The Portability of American Job Involvement and Job Satisfaction Scales to Non-English Speaking South Africans

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ABSTRACT

The scales discussed in Boshoff and Hoole (above) were applied to a sample of non-English mother tongue speakers in South Africa to test their "portability" between America and South Africa. Where more than one possible structure was obtained, they were compared by means of confirmatory factor analysis. To reduce error variance and improve goodness of fit indices, items were aggregated by taking the mean of random item clusters, and the confirmatory factor analyses repeated. The best fit solution for each of the scales was identified and discussed. Indications are that both the Minnesota Satisfaction Questionnaire and the Kanungo Job Involvement Scale can be used with confidence in South Africa, even on respondents who are not home language English speakers.

INTRODUCTION

It is not uncommon for a researcher to use a scale developed in one country to gather data in another, on the assumption that the scale would be measuring the same construct in its new area of application. Edwards & Leger (1995) list various studies in which this has been done by researchers in Africa. The term "portability" has been applied to this aspect of construct validity, and was introduced into the South African literature by Boshoff, Julyan and Botes

(1996) in their study of the Kanungo Job Involvement Questionnaire and the Minnesota Satisfaction Questionnaire (MSQ) from this perspective.

However, concerns have been expressed as to whether instruments developed in one cultural setting would be appropriate when used in another (Anastasi, 1982; Berry, Poortinga, Segall & Dasen, 1992; Bhagat & McQuaid, 1982; Bhagat, Kedia, Crawford & Kaplan, 1990; Retief, 1988; Taylor, 1987; Triandis, 1972). Retief (1988) suggests a three-part framework (comparability and equivalence, translation of meaning, and bias) to describe the pitfalls that exist when applying tests across cultures. In an attempt to address these concerns, the International Test Commission (1994) has developed guidelines to be followed when using psychological instruments in cross-cultural studies.

At least two studies performed in this country, albeit involving different scales, have shown that different psychometric patterns sometimes occur when scales developed for one language group are applied to another (Edwards & Riordan, 1994; Edwards & Leger, 1995).

A major problem in the cross-cultural use of psychometric instruments appears to lie in the systems used to attribute meaning to events in different cultures (Poortinga, 1983; Retief, 1992).

Berry & Triandis (1980) and Berry & Lonner (1986) state that for scale scores obtained from different cultures to be comparable, the instrument used must show three types of equivalence: *functional*, ie the behaviour referred to should have a similar function in each culture; *conceptual*, an item should have the same meaning to members of both cultures, and *metric*, the scale used should have the same psychometric properties in both the cultural groups concerned.

This paper investigates the *metric* equivalence of the two scales being studied.

In a study which also focuses on the metric equivalence of these same two scales, Boshoff et al. (1996) used exploratory and confirmatory factor analyses to examine the structures produced for the scales on a South African sample which consisted of white collar professionals. They found the nine items which they retained from the Kanungo scale to measure one confirmed factor which accounted for 44.1% of the variance. The scale had an Alpha of .83. They also found the MSQ to be essentially unidimensional. One factor explained 36.3% of the variance and the scale alpha was .90. They concluded that both scales were robust as far as portability between the United States and South Africa is concerned.

In this study, the portability of these two instruments was again examined, on a South African sample that differed in an important way from that used in the study of Boshoff and his colleagues: scales were applied to respondents who did not have English as their mother tongue

METHOD

Instruments

The instruments used in this study were again the two scales used in the previous study, ie the MSQ and Kanungo's Job Involvement scale.

MSQ

Median reliabilities of .90 have been reported for the short, 20 item form of the Minnesota Satisfaction Questionnaire (Weiss, Dawis, England and Lofquist, 1967). The MSQ measures job satisfaction in two dimensions, extrinsic and intrinsic, with 10 items for each dimension.   A total satisfaction score is also provided by the responses to all 20 items. All items are positively worded.

Kanungo's Job Involvement Scale

The Kanungo (1982) job involvement scale contains 10 items and has developed as an improvement on the previously widely used measure of Lodahl and Kejner (1965), measuring job involvement as a unidimensional construct (Boshoff, Bennett & Kellerman, 1994). Kanungo reported an Alpha coefficient of .83 for the scale. Two items are negatively phrased and have to be reverse scored.

Sample

The sample for this study was obtained from a South African government organization, the Department of Correctional Services.   The sample frame was 540 employees to whom English was a second language.   The two scales used were combined into one questionnaire which was applied by the human resources staff of the client organization.   Completed questionnaires were received from 237 respondents (43.9%).   Non-response was mainly the result of unavailability of respondents on the day that the data gathering had been scheduled.

Four of the respondents were Indian, 97 coloured, and 136 black. All were matriculated (had twelve years of schooling). Males numbered 213 (90%) while 24 (10%) were female. Mean length of service for the sample was 10.01 years, SD = 7.29. Mean age for the Indian respondents was 32.5 years, SD = 10.5; for the coloured respondents, 37.0, SD = 10.3 and for the black respondents 31.5 years, SD = 10.3. The men had an average age of 30.5, SD = 11.1 and the women 33.5, SD = 12.3. Average age for the sample frame was 33 years, SD = 13.7, and age range was 20 to 59 years.

Analyses performed

Program 4M of the BMDP (1990) statistical package was used to factor analyze the data. The extraction method was principal component factor analysis with direct quartamin oblique factor rotation to allow for intercorrelation between factors. Factor loadings greater or equal to .30 were regarded as significant. Both Kaiser's rule, ie factors with eigenvalues greater than one, and scree tests were used to aid in decisions on the optimal number of factors to retain. Items with maximum factor loadings less than .30 were omitted as well as items that loaded significantly on more than one factor. Items were inverted where necessary to ensure that all were scored in the same direction. Cronbach's alpha was used to determine internal consistency. Confirmatory factor analysis, using the EQS computer package (Bentler, 1996) was performed for one-, two- and three-factor solutions for both scales, first for models consisting of the original items, and thereafter for models with aggregated scores. The following fit indices were inspected to determine which model provided the best fit:

(a)   Independence Model Chi-square;

(b)   Model Chi-square;

(c)   Akaike's Information Criterion (AIC);

(d)   Bozdogan's Consistent Version of the AIC (CAIC);

(e)   Bentler-Bonnet Normed Fit Index (BNFI);

(f)   Bentler-Bonnet Nonnormed Fit Index (BNNFI);

(g)   Comparative Fit Index (CFI);

(h)   Residual Normed Index (RNI);

(i)   Robust Comparative Fit Index (RCFI);

(j)   Bollen Fit Index (IFI);

(k)   McDonald Fit Index (MFI);

(l)   Lisrel Fit Index (GFI);

(m)   Lisrel Fit Index (AGFI);

(n)   Root Mean Square Residual (RMR);

(o)   Root Mean Square Error of Approximation (RMSEA);

According to Bentler (1996), Chi-square values are inversely related to model fit. The RMR and RMSEA are also inversely related to model fit. The model that produces the minimum AIC or CAIC may be considered, in the absence of other substantive criteria, to be a potentially useful model. Regarding the fit indices, values greater than .90 are desirable.

RESULTS

MSQ

The indices obtained from the various confirmatory factor analyses conducted on the outcomes of the exploratory factor analyses for the MSQ are shown in Table 1.

Table 1   Indices obtained from confirmatory factor analyses on MSQ

	Model Chi-Square	Independence Model Chi-Square	Akaike's Information Criterion (AIC)	Bozdogan's ConsistentVe rsion of The AIC (CAIC)	Bentler-Bonnett Normed Fit Index (BNFI)	Bentler-Bonnett Nonnormed Fit Index (BNNFI)	Compa-rative Fit Index (CFI)	Residual Normed Index (RNI)
Three-factor solution	203.58	850.97 d/f = 78	75.58	-209.01	.76	.78	.82	.82
Two-factor solution	410.90 d/f=169, p<.00	1574.11 d/f = 190	72.90	-678.60	.74	.80	.83	.82
One-factor solution	503.73 d/f=170, p<.00	1574.11 d/f = 190	163.73	-592.22	.68	.73	.76	.76

Table 1 (continued)

	Robust (RCFI)	**Bollen** (IFI)	**Mc Donald** (MFI)	**Lisrel** (GFI)	**Lisrel (** AGFI)	**Root mean square residual** (RMR)	**Root mean square error of approxi- ation** (RMSEA)
Three- factor solution	.83	.82	.74	.89	.85	.21	.10
Two- factor solution	.85	.83	.59	.85	.81	.09	.08
One- factor solution	.78	.76	.49	.81	.76	.10	.09

Table 2	Sorted rotated factor loadings for best fit, two-factor solution after exploratory factor analysis on MSQ			
	MSQ Item		**Factor 1**	**Factor 2**
17	The working conditions	(E)	.77	
19	The praise I get for doing a good job	(E)	.72	
13	My pay and the amount of work I do	(E)	.71	
18	The way my co-workers get along with each other	(E)	.67	
12	The way company policies are put into practice	(E)	.63	
6	The competence of my supervisor in making decisions	(E)	.63	
16	The chance to try my own methods of doing the job	(I)	.61	
15	The freedom to use my own judgement	(I)	.59	
5	The way my boss handles his workers	(E)	.58	
14	The chances for advancement on this job	(E)	.50	
20	The feeling of accomplishment I get from the job	(I)	.42	
9	The chance to do things for other people	(I)		.78
4	The chance to be "somebody" in the community	(I)		.61
8	The way my job provides for steady employment	(I)		.60
3	The chance to do different things from time to time	(I)		.58
10	The chance to tell people what to do	(I)		.57
11	The chance to do something that makes use of my abilities	(I)		.54
2	The chance to work alone on the job	(I)		.42
7	Being able to do things that don't go against my conscience	(I)		.41
1	Being able to keep busy all the time	(I)		.37
	% Common variance		77.57	22.43
	% Total variance		31.51	9.11
	% Total variance explained			40.62

E : **Item measures extrinsic job satisfaction**

I : **Item measures intrinsic job satisfaction**

Confirmatory factor analyses were then performed to compare the degrees of fit produced for these aggregated structures. Results appear in Table 3.

Table 3 shows that the three-factor solution can be discarded as it performs significantly worse than the one- and two-factor solutions. Its model chi-square is significant. All its fit indices are unacceptably low, well below those of the other solutions.

The two-factor solution appears to be better than the one-factor solution: it does better on the model chi-square, AIC and CAIC whilst all the other fit indices are identical to those for the one-factor solution. For both two- and one-factor solutions model chi-square probabilities are not significant, which indicates a non-significant deviation from the postulated factor model.

In the two-factor solution, the two factors explain 71.58% of total variance, Factor 1 explaining 55.72% and Factor 2, 15.86%. Factor 1 explains 77.84% of common variance, and Factor 2 22.16%. The factors correlate .55. Cronbach's Alpha for Factor 1 is .86, and for Factor 2, .73.

To summarize: the two-factor solution for the MSQ is preferred in both the non-aggregated and the aggregated analyses. In the non-aggregated analysis, the two factors explain 40.62% of total variance. Factor 1 accounts for 31.51% of total and 77.57% of common variance. Factor 2 explains 9.11% of total and 22.43% of common variance. The Cronbach's Alphas are .87 for Factor 1 and .75 for Factor 2. The correlation between the factors is .41. In the aggregated analysis, the two factors explain 71.58% of total variance, Factor 1 accounting for 55.72% and Factor 2 for 15.86%. Factor 1 explains 77.84% and Factor 2, 22.16% of common variance. The factors correlate .55. Cronbach's Alphas are .86 for Factor 1 and .73 for Factor 2.

Table 3   Indices obtained from confirmatory factor analyses on aggregated scales of MSQ

	Model Chi-Square	Independence Model Chi-Square	Akaike's Information Criterion (AIC)	Bozdogan's ConsistentVersion of The AIC (CAIC)	Bentler-Bonnett Normed Fit Index (BNFI)	Bentler-Bonnett Nonnormed Fit Index (BNNFI)	Comparative Fit Index (CFI)	Residual Normed Index (RNI)
Three-factor solution	84.40 d/f=8 p<.00	525.55 d/f = 15	68.40	32.82	.84	.72	.85	.85
Two-factor solution	5.96 d/f=8 p=.65	559.95 d/f = 15	-10.04	-45.62	.99	1.00	1.00	1.00
One-factor solution	4.36 d/f = 5 p=.50	624.15 d/f = 10	-5.64	-27.87	.99	1.00	1.00	1.00

Table 3 (continued)

	Robust (RCFI)	Bollen (IFI)	Mc Donald (MFI)	Lisrel (GFI)	Lisrel (AGFI)	Root mean square residual (RMR)	Root mean square error of approxi- ation (RMSEA)
Three-factor solution	.87	.85	.85	.91	.75	.25	.20
Two-factor solution	1.00	1.00	1.00	.99	.98	.01	.00
One-factor solution	1.00	1.00	1.00	.99	.98	.01	.00

Kanungo's Job Involvement Scale

Exploratory factor analyses were performed on Kanungo's Job Involvement scale producing three-, two- and one-factor solutions. Confirmatory factor analysis was conducted to determine the goodness of fit of the three solutions. Results appear in Table 4.

Table 4   Indices obtained from confirmatory factor analyses on Kanungo

	Model Chi-Square	Independence Model Chi-Square	Akaike's Information Criterion (AIC)	Bozdogan's Consistent Version of The AIC (CAIC)	Bentler-Bonnett Normed Fit Index (BNFI)	Bentler-Bonnett Nonnormed Fit Index (BNNFI)	Comparative Fit Index (CFI)	Residual Normed Index (RNI)
Three-factor solution	35.76 d/f = 8 p < 00	316.83 d/f = 15	19.76	-15.81	.89	.83	.91	.91
Two-factor solution	69.48 d/f = 26 p < 00	619.66 d/f = 36	17.48	-98.14	.89	.90	.93	.92
One-factor solution	63.89 d/f = 20 p < 00	616.79 d/f = 28	23.89	-65.05	.90	.90	.93	.92

Table 4 (continued)

	Robust (RCFI)	Bollen (IFI)	Mc Donald (MFI)	Lisrel (GFI)	Lisrel (AGFI)	Root mean square residual (RMR)	Root mean square error of approxi- ation (RMSEA)
Three- factor solution	.94	.91	.94	.95	.88	.15	.12
Two- factor solution	.95	.93	.91	.93	.88	.07	.09
One- factor solution	.95	.93	.91	.93	.87	.06	.10

Indices obtained from confirmatory factor analyses on Kanungo

Table 4 shows that the three-factor solution has the best score on two of the indices produced by the confirmatory factor analysis (MFI and GFI). The two-factor solution has three bests, AIC, CAIC, and RMSEA. The one-factor solution has two bests (BNFI and RMR). Compared with the two-factor solution, it does better on two indices, poorer on four, and equal on seven.

Its Alpha of .86 is better than those of the two-factor scale which are .84 and .59. It explains 47.95% of variance.

Model chi-squares are all significant, which indicate poor model fit. In order to improve the model fit and to reduce the error variance, the scales were aggregated randomly and confirmatory factor analyses performed for the two- and one-factor solutions. The three-factor solution could not be aggregated due to too few items per factor.

The two-factor configuration consisted of the following clusters: [(8, 5, 9, 6), (4, 1, 10)]; [7, 2], and the one factor configuration [(5, 9) (3, 6) (10, 8) (4, 1)].

Results appear in Table 5.

Table 5 Indices obtained from confirmatory factor analyses on aggregated scales of Kanungo

	Model Chi-Square	Independence Model Chi-Square	Akaike's Information Criterion (AIC)	Bozdogan's Consistent Version of The AIC (CAIC)	Bentler-Bonnett Normed Fit Index (BNFI)	Bentler-Bonnett Nonnormed Fit Index (BNNFI)	Comparative Fit Index (CFI)	Residual Normed Index (RNI)
Three-factor solution	35.76 d/f=8 p<00	19.76 d/f = 15	19.76	-15.81	.89	.83	.91	.91
Two-factor solution	69.48 d/f = 26 p<00	17.48 d/f = 36	17.48	-98.14	.89	.90	.93	.92
One-factor solution	63.89 d/f=20 p<00	23.89 d/f = 28	23.89	-65.05	.90	.90	.93	.92

Table 5 (continued)

	Robust (RCFI)	Bollen (IFI)	Mc Donald (MFI)	Lisrel (GFI)	Lisrel (AGFI)	Root mean square residual (RMR)	Root mean square error of approxi- ation (RMSEA)
Three- factor solution	.94	.91	.94	.95	.88	.15	.12
Two- factor solution	.95	.93	.91	.93	.88	.07	.09
One- factor solution	.95	.93	.91	.93	.87	.06	.10

The one-factor solution for Kanungo produces the best results, having the highest scores on 12 of the confirmatory factor analysis indices. The one factor accounts for 70.01% of total variance , and has an Alpha of .86 compared to .87 and.59 for the two-factor, and .80, .59, and undefined for the three-factor solution.

The one-factor solution retains eight of the original 10 items, only losing both the negatively phrased ones. The one-factor solution is shown in Table 6

Table 6 Sorted rotated factor loadings for best fit, one-factor solution after exploratory factor analysis on Kanungo's JIQ		
Kanungo Item		**Factor 1**
5	Most of my interests are centered around my job	.78
4	I live, eat and breathe my job	.76
6	I have very strong ties with my present job which could be very difficult to break	.73
9	I consider my job to be very central to my existence	.72
10	I like to be absorbed in my job most of the time	.72
8	Most of my personal life goals are job-orientated	.69
3	I am very much involved personally in my job	.56
1	The most important things that happen to me involve my present job	.53
	% Total variance explained	47.95

In sum, in its non-aggregated form, the one-factor solution of the Kanungo scale retained eight items, explaining 47.95% of variance and having an Alpha of .84. When aggregated into scales, the aggregated one-factor solution accounts for 70.01% of variance with an Alpha of .86.

The confirmatory factor analysis indices for the aggregated solution are all better than those for the non-aggregated solution. The non-significant model chi-square statistic is further indication of good model fit.

In the Boshoff *et al.* (1996) study, one of the two negatively phrased items was dropped. The remaining nine items (one more than was retained in this analysis) formed a one-factor solution which had an alpha of .83 and explained 44.1% of total variance, which is slightly less than our result. Their confirmatory factor analysis (on non-aggregated scale) produced fit indices that were good, being in the mid to high nineties, which were even better than those found in this study for the non-aggregated scale.

CONCLUSION

The two scales tested on this sample both retained their structure to a large degree.

The MSQ retained all 20 of its items (in the context of the comment made in the second last paragraph below it is significant to note that all were positively worded originally) in a two-factor configuration that closely replicated the original extrinsic and intrinsic dimensions. Internal consistency was satisfactory. This solution differed from that obtained by Boshoff, *et al.* (1996), who preferred a one-factor solution. While the fit indices produced by the confirmatory factor analysis on the non-aggregated MSQ in this sample were not very good, those obtained from the analysis on aggregated items were high.

Kanungo's Job Involvement Scale retained eight of the original 10 items, losing only the two negatively phrased items. The single factor solution had good internal consistency. Boshoff *et al.* (1996) also found a one-factor solution, retaining nine items, again with good internal consistency.

Boshoff *et al.* (1996) commented on the possible effect of the <u>nature</u> of the foreign sample in the interpretation of (their) portability results. The sample in their study (white, middle and upper middle class professionals) did materially differ from the one used as raison d'etre for this study, who were all non-English mother tongue speakers with a high-school education. Despite this difference, the results obtained for the Kanungo Job Involvement scale were very similar to those of Boshoff et al. They retained one more item, and their fit indices were higher. The structure obtained for the MSQ in this study was different, and the fit indices were again lower - proving their point to some degree.

It is interesting that the two negatively phrased items in the Kanungo scale did not perform well in the item analysis and both were discarded. In the

Boshoff *et al.* (1996) study, one negative item was discarded. This may not be strong evidence, but the comment by Schmitt and Stults (1985) (quoted by Tetrick & Farkas, 1988) reporting a concern about the use of negatively worded items to reduce response tendency does spring to mind.

Despite the fact that the sample on which the MSQ and Kanungo's Job Involvement Scale were applied in this study differed from the one used by Boshoff *et al.* (1996), the conclusion can be made that both scales again performed at least reasonably well and could be considered for further use on non-English speaking groups in South Africa. The MSQ held up very well and could be used with confidence virtually as is. The eight positively worded items of Kanungo's scale would provide a good scale for measuring job involvement.

This study concentrated mainly on the aspect of metric equivalence (Berry & Triandis, 1980; Berry & Lonner, 1986). Poortinga (1983) warns that psychometric analysis is in itself a limited way of investigating equivalence. Bhagat & McQuaid (1982) have questioned whether job satisfaction, the focal area of one of the scales examined in this paper, would hold the same connotation for workers in other countries that it holds in the United States. These aspects have not been adequately dealt with in this paper. The fact that the two scales stood up well psychometrically may in itself suggest that there were no great conceptual differences involved. However, the fact that the patterns obtained did differ to a degree, and that, where used, the reverse scored items had to be discarded does indicate that there may be some differences. Therefore, whether these two scales also have functional and conceptual equivalence still has to be shown.

NOTE

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