

Dimensionality of the Chinese Parent-Child Subsystem Quality Scale: Confirmatory factor analyses

Daniel TL Shek^{1-5,*}, PhD, FHKPS, BBS, SBS, JP, and Moon YM Law^{1,2}, BSW, MSW, DSW Candidate, RSW

¹Department of Applied Social Sciences, The Hong Kong Polytechnic University, Hong Kong, P.R. China

²Centre for Innovative Programs for Adolescents and Families, The Hong Kong Polytechnic University, Hong Kong, P.R. China

³Department of Social Work, East China Normal University, Shanghai, P.R. China

⁴Kiang Wu Nursing College of Macau, Macau, P.R. China

⁵University of Kentucky College of Medicine, Lexington, Kentucky, United States of America

Abstract

To understand family dynamics in Chinese families, the 17-item Chinese Parent-Child Subsystem Quality Scale was developed to assess three dimensions within the parent-child dyad (perceived behavioral control, psychological control, and parent-child relationship) in the father-adolescent dyad and mother-adolescent dyad. Previous findings based on exploratory factor analysis provided support for the three-factor structure. In this study, confirmatory factor analyses were used to re-analyze the Wave 1 data collected from 3,328 Chinese junior secondary school students in a longitudinal study in Hong Kong. Results showed that there was support for the three-factor structure. The present findings support the factorial validity of the scale and underscore the use of confirmatory factor analyses in clarifying the dimensions in measures of parent-child subsystem quality.

Keywords: behavioral control, psychological control, parent-child relationship, confirmatory factor analysis

Introduction

In social science, there are many abstract concepts in connection with different theories. For example, different theories mention about “quality of life” on the theoretical or conceptual level. However, the question is how quality of life can be measured in reality. Therefore, how to “operationalize” the abstract concept in the real world is an important issue to be considered. Different measures of quality of life, such as life satisfaction, psychological well-being and competences, have been proposed.

Similarly, different concepts are intrinsic to the quality of family life. Concepts such as family functioning, family cohesion, family adaptability, and parenting have been proposed in many theories of family processes. With specific reference to the parent-child dyad in the family, parenting and parent-

* Correspondence: Professor Daniel TL Shek, PhD, FHKPS, BBS, SBS, JP, Associate Vice President (Undergraduate Programme) and Chair Professor of Applied Social Sciences, Department of Applied Social Sciences, The Hong Kong Polytechnic University, Room HJ407, Core H, Hung Hom, Hong Kong, P.R. China. E-mail: daniel.shek@polyu.edu.hk

child relational quality have been proposed as the key elements. To measure such concepts in the abstract world, different research methods, including quantitative, qualitative and mixed methods, have been used. As far as objective assessment tools are concerned, many scales have been developed to measure such concepts in reality. For example, parenting scales have been developed to assess parenting concepts of responsiveness and demandingness (1). In the area of parent-child conflict, scales on conflict issues have been developed (2). Finally, parent-child communication scales have been developed to assess parent-child relationship, such as parent-child communication and mutual trust among the parents and children (3).

There are two issues that researchers should consider when using objective measures of abstract concepts. First, while it is not difficult to develop self-administered measures of abstract concepts, their psychometric properties should be thoroughly examined (4). Typically, the basic psychometric properties include reliability and validity of an assessment tool should be clarified. For reliability, it refers to the consistency of the scores based on the assessment tools. If a tool yields a score indicating "good" parent-child relationship today but another score saying that the parent-child relationship is "poor" tomorrow, it is obviously a highly unreliable measure. Similarly, if different items in a scale measure different constructs, we can argue that the scale is unreliable. For validity, it basically asks the question of whether a measure is assessing what it is intended to assess. Among the different forms of validity (such as whether the measure converges with indicators of similar nature), factorial validity is commonly used to assess the dimensionality of the measure. For example, if a researcher proposes that a 50-item measure of family functioning has the dimensions of emotional expressiveness, communication, leadership, adaptability and love, it is expected that these five dimensions would emerge from the responses to the items. If factor analysis does not support a five-factor solution, one may query the factorial validity of this measure.

Methodologically, two basic strategies can be used to examine the dimensionality of a measure (5, 6). The first approach is exploratory factor analysis (EFA). EFA works as an exploratory or descriptive

approach to identify the possible numbers of common factors or helps to uncover which measurable variables are appropriate indicators of the various latent dimensions (7, 8). In exploratory factor analyses, factors based on a group of items are first extracted and then rotated for interpretation. With reference to family measures, exploratory factor analyses are commonly used. For example, to understand the underlying dimensions of the Dyadic Adjustment Scale, Shek (9) used exploratory factor analysis and found that the identified dimensions were in line with the original conceptualization. In the area of family functioning, Shek (10) examined the Chinese version of the Self-Report Inventory and reported that the dimensions in the Chinese version were different from those of the original English version. Similar findings were obtained for the Family Assessment Device. Shek (11) showed that in contrast to the original model, the number of factors was smaller in the Chinese version. Regarding measures of parent-child dyads, Shek (12) used exploratory factor analyses to look at the structure of parenting measures. Although exploratory factor analysis is easily done, it has been criticized as subjective and not definitive because different models can fit the same set of data.

In contrast to exploratory factor analysis, confirmatory factor analysis (CFA) attempts to "confirm" the factors in a scale. Under CFA, different models can be proposed and they can be tested for "goodness of fit" with reference to the observed data. Confirmatory factor analyses (CAF) is always used to examine the latent structure of a testing instrument (such as newly established questionnaire) or to verify the number of underlying factors and the pattern of item-factor relationship (7). However, confirmatory factor analyses are more complex than exploratory factor analyses. Also, special software (e.g., LISERL, MPlus) rather than generic computer programs are needed for such analyses. The discussion on the relative strengths and weaknesses of these two methods and their applications can be seen in Shek and Ma (5) and Shek and Yu (6).

Confirmatory factor analyses have been used in family measures. For example, confirmatory factor analyses have been used to examine the factorial validity of the Chinese Family Assessment Instrument (13). In another study, the factor structure of the

Parenting Scale (over-reactivity, laxness, and verbosity) was examined in 596 Dutch-speaking mothers and 559 fathers with elementary school-aged children (14). CFA results did not support the hypothesized model. As a result, exploratory factor analysis was further conducted and a two-factor model (over-reactivity and laxness) was suggested. CFA was conducted again for the modified model, with the results replicated in the father and mother data. Confirmatory factor analysis was also conducted to examine the latent factor structure of the Family Adaptability and Cohesion Evaluation Scales (FACES-III) using 922 families with disabled children (15). Results revealed that the original model did not fit the data. Instead, results suggested that the Adaptability factor should be divided into two (i.e., Adaptability and Control and Discipline) whereas the Cohesion factors should remain unchanged.

The second issue which should be taken into account is that most of the objective psychosocial measures have been developed in the West. With particular reference to the Chinese culture, there are relatively fewer Chinese measures (13). For example, using “parent-child relationship” and “assessment” as search terms, a computer search of PsycINFO in November 2014 showed that there were 1,620

citations. However, when the search term of “Chinese” was added to the search, there were only 34 citations. As there are cross-cultural differences in human behavior (e.g., ideal attributes of a family), there is a need to examine whether translated measures and indigenous measures are reliable and valid.

As the quality of the parent-child dyad influences adolescent development, it is important to assess the quality of the parent-child dyad. According to Shek (16), there are three important dimensions in the parent-adolescent dyad. The first aspect is parental behavioral control which refers to how much the parent monitors and control the child. The second aspect is parental psychological control which refers to the parent’s attempt to control the child such as induction of guilt and intrusiveness. The final aspect is parent-child relationship which refers to the mutual trust between the parent and the child, and whether the child is satisfied with parental control. Shek (16, 17) developed measures to assess parental behavioral control, parental psychological control, and parent-child relationship. Research findings showed that these measures showed evidence of reliability and validity.

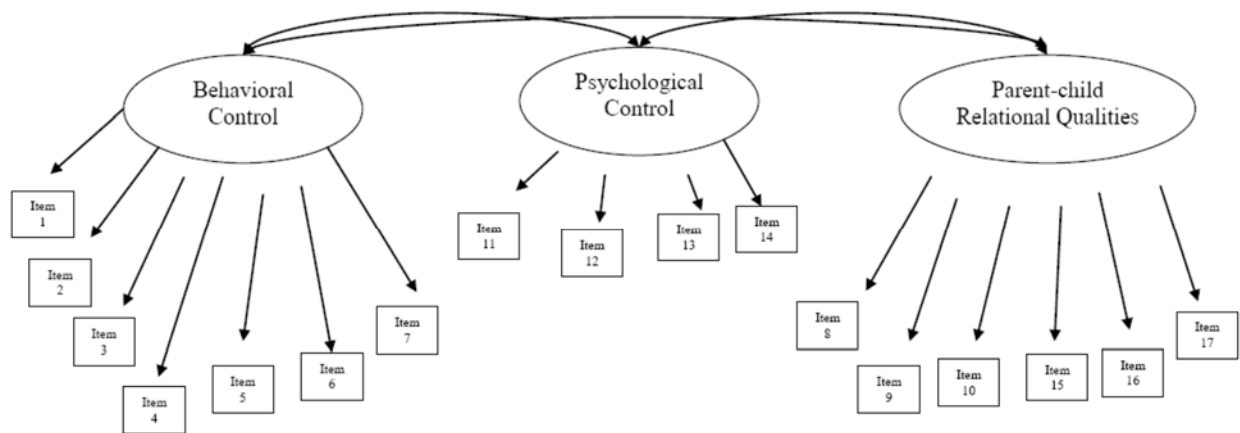


Figure 1. A hypothesized model based on Chinese parent-child subsystem scale (Model 3 and Model 3a).

To assess the quality of the parent-child dyad in a longitudinal study, Shek and his associates (18, 19) used a condensed version of the measures used in the previous studies. In the analyses conducted by Shek and Law (20), reliability analyses showed that the total scale as well as the three subscale measures

showed good internal consistency. Using exploratory factor analyses, results further showed that three factors could be extracted from the scale and these dimensions were found to be stable across different subsamples. While the findings based on exploratory factor analyses are good, it would be important to ask

whether these dimensions could be “confirmed” by confirmatory factor analyses. In this study, the data reported in Shek and Law (20) were re-analyzed using confirmatory factor analyses. The hypothesized model based on Chinese Parent-Child Subsystem Scale is shown in Figure 1.

Methods

The sample used in the present study was derived from the Wave 1 data from a large 6-year longitudinal study in Hong Kong. The purpose of the longitudinal study was to understand the psychosocial adjustment of the Hong Kong junior secondary school students. The Secondary 1 data were used in this study. Students were invited to respond to a standardized questionnaire. The questionnaire contains two major parts: the first part includes different measures of personal well-being, such as positive youth development, life satisfaction, and several types of adolescent risk behaviors, including Internet addiction, delinquency, substance abuse, pornography consumption, etc. In the second part, it includes measures of family processes, family functioning, and dyadic parent-child processes (e.g., behavioral control, psychological control and parent-child relationship). In the present study, measures of behavioral control, psychological control and parent-child relationship in relation to the parent-child subsystem were included for analyses.

Assessment of parental behavioral control

Validated measures of parental behavioral control were developed in the previous studies (21-24). Three aspects of Parental Behavioral Control were included: two items on paternal knowledge (e.g., “My father knows my situation in my school”); two items on paternal expectation (e.g., “My father has clear expectations about how I make friends”); and three items on paternal monitoring (e.g., “My father actively understands my situation at school”; “My father actively understands my afterschool activities”). Identical items were used to assess maternal behavioral control.

Assessment of parental psychological control

For the Paternal Psychological Control Scale, there were four items (e.g., “My father always wants to change my views and experiences”; “My father wants to control everything I do”). Identical items were used to assess maternal psychological control that formed the Chinese Maternal Psychological Control Scale (25, 26).

Assessment of parental child relational quality

Based on the measures of parent-child relational qualities used in previous studies (25, 26), six items were included for “paternal-child relational quality”, (e.g., “My father’s discipline of me is reasonable”; “I actively tell my father what happens to me”; “I actively share my experience with my father”). Identical items were used to assess the respondent’s satisfaction with maternal-child relational quality.

Participants and procedures

In 2009/10 school year, 3,328 Secondary 1 students (1719 males, 1670 females and 37 did not indicate their gender; mean age=12.5 years) were recruited from 28 schools randomly selected from all secondary schools in Hong Kong (20). Before the students completed the questionnaire in a self-administered manner, consent from the participating schools, students, and their parents had been collected. A trained research assistant was present the whole data collection process to brief the students about the purpose of the study and confidentiality of the data collected. The duration of the data collection lasted for around 30-45 minutes.

Data analytic strategy

Confirmatory factor analyses were performed to test the structure of the Chinese Parent-Child Subsystem Quality Scale using MPlus version 7.11. According to the original conceptual model and the findings of exploratory factor analysis, a three-factor model was proposed (see Figure 1). This model is composed of 7

items on parental behavioral control, 4 items on parental psychological control and 6 items on parent-child relationship. Before the analyses, the assumption of normality of distribution in terms of skewness and kurtosis values were checked. As they had values lower than 2 and 7 respectively, maximum likelihood estimation (ML) was used. To assess the level of model fit, several fit statistics were used, including chi-square goodness-of-fit test (χ^2), comparative fit index (CFI), Tucker-Lewis Index (TLI), standardized root-mean-square residual (SRMR), and root-mean-square error of approximation (RMSEA). Based on previous studies (27, 28), for CFI and TLI, values of .95 or greater indicate an excellent fit and values ranged from .90 to .94 indicate good fit to the data. For the values of SRMR, values below .08 represent acceptable fit. For RMSEA, values of .06 indicate an “excellent fit, and values of .08 or less would indicate a good fit.

Results

Table 1 shows the overall goodness-of-fit indices of the father-adolescent dyad in different models. For Model 1, there was one factor of the model (17 items, Item 1 to 17). The results showed that the model did not fit the data very well ($\chi^2_{(119)} = 11433.72$, $p < .01$; CFI = .65; TLI = .60; SRMR = .13; RMSEA = .17). For Model 2, there are two factors of the model, the first factor was “Paternal Control” (11 items, Item 1 to 7; Item 11 to 14), and the second factor was “Father-Child Relationship” (6 items, Item 8 to 10; Item 15 to 17). Though the results were better than Model 1 ($\chi^2_{(118)} = 8695.51$, $p < .01$; CFI = .74; TLI = .69; SRMR = .12; RMSEA = .15), Model 2 did not fit the data well in terms of CFI, TLI, SRMR and RMSEA.

Table 1. Summary of goodness-of-fit statistics for all models (Father-child dyad)

	Model	Description	χ^2	df	CFI	TLI	SRMR	RMSEA
	1	Paternal (1-factor: F1= Items 1-17)	11433.72	119	.65	.60	.13	.17 (.17-.17)
Paternal	2	Paternal (2-factor: F1 = Items 1-7, Items 11-14; F2 + Items 8-10, Items 15-17)	8695.51	118	.74	.69	.12	.15 (.15-.15)
	3	Paternal (3-factor model, F1=Items 1-7; F2=11-14; F3=Items 8-10, Items 15-17)	4776.26**	116	.86	.83	.86	.11 (.11-.11)
	3a	Paternal (3-factor: F1=Items 1-7; F2=11-14; F3=Items 8-10, Items 15-17 with 3 parameters are freely estimated)	2420.80**	113	.93	.91	.09	.08 (.08-.08)

CFI: Comparative fit index; TLI: Tucker-Lewis index; SRMR: Standardized root mean square residual; RMSEA: Root mean square error of approximation.

** $p < .01$.

Model 1: Omnibus Father-Child Subsystem Quality (Item 1-17).

Model 2: Paternal Control (2-factor, Item 1-7, Item 11-14); Father-Child Relationship (Item 8-10, Item 15-17).

Model 3: Paternal Behavioral Control (Item 1 to Item 7); Paternal Psychological Control (Item 11-14); Father-Child Relationship (Item 8-10, Item 15-17).

For Model 3, there were three factors: “Paternal Behavioral Control” (7 items, Item 1 to Item 7); “Paternal Psychological Control” (4 items, Item 11 to 14); and “Father-Child Relationship” (6 items, Item 8 to 10, Item 15 to 17). Although the results of Model 3 were better than Model 1 and Model 2 ($\chi^2_{(116)} = 4776.26$, $p < .01$; CFI = .86; TLI = .83; SRMR = .86; RMSEA = .11), the values of CFI and TLI were lower than .90 and the value of RMSEA was above .10. Based on the suggested Modification Indices, three pairs of error covariance were freely estimated: Item 1 and Item 2: MI=407.53; Item 5 and Item 6: MI=377.42; Item 16 and Item 17: MI=1527.81). After the suggested parameters were allowed to be freed (as

they belonged to the same factor), the revised model (Model 3a) illustrated an adequate fit to the data ($\chi^2_{(113)} = 2420.80$, $p < .01$; CFI = .93; TLI = .91; SRMR = .09; RMSEA = .08). Though the values of SRMR and RMSEA fitted the data marginally, the values of CFI and TLI indicated good fit.

The overall goodness-of-fit indices of the mother-adolescent dyad among different models are shown in Table 2. Same as father-adolescent dyad, there was one factor of Model 1 (17 items, Item 18 to 34). The results showed that the model did not fit the data very well ($\chi^2_{(119)} = 14205.48$, $p < .01$; CFI = .62; TLI = .56; SRMR = .14; RMSEA = .19). For Model 2, there are two factors of the model, the first factor

was “Maternal Control” (11 items, Item 18 to 24; Item 28 to 31), and the second factor was “Mother-Child Relationship” (6 items, Item 25 to 27; Item 32 to 34). Results of Model 2 were also not satisfactory ($\chi^2_{(118)} = 11092.29$, $p < .01$; CFI = .70; TLI = .65; SRMR = .13; RMSEA = .17).

Table 2. Summary of goodness-of-fit statistics for all models (Mother-child dyad)

	Model	Description	χ^2	df	CFI	TLI	SRMR	RMSEA
	1	Maternal (1-factor: F1= Item 18-34)	14205.48	119	.62	.56	.14	.19 (.19-.19)
Maternal	2	Maternal (2-factor: F1 = Item 18-24, Item 28-31; F2 + Item 25-27, Item 32-34)	11092.29	118	.70	.65	.13	.17 (.17-.17)
	3	Maternal (3-factor model, F1=Item 18-24; F2=28-31; Item 25-27, Item 32-34)	5027.38**	116	.87	.84	.08	.11 (.11-.12)
	3a	Maternal (3-factor: F1=Item 18-24; F2=28-31; F3=Item 25-27, Item 32-34 with 3 parameters are freely estimated)	2211.38**	113	.94	.93	.08	.08 (.07-.08)

CFI: Comparative fit index; TLI: Tucker-Lewis index; SRMR: Standardized root mean square residual; RMSEA: Root mean square error of approximation.

** $p < .01$.

Model 1: Omnibus Mother-Child Subsystem Quality (Item 18-34).

Model 2: Maternal Control (2-factor, Item 18-24, Item 28-31); Mother-Child Relationship (Item 25-27, Item 32-34)

Model 3: Maternal Behavioral Control (Item 18-24); Maternal Psychological Control (Item 28-31); Mother-Child Relationship (Item 25-27, Item 32-34).

Table 3. Factor loadings, error variances and squared multiple coefficients based on confirmatory factor analysis

Paternal (Model 3a)	Maternal (Model 3a)					
	FL	ER	SMC	FL	ER	SMC
Behavioral control						
Item 1	.75	.44	.56	.75	.43	.57
Item 2	.74	.46	.54	.75	.43	.57
Item 3	.60	.64	.36	.64	.59	.41
Item 4	.65	.58	.42	.63	.60	.40
Item 5	.77	.41	.59	.79	.37	.63
Item 6	.80	.35	.65	.80	.36	.64
Item 7	.76	.42	.58	.76	.42	.58
Psychological control						
Item 11	.50	.76	.24	.59	.66	.34
Item 12	.75	.43	.57	.84	.30	.70
Item 13	.84	.29	.71	.90	.20	.80
Item 14	.74	.46	.54	.74	.46	.55
Parent-child relational qualities						
Item 8	.84	.30	.70	.85	.28	.72
Item 9	.82	.33	.67	.82	.33	.68
Item 10	.83	.31	.69	.83	.31	.69
Item 15	.77	.41	.59	.78	.40	.60
Item 16	.67	.55	.45	.70	.51	.49
Item 17	.66	.56	.44	.69	.52	.48

FL: Standardized factor loadings; ER: Standardized error variances; SMC: Squared multiple correlation.

All coefficients are statistically significant ($p < .05$).

For Model 3, there were three factors: “Maternal Behavioral Control” (7 items, Item 18 to Item 24); “Maternal Psychological Control” (4 items, Item 28 to 31); and “Mother-Child Relationship” (6 items, Item 25 to 27, Item 32 to 34). Although the results of Model 3 were better than Model 1 and Model 2

($\chi^2_{(116)} = 5027.38$, $p < .01$; CFI = .87; TLI = .84; SRMR = .08; RMSEA = .11), the values of CFI and TLI were lower than .90 and the value of RMSEA was above .10. Based on the Modification Indices, three pairs of error covariance were freely estimated: Item 1 and Item 2: MI = 626.08; Item 5 and Item 6:

MI = 440.93; Item 16 and Item 17: MI = 1802.54). After the suggested parameters were allowed to be freed (as they belonged to the same factor), the revised model (Model 3a) illustrated an adequate fit to the data ($\chi^2_{(591)} = 2211.38$, $p < .01$; CFI = .94; TLI = .93; RMSEA = .08; SRMR = .08). Similar to the father-adolescent dyad, although the values of SRMR and RMSEA fitted the data marginally, the values of CFI and TLI indicated good fit.

As shown in Table 3, seven items (i.e., Items 1-7) loaded on the first factor which was labeled "behavioral control". The second factor labelled "psychological control" contained four items (i.e., 11-14). There were six items in the third factor which was labelled "parent-child relational qualities" (Items 8-10 and Items 15-17). The factor loadings for the father-adolescent dyad and mother-adolescent dyad were all significant (z -scores > 1.96 , $p < .05$). For the father-child dyad, the factor loadings of the first factor (behavioral control) ranged from .60 to .80, the second factor (psychological control) ranged from .50 to .84, and the third factor (parent-child relational qualities) ranged from .66 to .84. For the mother-child dyad, the factor loadings of the first factor (behavioral control) ranged from .63 to .80, the second factor (psychological control) ranged from .59 to .90, and the third factor (parent-child relational qualities) ranged from .69 to .85. Given the satisfactory fit of Model 3a in the father-adolescent data and mother-adolescent data, this model was chosen as the final model.

Discussion

The present study attempted to examine the factorial validity of the Chinese Parent-Child Subsystem Quality Scale using confirmatory factor analysis. The findings are generally consistent with the previous study using exploratory factor analysis (20). Based on exploratory factor analyses, Shek and Law (20) showed that there were three dimensions intrinsic to the Chinese Parent-Child Subsystem Scale for both the father-adolescent and mother-adolescent dyads, including parental behavioral control, psychological control, and parent-child relational qualities. In the present study, confirmatory factor analyses were further conducted to examine the factorial validity of

the trimmed version of the scale. Findings based on confirmatory factor analyses reinforced the findings based on exploratory factor analyses. As shown in the results, the values of several goodness of fit indicated gave support to Model 3a because the findings suggest that the model fitted the data well. Also, all factor loadings were statistically significant ($p < .05$). In short, the factorial validity of this scale was empirically supported.

There are several strengths of this study. First, this study underscores the importance of performing confirmatory factor analyses, and the results further reinforced the findings of previous EFA study (20) by conducting confirmatory factor analyses. In the scientific literature, there are many examples showing that confirmatory factor analyses may yield findings which are different from exploratory factor analyses. For example, Halberstadt and colleagues (29) examined the structure of the 33-item Parent's Beliefs about Children's Emotion Questionnaire in different groups. While exploratory factor analyses using principal components analysis showed eight factors (e.g., Negative Consequences, Value/Acceptance, Manipulation, Control, Parental Knowledge, Autonomy, Respect, and Stability), confirmatory factor analyses conducted on the second sample showed support for seven of the eight scales only. Also, there are other studies showing that confirmatory factor analyses did not support the original conceptual framework. For example, in the study conducted by Zaidman-Zait and colleagues (30) with 337 parents with children suffering from autism spectrum disorder, the underlying factor structure of the Parenting Stress Index-Short Form (PSI-SF) was examined. In the original conceptual framework, three dimensions including parenting stress, child difficulty, and parent-child dysfunctional interactions were proposed. Confirmatory factor analyses showed that the original three-factor model did not fit the data. Instead, a six-factor model (General Distress, Parenting Distress, Rewards Parent, Child Demandingness, Difficult Child, and Comparative Expectations) provided a better fit to the data. In another study with 418 Japanese adults, Sato and colleagues (31) compared the factor structure of the original two-factor model Parental Bonding Instrument (PBI) with those of four three-factor models. The results indicated that the original two-

factor model obtained the poorest fit among models and provided inadequate fit to the data in terms of gender and age invariance. Therefore, every newly established scale should be validated before use (32, 33).

Second, a large sample of Chinese adolescents was employed in this study. Individuals with different cultural backgrounds and roles may have different perceptions and understanding of a specific concept. For Chinese parenting, it has been affected by thousands years of history (34) and it is different from the Western culture. Even within the same country, there are discrepancies of parenting beliefs between different cities. For example, as Hong Kong is a modern society with more than 100 years of colonial history, this unique experience may affect the parenting beliefs of Hong Kong families.

Furthermore, using validated measurements to understand human behavior is important. As stated by Raykov and Marcoulides (4), psychometric theory “provides a general framework for behavioral measuring instrument development, including instrument construction, revision, and modification” (p. 9). Though family and parenting are factors strongly emphasized in the Chinese society, there are few validated measures related to parental control and parent-child relationship and based on Chinese sample (20). If researchers would like to conduct research on parental behavioral control in Hong Kong, they should use a measure which has been validated in this specific context (35, 36) or validate the measures before study. The satisfactory findings obtained in this study can enable family researchers and practitioners to understand the family dynamics of Chinese families, such as the relationship between parental control, parent-child relational qualities and adolescent risk behavior (37).

Though this study has several strengths as mentioned above, there are several limitations. First, although the confirmatory factor analyses findings are positive, there is the need to examine factorial invariance of the scales in different samples in future. Second, as the findings were based on one wave of longitudinal data in this study, stability of the factor structure over time should be explored. Third, besides Chinese adolescents in Hong Kong, it would be exciting to recruit adolescents outside Hong Kong to replicate the present findings.

Acknowledgments

This paper is based on the DSW thesis of the second author. The authorship is equally shared between the first author and second author. Findings of the present study were presented at the International Conference on Positive Youth Development and the Tin Ka Ping P.A.T.H.S. Project organized by the Tin Ka Ping Foundation, The Hong Kong Polytechnic University and the East China Normal University on June 11-12, 2014 in Shanghai, China.

References

- [1] Lamborn SD, Mounts NS, Steinberg L, Dornbusch SM. Patterns of competence and adjustment among adolescents from authoritative, authoritarian, indulgent, and neglectful families. *Child Dev* 1991;62:1049-65.
- [2] Robin AL, Foster SL. *Negotiating parent-adolescent conflict*. New York: Guilford, 1989.
- [3] Crouter AC, Head MR. Parental monitoring and knowledge of children. In: Bornstein MH, ed. *Handbook of parenting vol. 3*. Mahwah, NJ: Erlbaum, 2002:461-83.
- [4] Raykov T, Marcoulides GA. *Introduction to psychometric theory*. New York: Routledge, 2011.
- [5] Shek DTL, Ma CMS. The use of confirmatory factor analyses in adolescent research: Project P.A.T.H.S. in Hong Kong. *Int J Child Adolesc Health* 2014;13(2):217-26.
- [6] Shek DTL, Yu L. Confirmatory factor analysis using AMOS: A demonstration. *Int J Child Adolesc health* 2014;13(2):191-204.
- [7] Brown TA. *Confirmatory factor analysis for applied research*. New York: Guilford, 2006.
- [8] Fabrigar LR, Wegener DT, MacCallum RC, Strahan EJ. Evaluating the use of exploratory factor analysis in psychological research. *Psychol Methods* 1999;4(3):272-99.
- [9] Shek DTL. The Chinese version of the Dyadic Adjustment Scale: Does language make a difference? *J Clin Psychol* 1995;51(6):802-11.
- [10] Shek DTL. The Chinese version of the Self-Report Family Inventory: Does culture make a difference? *Res Soc Work Pract* 1998;8(3):315-29.
- [11] Shek DTL. Assessment of family functioning in Chinese adolescents: The Chinese version of the Family Assessment Device. *Res Soc Work Pract* 2002;12(4):502-24.
- [12] Shek DTL. Assessment of global parenting style and specific parenting behavior in a Chinese context. *Psychologia* 1999;42(2):69-79.

- [13] Shek DTL, Ma CMS. The Chinese Family Assessment Instrument (C-FAI): Hierarchical confirmatory factor analyses and factorial invariance. *Res Soc Work Pract* 2010;20(1):112-23.
- [14] Prinzie P, Onghena P, Hellinckx W. Reexamining the parenting scale: Reliability, factor structure, and concurrent validity of a scale for assessing the discipline practices of mothers and fathers of elementary-school-aged children. *Eur J Psychol Assess* 2007;23:24-31.
- [15] Crowley SL. A psychometric investigation of the FACES-III: Confirmatory factor analysis with replication. *Early Educ Dev* 1998;9:161-78.
- [16] Shek DTL. Perceived parental control based on indigenous Chinese parental control concepts in adolescents in Hong Kong. *Am J Fam Ther* 2007;35(2):123-37.
- [17] Shek DTL. Perceived parental control processes, parent-child relational qualities, and adolescents psychological well-being in intact and nonintact families: Longitudinal findings in the Chinese culture. *J Divorce Remarriage* 2008;49(1/2):171-89.
- [18] Ma CMS, Shek DTL. Consumption of pornographic materials in early adolescents in Hong Kong. *J Pediatr Adolesc Gynecol* 2013;26:S18-25.
- [19] Shek DTL. Sexual behavior and intention to engage in sexual behavior in junior secondary school students in Hong Kong. *J Pediatr Adolesc Gynecol* 2013;26(2013):S33-41.
- [20] Shek DTL, Law MYM. Assessment of parent-child subsystem qualities in Chinese adolescents: Behavioral control, psychological control and parent-child relational qualities. *Int J Disabil Hum Dev* 2015;8(2):207-17.
- [21] Shek DTL. Assessment of family functioning in Chinese adolescents: The Chinese version of the family assessment device. *Res Social Work Prac*. 2002;12(4):502-24.
- [22] Shek DTL. Family functioning and psychological well-being, school adjustment, and substance abuse in Chinese adolescents: Are findings based on multiple studies consistent? In: Shohov SP, editor. *Advances in psychology research*. New York: Nova Science, 2003:163-84.
- [23] Shek DTL, Ma CMS. The Chinese Family Assessment Instrument (C-FAI): Hierarchical confirmatory factor analyses and factorial invariance. *Res Social Work Pract* 2010;20(1):112-23.
- [24] Siu AMH, Shek DTL. Psychometric properties of the Chinese Family Assessment Instrument in Chinese adolescents in Hong Kong. *Adolescence* 2005;40(160):817-30.
- [25] Shek DTL. Perceived parental control based on indigenous Chinese parental control concepts in adolescents in Hong Kong. *Am J Fam Ther* 2007;35(2):123-37.
- [26] Shek DTL. Assessment of perceived parental psychological control in Chinese adolescent in Hong Kong. *Res Social Work Pract* 2006;16(4):382-91.
- [27] Bentler PM, Bonett DG. Significance tests and goodness of fit in the analysis of covariance structures. *Psychol Bull* 1980;88(11):588-606.
- [28] McDonald RP, Marsh HW. Choosing a multivariate model: Noncentrality and goodness of fit. *Psychol Bull* 1990;107(3):247-55.
- [29] Halberstadt AG, Dunsmore JC, Bryant Jr. A, Parker AE, Beale KS, Thompson JA. Development and validation of the parents' beliefs about children's emotion questionnaire. *Psychol Assess* 2013;25(4):1195-210.
- [30] Zaidman-Zait A, Mirenda P, Zumbo BD, Georgiades S, Szatmari P, Bryson S, et al. Factor analysis of the Parenting Stress Index-Short Form with parents of young children with autism spectrum disorders. *Autism Res* 2011;4:336-46.
- [31] Sato T, Narita T, Hirano S, Kusunoki K, Sakado K, Uehara T. Confirmatory factor analysis of the Parental Bonding Instrument in a Japanese population. *Psychol Med* 1999;29:127-33.
- [32] Shek DTL, Ma CMS. Dimensionality of the Chinese perceived causes of Poverty Scale: Findings based on confirmatory factor analyses. *Soc Indic Res* 2009;90(2):155-64.
- [33] Yu L, Shek DTL. Testing factorial invariance across groups: An illustration using AMOS. *Int J Disabil Hum Dev* 2014;13(2):205-16.
- [34] Ho DYF. Continuity and Variation in Chinese Patterns of Socialization. *J Marriage Fam* 1987;51(1):149-63.
- [35] Cohen RJ, Swerdlik ME. *Psychological testing and assessment. An introduction to tests and measurement*. New York: McGraw Hill, 2002.
- [36] Shek DTL, Yu L. Internet addiction phenomenon in early adolescents in Hong Kong. *Scientific World Journal* 2012;2012:1-9.
- [37] Shek DTL, Law MYM. Parental behavioral control, parental psychological control and parent-child relational qualities: Relationships to Chinese adolescent risk behavior. In: Shek DTL, Sun RCF, Ma CMS, eds. *Chinese adolescents in Hong Kong: Family life, psychological well-being and risk behavior. Quality of life in Asia*, 5. Singapore: Springer, 2014: 51-69.

Submitted: December 14, 2014. *Revised:* January 04, 2015. *Accepted:* January 14, 2015.

Copyright of International Journal of Child Health & Human Development is the property of Nova Science Publishers, Inc. and its content may not be copied or emailed to multiple sites or posted to a listserv without the copyright holder's express written permission. However, users may print, download, or email articles for individual use.