ORIGINAL PAPER

COMPARISON OF FAMILY ENVIRONMENTAL SCALE (FES) SUBSCALES BETWEEN MALAYSIAN SETTING WITH THE ORIGINAL DIMENSION OF FES

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Abstract

Introduction: **Family Environment Scale (FES) was developed by Moos1, has ten subscales and was categorized into three dimensions.** *Objective:* **The objective of this study was to develop factor structure for the Malay-translated version of the FES subscales.** *Methodology:* **The study used Malay translated version of FES by Khairani et. al2. This study was a multi centre, cross-sectional study, involving four secondary schools consisted of adolescents, aged between 12-17 years old and a total of 295 participants were enrolled in this study. Exploratory factor analyses was done across two groups of analysis set on the subscales with Cronbach's alpha more than 0.50 and 0.53 respectively.** *Results:* **Two distinct factors were extracted across the four subscales consisted of Cohesion, Conflict and Organization in factor 1 and only Control in factor 2.** *Conclusion:* **The finding indicated that element of Cohesion, Conflict and Organization has a good indicator of a good family relationship.**

Keywords: **FES, subscales and factor structure**

Introduction

Family Environmental Scale is an instrument used to measure many family aspects such as family integrity, family dynamics, communication, closeness, and functions of each family member. Previous studies have already confirmed that it is also an effective instrument to differentiate between functional families and families with problems3, 4, 5. In particular, the FES was developed to assess the interpersonal atmosphere within a family with respect to its relationships, patterns of growth, and its organizational features6.

The FES comprised 10 subscales that measure the social environment of families. The author of original FES constructed these 10 subscales based on conceptual framework which assess three underlying sets of dimensions (see Table 2).

The conceptualization framework might differ if it is tested using different population for example the Malaysian population. Thus, the objective of this study was to examine factor structure using appropriate statistical analysis on the translated Malay version of the FES subscales to describe family function in a

Malaysian setting. The finding then was compare to FES dimensions in original version.

Methods

There are three separate forms of the FES available that correspondingly measure different aspects of dimensions (Real, Ideal and Expectation). In this study, the 'Real' form was chosen and translated into the Malay language. The Real Form (Form R) measures people's perception of their actual family environments. This could help investigators to understand individuals' perceptions of their conjugal and nuclear families and would be beneficial to facilitate family counselling or educational programs7. The detail of the translation process was written by Khairani et. al1. The translated Malay version was self-administered to adolescents, aged between 12-17 years old. This study applied convenient and quota sampling. A convenience selection was made on the schools with the assumption that the characteristic of the students in normal public schools were homogenous. The respondents were selected using quota sampling to obtain a representative Malaysian population in respect to racial proportion among Malay, Chinese and Indian with the ratio of 6: 3: 1 respectively. A total of 295 students were enrolled from four different schools located within the Klang Valley. The translated FES was distributed randomly and self-administrated to avoid interviewer bias. This was an observational research which was unlikely to impact on the safety and well being of the human subjects involved and therefore a waiver on written informed consent was taken from study subjects and verbal consent was sufficient.

Statistical Analysis

All statistical analyses were conducted using software package SPSS version 14.08 for Windows. The descriptive statistics were analyzed for demographic characteristics of the respondents. Internal consistency was evaluated by means of Cronbach's alpha to confirm the assumption for factor analysis. Subscales with internal consistency (Cronbach's alpha) more than 0.50 is acceptable9,10. Factor structure was constructed using exploratory factor analysis based on Principle Component Analysis (PCA) extraction method with Varimax rotation. The main purpose of this procedure was to group the acceptable subscales into meaningful distinct factor. Subsequently, the reliability and correlation test of the new factors were performed.

Results

In this study, the ethnic and gender distribution of the samples were approximately proportionate to the Malaysian population as presented in Table 1 (based on the Malaysian Statistics Department11). The majority of the respondents were Malays (63.1%), followed by Chinese (28.5%) and Indians (6.8%). There were 47.0% male and 53.0% were female.

Table 1. Socio-demographic of respondents.

Characteristics	Number	%
Age		
12-13	21	7.1
14-15	168	57.0
16-17	106	35.9
Gender		
Male	138	46.8
Female	157	53.2
Race		
Malay	186	63.0
Chinese	84	28.5
Indian	20	6.8
Others	5	1.7
Religion		
Islam	192	65.3
Christian	15	5.1
Hinduism	13	4.4
Buddhist	72	24.5
Others	2	0.7

Cronbach's alpha coefficients for internal consistency are presented in Table 2. Values for the two subscales, *Cohesion* and *Conflict* were good (alpha=0.70 and 0.63 respectively). Cronbach's alpha for all other subscales ranged between 0.10 and 0.58. Cronbach's alpha coefficient values less than 0.50 were: *Expressiveness, Independence, Achievement orientation, Active recreational orientation* and *Moral-religious emphasis*. Cronbach's alphas with more than 0.5 were *Cohesion, Conflict, Intellectual-cultural orientation, Organization* and *Control*. The statistical analysis determined that half of the subscales were invalid because of the inconsistency problems (Cronbach's alpha < 0.5), thus only half of the subscales were valid to be analyzed using the factor analysis.

Table 2. Descriptive statistics, internal consistency and corrected average item subscales correlation (CAISC) of the Malay translated version of the Family Environment Scale (FES)

Dimension	Subscale	Cronbach's alpha	CAISC
Relationship	Cohesion	0.70	0.39
	Expressiveness	0.22	0.08
	Conflict	0.63	0.31
Personal growth	Independence	0.10	0.03
	Achievement orientation	0.24	0.10
	Intellectual-cultural orientation	0.51	0.23
	Active-recreational orientation	0.33	0.13
	Moral-religious emphasize	0.45	0.20
System maintenance	Organization	0.58	0.28
	Control	0.54	0.25

*CAISC - Corrected Average Item-Subscale Correlations

As presented in Table 3 and Table 4, exploratory factor analysis was used to obtain construct validity for the subscales with Cronbach's alpha consistency values of more than 0.50 and 0.53 respectively. Another five subscales with low internal consistencies (alpha<0.5), was not appropriate to conduct factor analysis and

were excluded. Using Varimax rotation, two distinct factors were developed (subscales with Cronbach's alpha >0.5) based on Principle Component Analysis (PCA) methods. Two distinct factors were identified based on five subscales consisted of Cohesion, Conflict and Organization in factor 1 and in factor 2 were Control and

Intellectual − cultural. Alternatively, four subscales with Cronbach's alpha value > 0.53, the Principle Component Analysis had developed two distinct factors which comprised of Cohesion, Conflict and Organization in factor 1 and only one subscale which was Control in factor 2. The most favorable result based on the four subscales had produced higher range of communalities (0.657 − 0.955), higher total cumulative of variance (75.3%) and factor loadings higher than ± 0.78. The Cronbach's alpha values for the three subscales were 0.730 and the correlations between them were in the range of ± 0.374 to 0.510. The tapping of the subscales were almost similar to the original FES7 except for Organization that should be grouped together with Control.

Table 3. Comparison of Principle Component Analysis (PCA) methods using Varimax rotation in factor analysis (subscales for Cronbach's alpha value > 0.5 and 0.53)

	Method 1 (*Cronbach's alpha > 0.50*)	**Method 2*** (*Cronbach's alpha > 0.53)*
KMO (P-value)	0.708 (<0.001)	0.654 (<0.001)
Degree of freedom	10	6
Communalities	0.524 – 0.804	0.657 – 0.955
Total cumulative of variance	66.7%	75.3%
Factor 1	Cohesion, Conflict and Organization	Cohesion, Conflict and Organization
Factor 2	Control and Intellectual -cultural	Control

*Method 2 was analyzed without Intellectual-cultural subscale

Table 4. Comparison of Principle Component Analysis (PCA) methods using rotated factor matrix in factor analysis. (subscales for Cronbach's alpha value > 0.50 and 0.53)

	Method 1 (*Cronbach's alpha > 0.50)*		**Method 2*** (*Cronbach's alpha > 0.53)*	
	Factor 1	Factor 2	Factor 1	Factor 2
Cohesion	0.8474		0.8552	
Conflict	-0.7821		-0.7945	
Organization	0.7510		0.7800	
Control		0.8944		0.9770
Intellectual-cultural		0.5148		

*Method 2 was analyzed without Intellectual-cultural subscale

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Discussion

This study emphasize sample proportion based on ethnicity to indicates that this sample can represent Malaysian population so that the finding of Malay translated version of FES can be applied at least in these three major ethnicity.

Results of this study clearly indicate that culture and lifestyle play very important roles in understanding the concept of the subscales. These poor internal consistencies in the subscales could be explained by the fact that our local adolescents have different socio-cultural concepts[1]. Previous studies have also found that the reliabilities of some subscales in their studies were lower in comparison to those initially reported of the original FES[12]. Consequently, only a limited amount of subscales were valid for testing using factor analysis. Out of the four and five subscales (Cronbach's alpha > 0.50 and 0.53) that were involved in the factor analysis, result which based on four subscales produced better results in terms of range of communalities, total cumulative of variance and factor loadings.

In the original version, Cohesion and Conflict were in the same Relationship Dimension while Organization and Control were in another dimension of System Maintenance[7]. However, in this study the Organization falls under the Relationship Dimension. This difference in categorization may be attributed to the relationship among family members, which influenced the organization of the family. Findings from this study was supported by Down and Theodore[13] which found that Cohesion, Conflict and Organization categorized under the same dimension while Control belongs to a different and unique dimension. Hence the results of this study concluded that Factor 1, which comprised of Cohesion, Conflict and Organization, can be labeled as Relationship Dimension and Factor 2 which includes Control can be labeled as Control Dimension. However, the analysis with limited number of subscales might be insufficient to explain the overall dimensions of a family function.

According to Moos[7], Cohesion refers to the degree of commitment, help and support family members provide for one another. Conflict stands for the amount of openly expressed anger and conflict among family members while Organization meant for the degree of importance of clear organization and structure in planning family activities and responsibilities. For Relationship Dimension factor, Cohesion and Organization resulted the highest mean score of 6.93 (2.02) and 6.67 (1.78) respectively while Conflict has resulted the lowest mean score of 3.04 (2.09). Study results have revealed positive direction of family functioning considering the study took normative sample. On the other hand, effective family in relation to Cohesion and Organization will lead to less Conflict in a family. The results also demonstrated that, there were good connections among all three subscales with Cronbach's alpha of 0.730 and the correlation between them were within the range of ± 0.374 to 0.510.

For recommendation, element of Cohesion and Organization need to be stressed but conflict in a family need to be avoided to maintain a good relationship in a family. FES need to be revised to suit for Malaysian setting and once validated FES was found, the factor structure for FES subscales need to be tested again to get overall picture of family functioning. Besides that, FES has to be tested in a problematic family to have justification on discriminative validity.

Several limitations were found in this study. The inconsistency problems resulted from

the study has caused only few subscales to be included for factor analysis. Thus, the findings of this study do not represent the adequate family functioning as overall. The inconsistency problems might be due to the differences in cultural adaptations of the local respondents1. Apart from that, there was expected a possibility of random sampling error since by logistic, the study used convenient sampling.

Conclusion

Only two dimensions were developed using factor analysis based on four subscales and the dimensions were Relationship and Control Dimensions. With regards to Malaysian setting, the two dimensions were not adequate to explain family functioning as a whole. However, the finding indicated that element of Cohesion, Conflict and Organization are good indicators of a good relationship in a family. In order to improve the factor structure of the Malaysian FES, it is proposed that a new scale for family environment in a family population is developed as the most rational solution to this issue. The rational for the new scale is due to the differences in the family setting, family concept and family understanding between Asian and Western countries

Acknowledgement

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