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A CONFIRMATORY FACTOR ANALYTIC STUDY OF THE WORK DOMAIN SATISFACTION SCALE IN ZAMBIA

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Abstract

This study aimed at investigating the psychometric properties of the Work Domain Satisfaction Scale (WDSS) on a Zambian sample. Work attitudes are important predictors of employee effectiveness on the job (Randhawa, 2013). A psychometrically sound instrument that evaluates cognitive appraisal of employee wellbeing is therefore required to detect employee's level of work domain satisfaction. A non-probability sample consisting of 209 government employees working in Zambia was studied. The WDSS was used to measure work domain satisfaction, and its reliability was evaluated using SPSS, while construct validity was assessed through confirmatory factory analyses in the Linear Structural Relations (LISREL) programme. Reasonable fit with the data was found for the measurement model through confirmatory factor analyses. The study demonstrated evidence of construct validity for the usage of the WDSS in the Zambian context. By confirming the psychometric properties of the WDSS the study promotes the usage of reliable and valid instruments in Zambia.

Keywords: *work domain satisfaction, confirmatory factor analysis*

1. INTRODUCTION

Work is central to people's lives in that it provides the economic basis of our lifestyles, defines and shapes our self-concept and also affects our well-being (Blustein, 2008; Greenberg & Baron, 2003). Work is an important life domain that has an impact on one's overall well-being (Vallerand, 1997). According to Kahneman (2006) work is the life domain in which employees report the lowest levels of well-being. Given this importance, it is therefore essential that organisations have an understanding on how work influences wellbeing. Although literature abounds with instruments measuring job satisfaction yet none of these instruments

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measures employees' cognitive evaluations of how their work brings them well-being. One such a scale is the work domain satisfaction scale which measures work domain satisfaction and captures employee cognitive appraisals wellbeing with work related activities. The job satisfaction instruments on the other hand measures wellbeing within a job.

The WDSS thus holds potential to be used in Zambia as a predictor of employee wellbeing. To justify the use of the WDSS in Zambia, however requires that predictive validity of the criterion-referenced inferences be empirically demonstrated. This requires more than merely demonstrating a correlation relationship between the WDSS and wellbeing. To convincingly demonstrate that the derivations of inferences on a specific criterion construct are justifiable the construct validity and the predictor measures as well as the construct validity of the criterion measures have to be demonstrated (Binning & Barrett, 1989). To the researcher's knowledge, there's been no study done to validate the construct-referenced inferences derived from the dimension scores obtained on the WDSS on a Zambian sample. It was considered important that the validation of the construct-referenced inferences derived from the dimension scores obtained on the WDSS precedes its use in applied and research settings and precedes the validation of the criterion-referenced inferences derived from the dimension scores obtained on the WDSS. The main research question of the study was thus, is the Work Domain Satisfaction Scale (WDSS) a reliable and constructs valid measure of the perceived work domain satisfaction construct as constitutively defined in Zambia.

1.1 RESEARCH-INITIATING QUESTION

The research-initiating question setting the current research study in motion consequently was the two-pronged question:

- What is the connotative meaning of the perceived work domain satisfaction construct?
- Does the WDSS provide reliable and construct valid measures of the perceived work domain construct as constitutively defined?

2. OBJECTIVE AND HYPOTHESES

2.1. OBJECTIVE

The main objective of the study was to empirically evaluate the reliability and construct validity of the work domain satisfaction Scale (WDSS) adapted by Berube, Donia, Gagne & Houlfort (2016), from the Satisfaction with Life Scale developed by Diener, Emmons, Larsen, and Griffin's (1985) on the Zambian Sample. Specific operational objectives were:

- To explicate the constitutive definition of the perceived work domain satisfaction construct that clarifies the connotative meaning of the construct;
- To confirm the reliability of the Work Domain Satisfaction Scale by computing the Cronbach's alpha reliability coefficient;
- To evaluate the construct validity of the Work Domain Satisfaction Scale by testing the measurement model goodness of fit using the confirmatory factor analyses;
- To confirm discriminant validity of the Work Domain Satisfaction Scale.

2.2. HYPOTHESES

The overarching substantive research hypothesis is that the WDSS provides a construct valid and reliable measure of satisfaction with work as defined by the instrument among government employees in Zambia. The overarching substantive research hypothesis can be dissected into the following specific operational hypotheses:

- The construct -referenced inferences on Zambian employee's standing on the satisfaction with work-dimensional construct, derived from the WDSS, could be considered valid (i.e. permissible) if: The measurement model implied by the scoring key and the design intention on the manner in which the WDSS items should reflect the latent dimensions of the work domain satisfaction construct shows close (or at least reasonable) fit;
- The unstandardised factor loadings λ_{ij} are statistically significant ($p < .05$);
- The completely standardised factor loadings are large ($\lambda_{ij} \geq .50$);
- The unstandardised measurement error variances $\theta_{\delta ii}$ are statistically significant ($p < .05$);
- The completely standardised measurement error variances are small ($\theta_{\delta ii} \leq .75$);
- The inter-latent dimensions correlate ϕ_{kj} statistically significantly ($p < .05$) but low with each other.

3. METHOD

3.1. PARTICIPANTS

The research sample consisted of 209 adult employees of whom 96 were male, 110 female, and 3 falling in the other category. They were aged between 18 and 40

years and above. Majority of participants are degree holders and with most in middle management.

3.2. INSTRUMENTS

Data was collected using the 5 item Work Domain Satisfaction Scale. The WDSS is a five items questionnaire that evaluates cognitive appraisal of a person's work situation or a person's well-being in the work context on a seven point Likert scale (Berube et al., 2016). The scale has acceptable reliability coefficients of between .73 to .87 (Berube et al., 2016).

3.3. PROCEDURE

Research subjects were invited to participate through convenience sampling. All the recruited participants completed an online survey taking no more than 10 minutes. The purpose of the research was explained to the Participants with anonymity of participants carefully protected.

3.4. RESEARCH DESIGN

Structural equation modelling (SEM) was used to achieve the objectives set out for this study. A quantitative ex post facto correlational design was used to achieve the research objectives.

3.4.1 STATISTICAL ANALYSIS

The success with which the indicator variables comprising the latent variables were evaluated empirically via item analysis, exploratory factor analysis (EFA) and confirmatory factor analysis. Item analysis was done using the statistical package of the social sciences (SPSS 25.0) to evaluate the internal consistency of the work domain satisfaction scale by means of the Cronbach's alpha coefficients (α). Item analysis assesses the consistency between items in (Van der Bank, 2007). Good items will have high internal consistency and weak items will be inconsistent with the rest of the items (Chikampa, 2013). Exploratory factor analysis (EFA) was used to examine the uni-dimensionality assumption with regards to the satisfaction with work scale. In particular, the principal-axis factoring extraction method with the direct oblimin-rotated solution was used in SPSS 25.0. The cut-off point for substantial factor loadings was loadings ≥ 0.40 (Hinkin, 1998).

3.4.2 EVALUATION OF THE FIRST ORDER WDSS MODEL

Data was also analysed with confirmatory factor analysis (CFA) and structural equation modelling in Lisrel 8.80 (Jöreskog & Sörbom, 2006).

An assessment of model fit was based on various goodness fit indices (Bollen, 1989), such as the root mean square error of approximation (RMSEA), root mean squared residual (RMR), standardised root mean square residual (SRMR) goodness-of-fit index (GFI), adjusted GFI, normed fit index (NFI), non-normed Fit Index (NNFI), comparative fit index (CFI), incremental fit index (IFI), and relative fit index (RFI).

The root mean square error of approximation (RMSEA) focuses on the discrepancy between the observed population covariance matrix and the estimated population covariance matrix implied by the model per degree of freedom (Diamantopoulos & Siguaw, 2000). Values under .05 are indications of good model fit, those above .05 but less than .08 indicate reasonable fit, values greater than .08 but smaller than .10 indicate a mediocre model fit and those above .10 indicate poor fit(Browne & Cudeck,1993;Diamantopoulos & Siguaw,2000).

The root mean square residual (RMR) is a summary measure of fitted residuals and represents the average value of the residual matrix while the SRMR represents the fitted residual divided by their estimated standard errors **(**Diamantopoulos & Siguaw, 2000). Values less than .05 on the latter index are regarded as indicative of a model that fits the data well.

The goodness of fit index (GFI) is an indication of the relative amount of variance and covariances explained by the model (Diamantopoulos & Siguaw, 2000). Values of the GFI should range between 0 and 1, with values greater than .90 indicating that the model fits the data well (Diamantopoulos & Siguaw, 2000).

The normed fit index (NFI) represents the portion of total covariance among observed variables explained by a target model when using the null model as a baseline model (Hoyle, 1995). The Non-normed fit index (NNFI) uses a similar logic as the NFI but adjust the normed fit index for the number of degrees of freedom in the model (Kelloway,1998). The two measures should range between 0 and 1. Values greater than .90 are interpreted as reflecting acceptable fit (Diamantopoulos & Siguaw, 2000).

For model comparative assessment purpose the Incremental fit index (IFI), the comparative fit index (CFI) and the RFI are recommended (Diamantopoulos & Siguaw, 2000; Schumacher & Lomax, 2004; Balogun, Mahembe & Allen IIe, 2020).

4. RESULTS

4.1 MISSING VALUES

Multiple imputation was used as the method to solve the problem of missing values. Treating missing values is the process of dealing with data sets with incomplete responses. The multiple imputation method conducts several imputations for each missing value (Du Toit & Du Toit, 2001; Jöreskog & Sörbom, 1996; Raghunatha & Schafer as cited in Dunbar-Isaacson, 2006). The use of this method resulted in an effective sample size of 209 cases.

4.2 RELIABILITY ANALYSIS

Reliability coefficient was calculated using SPSS (Version 25). The work domain satisfaction scale obtained a cronbach alpha of .74. The scale reliability analysis results can generally be considered satisfactory. The scale meets the benchmark reliability standard of greater than 0.70(Nunnally & Berstein, 1994; Pallant, 2010).

4.3 EXPLORATORY FACTOR ANALYSIS

Exploratory factor analysis (EFA) was used to investigate the uni-dimensionality assumption with regards to each of the three scales.

The scale was found to be uni-dimensional. The items comprising the scale all reflect a single underlying factor. All factor loadings were acceptable (> 0.50) and variance explained was satisfactory (> 40%). The Scale obtained an adequate Kaiser-Meyer-Olkin (KMO) value of .734. According to Tabachinick and Fidel (2007) when the KMO approaches unity, or at achieves a value bigger than .60 the correlational matrix is deemed factor analysable.

4.4 MULTIVARIATE NORMALITY

Robust maximum likelihood (RML) estimation method was performed to normalise the data.

4.5 CONFIRMATORY FACTOR ANALYSIS

The completely standardised solution for the WDSS measurement model is shown in Figure 1. The goodness of fit statistics for the measurement model are presented in Table 1. The RMSEA value of 0.157 indicates poor model fit in the sample (Diamantopoulos & Siguaw, 2000).

Although the RMSEA is currently one of the most popular measures of goodness of model fit within structural equation modelling (SEM), yet RMSEA performs poorly in models with small degrees of freedom (Kenny, Kaniskan & McCoach,2015). In this study there were 5 degrees of freedom. When the cut off

values are used to assess the fit of models with small degree of freedom and small sample size, the RMSEA too often falsely indicates a poor fitting model (Kenny et al., 2015). Since the usage of RMSEA when assessing model fit in models with small degree of freedom is problematic and potentially misleading, it is advisable to consider other model fit indices (Macculum, 1990; Kenny et al., 2015). In this study a number of indices of comparative fit were considered.

Results of the incremental fit measures indicate that the model achieved NFI (0.90), NNFI(0.829) , CFI(0.915), IFI(0.916), and the RFI (0.803) indices closer and exceeding .90 which represent reasonable fit(Diamantopoulos & Siguaw, 2000; Kelloway, 1998). The GFI value of 0.932 meets the acceptable.90 levels. However In terms of the SRMR, the model missed the accepted 0.05 cut-off level. An overall evaluation of the fit indices is generally within acceptable fit cut off levels.

The test of close fit indicates that the probability of observing the sample RMSEA estimate under the null hypothesis of close fit in the parameter (H_0: RMSEA ≤.05) was sufficiently small ($p < .05$) to reject the assumption of close fit in the parameter.

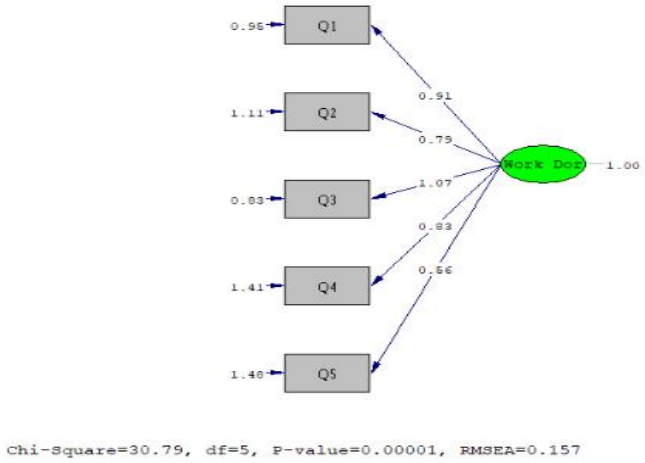

Figure 1. Path diagram of the fitted WDSS measurement model (completely standardised solution)

Table 1-Goodness of fit indices for the WDSS (5item) measurement model

Model	P_close fit	RMSEA	SRMR	GFI	NFI	NNFI	CFI	IFI
Measurement	.001*	.157	0.0689	.932	0.901	0.829	0.915	0.916

* $p < .05$

The completely standardised statistical significance factor loading for the items contained in the overall measurement model are shown in table 2 and are generally satisfactorily large >.50 (Hair, Black, Babin, & Anderson, 2010), except for item 5 with a relatively low loading (0.417) on its hypothesised latent factor. As is evident, all items were reasonable indicators of their respective latent factors.

Table 2-Completely standardised lambda-X factor loading matrix of the WDSS measurement model.

	W_Domain
Q1	.684
Q2	.600
Q3	.761
Q4	.574
Q5	.417

Note: W_Domain refers to work domain satisfaction scale.

The completely standardised measurement error variances are shown in Table 3. All the measurement error variances are satisfactorily small (≤.75) except for item 5.

Table 3-Completely standardised measurement error variances

Q1	Q2	Q3	Q4	Q5
0.533	.640	.421	.671	.826

The squared multiple correlations are shown in Table 4. The R^2 values in Table 4 are the sum of the squared completely standardised factor loadings for each item as shown in Table 2. Table 4 echoes the fact that the WDSS items generally were quite.

Table 4-Squared multiple correlations for the items of the WDSS

Q1	Q2	Q3	Q4	Q5
.467	.360	.579	.329	.174

In terms of the dissected overarching substantive research hypothesis, the WDSS to a limited degree met this evidentiary burden but failed to do so in an unqualified manner. The measurement error variances $\theta_{\delta ii}$ were statistically insignificant ($p > .05$).

4.6 DISCRIMINANT VALIDITY

An examination of the phi matrix of the WDSS measurement model revealed that there was no need of testing for discriminant validity since the instrument only measures one latent dimension. In Berube et al., (2016) the work domain satisfaction is a related but distinct construct from general life satisfaction and job satisfaction.

5. CONCLUSIONS

The primary goal of the present study was to ascertain the reliability and construct validity of the WDSS on a Zambian sample. The scale recorded high reliability coefficient above the .70 threshold (Nunnally & Bernstein, 1994). This is in tandem with the reliability coefficients obtained by Berube et al., (2016) which were all above .70. The WDSS was found to be uni-dimensional and accounted for more than 49% of the variance. The measurement model showed reasonable model fit to the data on account of the goodness fit statistics although it can be conclusively said that limited support for the construct validity of the WDSS was obtained.

The current study makes a significant contribution to industrial psychology as well as human resource literature by providing empirical evidence on the psychometric property of the WDSS on the Zambian sample.

Small sample size could have had a huge effect on the result. Future studies should replicate the study using bigger and culturally diverse samples. Future studies should avoid using an ex post facto research design and a non-probability procedure since it is difficult to generalize the results. Conclusive research on the reliability and construct validity of the WDSS is required since the study provided limited evidence of construct validity. Future studies should also determine the measurement equivalence and measurement invariance of the WDSS across different Zambian cultural groups.

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