



## **The Measurement Analysis of Parent-grandparent as Educator Questionnaire (Parent Version)**

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### **ABSTRACT**

This paper examined the claims for validity and reliability of parent-grandparent as educator questionnaire (PGEQ). The PGEQ is a multi-dimensional instrument which is capable of reliably measuring parents and grandparents' religious thought, superstition, culture, morality, socialization, economy, education, language, internationalization, and skill that they pass on to children and grandchildren. A sample of 338 were randomly selected from three Malaysia cities. The researcher applied principal components analysis (PCA), confirmatory factor analysis (CFA), and Cronbach's alpha to test validity and reliability of the PGEQ. The analysis results suggest that the PGEQ is a multi-dimensional instrument which reliably measured ten-factor structure with a total number of 63 validate and reliable items. The PCA extracted factors accounted for 75.7% of total variance explained. Interestingly, the degree of inter-correlation among the items of the PGEQ also reached a satisfactory level. The CFA indicates the assessment result of within and between the validity of indicators of the 10-factor model,  $\chi^2(9) = 27.560$ , comparative fit index = 0.986, Tucker-Lewis index = 0.929, root mean square error of approximation = 0.078, goodness of fit index (GFI) = 0.985 and adjusted GFI = 0.906. These findings established a satisfactory measurement model fit for the PGEQ. The study not only significantly contributes to on going parental instrument development, but also adds to the development of a psychometrically sound instrument to conduct diagnostic assessments on parents, grandparents, and childminders' contributions to children's upbringing in a wide range.

**Keywords:** Parent-grandparent as Educator Questionnaire, Questionnaire, Parent-grandparent, Educator

**JEL Classifications:** A10, A20, A30

### **1. INTRODUCTION**

In the past years, educational researchers have centered much of their attention on parents' involvement in educating their children. Involvement of parents in the children's education had been found to be a facilitator of children's learning engagement across a wide range of cultures (Mitchell, 2007). Although there are many studies on parents' contribution towards children's education, much of these studies focus more on socioeconomic background (Epstein, 1995; Strassmann and Garrard, 2011; Sheridan et al., 2011).

A number of studies show that grandparents desire to spend time with their grandchildren, in fact, they take care of their grandchildren with interest, passion and love. The grandparents could play an important role in developing emotion and cognitive systems of their grandchildren. In order for children to be both

emotionally and cognitively engaged in learning, parents and grandparents must actively be involved in several activities of children (Jenkins and Mostafa, 2014; Ferguson and Ready, 2011; Sarti, 2010; Cross et al., 2010; Lee, 2010; Oswalt, 2008; Kelley et al., 2000). These studies, however, did not consider at a time religious thought, morality, socialization, and a host of other factors that are detailed in the present study.

Further, previous researchers have directed their attention specifically to assessing and measuring the dimensionality of parent participation in children's education (Jenkins and Mostafa, 2014; Cross et al., 2010). Epstein (2009) proposes a six factor model and internal consistency of the whole scales was examined using Cronbach's alpha. The proposed six factor solutions are parenting, communicating, volunteering, learning at home, decision making, collaborating with the community. The six factors reported by

Epstein were of questionable reliability. Although there are some serious limitations to his factor analytic techniques, but the result suggested the multi-dimensionality of the parental involvement construct.

Another study, which has attempted to measure dimensions of parental involvement was carryout by Hashim and Hassan (2012). Following Epstein's lead, Hashim generated items to represent the perspectives of students, teachers, and parents on parental involvement, employing a variety of measuring devices. The factor analysis result shows the sum of the factor scores for the extracted factors as dependent measures in a survey design. The exploratory analysis result of both primary and secondary school pupil reveal somehow different underlying factor, to that of Epstein's (2009) parent involvement model. The interpretation of these factor analytic results is difficult since several items were strongly cross-loaded on two factors, and the authors failed to examine other solutions. Nonetheless, the instrument has been found to be fairly reliable. In spite of this, to the researcher best knowledge, there were no evidences that either confirmatory factor analysis (CFA) was performed to determine the psychometric properties of the Epstein six factors model. The primary purpose of this research, therefore, is to examine parent-grandparent as educator questionnaire (PGEQ) by using principal components analysis (PCA), CFA, and Cronbach's alpha to improve the measures if required.

## 2. METHODOLOGY

### 2.1. Participants

A sample of 338 parents and grandparents was selected from three Malaysia cities, precisely, Ipoh, Tanjung Malim, and Wilayah Persekutuan. The sample size (338) was determined by considering the confidence interval of 95% and the margin of error at  $\pm 6\%$  as suggested by Vockell and Asher (1998) and Yamane (1967). The respondents were randomly selected and participated voluntarily in answering the survey questionnaires, which were distributed to the respondents during their free time. They were asked to express their level of agreement or disagreement with the propositions in the survey instrument.

### 2.2. Instrument Development

The study used the PGEQ which was developed by the researcher. Initially, the items were generated from extensive analysis of the related literature on parental education and via the themes of several interviews conducted by the researcher with parents, grandparents, children, and grandchildren. The questionnaire is composed of close-ended statements used to determine the phenomenon that the research aimed to investigate. Furthermore, the PGEQ comprised three sections. Section one, formed of several items, requested respondents to provide their demographic information. Section two, consists of only three items of parenting control approach. Originally, section three comprises 13 dimensions, they are: (1) Religious thought, (2) superstition, (3) culture, (4) morality, (5) socialization, (6) economy, (7) education, (8) language, (9) internationalization, (10) skill, (11) emotion, (12) communication, and (13) cognitive. Each dimension consists of at least 10 items, investigated. Thus, excluding the demographic

information on the respondents and three items of parenting control approach, the questionnaire originally consisted of 135 items. For the above mentioned 13 constructs and 135 items, a five-point Likert type scale was employed for data collection. The scale is interpreted as: 1 = Strongly disagree, 2 = Strongly disagree, 3 = Neutral, 4 = Agree and 5 = Strongly agree.

### 2.3. Data Analysis and Findings

The data collected were analyzed following a three-step procedure. First, the PCA was used to test the factors that underlie the construct of the study. This was then followed by application of structural equation modelling using AMOS Version 17.0 software to test the structural models of the construct. Finally, assessment of construct validity using CFA and construct reliability through composite reliability index (CRI) were performed.

### 2.4. PCA

PCA with varimax rotation was conducted to test the construct validity of the PGEQ. The analyses involved an iterative process to reach the final solution, whereby the items that did not contribute significantly and practically to the factors extracted were automatically discarded. Furthermore, the factors with eigenvalues of 1 or greater were considered as good factors, and therefore retained. Given such a rule of thumb, a number of factors were extracted from the pool of items. The correlation matrix yielded more than two correlations  $>0.30$ . The measures of sampling adequacy requirement of (0.50 or greater) were also satisfied. The anti-image correlation ranged between 0.78 and 0.93. In addition, all communalities were  $>0.50$  (ranged between 0.58 and 0.86), which indicates fulfillment of the requirement.

Moreover, the analysis revealed ten interpretable factors with eigenvalues greater than one, they are: Religious thought, superstition, culture, morality, socialization, economy, education, language, internationalization, and skill. The extracted factors accounted for 75.7% of variance explained in the constructs analyzed. Interestingly, the degree of inter-correlation among the items of PGEQ also reached a satisfactory level. Bartlett's test of Sphericity was statistically significant  $\chi^2(4809) = 1470, P \leq 001, KMO = 0:899$ .

### 2.5. Measurement Model Fit

The measurement model of PGEQ was assessed using AMOS - SPSS Version 17.0 software. A CFA with maximum likelihood was used to assess the composite score of the ten-factor model of the PGEQ (Hair and Black, 1998; Holye, 1995). The analysis allows an overall assessment of within and between the validity of indicators of the 10-factor model of the PGEQ. Also, the tool assists the researcher to investigate the extent to which the hypothesized 10-factor model fits the data. Some explicit measures were used in establishing the goodness-fit index (GFI) of the model. They are;  $\chi^2$ , comparative fit index (CFI), and root mean square error of approximation (RMSEA) GFI statistic and the adjusted GFI statistic (AGFI).

The initial results of the measurement model of the 10-latent exogenous variables demonstrated poor fit statistics;

Figure 1: Parents/grandparent as educator model

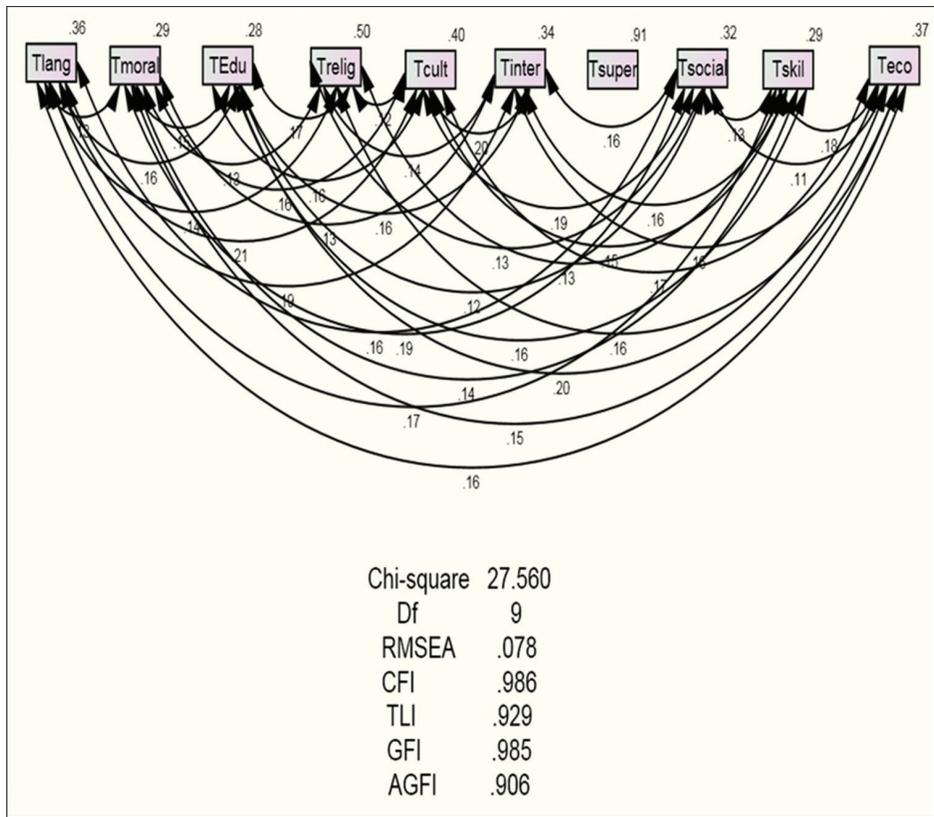


Table 1: Construct factor loading

Item	Tlang	Teco	Tcult	Tinter	Tsocial	Tedu	Tmoral	Tskil	Trelig	Tsuper
1	0.68	0.80	0.65	0.60	0.77	0.72	0.70	0.84	0.77	0.53
2	0.73	0.90	0.76	0.68	0.69	0.61	0.67	0.82	0.68	0.72
3	0.76	0.57	0.79	0.77	0.79	0.62	0.59	0.78	0.74	0.81
4	0.76	0.62	0.68	0.72	0.55	0.66	0.57	0.73	0.67	0.83
5	0.76		0.71	0.79	0.65	0.70	0.62	0.61	0.80	0.76
6	0.60		0.57	0.81	0.52	0.77	0.66	0.55	0.73	0.89
7							0.68			0.80
8							0.78			0.78

GFI criteria:  $\chi^2=565$ ;  $\chi^2(9)=27.560$ , CFI=0.986, TLI=0.929, RMSEA=0.078, GFI=0.985, AGFI=0.906, Tlang: Language, Teco: Economic, Tcult: Culture, Tinter: Internationalization, Tsocial: Socialization and interaction, Tedu: Education, Tskil: Skill, Tsuper: Superstition, CFI: Comparative fit index, RMSEA: Root mean square error of approximation, GFI: Goodness of fit index, AGFI: Adjusted goodness of fit index, TLI: Tucker-Lewis index

$\chi^2(470) = 704.7018$ , CFI = 0.91, Tucker-Lewis index (TLI) = 0.88, RMSEA = 0.09 and CMIN = DF = 3.63. All fit statistics appear to be in compliance with conventional standards, with the exception of the RMSEA and the TLI, which fell within the gray-area 0.09 and 0.88. This makes the conclusion about the model to be a bit difficult to interpret. However, when the model was revised and some offending estimate inter-correlations among the 10 factors were freed, the model showed better fit. Based on this adjustment, the discrepancies declined and better model fit to the sample data was established.  $\chi^2(9) = 27.560$ , CFI = 0.986, TLI = 0.929, RMSEA = 0.078, GFI = 0.985 and AGFI = 0.906 (Figure 1). Moreover, CMIN/DF revealed a value of 3.2, which, according to Schermellah-Engel et al. (2003), is an indication of better GFI for a model. The factor loadings of indicator variables to factors are presented in Table 1. All items of PGEQ’s subscales show very good factor loadings (0.60) (Comrey and Lee, 1992). In addition, Table 1 shows that all factor loadings were statistically significant.

Table 2: Subscales reliability

Construct	CRI	Overall alpha reliability
Language	0.86	0.931
Morality	0.89	
Education	0.86	
Religion	0.86	
Culture	0.96	
Internationalization	0.88	
Socialization	0.87	
Superstition	0.83	
Skill	0.84	
Economy	0.95	

CRI: Composite reliability index

2.6. Internal Consistency of PGEQ

The reliability analysis was conducted to assess the internal consistency of the instruments. Nunnally (1978) recommended value of 0.70 or greater for a reliable model tested. As shown in Table 2., the results of reliability test revealed the overall

**Table 3: Constructs validity**

Construct	Tmoral	Tlang	Tedu	Trelig	Tcult	Tinter	Tsuper	Tsocial	Tskil	Teco
Tmoral	1									
Tlang	0.410**	1								
TEdu	0.534**	0.497**	1							
Trelig	0.342**	0.319**	0.443**	1						
Tcult	0.459**	0.543**	0.475**	0.268**	1					
Tinter	0.425**	0.542**	0.513**	0.337**	0.535**	1				
Tsuper	-0.125*	-0.084	-0.231**	-0.051	-0.010	-0.087	1			
Tsocial	0.636**	0.480**	0.408**	0.326**	0.534**	0.482**	-0.079	1		
Tskil	0.469**	0.538**	0.559**	0.344**	0.449**	0.516**	-0.172**	0.433**	1	
Teco	0.466**	0.451**	0.620**	0.361**	0.448**	0.439**	-0.152**	0.329**	0.544**	1

\*Correlation is significant at the 0.01 level (two-tailed). Tlang: Language, Teco: Economic, Tcult: Culture, Tinter: internationalization, Tsocial: Socialization and interaction, Tedu: Education, Tskil: Skill, Tsuper: Superstition, \*\*Correlation is significant at the 0.05 level (two-tailed)

coefficient alpha of  $\alpha = 0.931$  indicating a substantial internal consistency between individual items, thus the items have positive covariance and the alpha is very close to 1 encouraging that the internal consistency of the model is not a mediocrity (Abdullah et al., 2008; Abdullah, 2006).

The correlations between the validated constructs of the PGEQ were presented in Table 3. The constructs included in the analysis revealed a reasonably high significant correlation among the variables of the study. More specifically, the correlations ranged from ( $r = -0.10$  to  $r = 0.620$ ,  $P \leq 0.01$ ). These results also established the evidence that the convergent validity of PGEQ's subscales prevailed. Scientifically, the 63 items and the ten subscales of the PGEQ were suitable, reliable, and sustainable as well as the CRI produced substantial scores for the construct.

### 3. DISCUSSION AND IMPLICATION

Ultimately, this study aimed at investigating the psychometric properties of the PGEQ. The results of the PCA and CFA support the assertion that the PGEQ is a multi-dimensional construct. The study not only adds a significant value to existing instruments used to investigate parents and grandparents contribution towards children's development, but also suggests an empirical evidence on how different parents and grandparents influence children and grandchildren's growth in a wide scope.

The ten dimensions of the PGEQ are religious thought, superstition, culture, morality, socialization, economy, education, language, internationalization, and skill. This finding is tallied with previous studies of parental involvement in children learning (Epstein, 2009; Hashim and Hassan, 2012). The present research has produced both first and second-generation instrument by using both exploratory and CFA measures. The most important and obvious conclusion from this study is that the construct of the PGEQ does appear to be a multi-dimensional construct. On the basis of the results obtained herein, the author has offered an instrument which comprises of the 62 items shown in Table 1 for consideration by future researchers concerned with parents and grandparents' involvement in children's children's nurturing and development. The data suggest that this instrument is capable of reliably measuring religious thought, superstition, culture, morality, socialization, economy, education, language, internationalization, and skill.

This study has implications for educational practices, especially in assessing parents and grandparents as educators. The 63-item and ten-factor structure yield a valid and reliable measurement model; the scale is, therefore, useful in conducting diagnostic assessment on parents, grandparents, even child minders' contributions to children's upbringing. Results of assessment would enable the governments and human society at large to design and implement intervention programs that could shape attitudes and perceptions of both the parents and grandparents on the importance of their participation and involvement in their children's educational activities. By doing this we will be able to contribute effectively to the ultimate children development which is the crucial lost goal of the current global education system and limit the negative effects of ongoing internationalization of barbaric behaviours in the name of freedom and democracy that in some aspects are not ethically and morally justified. In an era of increasing moral decadence, hooliganism, drug abuse and high rate of absenteeism in schools, it is crucial to understand how both immediate and extended families' assets and experiences contributed in mitigating all these social and educational maladies.

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