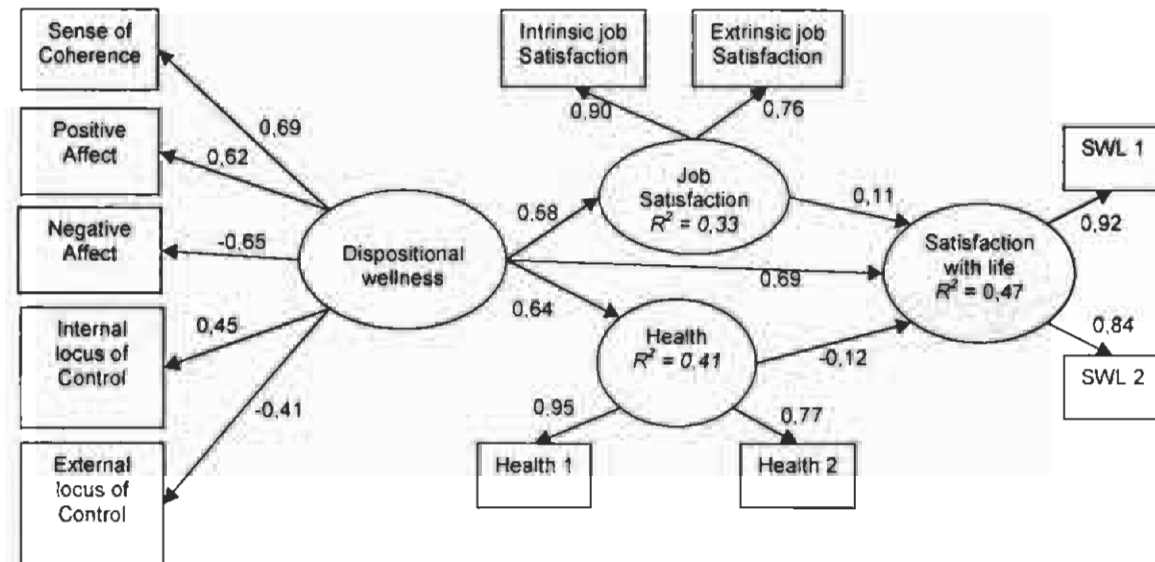


Figure 2. A structural model of satisfaction with life in the chemical industry

The fit statistics for the structural model of satisfaction with life in the chemical industry obtained are:  $\chi^2 = 249,07$ ;  $\chi^2/df = 6,89$ ; IFI = 0,91; CFI = 0,91; RMSEA = 0,10. The results indicated an adequate model fit although the RMSEA value is at the upper limit suggested by Arbuckle (1999) and Byrne (2001). The statistically significant relationship between dispositional wellness and satisfaction with life ( $r = 0,69$ ), but no significant relationships between job satisfaction and satisfaction with life ( $r = 0,11$ ), and between health and satisfaction with life ( $r = -0,12$ ) refuted hypothesis 1. There was no mediating effect of job satisfaction or health on the relationship between dispositional wellness and satisfaction with life. Employees with a stronger developed dispositional wellness would report more positive on both the levels of satisfaction they experienced in their jobs and in life in general. The strong relationship between dispositional wellness and satisfaction with life could also be related to the posited happiness set point (Diener et al., 1985). This set point is, according to Biswas-Diener et al. (2005) a result of past experiences rendering most people happy, and despite any effort, to improve the level of happiness, when the effort is relaxed the momentary increase will plummet to the evolutionary lower set point (Diener et al., 1985).

This confirms the importance of early life experiences, for example during early adulthood, when dispositional wellness evolves (sense of coherence, affect and locus of control). During the same period, while committing to life (Felt et al., 2004), the individual sets the criteria he/she will apply later to evaluate levels of satisfaction in different domains and in general.

The strong relationship between the dispositional wellness factors and both job satisfaction ( $r = 0,58$ ) and health ( $r = 0,64$ ) confirmed hypothesis 2. The strong relationship between dispositional wellness and both job satisfaction and satisfaction with life, and taking Diener et al.'s (1985) notion in consideration that satisfaction with life is more than the sum of the satisfaction in the sub-domains, support the supposed hierarchical structure of subjective well-being in the chemical industry.

A weak relationship existed between job satisfaction and satisfaction with life ( $r = 0,11$ ), and health and satisfaction with life ( $r = -0,12$ ), supporting hypothesis 3. Pavot et al. (1991) point out that general satisfaction, for example life satisfaction, represents a collective satisfaction, which combines satisfaction in various domains specific areas. According to Diener et al. (1985), on the other hand, satisfaction with life is more than the sum of the scores of the satisfactions in different sub-domains. Since job satisfaction and health were the only such domain specific areas assessed, it can be posited that if more domains were included, a larger percentage of variance in satisfaction with life is explained.

## DISCUSSION

The objectives of this study were to test the relationship between job satisfaction, sense of coherence, affect and locus of control as indicators of subjective well-being from where corporate wellness from a psychological perspective can be deducted.

The most important finding of the study is the confirmation of a strong relationship between dispositional wellness and the level of job satisfaction, and satisfaction with life. A much weaker than anticipated relationship between both job satisfaction and health and satisfaction with life is also reported. Satisfaction with life, or subjective well-being as the highest level of an individual's state of mind, is however more than the sum of satisfaction in subordinate domains and therefore much more than just job satisfaction or health. If the satisfaction in more domains is measured, the aggregate of their scores will be a closer indication of

satisfaction with life. The results do however support the notion of a subordinate hierarchical structure for general satisfaction with life or subjective well-being.

The correlation between all the subjective well-being related variables in the study was statistically significant, with the exception of marriage satisfaction that did not correlate significantly with health, extrinsic job satisfaction and both external and internal locus of control. Where marriage satisfaction did correlate with the other variables, it was of a lower order, but consistently of no practical significance. Marriage satisfaction was measured with a single item in the biographical questionnaire and enquired about the respondent's satisfaction with his/her relevant relationship, namely relationship, marriage or single status. The measurement of marriage satisfaction as a domain specific satisfaction should have been structured differently with, for example more questions to address specifics pertaining to different types of relationships, for example life partners, engaged, single, divorced, and married.

Strong correlations were reported between the dispositional wellness factors, namely sense of coherence, positive affect, negative affect, and external locus of control and internal locus of control. Although the correlations between affect (positive and negative) and locus of control (internal and external) were statistically significant, it was only practically significant (medium effect) between positive and negative affect, and between negative affect and external locus of control. Similarly, sense of coherence correlated positively on statistically significant level (medium effect) with positive affect and internal locus of control, and correlated negatively on a statistically significant level (medium effect) with negative affect and external locus of control. Early adult life experiences are important for the development of an individual's disposition through experiences, which leave a perception of the world as predictable and consistent, while life's outcomes can be shaped (Ortlepp & Friedman, 2001). According to Antonovsky (1987, 1993) real life experiences result early in life in a dispositional personality orientation that evolves as a sense of coherence. It is therefore deduced that constructive experiences in early adult life will result in a positive outlook on life (positive affect) and through the individual's successful involvement, the individual's confidence in his/her own ability to influence life's outcomes the locus of control is kept within the individual (internal locus of control). Conversely, negative experiences will contribute to a bleak outlook on life (negative affect) especially if the person experiences it as

beyond his/her control to shape life's outcomes for the better which evolves as an external locus of control.

The relationship between dispositional wellness and job satisfaction was confirmed with 38% of the variance in intrinsic job satisfaction and 24% of the variance in extrinsic job satisfaction being explained by the dispositional wellness factors. Job satisfaction is the result of an individual's affective-cognitive judgement of his/her circumstances against what he or she thinks an appropriate standard is (Pavot et al., 1991). The criteria against which events and situations later in life are evaluated already develop early in a young adult's life, through personal experiences in different life situations. These life experiences evolve in a dispositional personality orientation (sense of coherence) (Antonovsky, 1987). Similarly, the relationship between the dispositional wellness factors and health, where 38% of the variance in health could be explained by the dispositional factors, point at the importance of the criteria a person develops early in life and against which his/her health is later evaluated. Nilsson et al. (2003) described how a mother's sense of coherence changed between her first and second childbirth, with the latter coinciding with a higher level of sense of coherence than with her first child's birth. The mother's criteria for what a "good" birth would be, and since she had no experience herself, probably evolved from her interaction with other female members in her family. Through experiencing her first birth, she developed her own criteria of what constituted a "good" birth. If her criteria before her first birth were realistic and she experienced a "good" birth, the constructive experience of the birth would contribute to building a stronger sense of coherence (disposition) for her second birth. If her experience during the first birth was less satisfactory according to her criteria it would negatively affect her disposition regarding future births. Similarly, other early life experiences related to health, for example a terminally ill family member, death in the family and chronic illnesses contribute to the persons disposition regarding health, and how he/she will evaluate her/his own health later in life.

The relationship between the dispositional wellness factors and satisfaction with life was also confirmed, with 34% of the variance in satisfaction with life that was explained by the combined dispositional wellness factors. As pointed out, a dispositional personality orientation (Antonovsky, 1987) develops as the result of early life experiences. It was also pointed out earlier what the relationship is between these dispositional wellness factors and both health and job satisfaction. With these relationships and the fact that satisfaction with

life was reported as an aggregate of satisfactions in subordinate domains, the relationship between the dispositional wellness factors and satisfaction with life was implicit with a stronger sense of coherence (dispositional indicator) relating positively to a higher level of satisfaction with life.

The development of a dispositional personality orientation through early adult life experiences, which remains rather stable through life, can be compared with the happiness set point posited by Diener et al. (1985). This happiness set point remains generally at an evolutionary set level, and although it can be escalated this elevated state will be temporary and the level will plummet to the evolutionary lower set point as soon as the situation causing the increase passes, or the effort is relaxed (Biswas-Diener et al., 2005). The strong relationship between dispositional wellness and satisfaction with life raises the question, since happiness is also used synonymous with subjective well-being, whether satisfaction with life does not also have a unique set point for each person, where a person's level of satisfaction will return to after the efforts to better his/her state of good is relaxed.

The strong positive correlation with a practical significance of a large effect between intrinsic job satisfaction and extrinsic job satisfaction suggests that job satisfaction be considered as a single construct. Intrinsic job satisfaction and extrinsic job satisfaction together, explained 16% of the variance in satisfaction with life. Diener et al. (1985) however assert that satisfaction with life is more than the sum of the scores of the satisfactions in different domains. Since only one domain specific satisfaction, namely job satisfaction was used to explain the variance in satisfaction with life, it is posited that a larger percentage of variance in satisfaction with life could be explained if more domain specific areas were included noting that the sum of all the domain specific satisfactions would not equate satisfaction with life fully.

When health was included in the regression analysis, together with intrinsic job satisfaction and extrinsic job satisfaction the percentage of variance in satisfaction with life was reduced from 12% to 7%. When health was, however introduced with the dispositional wellness factors to explain the variance in satisfaction with life, the percentage already explained by the dispositional wellness factors alone remained unchanged at 34%. While health thus reduced the ability of job satisfaction (intrinsic and extrinsic) to explain the variance in satisfaction with life, health did not affect the percentage of variance explained by the

dispositional wellness factors, thus pointing to the mediating effect health has on job satisfaction to explain the variance in satisfaction with life. The mediation was only partial because although job satisfaction (predictive variable) and satisfaction with life (dependant variable or outcome), and job satisfaction and health (mediator), correlated sufficiently, and while health was found to influence job satisfaction to explain satisfaction with life, health (mediator) could not be confirmed to mediate the relationship between job satisfaction and satisfaction with life completely (Kenny, 2006).

Subjective well-being is, according to Kim-Prieto et al. (2005), a combination of different domain satisfactions culminated as life satisfaction or quality of life. Life satisfaction is again an indication of an individual's evaluation of his/her general quality of life (Saris et al., 1996) or a global evaluation of his/her life (Diener et al., 1985), as evaluated against self-established criteria (Diener et al., 1985; Pavot et al., 1991) that evolved from early adult life experiences. While satisfaction with life and affect have been identified by Andrews and Withey (1976) as contributing subcomponents to subjective well-being, Kahnemann (2006) used satisfaction with life synonymous with subjective well-being. Subjective well-being is on an individual level ultimately the highest level of an individual's state of mind (Saris et al., 1996) and the culmination of satisfaction in different domains of life or quality of life (Kim-Prieto et al., 2005).

Through a series of standard multiple regressions the dispositional wellness factors, namely sense of coherence, affect, and locus of control were tested to explain the variance in the first level of satisfaction, namely job satisfaction and health, and also to explain the variance in satisfaction with life or subjective well-being as a higher level of satisfaction as it is subject to a combination of different subordinate domain satisfactions culminated as life satisfaction or quality of life (Kim-Prieto et al., 2005).

In the first step it was determined that 16% of the variance in satisfaction with life could be explained by intrinsic job satisfaction and extrinsic job satisfaction. In a further step, 34% of the variance in satisfaction with life could be explained by a combination of the dispositional wellness factors, namely sense of coherence, affect, and locus of control, while 38% of the variance in both intrinsic job satisfaction and health, and 24% of the variance in extrinsic job satisfaction could be explained by the dispositional wellness factors. Finally, while including either intrinsic job satisfaction or extrinsic job satisfaction with the dispositional wellness

factors in a regression analysis, only a marginal increase in the percentage of variance in satisfaction with life explained was noted, bringing the total percentage of variance in satisfaction with life explained to 35%. Including health with the dispositional wellness factors, replacing job satisfaction, failed to explain more of the variance in satisfaction with life than what was already explained by the dispositional wellness factors and job satisfaction.

The proposed hierarchical structure of satisfaction reported by Diener et al. (2003) was evident from the percentage of variance in job satisfaction (first level domains) and satisfaction with life (second level domain) successively explained by levels of satisfaction in subordinate domains. Early life experiences contribute to the evolution of dispositional wellness, which affect the criteria and affective-cognitive evaluation of satisfaction in different domains in life later on. The levels of satisfaction in these higher order domain specific areas contribute to the overall evaluation of the quality of life, or satisfaction with life, or subjective well-being.

The results confirmed both the significant relationship between early life experiences, domain specific satisfaction, for example job satisfaction, general satisfaction with life, quality of life and subjective well-being as reported (Chiu, 1998; Greenhaus & Singh, 2003; Rain et al., 1991), as well as the hierarchical structure in which the relationships between the layers were reciprocal with satisfaction in each higher domain having the larger effect. These findings concur with the reciprocal relationship reported between job satisfaction (lower level) and satisfaction with life (higher level), with the higher level of satisfaction (satisfaction with life) having the larger effect (The Effects Of, 2001).

Veenhoven (2004) however asserts that although well-being is a state of good, it needs to be made specific in terms of specific criteria and a specific domain. Measuring the level of dispositional wellness (sense of coherence, affect and locus of control) and keeping track of the levels of satisfaction reported by individuals up to their general satisfaction with life will give a good indication of the subjective well-being of the people in the organisation, thus also providing a good indication of the wellness in the organisation, as specified for in this study to be corporate wellness from a psychological perspective.

This study, through a systematic analysis of the antecedents of satisfaction in the workplace, contributes to a better understanding of subjective well-being as it relates to corporate wellness from a psychological perspective, but does present some limitations. First, the width of the study scope encompassing different aspects from dispositional wellness factors, different areas of satisfaction, and satisfaction with life all in one study limits the possibilities to explore the different interactions sufficiently. The available numbers representing some demographic groups were not optimal. Focussing on mainly one domain specific area of satisfaction, namely job satisfaction restricted the study in exploring the affect of satisfaction in multiple domains, including non-work related areas on work related satisfaction and ultimately corporate wellness. Although health was also used in a domain specific context, health is rather an indication of the respondent's subjective report of his/her current health state and not an indication if his/her satisfaction with his/her state of health. Lastly, the cross sectional design limited the data to a point in time limiting this study in terms of presenting results that will indicate the effect dispositional wellness factors will have on job satisfaction and satisfaction with life over time.

## **RECOMMENDATIONS**

The importance of employee well-being or wellness is evident from literature. Focussing on and keeping only track of gross domestic product (GDP) is not enough. The importance of people to future business successes is acknowledged and realised by the corporate world. It is through people's efforts working in the industry that technology, processes, and products come to full effect. This study was done in the chemical factory environment with a sample representing a crosscut of all job layers in the organisation at a specific point in time. Although the results are promising, the full potential of this research can only be realised if a number of suggestions can be implemented.

The study must be repeated over time to confirm the structure of wellness or well-being in the industry from a psychological perspective. The study can also be extended to include non-psychological variables, for example turnover, attendance, disciplinary trends, etc. in order to enhance the understanding of the broader business concept corporate wellness and how it relates to wellness from a psychological perspective.

The importance of constructive experiences early in life contributing to the development of an individual's wellness disposition (for example sense of coherence) that in turn affects different levels and areas of satisfaction, and ultimately influencing an individual's subjective evaluation of well-being is evident from the results of this study. These findings can require employers to revisit their approach to people development and can have considerable implications for future business successes. These findings can be used in the workplace to develop interventions of a coaching or mentoring nature aiding and guiding all employees, but specifically young adults to work through their unique early adulthood as well as later life experiences to develop strong positive dispositions (for example sense of coherence) as this will positively affect different areas of satisfaction later in life and contribute to the subjective evaluation of their well-being and ultimately contribute to the company's overall corporate wellness.

In a time where company expansions are rather being hampered by the lack of human resources than the lack of finances, the importance of people's well-being is evident. A war for talent is waging and the general approach to address this from a financial rewards angle holds little promise beyond the short-term. This only momentarily alleviates the dilemma while payroll costs, and turnover soar and competence remain alarmingly low.

To survive in a highly competitive domain the chemical industry at large will have to alter their current thinking about employment and how to change the working arrangements to suit the needs of a new generation of workers and emerging leaders. If the findings in Bhutan are true, the levels of dispositional wellness and satisfaction of the current and future workforce and the efforts to strengthen these levels will form a significant part of the basis for future business successes.

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## CHAPTER 5

### CONCLUSIONS, LIMITATIONS AND RECOMMENDATIONS

This chapter is aimed at providing a conclusion in respect of the findings from the three empirical studies regarding corporate wellness in the chemical factory environment. The conclusions are discussed in relation to the different objectives set in the three different articles. The general limitations of this study are also discussed and recommendations are made to the employer in the chemical industry where the factories are situated. Finally, some recommendations are made to guide further research in this area.

#### 5.1 Conclusions

The general objective of this study was to investigate corporate wellness from a psychological perspective, with specific focus on the underlying (subordinate) hierarchical structure of subjective well-being (job satisfaction, sense of coherence, affect, locus of control, health and satisfaction with life) as it relates to wellness.

The first objectives of this study were to analyse job satisfaction in the chemical industry and to validate the Minnesota Satisfaction Questionnaire (MSQ) for use with multilingual groups in the chemical industry. The second set of objectives aimed to investigate sense of coherence in the chemical industry and to design and validate an abbreviated version of the Orientation to Life Questionnaire for use in the chemical industry. The third objective was to look at satisfaction in different domains in the chemical industry and to design a model to assess subjective well-being in the chemical industry as an indication of wellness in the organisation.

In the first two objectives of the study two questionnaires, namely the Minnesota Satisfaction Questionnaire and an abbreviated form of the Orientation to Life Questionnaire were validated for use in the chemical factory environment. Both questionnaires presented with acceptable levels of internal consistency for use in multilingual groups. The two-factor structure of the Minnesota Satisfaction Questionnaire was also confirmed. The Orientation to Life Questionnaire was analysed as a one-factor construct, although care was taken in selecting items to ensure that an equal number of items were selected from the original 29-

item Orientation to Life Questionnaire to represent all three the theorised sub-constructs of sense of coherence (Antonovsky, 1987).

The levels of job satisfaction and sense of coherence of employees in the chemical factory environment were then also assessed with the aforementioned questionnaires (Minnesota Satisfaction Questionnaire and Orientation to Life Questionnaire). Significant differences were found between the means of both sense of coherence and job satisfaction for some demographic groups. Notably, these differences were found among sub-groups in the categories language, age, job level and qualification. In the category language, the Afrikaans/English respondents reported significantly higher means than their African colleagues for both job satisfaction and sense of coherence. In the other categories (for example age, job levels and qualification) the means for sense of coherence and job satisfaction increased consistently with subsequent higher levels. These increases, although marginal in both sense of coherence and job satisfaction, levelled off from senior management level upwards, older than 50 years of age, and after more than 20 years of service. As expectations in life generally become more realistic with age, and as people develop over time they also move into jobs closer characterised by what they expect from a job, a higher level of job satisfaction is also experienced.

The chemical factory employees, regardless of their demographic group, consistently reported stronger intrinsic than extrinsic job satisfaction. Job satisfaction among genders was, however found to be not significantly different as also reported by Sloane and Williams (2000). Job satisfaction differed significantly between the Afrikaans/English, and African-speaking groups, with the latter reporting lower levels of job satisfaction (Greenhaus, Parasuraman, & Wormley, 1990; Clark, 1996). The demographic variables could also explain only 6% of the variance in job satisfaction (intrinsic or extrinsic). This limited ability to explain job satisfaction with demographic variables is consistent with Keita's (2006) notion that people from different racial backgrounds use essentially the same criteria to determine job satisfaction. Since job satisfaction is essentially an individual affective-cognitive evaluative process where individuals compare their personal work outcomes to pre-self determined criteria (Cranny, Smith, & Stone, 1992), the basis for job satisfaction differences is less likely to be found in demographic variables.

The third set of objectives of this study was to investigate corporate wellness from a psychological perspective as it related to the relationship between job satisfaction, sense of coherence, affect, locus of control and satisfaction with life as an indication of subjective well-being.

An important finding of the study is the strong relationship between the dispositional wellness factors and the level of job satisfaction, as well as the level of satisfaction with life. This confirms the importance of experiences, as it manifests in a dispositional personality trait that in turn contributes to a subjective disposition regarding well-being. The rather weak relationship found between job satisfaction and satisfaction with life, as well as health and satisfaction with life should be appreciated in context. Satisfaction with life, or subjective well-being as the highest level of an individual's state of mind (Saris, Veenhoven, Scherpenzeel, & Bunting 1996), is also more than the mere sum of satisfaction in subordinate domains (Diener, Emmons, Larsen, & Griffin, 1985) and therefore much more than job satisfaction or health alone. If the satisfaction in more domains were measured, a stronger relationship could have been expected between the aggregate of these domain specific scores and satisfaction with life. The current results however support the notion of a hierarchical structure of satisfaction as posited by Diener, Scollon and Lucas (2003).

The correlation between all the subjective well-being related variables in the study was statistically significant, with the exception of marriage satisfaction that did not correlate significantly with health, extrinsic job satisfaction and both external and internal locus of control. Where marriage satisfaction did correlate with the other variables, it was of a lower order, but consistently of no practical significance. Marriage satisfaction was measured with a single item in the biographical questionnaire and enquired about the respondent's satisfaction with his/her relevant relationship, namely relationship, marriage or single status. In hindsight, the measurement of marriage satisfaction as a domain specific satisfaction should have been structured differently with for example more questions to address specifics pertaining to different types of relationships, for example life partners, engaged, single, divorced, married etc.

In conclusion the results, confirms a strong interrelationship between different dimensions associated with wellness, and confirms the importance of dispositional wellness as a result of earlier life experiences. A dispositional personality orientation evolves and is set in early

adult life. Efforts or events that affect the dispositional personality (that is, sense of coherence) last only temporarily and generally revert to a level close to where it has been after the event passes or the effort is relaxed. This corresponds with the happiness set point (Diener et al., 1985), while happiness is also used *inter alia* with subjective well-being (Blanchflower & Oswald, 2005). With happiness and satisfaction with life equated, it is deduced that satisfaction with life also functions on a set point as evolved and set earlier in life as a result of different life events. The importance of constructive early adult life experiences is again emphasised as it forms the basis of the set point from where quality of life will be determined later in life.

## **5.2 LIMITATIONS OF THIS STUDY**

This study suffered from some limitations. The first limitation was the restricted sample with less optimal numbers of participants representing the different demographic groups in the larger population. This must be addressed in future studies when participant numbers must be bolstered with specific attention to race, ethnic, and language groups (Munsey, 2006). In all three articles, a cross sectional survey design was also used that limited the results to a specific point in time. Follow up studies must be done to gather longitudinal data to determine if any changes in the self-reported levels occur in the different variables studies over time.

The scope of the study, ranging from the validation of two of the measurement instruments, to determining the means of different dimensions for different demographic groups, to the systematic analysis of the antecedents of well-being in the workplace, resulted in a body of results that was limited for inclusion by the parameters of the thesis in an article format. The scope of Chapter 4, encompassing dimensions related to subjective well-being (affect, sense of coherence, locus of control, job satisfaction, health and satisfaction with life), all in one study resulted in limited prospects to explore the different interactions sufficiently and report on the results within the ambit of one article.

The data represented the respondents' self-reported subjective evaluation of their state of good or levels in specific dimensions. This could have resulted in estimation errors with some consequences for the statistical analysis of the data.

During the validation of the questionnaires, the focus was on one specific instrument per dimension, assuming that it was the most reliable and valid questionnaire available. Comparisons were done based on the original instruments and items published in other research. The Orientation to Life Questionnaire (OLQ) items appear to require attention in terms of the quality of the language used (syntax, language and grammar). Lastly, the study was limited to one industry, largely concentrated in one geographical area in South Africa, rendering the results not suitable for comparisons with similar industries or to be extrapolated beyond the specific region or specific organisation.

### **5.3 RECOMMENDATIONS**

In this part of the study, some recommendations are made specifically for the chemical industry as well as for future studies.

#### **5.3.1 Recommendations for the organisation**

The results of this study can prove valuable for the organisation if the findings can be incorporated in current employee induction, orientation and development methodology. This will contribute to improve the future wellness in the organisation, with far-reaching benefits, for example staff retention, potential optimisation, competence building, as well as the general wellness in the organisation. The results can also be used to influence current company policies and practices and to direct the evolution of the employment relationship with employees to ensure a future employee and leadership contingent with strong dispositional personality traits and high levels of subjective well-being.

As satisfaction in different domains in life is determined through an affective-cognitive evaluation process using criteria set in early adult life, significant efforts are necessary to understand future generations, their needs and what will be required to satisfy them in future. A phrase often heard in the organisation is “we create the environment we live in”. The well-being within the organisation is eventually a result of what the organisation creates within itself. With the knowledge of the hierarchical structure of subjective well-being and the importance of the state of the employees’ dispositional wellness known, the importance of sound processes to introduce new employees into the organisation is evident. While the organisation’s brand is known and appreciated, and accentuated with a well-structured and

presented induction programme for new employees, their subsequent development after their initial introduction to the workplace lacks support and constructiveness. Gaining comprehension about the world around us, and building confidence to deal with the world require exposure to increasing levels of work and life complexities. This exposure to life's experiences does not necessarily have to be positive or successful as long as the experience can be translated into a constructive experience. Coaching, mentorship and counselling opportunities must therefore be made available for all employees to assist them to deal constructively with different life events and build strong dispositional personality traits as a result.

### **5.5 Recommendations for further research**

Although this study presented some limitations, there are a number of findings that are important for future research.

Firstly, a longitudinal study must be conducted to determine whether the findings in the current study are due to differences between generations or to demographic differences. Although various factors contributing to a dispositional personality trait and satisfaction in different areas and levels were assessed follow up studies must investigate specific parts of this study with more relevant variables, for example satisfaction in different domain specific areas. The relationship between the different factors contributing to what was coined dispositional wellness, or a dispositional personality trait must be studied and more possible variables must be included to determine the antecedents of a dispositional personality trait.

The current study also relied solely on self-reported data about the self-assessed levels of different variables. More quantitative measurement data, for example medical data or the ratings of peers must be included to reduce the subjectivity of the self-appraisals.

Lastly, while the concept wellness is widely used and flaunted in the organisation, constructive actions and interventions are still lacking. Future efforts must include surveys, research, design, as well as implementation and monitoring of wellness in the organisation from a scientific perspective in collaboration with other disciplines.

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## REMARKS

The reader is reminded of the following:

- This thesis was written in accordance with the American Psychological Association (APA) editorial style (*Publication Manual* 5<sup>th</sup> edition). This practise is in line with the policy of the Programme in Industrial Psychology of the North-West University's (Potchefstroom Campus) policy to use the APA style in scientific publications.
- The thesis comprises three research articles in line with the policy of the North-West University's Programme in Industrial Psychology (Potchefstroom Campus).

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## SUMMARY

**Topic:** Corporate wellness in a chemical industry in South Africa

**Key terms:** Wellness, well-being, life satisfaction, job satisfaction, marital satisfaction, sense of coherence, affect, work locus of control, health, management, supervision, languages, gender, tenure, job level, qualification

The world of work is changing at a whirlwind speed with mergers, acquisitions, new markets, products, growth as well as many similar business activities being at the order of the day, all aimed at improving income and profits. Fierce competition, and optimisation of resources by businesses, has led to corporations realising that economic and social sustainability cannot be achieved through technology alone and attention has to be given to human needs. Peoples' capacities are progressively being optimised as a strategic important business element and when this resource is neglected, it can have detrimental effects for businesses. This confirms a growing interest and call for wellness and well-being efforts by employers to find out just how happy people are, and what can be done to improve employees' satisfaction.

Since employee satisfaction is recognised as important to the success in the workplace, efforts to improve and maintain high levels of job satisfaction will contribute to the overall success of a business. Limited research that can guide interventions in the chemical factory environment to improve general satisfaction in the workplace exists about the relationship between satisfaction in the workplace and subordinate structures influencing job satisfaction and the effect job satisfaction has on general satisfaction in the workplace.

This study aimed at investigating satisfaction or wellness in the workplace by focussing on the different layers of satisfaction and how the satisfaction on a level is affected by the level of satisfaction on subordinate levels. To enhance the results of the study, the two primary questionnaires were also validated for use in the chemical factory environment, and sense of coherence and job satisfaction in the chemical factory were analysed at the same time.

The research approach followed in this study focussed on a literature study, followed by an empirical analysis of data collected that was related to the specific area of study. A survey design was used to collect the data, using a questionnaire booklet that was distributed to a

crosscut sample of employees working in the chemical factory environment. The sample represented all the demographic groups in the organisation ( $N = 583$ ). The questionnaires used were the Orientation to Life Questionnaire, Minnesota Satisfaction Questionnaire, the Health Questionnaire, Work Locus of Control Scale, and Satisfaction with Life Scale, Affectometer, and a biographical questionnaire.

In Article 1 and Article 2, two questionnaires considered primary to the study were tested for use in the chemical factory environment. The Minnesota Satisfaction Questionnaire's structural equivalence for use in a multilingual population, and the construct validity of the Orientation to Life Questionnaire in an abbreviated 11-item format, were confirmed.

The different levels of job satisfaction and sense of coherence for different demographic sub-groups were also determined. Job satisfaction was found to differ significantly between the different language groups, certain age groups, as well as for different job levels. Moreover, while intrinsic job satisfaction increased with age and job level, extrinsic job satisfaction decreased with the level of education. Sense of coherence differed also significantly between some demographic groups, namely language, qualification and job level.

In Article 3 the relationship between job satisfaction, sense of coherence, affect and locus of control were tested as an indication of the hierarchical structure of subjective well-being. The hierarchical structure of subjective well-being was confirmed, deducted from the correlation between different variables and the percentage of variance in successive levels of satisfaction explained by the level of satisfaction in subordinate levels.

Recommendations were made to the host organisation and for future research.

## OPSOMMING

**Onderwerp:** Korporatiewe welstand in 'n chemiese industrie in Suid-Afrika.

**Sleutelwoorde:** Welstand, welsyn, lewenstevredenheid, werkstevredenheid, huwelikstevredenheid, koherensiesin, affek, werklokus van beheer, gesondheid, bestuur, toesighouer, taal, geslag, diensjare, posvlak, kwalifikasie

Die wêreld van werk verander teen 'n vinnige tempo met samesmeltings, oornames, nuwe markte, produkte, groei en talle ander soortgelyke besigheidsaktiwiteite wat aan die orde van die dag is en wat ten doel het om inkomste en winste te verbeter. Te midde van streng kompetisie, en terwyl besighede hulle bronne optimeer, is die besef dat ekonomiese en sosiale volhoubaarheid nie deur tegnologie alleen bereik kan word nie en dat aandag aan die mense se behoefte gegee moet word. Mense se vermoëns word progressief geoptimeer as 'n strategies belangrike besigheidselement en sodra hierdie bron verwaarloos word kan dit ernstige negatiewe gevolge vir 'n maatskappy inhou. Dit bevestig 'n toenemende belangstelling en oproep na die welstand en welsyn van werknemers deur werkgewers om sodoende te bepaal hoe gelukkig werknemers is en wat gedoen kan word om hulle tevredenheid te verbeter.

Aangesien werknemertevredenheid belangrik geag word vir sukses in die werksplek, sal pogings om werknemerwelstand te verbeter of in stand te hou, bydra tot die oorhoofse sukses van 'n besigheid. Beperkte navorsing bestaan aangaande die verband tussen werkstevredenheid en die onderliggende strukture, en hoe die onderliggende faktore werkstevredenheid beïnvloed asook die uitwerking wat werkstevredenheid het op algemene tevredenheid in die werksplek. Hierdie navorsing sou kon dien as 'n riglyn om ingrypinge te rig in die chemiese fabrieksomgewing om sodoende algemene werkstevredenheid te verbeter.

Die studie het ten doel gehad om ondersoek in te stel na tevredenheid of welstand in die werksplek deur te fokus op die verskillende vlakke van tevredenheid of welstand in die werksplek en hoe die tevredenheid op 'n spesifieke vlak deur die tevredenheid op ondergeskikte vlakke beïnvloed word. Om die resultate van die studie te verbeter is die twee primêre vraelyste wat in die studie gebruik is ook gevalideer vir gebruik in die chemiese

fabrieksomgewing. Terselfdertyd is die vlakke van werkstevredenheid en koherensiesin van verskillende demografiese groepe ook gemeet.

Die navorsingsbenadering wat gevolg is het gefokus op 'n literatuuoroorsig gevolg deur 'n empiriese studie van die data wat verband hou met die spesifieke area van die studie. 'n Vraelysontwerp is gebruik om data in te samel, deur vraelyste in boekformaat onder 'n kruissnitsteekproef van werknemers in die chemiese fabrieksomgewing te versprei. Die steekproef verteenwoordig al die demografiese groepe in die fabriek ( $N=583$ ). Die vraelyste wat gebruik is, is, die Lewensoriëntasievraelys, Minnesota Werkstevredenheidsvraelys, die Gesondheidsvraelys, Werklokus van Kontroleskaal, die Lewenstevredenheidsvraelys en Affektometer, asook 'n biografiese vraelys.

In Artikel 1 en Artikel 2 is die twee vraelyste wat primêr vir die studie geag word getoets vir gebruik in die chemiese fabrieksomgewing. Die Minnesota Werkstevredenheidskaal se konstrukekwivalensie vir meertalige populasies en die konstrukgeldigheid van die Lewensoriëntasievraelys in 'n verkorte 11-item weergawe is bevestig.

Die verskillende vlakke van werkstevredenheid en koherensiesin vir verskillende demografiese groepe is bepaal. Daar is gevind dat daar 'n betekenisvolle verskil is van werkstevredenheid tussen die verskillende taalgroepe, sommige ouderdomsgroepe, asook tussen verskillende posvlakke. Daar is verder ook gevind dat intrinsieke werkstevredenheid toeneem met ouderdom en posvlakke terwyl ekstrinsieke werkstevredenheid afneem met toenemende kwalifikasie. Koherensiesin tussen sommige demografiese groepe, soos taal, kwalifikasie en posvlak verskil ook betekenisvol.

In Artikel 3 is die verhouding tussen werkstevredenheid, koherensiesin, affek en lokus van beheer getoets as indikators van die hiërgargiese struktuur van subjektiewe welstand. Die hiërgargiese struktuur van subjektiewe welstand is bevestig deur afleidings wat gemaak is oor die korrelasie tussen die verskillende veranderlikes en die persentasie van veranderlikheid in opeenvolgende vlakke van tevredenheid wat verduidelik is deur die vlak van tevredenheid in die ondergeskikte vlakke.

Aanbevelings is ook vir die gasheerorganisasie, en vir toekomstige navorsing gemaak.