Job satisfaction in a chemical factory

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ABSTRACT

Subjective well-being is regarded as an important goal given the positive outcomes thereof for individuals. Job satisfaction is an important indicator of the subjective well-being of individuals. 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 with a sample (N = 583) representing different job levels in a chemical factory. The 20-item MSQ and a biographical questionnaire were administered. The results confirmed that job satisfaction consists of two internally consistent factors, namely extrinsic and intrinsic job satisfaction. The factorial invariance of the MSQ was confirmed for African languages and an Afrikaans and English group. Language was the only demographic variable that statistically significantly predicted extrinsic job satisfaction. Intrinsic job satisfaction was statistically significantly predicted by two demographic variables, namely age and qualification.

Key words: job satisfaction, chemical factory, language, age, job level

Introduction

Work is a pervasive and influential factor impacting on individuals' subjective well-being (Harter, Schmidt & Keyes 2002). Subjective well-being refers to subjective judgements of the quality of an individual's life with regard to both the presence and relative frequency of positive and negative moods and emotions over time, one's overall level of life-satisfaction, and one's satisfaction with specific domains such as

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work, family, health, leisure, finances, the self and the group (Diener, Kesebir & Lucas 2008). Subjective well-being manifests in various positive outcomes, including superior attention, longevity, recovery from illnesses and protecting people against the onset of physical diseases and pathology (Seligman 2008). Job satisfaction can be regarded as one indicator of subjective well-being (Sevastos, Smith & Cordery 1992).

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). 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 satisfying. There is an extensive body of research in organisational psychology that has considered the role of job satisfaction in the workplace (Christen, Iyer & Soberman 2006; Heywood, Siebert & Wie 2002). Job satisfaction is related to reduced stress, less anxiety, fewer physical symptoms, meaning in life (Witmer, Rich, Barcikowski & Margue 1983; Witmer, Sweeney & Myers 1998), and longevity and greater productivity (Pelletier 1994). In a meta-analysis, Judge, Thoreson, Bono and Patton (2001) obtained a 0.30 correlation between employee satisfaction and employee productivity.

The chemical industry 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, the USA and recently also China. The company that was the subject of this study 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 were previously disadvantaged, find themselves in a better position than before, with better opportunities, more equality and greater prospects. However, only one scientific study was found regarding the measurement of job satisfaction and the relationship between demographic factors and job satisfaction in the multilingual South African context (see Buitendach & Rothmann 2009).

During the last few decades, a great effort has been made to correct inequalities in the workplace (Greenhaus, Parasuraman & Wormley 1990; Harrison, Price & Bell 1998). The workplace is renowned for a history of inequities. These inequities 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). 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 at different job levels, as well as the 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 inequalities 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 the question arises whether individuals from different demographic groups will be equally satisfied with their jobs.

Work is regarded as important to the overall enjoyment of life and generally considered good for both physical and mental health. 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' subjective 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 et al. 2006).

South Africa is a multicultural society. Therefore, measurement equivalence (factorial invariance) should be computed for measuring instruments in any multicultural setting where individuals from different cultural groups are compared in terms of a specific construct (Van de Vijver & Leung 1997). Measurement equivalence should be tested for a multicultural context where differences in scores could be attributed to cultural or language influences in terms of item meaning and understanding, rather than differences resulting from the measuring constructs by the measuring instruments.

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, and secondly to investigate the relationship between job satisfaction and demographic variables (including age, qualification, language, gender and job level) of employees in a chemical factory.

Job satisfaction

Job satisfaction is an evaluative judgement about the degree of pleasure an employee derives from his or her job that consists of both affective and cognitive components (Weiss 2002). An employee's evaluation of work is based on his or her comparison of the *actual* work outcomes with the *expected* outcomes (Cranny, Smith & Stone 1992). 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 evaluation affects outcomes such as the intention to change work or to leave the company (Sumner & Niederman 2003). According to Sempane, Rieger and Roodt (2002), employees evaluate their jobs using factors that they regard as important to them. This evaluation is influenced by individuals' perceptions and unique circumstances, for example, needs, values and expectations.

The theoretical basis for job satisfaction can be found in the dual-factor theory of job satisfaction (Herzberg, Mausner, Peterson & Capwell 1957), identifying both an intrinsic and an extrinsic component, which can also be equated to situational (extrinsic) and dispositional (intrinsic) factors (Hirschfeld 2000; Spector 1997). The intrinsic component of job satisfaction includes variables such as recognition, the work itself (Faubion, Palmer & Andrew 2001), achievement and professional growth, working 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). Intrinsic factors were found to correlate with motivators or satisfiers (Faubion et al. 2001). 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.

Equity theory (Adams 1963) can be used to understand job satisfaction and its relation to work-related outcomes. Employees invest in the relationship with their employers in terms of time, effort and knowledge. In return, they receive rewards such as salary, job security, status and prestige. Employees who are satisfied with these rewards would feel obliged to invest their efforts in the organisation. Therefore, employee satisfaction has activating and motivational potential (Bjornebekk 2008).

The Minnesota Satisfaction Questionnaire (MSQ): short form

The MSQ was developed by Weiss, Dawis, England and Lofquist (1967) to measure job satisfaction. Conceptually, the MSQ was based on the *Theory of Work Adjustment* (Weiss et al. 1967), which uses the fit between work personality and the work environment as the reason for work adjustment outcomes (such as job satisfaction). According to this theory, vocational abilities and needs are significant aspects of work personality, while ability requirements and reinforcement systems are significant aspects of the work environment. Work adjustment (for example, job satisfaction) is the consequence of correspondence between an individual's abilities and the ability requirements in work, as well as the correspondence between individual needs and reinforcers available in the environment.

The MSQ measures satisfaction with specific aspects of work and work environments rather satisfaction with the job in general. This is useful, since individuals might have the same total job satisfaction score, but differ regarding the sub-factors with which they are satisfied. In the long form of the MSQ, satisfaction with 20 different aspects of the work and work environment are measured by using five items per factor. The short form of the MSQ also measures 20 different aspects of the work and work environment, but only one item is used per factor. Weiss et al. (1967) obtained a two-factor solution for the MSQ (short form), namely intrinsic and extrinsic job satisfaction.

Arvey, McCail, Bouchard, Taubman and Cavanaugh (1994) found that job satisfaction as measured by the MSQ is best represented by two factors, namely intrinsic job satisfaction and extrinsic job satisfaction. However, Arvey, Dewhirst and Brown (1978) and Spector (1997) found that job satisfaction as measured by the MSQ is best represented by one factor. Using exploratory factor analysis, Buitendach and Rothmann (2009) found support for a two-factor structure of the MSQ. Only 17 items loaded on the two factors, which were labelled as intrinsic and extrinsic job satisfaction. Buitendach and Rothmann also confirmed the structural equivalence of the MSQ for black and white employees in selected organisations in South Africa. However, a limitation of this study was that an exploratory rather than a confirmatory factor analytical approach was used in their study.

Background variables and job satisfaction

Reports on job satisfaction levels of men and women vary significantly in the 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; Sloane & Williams 2000; Souza-Poza & Souza-Poza 2003; Spector

1997). Being a woman despite a disadvantaged history in the workplace is seen as an important characteristic associated with high levels of job satisfaction (Clark 1996; Gallup 2001; Souza-Poza & Souza-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. Clark (1996) also attributed gender job satisfaction differences to: (1) men and women's generally different jobs, qualifications and working hours, (2) why work is valued, (3) women who find it culturally easier to leave a jobs when dissatisfied than men, resulting in more satisfied than unsatisfied women working, and (4) different work expectations for men and women, which 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; Muhonen & Torkelson 2004; Riley 1997; Utsey, Ponterotto, Reynolds & Cancelli 2000). 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 (Clark 1996; Greenhaus et al. 1990; Jones, James, Bruni & Sells 1977).

Population ageing in the workforce has led to a growing interest in the differences between younger and older workers (Warr 1990). 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). 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 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 among older people (compared to younger people) is attributed to the following factors: (1) over time and through development, people move on to 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 become lowered (more realistic); (4) older people could also have been more satisfied with their jobs (cohort phenomena); (5) older people who are 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 and family life. 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 as 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 far earlier in their careers.

Higher qualification correlates with better opportunities in the workplace, for example, higher earnings, quicker promotions and better positions (Clark 1996). Clark (1996) reported that higher qualifications affected the level of job satisfaction of women. Although higher qualifications usually translate to better jobs, education rather correlates with workers' expectations of what jobs they should have. The result is an inverse relationship between qualification and jobs satisfaction, with lower job satisfaction being associated with higher qualifications (Clark 1996).

Hypotheses

The hypotheses for this study were as follows:

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

H2:   The factor(s) of the MSQ are invariant for multilingual samples.

H3:   Demographic factors (including gender, language, age, job level, and qualification) predict job satisfaction.

Method

Participants

A convenience sample was taken from the employee population in sub-businesses of a chemical industry in the Vaal Triangle 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 were collected in a series of efforts, applying various methods, for example, group sessions, focused efforts in different areas and a general mail effort to ensure a sufficient sample size of different demographic groups. 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 (Sotho/Xhosa/Zulu)	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	39.08
	Supervisor (L7–L6C)	180	30.72
	Middle Managers (L5B–L5A)	40	6.83
	Senior Managers (L4–L3)	13	2.22
	Missing	124	21.16

The average age of the respondents in the sample falls into the category aged 40–49 years. The gender distribution is 66.93% males and 29.88% females. This compares well with the demographics of the general workforce in the chemical industry, which is predominantly male. The language representation of the sample also corresponds to the demographics of the area, with 72.51% of the respondents reporting either Afrikaans or English as their home language irrespective of any racial category, and 25.10% of the respondents reporting Sotho, Zulu or Xhosa (African languages) as their first language. The participants also represented the different job levels, with 43.43% from a non-supervisory (employee) level, 29.48% from the supervisor level, 14.34% from middle management level, and 4.78% 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 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 and an acceptable mean inter-item correlation of 0.22 (Clark & Watson 1995).

A questionnaire was used to measure the biographical variables included in this study.

Statistical analysis

The statistical analysis was carried out with the SPSS program (SPSS Inc. 2008). In the first step, means, standard deviations, minimum and maximum values, skewness and kurtosis were determined to describe the data. Structural equation modelling, as implemented in AMOS (Arbuckle 2006), was used to test the factorial models and structural equivalence of the MSQ by using the maximum likelihood analyses. One- and two-factor models were considered. The following indexes produced by AMOS were used in this study: the Chi-square statistic, which is the test of absolute fit of the model, the Goodness-of-Fit Index (GFI), the Adjusted Goodness-of-Fit Index (AGFI), the Normed Fit Index (NFI), the Comparative Fit Index (CFI), the Tucker-Lewis Index (TLI) and the Root-Mean-Square Error of Approximation (RMSEA).

The hypothesised relationships between demographic variables and job satisfaction and the differences between the levels of job satisfaction for different demographic groups were tested with multiple regression analyses.

Results

Construct validity of the MSQ

Structural equation modelling (SEM) methods, as implemented by AMOS (Arbuckle 2006), were used to test the factorial model for the MSQ. Before performing SEM, the frequency distribution of the items of the MSQ was checked in order to assess deviations from normality, and multivariate outliers were removed. It was assumed that the χ^2 goodness-of-fit statistics are not likely to be inflated if the skewness and kurtosis for individual items do not exceed the critical values of 2.00 and 7.00 respectively (West, Finch & Curran 1995).

According to Byrne (2001), the primary focus of the estimation process in SEM is to yield parameter values such that the residual between the sample covariance matrix and population covariance matrix implied by the model is minimal. Data analyses proceeded as follows: Firstly, a quick overview of model fit was done by looking at the overall χ^2 value together with its degrees of freedom and probability value. Global assessments of model fit were based on several goodness-of-fit statistics (GFI, AGFI, NFI, TLI, CFI and RMSEA). Secondly, given the findings of an ill-fitting initially hypothesised model, analyses proceeded in an exploratory mode. Possible misspecifications, as suggested by the modification indices, were searched for, and a revised, respecified model was fitted to the data.

Hypothesised models

In the hypothesised models, each of the 20 variables loads on only one factor. The indicator variables in the models were treated as continuous variables. Errors of measurement associated with each observed variable are uncorrelated. Latent variables were allowed to correlate. The hypothesised models were as follows:

- Model 1: A one-factor model (consisting of one latent factor, namely Job Satisfaction).
- Model 2: A two-factor model (consisting of two latent factors, namely Extrinsic Job Satisfaction and Intrinsic Job Satisfaction).

Table 2 presents fit statistics for the test of the (unconstrained) models in the Afrikaans/English and African samples.

Table 2: Goodness–of–fit statistics for the hypothesised MSQ models

Model	Description	CMIN	df	CMIN/df	GFI	CFI	NFI	TLI	RMSEA
1	1 factor	1425.08	340	4.19	0.78	0.75	0.70	0.72	0.08
2	2 factors	1228.84	338	3.64	0.81	0.80	0.74	0.77	0.07

Comparison of the fit indices indicates that Model 2 fitted the data better than Model 1. Table 2 shows that a χ^2 value of 1228.84 ($df = 338$) was obtained for Model 2, which was subsequently used as a baseline model to decide whether the model represented a statistically significant improvement. The following change in Chi-square (χ^2) was found: Model 2 and Model 1 ($\chi^2 = 196.24$, $df = 2$, $p < 0.01$). These results show that Model 2 indeed fits the data statistically significantly better than Model 1. The second model hypothesised that the MSQ consists of two factors, namely intrinsic job satisfaction (12 items), and extrinsic job satisfaction (8 items). It was assumed that the errors of items are uncorrelated. The model was over-identified: It had 420 distinct sample moments, 82 distinct parameters to be estimated and 338 degrees of freedom.

The statistically significant χ^2 value of 1228.84 ($df = 338$; $p < 0.01$) revealed a poor overall fit of Model 2. However, both the sensitivity of the likelihood ratio test to sample size and its basis on the central χ^2 distribution, which assumes that the model fits perfectly in the population, have been reported to lead to problems of fit. Jöreskog and Sorbom (1993) point out that the use of χ^2 is based on the assumption that the model holds exactly in the population, which is a stringent assumption. A consequence of this assumption is that models that hold approximately in the population will be rejected in a large sample. Regarding the acceptability of Model 2 from a practical perspective, unacceptable fit is evident from NFI, TLI and CFI values lower than 0.90, while acceptable fit is indicated by an RMSEA value that is lower than 0.08. Table 3 shows the standardised regression coefficients for the two-factor model of the MSQ.

Post hoc analyses

Given the relatively poor fit of the two-factor model, the focus shifted from model testing to model development (exploratory factor analysis). Residual covariances were inspected to identify items that contributed to misfit in the model. A residual is the

Table 3: Standardised regression coefficients of a two-factor model of the MSQ

Item			Estimate (Afrikaans/ English)	Estimate (African)
MSQ16	<---	Intrinsic Job Satisfaction	0.73	0.68
MSQ15	<---	Intrinsic Job Satisfaction	0.77	0.74
MSQ11	<---	Intrinsic Job Satisfaction	0.66	0.69
MSQ10	<---	Intrinsic Job Satisfaction	0.47	0.59
MSQ9	<---	Intrinsic Job Satisfaction	0.59	0.57
MSQ8	<---	Intrinsic Job Satisfaction	0.59	0.54
MSQ7	<---	Intrinsic Job Satisfaction	0.49	0.38
MSQ4	<---	Intrinsic Job Satisfaction	0.52	0.41
MSQ3	<---	Intrinsic Job Satisfaction	0.54	0.58
MSQ2	<---	Intrinsic Job Satisfaction	0.44	0.29
MSQ1	<---	Intrinsic Job Satisfaction	0.47	0.53
MSQ19	<---	Extrinsic Job Satisfaction	0.70	0.58
MSQ14	<---	Extrinsic Job Satisfaction	0.59	0.70
MSQ13	<---	Extrinsic Job Satisfaction	0.53	0.51
MSQ12	<---	Extrinsic Job Satisfaction	0.51	0.70
MSQ6	<---	Extrinsic Job Satisfaction	0.75	0.63
MSQ5	<---	Extrinsic Job Satisfaction	0.75	0.63
MSQ20	<---	Intrinsic Job Satisfaction	0.71	0.65
MSQ18	<---	Extrinsic Job Satisfaction	0.52	0.53
MSQ17	<---	Extrinsic Job Satisfaction	0.71	0.70

difference between the sample matrix and population matrix. Residuals can be standardised to have a mean of zero and a standard deviation of one, making them easier to interpret. Standardised residual covariances larger than absolute value 2 are considered to be suggestive of a lack of fit (Byrne 2001). Three items showed standardised residual covariances higher than the cut-off value, namely item 2 versus item 3 (standardised residual covariances = 3.37 [Afrikaans/English sample] and 3.34 [African sample]), and item 20 versus item 19 (standardised residual covariances = 3.67 [Afrikaans/English sample] and 3.78 [African sample]), and item 16 versus item 15 (standardised residual covariances = 4.55 [Afrikaans/English sample] and

2.21 [African sample]). Model 2 was respecified with these three items removed. This model was labelled Model 3. Table 4 summarises the goodness-of-fit statistics of Model 3.

Table 4: Goodness–of–fit statistics for the hypothesised MSQ models

Model	Description	CMIN	df	CMIN/df	GFI	CFI	NFI	TLI	RMSEA
3	Model without 2 items	631.94	236	2.68	0.88	0.88	0.82	0.86	0.06
4	Model 3 with errors of two item pairs correlated	477.32	232	2.06	0.91	0.92	0.86	0.91	0.04

The fit statistics in Table 4 indicate an improved fit for the respecified model. Although the χ^2 value of 631.94 ($df = 236$; $p < 0.01$) was still high, it was statistically significantly lower than the value for Model 2 ($\chi^2 = 793.14$, $df = 102$, $p < 0.01$). The other fit statistics (CFI < 0.90, GFI < 0.90, NFI < 0.90 and TLI < 0.90) indicated that the model did not fit the data well, while the RMSEA (0.06) indicated a mediocre fit.

Modification indexes (MI) were considered to pinpoint areas of misspecification in the model. The constrained parameter exhibiting the highest degree of misfit lay in the error correlations between two pairs of items of the MSQ, namely items 5 and 6 (MI = 71.58 and MI = 14.47 in the Afrikaans/English and African samples respectively), as well as items 13 and 14 (MI = 71.58 and MI = 14.47 in the Afrikaans/English and African samples respectively). When compared with MI values for all other parameters, it was found that these values were high. Based on the modification index and on theoretical considerations, the error of items 5 and 6, and 13 and 14 were allowed to correlate. This model was labelled Model 4. Table 4 summarises the goodness-of-fit statistics of Model 4.

The fit statistics in Table 4 indicate an improved fit for the respecified model. Although the χ^2 value of 631.94 ($df = 236$; $p < 0.01$) was still high, it was statistically significantly lower than the value for Model 2 ($\chi^2 = 793.14$, $df = 102$, $p < 0.01$). The other fit statistics (CFI < 0.90, GFI < 0.90, NFI < 0.90 and TLI < 0.90) indicated that the model did not fit the data well, while the RMSEA (0.06) indicated a mediocre fit.

The fit statistics in Table 4 indicate an improved fit for Model 4. The χ^2 value of 477.49 ($df = 232$; $p < 0.01$) was still high, but it was statistically significantly lower than the value for Model 3 ($\chi^2 = 154.62$, $df = 4$, $p < 0.01$). The other fit statistics (CFI > 0.90, GFI > 0.90, TLI > 0.90 and RMSEA ≤ 0.05) indicated that the model fit was acceptable. However, the NFI was lower than the cut-off value of 0.90.

Measurement invariance of the MSQ

Measurement invariance of the MSQ was tested using the likelihood ratio test (LRT) (Vandenberg & Lance 2000). The LRT assesses the difference in Chi-square (i.e. χ^2) per degree of freedom between the initially developed model and a more restricted model including equality constraints. A non-significant χ^2 resulting from the LRT indicates that the parameters constrained to equality are not significantly different across groups. All tests of invariance across the samples began with a global test of the equality of their covariance structures (Jöreskog 1971). In testing for these equivalencies, sets of parameters are tested in a logical order and by increasing restrictions in every step. The sets of parameters that are of most interest regarding group variances are: (1) factor loading paths, and (2) factor variances/covariances. The results of the multigroup analyses to assess the factorial invariance of the MSQ for the Afrikaans/English and African samples are reported in Table 5.

Table 5: Measurement invariance of the MSQ

Model	df	χ^2	p	NFI	IFI	TLI
Measurement weights	15	23.72	0.07	0.00	.00	–.00
Structural covariances	18	25.44	0.11	0.00	.00	–.00

Table 5 indicates that a χ^2 value of 477.32 ($df = 232$) was obtained for the baseline (unconstrained) model in the Afrikaans/English and African samples. In the first step of the multigroup analysis, the measurement weights of MSQ for the two samples were constrained equally. However, the change in χ^2 was not statistically significant ($\chi^2 = 23.72, df = 15, p > 0.01$). In a subsequent step, the structural covariances were constrained equally between the two samples. No significant changes in χ^2 values were found. This finding confirms the factorial invariance (structural equivalence) of the MSQ for the Afrikaans/English and African samples. Therefore the conclusion can be drawn that the factor structure of the MSQ in the Afrikaans/English sample was equivalent to that of the African sample.

Descriptive statistics

The data were analysed for normality, and the descriptive statistics, alpha coefficients, skewness and kurtosis of the two factors of the MSQ are presented in Table 6.

The normal distribution of the MSQ data is confirmed and presented in Table 6. Both MSQ-scales presented satisfactory levels of internal consistency (Intrinsic Job satisfaction: $\chi = 0.82$; Extrinsic Job Satisfaction: $\chi = 0.84$). Both Cronbach's alphas

Table 6: Descriptive statistics of the MSQ

	Valid N	Mean	SD	Min	Max	Skewness	Kurtosis	α
MSQ_Intrinsic	563	3.83	0.57	1.00	5.00	−0.95	2.63	0.82
MSQ_Extrinsic	563	3.03	0.75	1,00	5.00	−0.60	0.30	0.84

are larger than the recommended cut-off point ($\chi > 0.70$) (Nunnally & Bernstein 1994), confirming the reliability of the two MSQ factors. The correlation between Intrinsic and Extrinsic Job Satisfaction is statistically significant ($r = 0.68, p < 0.01$).

Standard multiple regression analysis was used to investigate whether demographic variables predict intrinsic and extrinsic job satisfaction. The results of standard multiple regression analyses with demographic variables as independent variables and Intrinsic and Extrinsic Job Satisfaction (as measured by the MSQ) as dependent variables are reported in Table 7.

Table 7 shows that demographic variables (age, qualification, tenure, job level, gender and language) statistically significantly predict extrinsic job satisfaction, as measured by the MSQ ($F = 3.63, p < 0.01, R^2 = 0.05$). Only one variable, namely language, contributes statistically significantly to extrinsic job satisfaction ($\beta = $ -0.14, $p < 0.01$). Subsequent analyses showed that the Afrikaans/English sample scored higher on extrinsic job satisfaction (Mean $= 3.36, SD = 0.73$) compared with the African sample (Mean $= 3.12, SD = 0.78$). However, the difference between the two samples is of small practical significance ($d = 0.31$) (Steyn 1999).

Furthermore, demographic variables statistically significantly predict intrinsic job satisfaction, as measured by the MSQ ($F = 4.55, p < 0.01, R^2 = 0.06$). Two variables, namely age ($\beta = 0.16, p < 0.01$) and qualification ($\beta = 0.15, p < 0.01$), contribute statistically significantly to intrinsic job satisfaction ($\beta = $ -0.14, $p < 0.01$). Subsequent analyses showed that employees in the age group < 30 experienced statistically significantly ($p < 0.01$) less intrinsic job satisfaction (Mean $= 3.70, SD = 0.59$) than the age group > 50 (Mean $= 3.93, SD = 0.56$). The difference between the two age groups was also of small practical significance ($d = 0.39$) (Steyn 1999). However, one-way analysis of variance (ANOVA) showed that the intrinsic job satisfaction of employees with different qualifications did not differ statistically significantly.

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,

Table 7: Multiple regression analyses with job satisfaction as dependent variable and demographic factors as independent variables

Variable	Unstandardised Coefficients		Standardised Coefficient	t	p	F	R²	R
	B	SE	Beta					
Extrinsic Job Satisfaction						3.63*	0.05	0.22
(Constant)	3.45	0.24		14.45	0.000			
Age	0.11	0.05	0.13	2.11	0.035			
Qualification	–0.01	0.05	–0.01	–0.19	0.849			
Tenure	–0.06	0.05	–0.08	–1.20	0.231			
Job level	0.10	0.05	0.11	1.86	0.064			
Gender	–0.09	0.08	–0.06	–1.12	0.264			
Language	–0.25	0.09	–0.14	–2.85	0.005*			
Intrinsic Job Satisfaction						4.55*	0.06	0.24
(Constant)	3.68	0.17		21.48	0.000			
Age	0.09	0.04	0.16	2.50	0.013*			
Qualification	0.09	0.03	0.15	2.69	0.007*			
Tenure	0.00	0.04	0.00	0.04	0.966			
Job level	0.01	0.04	0.01	0.18	0.856			
Gender	–0.06	0.06	–0.06	–1.06	0.289			
Language	–0.11	0.06	–0.08	–1.75	0.081			

* $p < 0.01$ statistically significant

and to investigate whether the self-reported levels of job satisfaction for employees in a chemical factory environment differ between demographic groups based on gender, language, age, qualification, tenure and job level. The results showed that job satisfaction consists of two factors, namely extrinsic and intrinsic job satisfaction. The MSQ showed factorial invariance for Afrikaans/English and African language groups in the chemical factory.

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), with sufficient internal consistency. Based on conceptual grounds, three items (item 2, 16, and 20) were removed from the analyses because of their high standardised residual covariances with other items. This resulted in a 17-item

scale, with eight items measuring extrinsic job satisfaction and nine items measuring intrinsic job satisfaction.

Item 20 ('The feeling of accomplishment I get from my job') showed a high standardised residual covariance relative to item 19 ('The praise I get for doing a good job'). Item 20 loaded on intrinsic job satisfaction, while item 19 loaded on extrinsic job satisfaction. A possible reason for the high standardised residual covariance between the items is that personal accomplishment could have been seen as related to praise received for good work. The high standardised residual covariance between item 15 ('The freedom to use my own judgement') and item 16 ('The chance to try my own methods of doing the job') can be explained by the similarity of the two items (at least from the perspective of the employees who responded to the questionnaire). Items 16 and 20 were also found to be problematic in a previous study (Buitendach & Rothmann 2009). It is not clear why a high standardised residual covariance between item 2 ('The chance to work alone on the job') and item 3 ('The chance to do different things from time to time') existed. However, it is possible that employees associated the chance to do different things with the chance to work alone.

The error terms of two item pairs had to be correlated to improve the fit of the MSQ model with the empirical data. The errors of item 5 ('The way my boss handles his/her workers') and item 6 ('The competence of my supervisor in making decisions') as well as item 13 ('My pay and the amount of the work I do') and item 14 ('The chances for advancement on this job') were correlated. In general, the specification of correlated error terms for the purpose of achieving a better-fitting model is not an acceptable practice. Correlated error terms in measurement models represent systematic, rather than random, measurement error in item responses. They may derive from characteristics specific either to the items or the respondents (Aish & Jöreskog 1990). For example, if these parameters reflect item characteristics, they may represent a small omitted factor. However, as may be the case in this instance, correlated errors may represent respondent characteristics that reflect bias such as social desirability (Aish & Jöreskog 1990), as well as a high degree of overlap in item content (Byrne 2001).

The factorial invariance (construct equivalence) of the MSQ for different language groups for Afrikaans/English and African language speakers in the chemical factory was confirmed (which provides evidence for hypothesis 2). Therefore, it seems that it is justified to use the MSQ to measure the job satisfaction of employees in these language groups in the chemical factory.

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 that contributed significantly to

extrinsic job satisfaction. Demographic variables explained only 5% of the variance in extrinsic job satisfaction. The results showed that only language was a statistically significant predictor of extrinsic job satisfaction, and although the effect size was small, Afrikaans/English speakers experienced higher extrinsic job satisfaction than African language speakers. The posited difference between the self-reported levels of job satisfaction reported by African and Afrikaans/English-speaking groups (hypothesis 3) was confirmed.

Demographic factors explained 6% of the variance in intrinsic job satisfaction. However, only age and qualification were statistically significant predictors of intrinsic job satisfaction. Although the effect sizes were again small, the results showed that intrinsic job satisfaction is positively related to age and the level of an employee's qualification. Older people with higher qualifications were more intrinsically satisfied with their jobs than younger people with lower qualifications. As posited in hypothesis 3, intrinsic job satisfaction was found to increase with age. Clark et al. (1996) provide a possible explanation describing the effect of age on intrinsic 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 intrinsic job satisfaction among them.

Qualifications and job satisfaction are generally reported to correlate positively (Clark 1996) and are mirrored in this study. The results in this study confirmed increasingly higher levels of intrinsic job satisfaction with consecutive higher levels of qualifications. 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 individuals with postgraduate qualifications could therefore be indicative of 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.

Statistically, the level of self-reported job satisfaction for men and women did not differ significantly, and the results found by Sloane and Williams (2000) and Souza-Poza and Souza-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 those of men. This can possibly be attributed to women in the sample being younger and more highly qualified professionals, and because they probably experience equal opportunities in the workplace (Clark 1996). Job level did not statistically significantly predict job satisfaction in this study.

Intrinsic job satisfaction in this study was higher than extrinsic job satisfaction. 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 them rather than extrinsic factors (for example, working conditions, compensation, co-workers). Intrinsic satisfaction as it relates to the work itself – in terms of content, variety and autonomy – 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 a better understanding of job satisfaction in the chemical factory environment, but it had some limitations. The first limitation was the restricted sampling, as was evident from the number of participants represented in the different demographic groups. Secondly, the limited focus on a single primary geographical area could limit 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, which has become multicultural and where integration has probably taken effect as much as it ever will, the question was to establish the level of satisfaction with their jobs among people working in that environment. Opportunities for all are better than ever before, and discrimination is presumably at an all time low. Although differences regarding their levels of job satisfaction were found between some demographic groups, the effect of demographic factors (including gender, language, tenure, age and qualification) was relatively small. In the literature, the similarity between the levels of job satisfaction – for gender groups, for example – is attributed to the rather positive experience among women of the improved and perceived equal opportunities in the workplace. This experience may, however, be temporary, as it is posited by Souza-Poza and Souza-Poza (2000) 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 anticipation of a 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 better job satisfaction.

This study indicated differences between some of the demographic groups, yet the sample size for sub-groups should be larger. The two-factor structure of job satisfaction was confirmed. Job satisfaction should be studied further in the chemical

factory environment using a longitudinal study approach. Work-related variables should be included, for example sick leave, absenteeism, intention to quit, generation groups, personality and urbanisation in order to reach a deeper understanding of the antecedents of job satisfaction.

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