Measuring Entrepreneurial Attitudes Inter-culturally — Is it Possible?

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ABSTRACT

Non-portability of constructs is seen as a potential problem in international research. Studying attitudes as an approach to understanding entrepreneurs is seen as potentially profitable in order to understand members of this entrepreneurs. The construct validity of the Entrepreneurial Attitude Orientation Scale (as adapted) when used on a South African sample is psychometrically examined by means of Exploratory and Confirmatory Factor Analysis. It is found that the factor structure differs from that established on a North American sample. Portability of constructs embodied in measuring instruments seems to be a significant problem when research is contemplated on an international scale.

INTRODUCTION

According to a recent review of the literature on the characteristics of entrepreneurs Hoole (1996) indicated that studies in this field had initially dealt with the personality traits and demographic/biographic backgrounds of entrepreneurs. This did not prove to be very fruitful and various other approaches e.g. dealing with the managerial behaviour of entrepreneurs (Lau, 1992), were proposed in order to learn more about entrepreneurs and their functioning. According to Hoole (1996) a further Z (and later) determining the characteristics of entrepreneurs consisted of studying the attitudes of individuals engaged in entrepreneurial activities. An attempt was, for instance, made by Robinson, Stimpson, Huefner and Hunt (1991) to determine whether entrepreneurs and non-entrepreneurs differed in terms of certain attitudes, the argument being that attitudes are "closer" to behaviour than general personality traits and can be changed more readily than more fundamental characteristics - which could be important and useful in terms of the development of entrepreneurs Robinson et al (1991) also argued that certain attitudes i.e. towards achievement, innovation, self-esteem and personal control in business situations

could possibly distinguish entrepreneurs from non-entrepreneurs. The authors developed an instrument i.e. the Entrepreneurial Attitude Orientation Scale (EAOS) to measure these four attitudes (Robinson et al 1991). Validation of the instrument proved that it had adequate construct and discriminatory validity as well as adequate internal consistency when used in the United States of America. The question which will be addressed in this paper is whether it will also have acceptable psychometric qualities when used in another culture, viz in South Africa.

Cross-cultural validity and reliability of measuring instruments are a major problem in international research (Bhagat, Kedia, Crawford & Kaplan, 1990). It seems as if words, phraseology, syntax even when the same language is used e.g. English is used, prove to interpreted differently by respondents from different cultures. Problems in this regard were found with regard to such use of the Robinson et al (1991) EAOS by researchers (Stimpson, Huefner, Narayanan & Shanthakumar 1992; Stimpson, Robinson, Waronusuntikule & Zheng, 1990). Kerlinger (1986) indicates that a fundamental problem in social science research is that agreement on the constructs studied and their contents often does not exist. This makes replication of studies difficult and impedes accumulation of knowledge in a given field.

Under the circumstances it was decided to try to determine the factorial structure of the EAOS and the contents of the hypothesised subscales when the instrument is applied to a South African (i.e. a sample from a culture which probably differs from that of the USA).

METHOD

Respondents

The sample consisted of individuals from three occupational groups. The first group of respondents (N=110) was identified as entrepreneurs. Identification of individuals to be included in this group is described in the "Procedure" subsection. The mean age of the entrepreneur group was 43.8 years (S1) = 8.2, range 27-63 years). Ninety-nine of the members of this group were males and 11 females.

The second occupational group consisted of engineers (N=113). This group had a mean age of 34.7 years (SD - 9.45, Range 21-63 years). Only 12 members of this group were females. To be regarded as an engineer potential respondents had to be

in a position where he/she did not have managerial or supervisory responsibilities, were to be regarded by the employing organisation as having only an engineering role and, lastly, had to regard themselves as full-time professional engineers.

The third group of subjects consisted of individuals (N=76) in managerial positions in organisations. Included in the group were 69 males and seven females. This group had a mean age of 40.5 years (SD = 7.3, range 27-57).

The total group on whose responses the analyses were based had a mean age of 39.5 years (SD = 9.1, range 21-63 years).

Measuring instrument

The respondents completed the EAOS developed by Robinson et al (1991) as added to by Stimpson (1993). Robinson et al (1991) argued that scales to measure attitudes had to be carefully constructed and validated before such scales could be used with confidence to distinguish entrepreneurs from non-entrepreneurs. They used four constructs which, according to a literature survey, were associated with entrepreneurial behaviour. These constructs were: Economic innovation, achievement, locus of control and self-esteem. These constructs were used as the basis of a factor analytically developed scale, the EAOS, which contained four subscales i.e. attitudes towards innovation, achievement, personal control and self-esteem. The four subscales consisted of 25, 23, 12 and 14 items respectively. Stimpson (1993) added a further construct i.e. Machiavellianism to the scale. This subscale contains 14 items. Test-retest reliabilities of the attitudinal subscales are given as Innovation .85; Achievement .76; Personal Control .71; Self-esteem .76. Alpha coefficients were regarded as satisfactory at Innovation .90; Achievement .84; Personal control .70 and Self-esteem .73. (Test-retest reliabilities and Alpha coefficients are not available for the Machiavellianism subscale). Discriminatory validity was investigated by Robinson et al (1991) by comparing, by means of MANOVA, the scores of entrepreneurs and non-entrepreneurs. A significant overall difference was found as well as significant differences in the total score and in the scores for the different subscales. Discriminant validity of the scale was investigated by means of Stepwise Discriminant Analysis. Only Attitude towards achievement did not enter into the model built. Robinson et al (1991) concluded that the scale and subscales seemed to possess satisfactory psychometric qualities when used on North American respondents.

Procedure

An attempt was made to include members of three clearly distinguishable occupations in the sample. To be included as a member of the entrepreneurial group the respondents had to be a manager of a business organisation and/or the owner of the business or had to have started the business he/she was currently engaged in. The business had to be employing between five and 100 employees while the turnover had to be less than R3m per year if in retailing, less than R3m per annum if in the manufacturing sector and below R1m if engaged in the Services area. Total assets (excluding land and buildings) had to be less than R1m. The entrepreneurial group was obtained by scrutinising 502 files of a venture capitalist. Of this group 116 potential respondents were operating in areas where social unrest, violence or crime assumed levels which made it unfeasible to try and obtain data. The level of success of 153 of the businesses could not be ascertained from the files. The survey population therefore consisted of 233 entrepreneurs. A letter (on the letterhead of the authors') university in which the purpose of the study was explained and participation requested was mailed to each of these individuals. Participation was in this way obtained from 41 individuals. Telephonic follow-up elicited promises of participation from 97 additional individuals. Questionnaires were delivered to each of these (N=138) individuals who were willing to participate. One hundred and ten useable questionnaires were returned and included in the analysis. The questionnaires were completed in the presence of a field worker.

The members of the second occupational group were all specialist engineers who, in their own and the view of their employers, did not have managerial responsibilities. The 113 respondents were all from the Gauteng province and were employed by three different organisations in the chemical industry. The questionnaires were completed in the presence of a field worker during an appointment made about a week before.

The respondents (N=76) in the third occupational group were managers who participated in a middle management course at the Graduate School of Management of the University of Pretoria. This group completed the EAOS, scored it themselves and were helped to interpret their scores during an introductory getting-to-know each other sessions of the three courses in which the respondents participated.

Data was analysed by means of the EQS set of programmes developed by Bentler (1995). Exploratory Factor Analysis and Confirmatory Factor Analysis were used

to determine whether the factorial structure identified by Robinson et al (1991) i.e. five factors consisting of 26, 23, 12, 14 and 14 items respectively would be replicated in terms of the responses of the 299 respondents included in the present study.

RESULTS

Exploratory factor analysis was firstly carried out using the factor analysis subroutine in the EQS. In the first round of this analyses an attempt was made to replicate the five factor structure defined by the authors of the EAOS (Robinson, et al, 1991). Extraction of five factors, a scree test (plot of the eigenvalues), and a Direct oblimin rotation were specified. The five highest eigenvalues were respectively, 10.67, 5.11, 3.97, 2.90 and 2.67. The sixth eigenvalue was 2.18.

In terms of the eigenvalues it is clear that a five factor solution seemed feasible - a clear visual break is present between the fifth and sixth factors. The eigenvalue of the sixth factor is not as clearly different from that of the seventh factor.

When five factors are extracted 58 items had factor loadings > .30 or higher on factor and did not load .30 or higher on more than one factor. A total of 31 items were therefore eliminated from further analyses. Of the items eliminated 7 were seen by the developers of the instrument to as belonging to the subscale Attitude to Innovation with respectively .8, 4, 3, and 9 originally seen as part of, respectively, the subscales Attitude towards Achievement, Self-esteem, Personal Control and finally Machiavellianism.

The 58 remaining items were subjected to a further round of exploratory factor analysis with five factors again specified. Five eigenvalues of >2 were obtained, the highest being 7.49 and the fifth highest 2.031. Using the same decision rules as before another six items were eliminated from further analyses. These items were, respectively, part of the subscales Attitude to Innovation (three items), Achievement (one item), Personal Control (two items). This process of exploratory factor analysis was repeated. In the next (third) round the five highest eigen-values varied between 6.888 and 1.909. Of the 52 items included in this analysis three did not meet the requirements (as stated before) for inclusion in further analyses and were therefore eliminated from the nest round of exploratory factor analysis. The items eliminated were originally part of the subscales Innovation (one) and Achievement (two).

In the fourth round of the exploratory factor analysis only one item (No 77, originally included in the subscale Attitude to Innovation) did not meet the requirements for inclusion in further analyses and was eliminated. Of the original 89 items in the scale 48 therefore loaded .30 or higher on one of the five factors identified without having a cross-loading of .30 or higher on another factor. The five factor structure is shown in Table 1.

Table 1 : Factor pattern obtained from five factor solution (48 items)

ITEM	FACTOR 1	FACTOR 2	FACTOR 3	FACTOR 4	FACTOR 5
V1					0.5387
V2	0.3609				
V3			0.3339		
V4					0.4910
V5					0.3308
V8	0.3543				
V12					0.3359
V13	0.4871				
V15			0.4067		
V16			0.4422		
V18		0.3953			
V21				0.3885	
V23			0.4254		
V28				0.5002	
V29		0.4556			
V31					0.3988
V32	0.4060				
V36				0.4492	
V38			0.3869		
V39	0.4862				
V40	0.3318				
V41			0.4199		
V44			0.4468		
V47	0.5143				
V48			0.4638		
V50		0.3790			
V51		0.4607			
V53		0.3384			

V55					0.4408
V56	0.4356				
V57				0.4475	
V58	0.5265				
V59		0.3626			
V62	0.4420				
V63	0.5088				
V68	0.4652				
V69	0.5367				
V70			0.4284		
V71			0.5621		
V72	0.4416				
V75	0.6267				
V76	0.3869				
V78			0.4835		
V79			0.4429		
V80		0.5536			
V83		0.4031			
V84		0.5236			
V89		0.4917			

Confirmatory Factor Analysis was then carried out on the factor pattern shown in Table 1. The results are shown in Table 2

From Table 2 it can be seen that the factor structure in Table 2 represented a poor fit with the data. The fit indices are low, unacceptably so.

Under these circumstances it decided to investigate the possibility that a four or even five factor model would represent a better fit with the data. The factor pattern shown in Table 2 indicates that only 53.9% (48 out of 89) of the items in the original questionnaire would be retained in the five factor structure presented. The factor pattern did not replicate the one implied in the division of items into factors as proposed by Robinson et al (1991) and Stimpson (1993). the first factor contained loadings > .30 from 12 of the items included in the Attitude to Innovation of the original scale. Two items from, respectively, the Attitude to Achievement and the Attitude to Personal Control subscales in the original questionnaire also loaded significantly on this factor which seems to be identifiable as measuring Attitude to Innovation.

Table 2 : Indices obtained from Confirmatory Factor Analysis carried out on 48 remaining items (Five factor structure)

Index	Value
Independence Model Chi-square (df=1128)	3844.977
Chi-square (df=1069)	1967.227
Independence AIC	1588.977
Model AIC	-170.7728
Independence CAIC	-3713.123
Model CAIC	-5195.547
Bentler-Bonett Normed Fit Index	.488
Bentler-Bonett Non-normed Fit Index	.651
Comparative Fit Index	.669
Bollen (IFI)	.676
McDonald (MFI)	.223
Lisrel GFI	.782
Lisrel AGFI	.760
Root Mean Square Residual RMR	.064
Standardised RMR	.115
Root Mean Square Error of Application (RMSEA)	.053
R.N.I.	.669

The second factor extracted contained five items from the Machiavellianism subscale, three from the Attitude to Self-esteem, one from the Attitude to Achievement and one from Attitude to Personal Control subscales, respectively. This factor is difficult to interpret. It seems to be related to Assertiveness and Autonomy. The third factor identified contained items from originally the Attitudes to Achievement (6), Personal Control (3), Self-Esteem (1) and Innovation (1). This factor was seen as related to the Attitude to Achievement subscale in the EAOS. The fourth and fifth factors were difficult to interpret. Only four items loaded on this factor. These items originally formed part of the Attitude to Self-Esteem (2), Attitude to Personal Control (1) and the Attitude to Achievement (1) subscales in the original questionnaire. It was not seen as a factor which could be interpreted readily. The fifth factor had six items loading on it, two each from the Attitudes to Self-esteem, Achievement and Personal Control subscales. Inspection of the item wording indicated no clear interpretation of the factor.

Under these circumstances it was divided to do further analyses in order to see whether more interpretable factor structures could be obtained. It was also considered possible that more economical structures which would at the same time fit the data better could result from such analyses.

The first part of the further analyses consisted of extracting, through exploratory factor analysis, four instead of five factors. A Scree test and a Direct Oblimin rotation were again specified. The four highest eigenvalues were 10.67, 5.11, 3.97 en 2.90 for the analysis based on the responses on the 89 items. Of these items 34 did not load .30 or higher on one factor without loading at the same level on another factor. Fifty five items therefore "survived" this analysis. The items which had to be left out from further analyses came from, respectively, the subscales Attitudes towards Innovation (6), Achievement (8), Self-esteem (9), Personal Control (5) and Machiavellianism (6). A further round of exploratory factor analysis yielded 50 items which loaded .30 or higher on a factor without loading .30 or higher on more than one factor. The items which did not meet these criteria came from, respectively, the subscales for Achievement (2), Self-esteem (2), Personal Control (2). The responses to the other 50 items were again subjected to exploratory factor analysis. This yielded a factor structure in which all the items loaded .30 or higher on a factor without loading .30 or higher on any other factor. The factor structure is shown in Table 3.

Table 3 : Factor pattern in four factor solution (50 items)

	FACTOR 1	FACTOR 2	FACTOR 3	FACTOR 4
V2	0.3817			
V3		0.3602		
V6	0.3558			
V7		0.3347		
V13	0.4847			
V15		0.4370		
V16		0.3632		
V19	0.3121			
V20	0.3381			
V23		0.4718		
V24		0.3996		
V26	0.3302			
V29			0.3354	

V32	0.4050			
V35		0.3356		
V37				0.5056
V38		0.4769		
V39	0.4343			
V40	0.3562			
V41		0.5204		
V44		0.3910		
V47	0.5244			
V48		0.4752		
V50				0.3258
V51			0.3297	
V53				0.4044
V54	0.4846			
V56	0.4742			
V58	0.5352			
V59		0.4146		
V62	0.4711			
V63	0.5477			
V64			0.3237	
V65			0.3774	
V66		0.5123		
V68	0.4779			
V69	0.5790			
V71		0.4661		
V72	0.4812			
V73		0.4321		
V75	0.6231			
V76	0.4004			
V77	0.4529			
V78	0.5068			
V79		0.3789		
V80			0.4669	
V82			0.5501	
V83			0.4579	
V84			0.5381	
V89			0.4847	

From Table 3 it can be seen that the four factors extracted had respectively 21, 27, 9, 3, items loading on them. The first factor contained items from the original subscales for Attitudes to Innovation (16), Achievement (3), Personal Control (1) and Machiavellianism (1), the second items from the Attitudes towards Achievement (9), Innovation (4), Personal Control (3), Self Esteem (1), the third items from the Attitudes towards Machiavellianism (7), Personal Control (1) and Self Esteem (1) while the fourth factor contained attitudinal items originally seen as part of the subscales for Personal Control (2) and Self Esteem (1).

To determine the degree of fit between the factor structure based on the fifty items in the four factor solution and the data a Confirmatory Factor Analysis was subsequently carried out. The indices obtained are shown in Table 4.

Table 4: Results of confirmatory factor analysis on four factor structure

Index	Value
Independence Model Chi-square (degrees of freedom (df) 1225)	4319.153
Independence AIC	1869.15267
Independence CAIC	3888.89071
Model AIC	74.32942
Model CAIC	5549.14796
Chi-Square (df 1169) probability value less than 0.001	2263.671
Normal RLS Chi-Square	2327.193
Bentler-Bonnett Normed Fit Index	0.476
Bentler-Bonnett Nonnormed Fit Index	0.629
Comparative Fit Index (CFI)	0.646
Bollen (IFI) Fit Index	0.653
McDonald (MFI) Fit Index	0.160
Lisrel GFI Fit Index	0.762
Lisrel GFI Fit Index	0.740
Root Mean Squared Residual (RMR)	0.068
Standardized RMR	0.128
Root Mean Sq Error of App. (RMSEA)	0.056
Relative Non-centrality Index	0.646

From Table 4 if can be seen that the degree of fit could not be seen as high or even satisfactory. Using the correction advocated by Bagozzi and Heatherton (1994) aggregates were made of the respondents' scores on groups items loading on each

of the factors. The aggregates consisted of the following items. Aggregate 1: items 2, 6, 13, 19; Aggregate 2: items 20, 26, 32, 39; Aggregate 2: items 40, 47, 54, 56; Aggregate 4: items 58, 62, 63, 68; Aggregate 5: items 69, 72, 75, 76, 77; Aggregate 6: items 3, 7, 15; Aggregate 7: items 16, 23, 24; Aggregate 10: items 73, 78, 79; Aggregate 11: items 29, 51, 64; Aggregate 12: items 65, 80, 82; Aggregate 13: items 83, 84, 89; Aggregate 14: items 37, 50, 53.

Exploratory Factor Analysis was carried out using the Aggregate 14 scores as items. The aggregates loaded on the same factors as "their" items. confirmatory Factor Analysis was again carried out, this time using the aggregates as independent variables. The results are shown in Table 5.

From Table 5 it can be seen that the fit between the four factor structure and the data appeared to be satisfactory but the indices did not represent a really good fit. An attempt was made to interpret the four factors in the structure. It seems as if the first factor could be seen as representing the Attitude to Innovation but also containing items from three of the original scales. The second factor contained mainly items from the attitude towards Achievement but also from three other subscales. It can be identified (with some doubt) as an Achievement factor. The third factor seems to be related to Machiavellianism. The last factor does not lend itself to easy interpretation and also consists of only three items. Personal Control and Self-esteem seemed to have disappeared as distinct factors.

The four factor structure obviously differed substantially from the postulated (original) structure. It contained one doubtful, not easily interpreted factor as a final attempt to get greater clarity on the dimensions measured by the 89 item EAOS a three factor extraction by means of exploratory factor analysis with a Direct Oblimin solution specified was subsequently attempted.

Exploratory factor analysis were carried out as before, using the same criteria for eliminating items and specifying a three factor solution.

Table 5: Results of CFA on aggregates in four factor solution (50 items)

Index	Value
Independence Model Chi-square (degrees of freedom (df) 19)	1199.877
Independence AIC	1017.87746
Independence CAIC	590.13709
Model AIC	19.68998
Model CAIC	314.04151
Chi-Square (df 71) probability value less than 0.001	161.690
Normal RLS Chi-Square	159.054
Bentler-Bonnett Normed Fit Index	0.865
Bentler-Bonnett Nonnormed Fit Index	0.895
Comparative Fit Index (CFI)	0.910
Bollen (IFI) Fit Index	0.920
McDonald (MFI) Fit Index	0.859
Lisrel GFI Fit Index	0.929
Lisrel AGFI Fit Index	0.895
Root Mean Squared Residual (RMR)	0.299
Standardized RMR	0.016
Root Mean Sq Error of App. (RMSEA)	0.066
Relative Non-centrality Index	0.918

In the first round of the exploratory factor analysis with three factors extracted three eigenvalues >3 were obtained (respectively 10.67, 5.12 and 3.97). Forty seven of the items did not meet the requirements for inclusion in further analyses. These items came from the subscales Attitudes to Innovation (8), Achievement (10), Self-esteem (7). In the second round of exploratory factor analysis the loadings of two items did not meet the required standards and had to be eliminated from further analyses. These items came from the subscales for Attitudes towards Achievement (1) and towards Self-esteem (1). In the third round of the exploratory factor analyses 50 items were therefore included. The factor loadings indicated that one item had to be eliminated from further analyses. This item was originally part of the Attitude towards Innovation subscale. In the fourth round of defining three factors by means of exploratory factor analysis 49 items were included. All these items met the requirements as stated before and the factor pattern as shown in Table 6 was therefore accepted.

Table 6: Factor pattern for 3 factor solution (49 items)

	FACTOR 1	FACTOR 2	FACTOR 3
V2	0.3576		
V3			0.3982
V6	0.3909		
V8	0.4269		
V13	0.5007		
V15			0.4709
V16			0.4241
V18		0.3916	
V20	0.4036		
V23			0.5335
V24			0.4368
V26	0.3679		
V29		0.3982	
V30			0.3247
V32	0.3802		
V35			0.3841
V37		0.3460	
V39	0.4678		
V40	0.3591		
V44			0.3851
V47	0.5628		
V48			0.3597
V49	0.3626		
V50		0.4017	
V51		0.4660	
V53		0.3396	
V54	0.4746		
V55			0.3790
V56	0.5065		
V58	0.5555		
V59			0.4051
V62	0.5028		
V63	0.4989		
V64	0.3546		
V66			0.4512
V68	0.5183		

V69	05638		
V70			0.4041
V71			0.4620
V72	0.4335		
V73			0.3835
V76	0.4157		
V77	0.4178		
V78			0.4815
V80		0.5316	
V82		0.4043	
V83		0.4369	
V84		0.5469	
V89		0.4286	

From Table 6 it can be seen that the three factors identified respectively contained 22, 11 and 16 items. The first factor contained 15 items originally from the Attitude towards Innovation subscale, three each from the Attitudes towards Achievement and the Personal Control subscales and one from the Machiavellianism subscale. This factor was interpreted as representing an attitude towards Innovation but somewhat differently constituted than the similarly named subscale in the original questionnaire. The second factor contained items which seemed to pertain to the concept of asserting oneself in business situations - sometimes in a way which can be interpreted as negative towards other individuals. The factor was therefore named Assertiveness. The third factor had mainly Achievement related items loading on it and seemed to measure something akin to the Attitude towards achievement in business situations identified by the authors of the original scale. It therefore seemed as if the three factor solution rendered factors which could be interpreted quite readily. some of the factors included in the questionnaire disappeared when a three factor solution was specified with some of the items originally measuring these factors loading on one of the other factors but with most of their items being "lost" in the analysis process. Of the 12 items in the Self-esteem subscale only four were retained and of the 14 items in the Personal Control subscale only eight "survived" the analysis.

To determine the degree of fit between the three factor structure and the data a Confirmatory Factor Analysis was again carried out. the indices obtained are shown in Table 7.

Table 7: Results of confirmatory factor analysis on three factor structure (49 items)

Index	Value
Independence Model Chi-square (degrees of freedom (df) 1176)	4168.481
Independence AIC	1816.48130
Independence CAIC	3711.24034
Model AIC	72.94098
Model CAIC	5356,23955
Chi-Square (df 1124) probability value less than 0.001	2.175.095
Normal RLS Chi-Square	2194.608
Bentler-Bonnett Normed Fit Index	0.478
Bentler-Bonnett Nonnormed Fit Index	0.633
Comparative Fit Index (CFI)	0.649
Bollen (IFI) Fit Index	0.655
McDonald (MFI) Fit Index	0.172
Lisrel GFI Fit Index	0.769
Lisrel AGFI Fit Index	0.748
Root Mean Squared Residual (RMR)	0.059
Standardized RMR	0.117
Root Mean Sq Error of App. (RMSEA)	0.056
Relative Non-centrality Index	0.6488

From Table 7 it can be seen that the value of the indices indicated that the fit between the model and the data was not satisfactory. Bagozzi and Heatherton's (1994) adaptation was again carried out. The aggregates formed can be identified as :

Aggregate 1:	Items 2, 6, 8, 13, 20	
Aggregate 2:	Items 26, 32, 39, 40, 47, 76	Factor 1
Aggregate 3:	Items 49, 54, 56, 58,62, 77	
Aggregate 4:	Items 63, 64, 68, 69, 72	
Aggregate 5:	Items 18, 29, 37, 84	
Aggregate 6:	Items 50, 51, 53, 89	Factor 2
Aggregate 7:	Items 80, 82, 83	
Aggregate 8:	Items 3, 15, 16,23	
Aggregate 9:	Items 24, 30, 35, 44	Factor 3
Aggregate 10:	Items 48, 55, 59, 66	
Aggregate 11:	70, 71, 73, 78	

Exploratory factor analysis indicated that the aggregates loaded on the three factors in the same way as the items out of which they were formed did.

Confirmatory Factor Analysis was carried out on the factor pattern obtained when the aggregates were used as independent variables. The indices obtained are shown in Table 8.

From Table 8 it seems as if the indices obtained indicate a moderate to good fit of the model to the data. it seems as if this is the best fit obtained - later than for the four and five dimensions structures.

Table 8: Results of confirmatory factor analysis on aggregates (three factor solution, 49 items)

Index	Value
Independence Model Chi-square (degrees of freedom (df) 105)	1522.908
Independence AIC	1312.90790
Independence CAIC	819.36132
Model AIC	16.46015
Model CAIC	392.47844
Chi-Square (df 87) probability value less than 0.001	190.460
Normal RLS Chi-Square	175.429
Bentler-Bonnett Normed Fit Index	0.875
Bentler-Bonnett Nonnormed Fit Index	0.912
Comparative Fit Index (CFI)	0.927
Bollen (IFI) Fit Index	0.928
McDonald (MFI) Fit Index	0.841
Lisrel GFI Fit Index	0.927
Lisrel AGFI Fit Index	0.900
Root Mean Squared Residual (RMR)	0.243
Standardized RMR	0.021
Root Mean Sq Error of App. (RMSEA)	0.063
Relative Non-centrality Index	0.927

DISCUSSION

The present study was undertaken to establish the construct validity of the EAOS scale when applied to a sample of South African respondents i.e. individuals from a

culture different from that of the United States of America, where the instrument had been developed. The results indicate that the five factor structure proposed by the authors of the instrument could not be replicated on the responses of the South African sample.

The factor structure proposed by Robinson et al (1991) and implied by Stimpson (1993) could not be replicated in the present study - possibly because so many of the items in all the subscales but especially in the Self esteem en Personal Control subscales did not survive the analysis. In total 40 items had to be taken out of consideration. Out of a total of 89 items this represents a loss of 44.9% of the items if the proposed three factor structure is taken as the best fit with the data while containing three interpretable factors. The three factors respectively contained items which were interpreted as measuring Attitudes to Innovation, Assertiveness and Achievement.

The three factor solution was preferred as it had slightly better fit indices than the four factor structure when Confirmatory Factor Analyses were carried out and the three factors identified were relatively easily interpreted while two of the four factors in the less parsimonious solution could not be interpreted readily.

Portability of at least two, probably three, of the original five constructs embodied in the EAOS must now be in doubt. The items included in the Personal Control, Self esteem and Machiavellianism dimensions in the EAOS as used in this study disappeared in the analyses. It seems as if some of the items from these subscales which did survive the analyses combined quite well and were interpreted by the respondents similarly to items in other subscales. The three factor scale therefore contained different constructs from those included in the five factor (EAOS) scale. These results seem to indicate quite clearly that intercultural portability of constructs is indeed an important consideration when doing inter-cultural/ international research.

The present study clearly has limitations. It was carried out to determine the structural integrity of the EAOS when applied to a non-United States sample. The predictive and the discriminatory validity of the instrument were not investigated, neither in its original form or in the form proposed as a result of the present study . The sample on which the present study was carried out was somewhat small. A nearer to ideal ratio would have been five to 10 respondents per item in the questionnaire against the 3.36 respondents per item on which the present analysis was carried out.

Future studies should probably be done on larger samples which should also be selected to represent more occupational groups. Discriminatory and predictive validity of the instrument should be studied as well. The data on which the present paper is based will be used to carry out such a study on a limited basis.

A large number of items were "lost" in the present study. Attention should probably be given to these items in order to determine whether rewording might make them more "portable".

Cross-validation of the results of the present study on samples from other cultures, including samples from the non-white population groups in South Africa, should take place if the instrument is to be used interculturally/internationally.

REFERENCES :

1. BAGOZZI, R.P. & HEATHERTON, T.F. (1994). A General Approach to Presenting Multifaceted Personality constructs : Application to State Self-Esteem. *Structural Equation Modelling*, 1, 35-67.
2. BENTLER, P.B. (1995). *EQS Structural Equations Programme Manual.* University of California, Los Angeles.
3. BAHAT, R.S. KEDIA, B.L., CRAWFORD, S.E. KAPLAN, M.R. (1990). Cross-cultural Issues in Organizational Psychology : Emergent trends and Directions for Research in the 1990s. *International Review of Industrial and Organizational Psychology*, 5, 59-99.
4. HOOLE, C. (1996). *Assessment of Structural Equation Modelling as Method for Predicting Success of Entrepreneurs.* MA thesis, University of Pretoria.
5. HOOLE, C. & BOSHOFF, A.B. (1997). *Measurement Qualities of the Entrepreneurial Attitude Orientation Scale when used Interculturally.* South African Journal of Economic and Management Sciences.
6. KERLINGER, F.N. (1986). *Foundations of BEHAVIOURAL research* (3rd ed). New York : Holt, Rinechart and Winston, Inc.
7. LAU, T. (1992, June). *The Incident Method – an Alternative Way of Studying Entrepreneurial Behaviour.* Paper presented at the Int Ent Conference, Dortmund.
8. ROBINSON, P.B., STIMPSON, D.V., HEUFNER, J.C. & HUNT, H.K. (1991). An Attitude Approach to the Prediction of Entrepreneurship. *Entrepreneurship : Theory and Practice*, 15(4), 13-31.
9. STIMPSON, D.V., HEUFNER, J.C. NARAYANAN, S. & SHANTHAKUMAR, D. (1992). *Attitudinal Characteristics of Male and*

Female Entrepreneurs in the United States and India. Paper read at 2nd Conference on Internationalizing Entrepreneurship Research, Education and Training. Dortmund, June.

10. STIMPSON, D.V., ROBINSON, P.B. WARONUSUNTIKULE, S. & ZHENG, R. (1990). Attitudinal Characteristics of Entrepreneurs in the United States, Korea, Thailand, and the People's Republic of China. *Entrepreneurship and Regional Development*, 2, 49-55.
11. STIMPSON, D.V. (1993). *Letter for A.B. Boshoff*, March 1993.