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Validation of the Chinese Parental Sacrifice for Child's Education Scale

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Abstract

Based on the data collected from a sample of parents (n=125) and a sample of adolescents (n=373) in Hong Kong, the psychometric properties of the Chinese Parental Sacrifice on Child's Education Scale (SA) are examined in this paper. Results showed that the scale had good reliability (internal consistency and test-retest reliability) and convergent validity in both samples. For the dimensionality of the measure, a 3-factor structure was extracted from the adolescent sample and a 5-factor structure was extracted from the parent sample. The present study is a pioneering attempt to assess parental sacrifice for child's education in Chinese communities.

Keywords: children's education; Chinese adolescents; Chinese parents; parental sacrifice; psychometric properties.

Introduction

Education has been regarded as a milestone for individuals in achieving upward social and economic mobility (1, 2). Apart from serving the instrumental purpose of climbing the social ladder, education possesses special meaning on the fulfillment of two fundamental values in Chinese culture: human malleability and self-improvement (3). It has an ultimate function in the cultivation of "*chun-tzu*" (man of virtue or noble character), which contains a strong moralistic sentiment (4, 5). Thus, education has a high value in adolescent development in the Chinese community.

To allow children to attain better education is an important task for parents, but it is not easy to fulfill. Among different theories describing parental contribution to children's education, parental sacrifice is an important feature identified in Asian culture (6). Parental sacrifice for child's education is a process by which parents give up their personal needs for the sake of the educational needs of their children. Though the concept of parental sacrifice for child's education is distinctive and important in understanding the family process on parent's contribution to their child's educational and developmental needs, it was almost neglected in the literature (7). In addition, validated measures of parental sacrifice are almost non-existent in different Chinese communities.

A validated indigenous measurement tool to assess parental sacrifice for child's education is important for two reasons. First, as the concept and the theories related to parental sacrifice are underdeveloped, a validated measurement tool would facilitate empirical studies in the area, which would make theorization and conceptualization of the concept of parental sacrifice possible. Second, it helps researchers to understand the family process on how Chinese people nurture their children under the influence of Confucian philosophy, which may be different from that of Western societies. There is always an urge for the development of indigenous Chinese family concepts that enhance our understanding of Chinese families and construction of relevant family models (8, 9).

The purpose of the paper is to present the studies on assessing the psychometric properties of the Chinese Parental Sacrifice on Child's Education Scale (SA). The Chinese Parental Sacrifice on Child's Education Scale (SA) was developed based on a survey of the literature on family resources for child's education, including family capital theory (10, 11), family investment model (12), and parental involvement on child's schooling and activities (13–16). Furthermore, two focus groups of parents and adolescents were arranged and interviewed separately to understand their perceptions and experiences on parental sacrifice for child's education. Five dimensions of parental sacrifice on child's education emerged in the qualitative data, including "striving of financial resources", "time spent on child education", "restructuring of daily routine", "sacrifice of lifestyle and aspiration", and "shielding of worries" (7). The dimensions reflect the conceptual model of family resources for child's education by recognizing the importance of financial resources and time allocation to child's education. Moreover, the affective dimensions of "restructuring of daily routine", "sacrifice of lifestyle and aspiration", and "shielding of worries" were also identified, which enriched the conceptual model of parental sacrifice for child's education.

Before the scale can be objectively used in research and practice contexts, it is important to establish the psychometric properties of the scale. Typically, three aspects of the

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psychometric properties of the scale should be examined. First, reliability of the measure, including internal consistency and test-retest reliability, should be assessed. Second, validity of the scale, particularly its relationship to a criterion measure (i.e., criterion-related validity) should be explored. Finally, the dimensionality of measure with reference to factorial validity should be examined. In this paper, data were collected from a parent sample and an adolescent sample to evaluate the psychometric properties of the measures.

Methods

Study 1

Participants and procedure For the study based on adolescent sample, students in two secondary schools were invited to participate in the study. There were 373 students participating in the study, with 65 students from Secondary 1, 90 from Secondary 2, and 218 from Secondary 3. There were 216 boys (57.9%) and 153 girls (41.05%) (four did not respond). The mean age was 14 years (SD=1).

During data collection, the purpose of the study was described to students and confidentiality of the data was emphasized. The students were informed that they could choose not to participate in the study (i.e., "passive" informed consent of the students was obtained from the students). All students responded to the Adolescent Questionnaire in a self-administered format. Adequate time was provided for the students to complete the questionnaire. The students took around 20 min to complete the questionnaires. Internal consistency, convergent validity, and factor analysis were carried out to examine the psychometric properties of the scale in the adolescent sample.

Instruments The Adolescent Questionnaire consisted of the following scales: Paternal Sacrifice for Child's Education Scale (PSA), Paternal Responsiveness Scale (PRES), Paternal Support Scale (PSUP), Maternal Sacrifice for Child's Education Scale (MSA), Maternal Responsiveness Scale (MRES), Maternal Support Scale (MSUP), and some questions on the demographic background of the respondents. To differentiate the possible roles and behaviors of fathers and mothers, both perceived paternal sacrifice (PSA) and maternal sacrifice (MSA) for children's education were measured.

Both PRES/MRES and PSUP /MSUP were used for the evaluation of the convergent validity of the PSA and MSA. The details of the measures are outlined below.

Paternal and Maternal Sacrifice for Child's Education Scale (PSA and MSA) An indigenous scale on assessing parental sacrifice for child's education was validated in the research. Based on the limited literature on parental sacrifice (17–19), theories on family investment (12), family capital (10, 11), and parental involvement in children's education (13–16), and data collected from focus groups of parents and adolescents were reviewed and items were developed. Eventually, 23 items measuring dimensions of sacrifice in terms of financial resources, time involvement on child's school work, reorganization of daily routine, sacrifice of lifestyles and aspiration, and shielding of worries from the children were developed. The higher score of the scale indicates the greater parental sacrifice for child's education.

Paternal and Maternal Support Scale (PSUP and MSUP) Shek (20) developed PSUP/MSUP, with three items in each scale (21). The scales showed internal consistency (α=0.89 and 0.86 for PSUP and MSUP, respectively) in a longitudinal study (20). Higher PSUP and MSUP indicate higher support from father and mother respectively.

Paternal and Maternal Responsiveness Scale (PRES and MRES) Based on the framework of Maccoby and Martin (22) and parenting assessment work of Lamborn et al. (23), Shek (24) developed a modified version of PRES and MRES to assess the responsiveness of father and mother on the child's behaviors respectively. The scales were found to be valid and reliable in the Chinese culture with support for its internal consistency, test-retest reliability, and concurrent validity (24–27). There are 13 items found in the Responsiveness Scale.

Study 2

Participants and procedure For the study based on the parent sample, parents with at least one child aged between 11 and 15 years were recruited from eight children and youth service centers to participate in the study. There were 125 parents participated in the study, with eight fathers (6.4%) and 117 mothers (93.6%). The age of parents ranged from 31 to 60 years, with majority of the age between 36 and 40 years (n=26, 20.8%). There were 35 parents with one child (28.0%), 66 with two children (52.8%) and 23 with three children (18.4%). Their children were 62 boys (49.6%) and 60 girls (48.0%), with mean age at 13.49 (SD=1.77).

During data collection, parents were requested to complete the Parent Questionnaire in a self-administered format. For those parents who had difficulties in comprehending the questions, social workers asked the questions in an interview format. Test-retest reliability test was also performed to assess the temporal stability of the measure. For test-retest reliability, the sampled parents were requested to complete the Parent Questionnaire. After 2 weeks, they were invited to fill in the Questionnaire once more. The results of the two equivalent tests were collected and analyzed. There were 25 parents participated in the test-retest reliability study. Internal consistency, test-retest reliability, convergent validity, and factor analysis were evaluated with the parent's data.

Instruments The Parent Questionnaire included Parental Sacrifice for Child's Education Scale (SA), Parental Responsiveness Scale (RES), Parental Support Scale (SUP), and some questions on demographic background. Again, both Parental Responsiveness Scale (RES) and Parental Support Scale (SUP) were used for the evaluation of the convergent validity of the Parental Sacrifice for Child's Education Scale (SA).

Results

Study 1

The adolescents' data showed that the scores of the Paternal Sacrifice for Child's Education Scale (PSA) were not significantly related to most demographic variables except educational level of adolescents ($r=0.12$, $p<0.05$) and father's educational level ($r=0.11$, $p<0.05$). The Maternal Sacrifice for Child's Education Scale (MSA) was only significantly related to marital status of parents ($r=0.13$, $p<0.05$). As the amount of overlap on the correlation of PSA and educational levels of adolescents and fathers were low (1.44% and 1.21% of the variance respectively), no separated analysis of PSA scores

by educational levels of adolescents and fathers were carried out. The same arrangement with MSA and marital status of parents was suggested because the amount of variance overlap was low (1.74% of the variance).

It was found that the internal consistency of the Paternal and Maternal Sacrifice on Child's Education Scale (PSA and MSA) was high, with the overall Cronbach's α of 0.96 ($p<0.001$) and 0.95 ($p<0.001$), respectively. The mean inter-item correlations were 0.48 and 0.49 respectively and the mean corrected item-total correlations were 0.68 and 0.68, respectively. PSA and MSA showed excellent internal consistency.

For assessing the validity of Paternal and Maternal Sacrifice for Children's Education Scales (PSA and MSA), convergent validity was assessed with the correlation of Paternal and Maternal Support Scale (PSUP and MSUP) and Paternal and Maternal Responsiveness Scale (PRES and MRES). It was found that PSA was significantly positively correlated with the Paternal Support Scale (PSUP) ($r=0.42$, $p<0.001$) and the Paternal Responsiveness Scale (PRES) ($r=0.58$, $p<0.001$). Furthermore, MSA was also significantly positively correlated with the Maternal Support Scale (MSUP) ($r=0.36$, $p<0.001$) and the Maternal Responsiveness Scale (MRES) ($r=0.55$, $p<0.001$). Table 1 presents the correlation coefficients between Paternal and Maternal Sacrifice for Child's Education Scales and other parenting measures.

To examine the underlying dimensionality of the scale, factor analysis of principal component analysis with varimax rotation was performed with PSA and MSA. From the initial factors extraction on PSA using the data of adolescents, a 3-factor solution was suggested because the three factors had eigenvalue greater than unity. The solution explained 67.61% of the total variance. The loadings of all items exceeded 0.40. The first factor was named as "striving for financial resources" accounting for 50.53% of the total variance. There were nine items included in the first factor (Item 1, 2, 3, 4, 5, 6, 7, 8, 9). The second factor was labeled "accommodation of daily routine and lifestyle" which explained 11.60% of the total variance. There were eight items (Item 15, 17, 18, 19, 20, 21, 22, 23) included in the second factor. The second factor combined the dimensions of "restructuring of family routine", "sacrifice of lifestyle and aspiration", and "shielding of worries". The third factor was named as "time spent on child's education" that accounted for 5.47% of the total variance. It included six items (Item 10, 11, 12, 13, 14, 16).

Similarly, in identifying the factor structure of MSA, an identical procedure of principal component analysis with varimax rotation was performed. The result was very similar to that of PSA: a three-factor solution of MSA was obtained. All three factors had eigenvalue greater than unity. The solution explained 67.51% of the total variance. The loadings of all items exceeded 0.40. The first factor was named "striving for financial resources" which accounted for 51.35% of variance, including nine items (Item 1, 2, 3, 4, 5, 6, 7, 8, 9). The second factor was labeled "accommodation of daily routine and lifestyle", explaining 9.75% of variance with nine items (Item 14, 15, 17, 18, 19, 20, 21, 22, 23). The third factor was named "time spent on child's education" which explained 6.42% of variance with five items (Item 10, 11, 12, 13, 16). Table 2 lists the rotation component matrix of PSA and MSA.

Table 1 Correlation coefficient between Parental Sacrifice for Child's Education and other parenting measures in adolescent study.

	PSUP	MSUP	PRES	MPES
PSA	0.42[a]		0.58[a]	
MSA		0.36[a]		0.55[a]

[a]$p<0.001$. PSA, Paternal Sacrifice for Child's Education Scale; MSA, Maternal Sacrifice for Child's Education Scale; PSUP, Paternal Support Scale; MSUP, Maternal Support Scale; PRES, Paternal Responsiveness Scale; MRES, Maternal Responsiveness Scale.

Study 2

The parent's data showed that the scores of Parental Sacrifice for Child's Education Scale (SA) were not significantly related to their gender, educational status, occupation, duration of stay in Hong Kong, marital status, family income, number of children, gender, age, and educational level of their children under study. However, it was significantly related to parental age ($r=-0.28$, $p<0.01$), suggesting that parents of older age would have a relatively lower level of parental sacrifice. The influence of parent's age on correlational study of SA would be considered.

It was found that internal consistency of SA was high, with the overall Cronbach's α of 0.94 ($p<0.001$). The mean inter-item correlation was 0.39 and the mean corrected item-total correlation was 0.60 which was considered high. The SA had good internal consistency. To assess the temporal stability of the measure, test-retest reliability was performed. The correlation coefficient, the Pearson's r, between two equivalent tests was taken as an estimate of the reliability of the test. Test-retest reliability coefficient, in terms of Pearson's r, was 0.82 ($p<0.001$). The scale showed good test-retest reliability.

For the convergent validity of the measure, the Scale was correlated with the Parental Support Scale (SUP) and the Parental Responsiveness Scale (RES). It was found that SA was significantly positively related with SUP, with Pearson's r at 0.26 ($p<0.01$). When parent's age was controlled, Pearson's r between SA and SUP was 0.27 ($p<0.01$). Also, SA was significantly positively related with RES (Pearson's $r=0.27$, $p<0.01$). When parent's age was controlled, the Pearson's r between SA and RES was 0.24 ($p<0.01$). Table 3 presents the correlation coefficient between Parental Sacrifice for Child's Education and other parenting measures.

For factor analysis, the sample size of parent's sample was a consideration. As the rule of thumb that a ratio of five subjects per variable (item) was basically required for factor analysis (28, 29), the measure contained 23 items and a minimum of 115 cases was required. The sample size of parent's sample in the study was 125, which was merely adequate for factor analysis.

For the initial factors extraction on SA using the data of parents, a 5-factor solution was obtained. All five factors had eigenvalue greater than unity. The solution explained 70.13% of the total variance. The loadings of all items exceeded 0.40.

Table 2 Rotation component matrix of PSA and MSA in adolescent study.

	Item	PSA			MSA		
		Component			Component		
		1	2	3	1	2	3
1	To fulfill the educational needs of my child, I eat and wear less.	**0.70**	0.22	0.15	**0.75**	0.29	0.16
2	I save money for my child to study in university, despite how hard the work I face.	**0.78**	0.12	0.22	**0.67**	0.13	0.20
3	The expense of child's education is more important than my personal expenses.	**0.64**	0.24	0.09	**0.76**	0.28	0.14
4	If my child needs tutoring, I would fulfill his/her needs even if family expenses have to be tightened.	**0.76**	0.22	0.21	**0.78**	0.26	0.23
5	If my child needs to join extra-curricular activities, I would fulfill his/her needs even if family expenses have to be tightened.	**0.76**	0.17	0.27	**0.69**	0.14	0.38
6	I save rigorously as to reserve funds for child's education.	**0.74**	0.18	0.30	**0.71**	0.24	0.36
7	Even if the family faces financial stress, I will not stop any educational expenses of children.	**0.77**	0.10	0.14	**0.77**	0.24	0.24
8	If my child needs to buy reference books, I would fulfill his/her needs even if family expenses have to be tightened.	**0.83**	0.21	0.22	**0.79**	0.20	0.29
9	In case the family faces financial stress, I will borrow money to fulfill the educational needs of children.	**0.61**	0.39	0.03	**0.65**	0.42	0.18
10	During the examination period, I will try my best to stay at home and accompany with my child.	0.22	0.33	**0.75**	0.29	0.39	**0.68**
11	If the teacher calls me to discuss about my child, I will stop my work and see the teacher even I am busy at the time.	0.26	0.23	**0.76**	0.41	0.16	**0.74**
12	I always reserve the time for participating in the parent day of school.	0.20	0.16	**0.80**	0.33	0.14	**0.78**
13	Even I am tired, I try my best to understand the school life of my child.	0.32	0.35	**0.70**	0.31	0.26	**0.75**
14	When my child studies at midnight, I will never sleep.	0.19	0.52	**0.60**	0.11	**0.70**	0.39
15	My life routine is adjusted according to the educational needs of my child.	0.16	**0.59**	0.57	0.19	**0.72**	0.43
16	During the examination period, I am more conscious in taking care of my children.	0.21	0.47	**0.69**	0.20	0.53	**0.63**
17	I will change the family habits in order to fit the educational needs of my child.	0.22	**0.62**	0.51	0.23	**0.73**	0.43
18	In order to have a silent environment for the study of my child, I give up family entertainment.	0.20	**0.66**	0.41	0.23	**0.68**	0.31
19	I give up my hobbies for the education of my child.	0.23	**0.77**	0.37	0.30	**0.81**	0.20
20	I sacrifice my aspiration for the education of my child.	0.23	**0.81**	0.33	0.25	**0.84**	0.17
21	I give up my social life for the education of my child	0.20	**0.82**	0.32	0.10	**0.54**	0.07
22	I will hide the family worries in front of my child in order not to disturb his/her studying.	0.32	**0.71**	0.20	0.42	**0.69**	0.03
23	In order not to affect the study of my child, I will hide my sickness when it happens.	0.28	**0.71**	0.13	0.39	**0.65**	0.02
	Variance explained	50.53	11.60	5.47	51.35	9.75	6.42
	Total variance	67.61%			67.51%		

Values in bold: the highest loadings obtained by a variable among the factors.

The first factor was named as "accommodation of daily routine and lifestyle" which accounted for 41.55% of the total variance. There were nine items included in the factor (Item 10, 14, 15, 16, 17, 18, 19, 20, 21). The second factor was labeled as "hardship on striving for financial resources" which explained 9.69% of the variance. There were four items in the factor (Item 1, 2, 3, 6). The third factor was labeled "precedence of child's education over family expense" which accounted for 8.72% of the variance. There were five items included in the factor (Item 4, 5, 7, 8, 9). The second and third factors constituted the "financial resources for child's education" in the conceptual model. The fourth factor was named as "time spent on child's education" that accounted for 5.75% of the total variance. It included three items (Item 11, 12, 13). The fifth factor was labeled as "shielding of worries", which accounted for 4.42% of the total variance. There were two items included in the factor (Item 22 and 23). Table 4 shows the rotated factor solution of SA.

Discussion

In view of the non-existence of validated assessment tools of parental sacrifice for child's education, the present paper

Table 3 Correlation coefficient between Parental Sacrifice for Child's Education and other parenting measures.

	SUP	RES
SA	0.26[a] (0.27[a])[b]	0.27[a] (0.24[a])[b]

[a]p<0.01. [b]The correlation coefficient was calculated with parent's age having controlled. SA, Parental Sacrifice for Child's Education Scale; SUP, Parental Support Scale; RES, Parental Responsiveness Scale.

describes two studies on the psychometric properties of the Chinese Parental sacrifice for child's education Scale. There are several unique characteristics of the studies. First, an indigenous measure of parental sacrifice for child's education was employed. Second, data based on both adolescents and parents were collected. Third, different aspects of the psychometric properties, including internal consistency, test-retest reliability, convergent validity, and factorial validity were explored.

The studies generated empirical evidence of the psychometric properties of the Parental Sacrifice for Child's Education Scale, which is considered as pioneering in this field. The scale showed good results in internal consistency, test-retest reliability, convergent validity, and factorial validity, suggesting that the scale possessed good psychometric properties on reliability and validity. In view of the paucity of research in this area, this study is an important addition to the literature.

Consistent with the literature on family resources and the conceptual framework based on the focus groups of parents and adolescents, factor analyses with adolescent and parent samples suggested that striving for financial resources, time involvement in child's education, and accommodation of daily routine and lifestyles were important dimensions of the construct. However, a 5-factor solution and a 3-factor solution were obtained from the parent's study and adolescent's study respectively. The discrepancies may be explained by two possibilities. First, there were discrepancies in the perceptions of parents and adolescents on parental sacrifice for child's education. Parents took a more sentimental view of parental

Table 4 Rotation component matrix of SA using parent's data.

	Item	SA				
		Component				
		1	2	3	4	5
1	To fulfill the educational needs of my child, I eat and wear less.	0.06	**0.79**	0.11	0.13	0.18
2	I save money for my child to study in university, despite how hard the work I face.	0.20	**0.71**	0.21	0.18	–0.02
3	The expense of child's education is more important than my personal expenses.	0.08	**0.69**	0.37	0.12	0.20
4	If my child needs tutoring, I would fulfill his/her needs even if family expenses have to be tightened.	0.19	0.47	**0.55**	0.08	0.01
5	If my child needs to join extra-curricular activities, I would fulfill his/her needs even if family expenses have to be tightened.	0.34	0.26	**0.70**	0.08	0.13
6	I save rigorously as to reserve funds for child's education.	0.17	**0.73**	0.34	0.21	0.04
7	Even if the family faces financial stress, I will not stop any educational expenses of children.	0.23	0.13	**0.83**	0.19	0.12
8	If my child needs to buy reference books, I would fulfill his/her needs even if family expenses have to be tightened.	0.30	0.26	**0.65**	0.30	0.11
9	In case the family faces financial stress, I will borrow money to fulfill the educational needs of children.	0.11	0.32	**0.67**	0.05	0.23
10	During the examination period, I will try my best to stay at home and accompany with my child.	**0.62**	0.24	0.17	0.35	–0.09
11	If the teacher calls me to discuss about my child, I will stop my work and see the teacher even I am busy at the time.	0.16	0.17	0.15	**0.74**	0.03
12	I always reserve the time for participating in the parent day of school.	0.08	0.14	0.18	**0.87**	–0.02
13	Even I am tired, I try my best to understand the school life of my child.	0.23	0.16	0.09	**0.80**	0.10
14	When my child studies at midnight, I will never sleep.	**0.60**	–0.01	0.37	0.23	0.10
15	My life routine is adjusted according to the educational needs of my child.	**0.76**	–0.10	0.23	0.32	0.12
16	During the examination period, I am more conscious in taking care of my children.	**0.77**	0.08	0.23	0.22	0.12
17	I will change the family habits in order to fit the educational needs of my child.	**0.75**	0.04	0.30	0.17	0.20
18	In order to have a silent environment for the study of my child, I give up family entertainment.	**0.53**	0.46	0.01	0.40	–0.04
19	I give up my hobbies for the education of my child.	**0.71**	0.40	0.09	0.01	0.35
20	I sacrifice my aspiration for the education of my child.	**0.72**	0.39	0.05	–0.11	0.26
21	I give up my social life for the education of my child	**0.66**	0.30	0.18	–0.08	0.36
22	I will hide the family worries in front of my child in order not to disturb his/her studying.	0.19	0.09	0.22	0.06	**0.87**
23	In order not to affect the study of my child, I will hide my sickness when it happens.	0.36	0.15	0.15	0.03	**0.78**
	Variance explained	41.55	9.69	8.72	5.75	4.42
	Total variance	70.13%				

Values in bold: the highest loading obtained by a variable among the factors.

sacrifice for child's education. They took accommodation of daily routine and lifestyle as the most salient factor for parental sacrifice for child's education, which involved effort and personal expense of lifestyle, hobbies, social life and even aspiration. Also, parents would hide their worries from their children so as to protect their children from interference. In contrast, adolescents perceived parental sacrifice for child's education from a more observable and instrumental view. Financial resources and time involvement were more direct and observable from adolescent's point of view. Second, as the sample of parent's study was just merely adequate for factor analysis, this may affect the result of factor structure of the measure. In addition, the mixture of fathers and mothers might also introduce additional noise for the data collected.

Although there were differences in the factor structure in adolescent and parent samples, perceptions of adolescents on paternal and maternal sacrifice on child's education were very similar. Three factors of "striving of financial resources", "time spent on child's education" and "accommodation of daily routine and lifestyle" were extracted. Except Item 14, all items fell into the same factors in PSA and MSA. It was found that Item 14, that is, "when my child studies at midnight, I never sleep" belongs to the factor of "accommodation of daily routine and lifestyle" in MSA, but "time spent on child's education" in PSA. The discrepancy may be explained by the differentiated roles of father and mother perceived by adolescents. Adolescents perceived that mothers took up the caring role in the families and thus would not fall asleep if their children were studying. Thus, this act would be considered as accommodation of daily routine and lifestyle, whereas fathers would be involved in assisting their children in the revision and thus the act belonged to "time spent on child's education" which was more direct.

There are four implications to the present findings. First, the studies deepen our understanding of the dimensionality of the construct of parental sacrifice for child's education as measured by the SA. As there are only limited theoretical conceptualizations of the construct, the present findings sharpen our ideas on the underlying facets of parental sacrifice. Second, the present findings provide evidence for an indigenous measurement tool that may be useful for further exploration of indigenous Chinese concepts as well as construction of Chinese family models. Third, the scale can be used to assess the perceptions of both parents and adolescents. Day et al. (30) argued that responses from one person in family research provided "a very limited basis for extrapolating a sequence of events that may lead to a certain decision or interactional style" (p. 110). They called for research strategies that include "the collective perceptions of multiple family members" (p. 110). The instrument, being validated by parent's and adolescent's samples, can gauge the views of different family members and allow triangulation of different data sources. Of course, in view of the differences in the dimensions identified in adolescent and parent samples, it is suggested that total scores instead of subscale scores be used to assess the construct.

Fourth, a reliable and valid measurement tool may bring special value for further research on family contribution to child development in families with socio-economic disadvantage. As suggested by family investment model that poor families may have restricted resources for the investment of cognitive development of their children (12), there are counter-arguments that families in socio-economic disadvantage do invest for the development of children (17, 31). Becker and Tomes (32) also suggested that it was investment preference rather than income that affected education of children in economic disadvantage. Regardless of income, parents who highly value their children devote more resources to the development of children, though investment in children's education required parental self-sacrifice in low-income families (31). Davis-Kean (33) optimistically concluded that economic difficulties did not necessarily constrain academic development of children. Parents could also provide a stable and stimulating environment despite restricted material resources. Thus, a validated instrument on measuring parental sacrifice for child's education may be important for researchers to understand the family contribution for the development of children in socio-economic disadvantage, as well as for social workers to help poor families in breaking the intergenerational cycle of poverty.

There are several limitations of the present findings. First, as adolescent and parent samples were not randomly sampled, generalizability of the findings may be limited. Second, as the parent sample composed mainly by mothers, this would bring overrepresentation of the maternal group and underrepresentation of the paternal group. Third, the small sample size in parent's study may restrict stability in factor analysis. Thus, there is a need to conduct factor analysis using larger samples. Fourth, the factor structures from parent's sample and adolescent's sample were different. It is essential to conduct further studies to investigate the dimensionality of the scales with different samples of fathers, mothers and adolescents. Fifth, as the findings presented in the study were based on adolescents and parents in Hong Kong, there is a need to assess the generalizability of the findings in different Chinese communities (e.g., mainland China) and Chinese people living in non-Chinese contexts (e.g., Chinese-Americans).

Despite the above limitations, the studies are pioneer in assessing the reliability, validity and dimensionality of the measure. It clearly demonstrates that the Parental Sacrifice on Child's Education Scale (SA) possesses good psychometric properties that can be used objectively in Chinese parent and adolescent samples. As commented by Shek (9), "there were few validated Chinese assessment measures and effort to validate the developed measures was inadequate" (p. 282); the studies are regarded as a positive response to Shek's suggestion.

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