CrossMark

ORIGINAL ARTICLE

Reliability and Validity of the Spence Children's Anxiety Scale for Parents in Mainland Chinese Children and Adolescents

Meifang Wang[1] · Qingxiao Meng[1] · Li Liu[1] · Jintong Liu[2]

Abstract This study examined the psychometric properties of the Spence Children's Anxiety Scale for Parents (SCAS-P) in 1943 father-mother dyads and 1785 students. Results of confirmatory factor analyses for SCAS-P were in favour of the original model with six correlated factors. The internal consistency of SCAS-P was acceptable ($\alpha = .63$–$.91$), and the test–retest reliability was acceptable ($r = .46$–$.72$). The convergent and divergent validity of SCAS-P was supported by significant correlations with an internalizing subscale to a greater extent than with an externalizing subscale. Congruent validity was supported by significant correlations between father and mother reports ($r = .60$–$.71$) and child and parent reports ($r = .25$–$.42$). Significant differences between community and clinical samples supported the discriminant validity. Adolescents showed higher anxiety levels than children, and girls showed higher anxiety levels than boys. Our findings suggest that the SCAS-P is a suitable parent instrument to measure child anxiety symptoms in Mainland Chinese children and adolescents.

Keywords Anxiety · Children and adolescents · Parents · Spence Children's Anxiety Scale · Psychometric properties

✉ Meifang Wang
 meifangw@hotmail.com

✉ Jintong Liu
 jintongliu@sdu.edu.cn

[1] Department of Psychology, Shandong Normal University, No. 88 East Wenhua Road, Jinan 250014, People's Republic of China

[2] Shandong Mental Health Center, Shandong University School of Medicine, No. 49 East Wenhua Road, Jinan 250014, People's Republic of China

Introduction

Anxiety disorders are one of the most common psychiatric disorders in children and adolescents [1, 2]. A meta-analysis showed that approximately 10–20 % of children and adolescents were affected by these disorders worldwide [3]. Previous studies found that anxiety problems were associated with internalizing problems such as depression as well as externalizing problems such as aggression and drug dependence [4, 5]; however, the associations between anxiety and internalizing problems were significantly higher than those between anxiety and externalizing problems [6]. Furthermore, anxiety problems in childhood and adolescence have demonstrated stability into adulthood if they remain untreated [7]. However, because of the covert nature of the anxiety symptoms, few children who suffered from these problems received appropriate care and treatment [8]. Therefore, an economic and easily administered instrument for screening anxiety disorders in children and adolescents is important.

There are many kinds of questionnaires to assess anxiety symptoms in children and adolescents [9]. Early developed questionnaires on childhood anxiety include the Revised Children's Manifest Anxiety Scale (RCMAS) [10], the State-Trait Anxiety Inventory for Children (STAIC) [11], and the Fear Survey Schedule for Children-Revised (FSSC-R) [12]. Although these measures revealed adequate psychometric properties and provided valuable information on the anxiety symptoms of children and adolescents [9], they all provided information on general anxiety (e.g., sample items such as "I am afraid", and "I am nervous") rather than specific anxiety symptoms (e.g., sample items such as "I feel scared when I have to sleep on my own" for separation anxiety, and "I feel afraid that I will make a fool of myself in front of people" for social phobia). However, it is

important to distinguish specific anxiety symptoms because that information regarding the clustering of specific patterns of anxiety problems may guide the content of treatment [6]. The Spence Children's Anxiety Scale (SCAS) [13] is a recently developed child self-report questionnaire that specifically assesses multiple anxiety symptoms among children and adolescents based on the criteria in the DSM-IV [14]. Suitable psychometric properties of SCAS (e.g., test–retest and internal reliability, concurrent and divergent validity) have been documented in both Western and Eastern countries, including Australia [6], North America [15], the United Kingdom [16], Japan [17], Hong Kong China [18], and Mainland China [19].

Notably, the majority of previous research has focused on developing child self-report questionnaires. However, it is common and recommended to include parents in the assessment of childhood anxiety [20] because parents may contribute information regarding different aspects of anxiety symptoms from a child's self-report. In addition, parents' detection of child anxiety will be help children to receive intervention as early as possible. The Spence Children's Anxiety Scale for Parents (SCAS-P) [20], which is derived from the SCAS, is a quick, but sufficiently detailed parent questionnaire that provides information on anxiety symptoms of children and adolescents. This scale has been shown to be a sensitive instrument to reflect improvements following successful treatment for child anxiety from a clinical perspective [21]. In addition, the psychometric properties of the SCAS-P have been examined in multiple cultures, including Australia [20], North America [15], Denmark [22], and Japan [17].

Although that the psychometric properties of the SCAS-P have been examined in multiple countries, little is known regarding the psychometric properties of the SCAS-P in China. A series of evidence appears to indicate that the psychometrics of SCAS-P vary to some extent across cultures. For example, the structure of SCAS-P differed between Australian [20] and Japanese samples [17]. Only one study by Li et al. [18] evaluated the psychometrics of the SCAS-P with Hong Kong Chinese children. However, Hong Kong Chinese have been influenced by Western cultures for a long time [23]; the anxiety of Hong Kong Chinese may be different from that of Mainland China Chinese. Thus, it remains necessary to assess the psychometric properties of this instrument in Mainland China. Additionally, Li et al.'s [18] study did not investigate the test–retest reliability and divergent validity, and only included data from community samples. Therefore, it is necessary to include a clinical sample because the differences between community and clinical samples may provide evidence of discriminate validity of the SCAS-P. For the aforementioned reasons, this study intends to comprehensively examine the psychometric properties of SCAS-P in Mainland Chinese samples. Moreover, this study also investigated the effects of child's gender and age in relation to their parents' score on total scale and subscales, because a range of evidence indicated that the pattern of age and gender differences varies to some extent across studies [20, 24].

In summary, this study's objectives were to examine the psychometric properties of SCAS-P in the Mainland Chinese community sample in several ways: (1) to examine the factor structure and factorial invariance of the Chinese SCAS-P; (2) to evaluate the internal consistency, test–retest reliability, the convergent and divergent validity, and the congruent validity of the Chinese SCAS-P; (3) to evaluate the discriminant validity through group differences between the Mainland Chinese community sample and clinical sample; and (4) to investigate age and gender differences in anxiety symptoms.

Methods

Participants

Community Sample

A total of 2113 father-mother dyads with at least one student between the ages of 7 and 15 years participated in the survey. These students were recruited from one public primary school and two public middle schools in the city of Jinan, located in Shandong Province, Eastern China. The questionnaires were returned by 1785 students and 1943 father-mother dyads. Therefore, the final community sample consisted of 1943 father-mother dyads with children aged 7–12 years (M = 9.78, SD = 1.67; 486 boys, 429 girls and 14 parents did not report the gender of their children) or adolescents aged 13–15 years (M = 13.73, SD = 1.10; 483 boys and 531 girls) and 1785 students in grade 3–9. The ages of the fathers and mothers ranged from 30 to 69 years (M = 40.76, SD = 3.85) and from 28 to 65 years (M = 38.90, SD = 3.63), respectively. Approximately 40 % of fathers and 35 % of mothers held a form of university degree, and nearly 76 % of the fathers and 67 % of the mothers had completed high school. In terms of employment, approximately half of the parents (50.13 % of the fathers and 50.01 % of the mothers) were employed in working-class jobs (e.g., factory workers), whereas 39.99 % of the fathers and 31.86 % of the mothers worked in professional, managerial, or technical positions. Only 1.80 % of the fathers and 4.99 % of the mothers classified themselves as unemployed. Thus, the sample was largely a working- and middle-class urban area sample.

Clinical Sample

The clinical sample was recruited from a mental health centre in the city of Jinan and consisted of 87 children (41.56 % boys and 58.44 % girls, age 7–15 years (M = 13.27, SD = 2.13) and their fathers or mothers (26 fathers and 51 mothers). Data relating to parental social status were not available for the clinical sample.

Measures

Spence Children's Anxiety Scale for Parents (SCAS-P)

The SCAS-P is a 38-item parents-report measure of anxiety symptoms for children and adolescents developed using community samples [20]. The SCAS-P consists of six subscales: separation anxiety disorder (SAD; six items), social phobia (SoP; six items), obsessive–compulsive disorder (OCD; six items), panic/agoraphobia (Panic; nine items), fear of physical injuries (Fear; five items), and generalized anxiety disorder (GAD; six items). Both fathers and mothers were requested to rate the items on a four-point scale (0 = never, 1 = sometimes, 2 = often, 3 = always). The scores of the total scale and each subscale can be calculated by summing the responses of the relevant items. In this study, a Chinese translated version of SCAS-P was used [25].

Spence Children's Anxiety Scale (SCAS)

The SCAS consists of 44 items, 38 of which are divided into six subscales that correspond with the SCAS-P; the remaining 6 items are positively-worded filler items. The students in grade 3–9 were requested to rate the items on the same 0 (never) to 3 (always) scale. The Chinese version of SCAS was used successfully and showed good internal reliability and validity [19, 26]. In this study, the Cronbach's alpha was .91 for the total score, and for subscales were .64–.77.

Child Behaviour Check List (CBCL)

The CBCL [27] is a commonly used parent-report measure of behaviour problems for children aged 4–18 years. CBCL includes 55 items, and all items are rated on a three-point scale (0 = not true, 1 = somewhat true, 2 = very true), reflecting the degree of behaviour problems now or over the past 6 months. CBCL includes two subscales: an internalizing subscale and an externalizing subscale. In this study, internalizing and externalizing subscales were used to evaluate the convergent and divergent validity of the SCAS-P. The Chinese version of CBCL was used successfully and showed good internal reliability and validity

[28]. In this study, the Cronbach's alphas for the total scale, the internalizing subscale, and the externalizing subscale were .91, .84, and .87 for the fathers' reports and .90, .83, and .86 for the mothers' reports, respectively.

Procedure

Community Sample

The community sample in this study was participants from an ongoing longitudinal study. Permissions from the school principals to administer questionnaires were obtained as were parental consents prior to data collection. Students completed the SCAS during classroom hours independently. After the students' assessment, two packets (one for the father and one for the mother) containing the parental questionnaires were sent home with the children. Fathers and mothers were requested to complete their questionnaires separately at home and to return them to the school. To examine the test–retest reliability of the SCAS-P in the Chinese culture, a subgroup of parents (263 fathers and 276 mothers) were retested over a period of 4 weeks after the initial screening.

Clinical Sample

The children in clinical sample attended the mental health centre for assessment and treatment. Parents whose children were diagnosed with an anxiety disorder were requested to participate in this investigation. After signing the parental informed consent, parents completed the SCAS-P and related information during the assessment session in the mental health centre.

The Institutional Review Board of Shandong Normal University approved all study procedures.

Data Analysis

Analyses on SCAS-P were conducted using the ratings from children's fathers and mothers. To examine the four factor structure models originally proposed by Spence [13] and Nauta et al. [20], confirmatory factor analyses (CFA) was performed using Robust Maximum Likelihood estimation. Given that in large sample sizes the χ^2 statistic is likely to be significant, the normed fit index (NFI), the non-normed fit index (NNFI), the comparative fit index (CFI), the incremental fit index (IFI), the relative fit index (RFI), the root mean square error of approximation (RMSEA) and root mean square residual (RMR) were calculated to evaluate the fit of the model in this study. Values of NFI, NNFI, CFI, IFI and RFI greater than .90 indicate an acceptable fit [29]. An RMSEA value below .06 and an

RMR value below .08 indicate a relatively acceptable fit [30].

To further examine whether the factor structure of anxiety symptoms is invariant across child age and gender groups, we conducted two multi-group confirmatory factor analyses using the Robust Maximum Likelihood estimation. In each multi-group analysis, a constrained model (a model in which all factor loadings were constrained to be equal) across age or gender groups was compared to an unconstrained model (a model in which these factor loadings were free to vary) across groups. In accordance with the criterion for evaluating factorial invariance across subgroups described by Cheung and Rensvold [31], the differences in goodness-of-fit indices (ΔGFIs) between constrained and unconstrained models less or equal to .01 are considered to indicate the factorial invariance.

Additionally, Cronbach's alpha coefficients were calculated to assess the internal consistency of the SCAS-P total and subscales. Pearson product moment correlations were calculated to assess test–retest reliability, convergent validity, divergent validity, and congruent validity. Independent sample t tests were calculated to compare the differences between the clinical and community samples. Child gender and gender differences in anxiety scores were examined using multivariate analyses of variance (MANOVA). Missing values were estimated in SPSS using the estimated means (EM) procedure, given that the percent of respondents with missing items in this study is 0.51 % [32].

Results

Confirmatory Factor Analyses

Confirmatory factor analyses were conducted on the community sample for fathers' and mothers' reports, which compared four models in accordance with the originally proposed structures tested by by Spence [13] and Nauta et al. [20]. The four models included: (1) one factor, (2) six uncorrelated factors, (3) six correlated factors, and (4) six correlated factors and one higher-order factor. Model fit indices for the four hypothesized models of fathers' and mothers' report are shown in Table 1. The results demonstrated that the values for fit indices of model 1, model 3 and model 4 fell within the acceptable to good ranges, indicating a satisfactory fit of these three models to this data. As shown in Table 1, Chi squared difference tests indicated that model 3 had a better fit to data compared with model 1 for SCAS-P (father: $\Delta\chi^2 = 1904$, $\Delta df = 5$, mother: $p < 0.01$; $\Delta\chi^2 = 1613$, $\Delta df = 5$, $p < 0.01$).

To examine whether the higher-order model (model 4) explains the covariation between the six correlated first-order factors (model 3), a target coefficient was calculated

as the ratio of the Chi squared value of the first-order model to the Chi squared value of the second-order model [33]. In this study, the target coefficients for fathers' and mothers' report were .90 and .94, respectively, which indicates that the second-order factor provides a satisfactory explanation for the covariation between the six first-order factors.

The standardized factor loadings for the model with six correlated factors (model 3) of SCAS-P are presented in Table 2. The standardized factor loadings ranged from .39 to .68 for the fathers' report and .37–.68 for the mothers' report. Given that the χ^2 value is influenced by sample size and that the other indices provide support for the hypothesized model, it is concluded that model 3 provided the best model fit for the data.

Factorial Invariance

Based on the previous six correlated factors model, the factorial invariance across age (children and adolescents) and gender (boys and girls) groups was tested (see Table 3). The results of multi-group confirmatory factor analyses indicated that all differences between model fits for age and gender groups were below .01; thus, the factorial invariance of the SCAS-P across age and gender groups was established.

Internal Consistency and Test–Retest Reliability

Cronbach's alpha coefficients were calculated to evaluate the internal consistency of the SCAS-P in Chinese children and adolescents. Cronbach's α values of the fathers' report were .91 for the total scale, .71 for separation anxiety, .74 for social phobia, .72 for obsessive–compulsive disorder, .77 for panic/agoraphobia, .64 for fear of physical injuries, and .73 for generalized anxiety disorder. Cronbach's α values of the mothers' report were .90 for the total scale, .67 for separation anxiety, .73 for social phobia, .69 for obsessive–compulsive disorder, .74 for panic/agoraphobia, .63 for fear of physical injuries, and .71 for generalized anxiety disorder. These results supported the acceptable internal consistency of the SCAS-P.

To examine the test–retest reliability of the Chinese SCAS-P, a second sample of participants, which included 263 fathers and 276 mothers in the community sample, were reassessed 4 weeks after the initial data collection. Pearson's correlation coefficients for the fathers' and mothers' report were as follows: total scale, .66 and .72; separation anxiety, .61 and .67; social phobia, .56 and .61; obsessive–compulsive disorder, .54 and .52; panic/agoraphobia, .53 and .53; fear of physical injuries, .65 and .70; and generalized anxiety disorder, .46 and .55, respectively. These results supported the acceptable test–retest reliability of the SCAS-P.

Table 1 Model fit indices for the four models of father's report (and mother's in parentheses)

	χ^2	df	p	NFI	RFI	IFI	NNFI	CFI	RMSEA	RMR
Model 1	10101	665	<.001	.92	.91	.92	.92	.92	.070	.027
	(6378)	(665)	(<.001)	(.91)	(.91)	(.92)	(.91)	(.92)	(.079)	(.028)
Model 2	10101	665	<.001	.88	.87	.88	.88	.88	.100	.076
	(9666)	(665)	(<.001)	(.86)	(.85)	(.87)	(.86)	(.87)	(.100)	(.076)
Model 3	4978	650	<.001	.94	.93	.95	.94	.95	.065	.023
	(4765)	(650)	(<.001)	(.93)	(.93)	(.94)	(.94)	(.94)	(.062)	(.025)
Model 4	5536	659	<.001	.93	.93	.94	.94	.94	.070	.024
	(5076)	(659)	(<.001)	(.93)	(.92)	(.94)	(.93)	(.94)	(.067)	(.026)

NFI normed fit index, *NNFI* non-normed fit index, *CFI* comparative fit index, *IFI* incremental fit index, *RFI* relative fit index, *RMSEA* root mean square error of approximation, *RMR* root mean square residual

Convergent and Divergent Validity

To further explore the convergent and divergent validity of the Chinese SCAS-P, correlations between the SCAS-P and CBCL subscales were calculated. As indicated in Table 4, the total score and subscales of the SCAS-P correlated significantly with the CBCL internalizing and the CBCL externalizing score. In accordance with the recommendation of Meng et al. [34] for significant correlations, a series of Z tests were conducted to determine whether the correlations between SCAS-P scales and the internalizing score are significantly stronger than the correlations between SCAS-P scales and the externalizing score. The results indicated that the correlations with the internalizing score were significantly greater than the correlations with the externalizing score for all scales of the SCAS-P (fathers: $Zs > 5.83$, $ps < .01$; mothers: $Zs > 3.33$, $ps < .01$). This finding supported the convergent and divergent validity of the Chinese SCAS-P.

Congruent Validity

Agreement between informants was examined using Pearson correlations for the child's report and parent's report, and the father's report and the mother's report on corresponding scales (see Table 5). The correlations between the parent and child ratings ranged from .25 to .42, which suggests an acceptable congruent validity between the child and parent scores. The correlations between the father and mother ratings ranged from .60 to .71, which suggests a satisfactory congruent validity between the father and mother scores. Moreover, paired t tests showed that the correlations between child and mother ratings were significantly higher than those between child and father ratings for the total scale, fear of physical injuries, and generalized anxiety disorder subscales ($ts > 2.01$, $ps < 0.05$). For other subscales, although the t tests were not significant ($ps > 0.05$), comparisons revealed that the correlations between child and mother

ratings were moderately higher than those between child and father ratings.

Discriminant Validity

Independent sample t tests were conducted to compare the clinical sample and the community sample (see Table 6). The clinical sample scored significantly higher ($p < .001$) on all scales of the SCAS-P except for fear of physical injuries in the fathers' report.

Age and Gender Differences

A MANOVA was performed to examine age and gender differences on the SCAS-P for total scores and subscales within the sample of 1943 father-mother dyads. Based on the Wilks' lambda criterion, results of the MANOVA indicated that the dependent variables were significantly affected by age (fathers: $F(6,1919) = 37.75$, $p < .001$, $\eta^2 = .106$; mothers: $F(6,1919) = 32.94$, $p < .001$, $\eta^2 = .093$), gender (fathers: $F(6, 1919) = 14.18$, $p < .001$, $\eta^2 = .042$; mothers: $F(6,1919) = 16.02$, $p < .001$, $\eta^2 = .048$), and age by gender interactions (fathers: $F(6, 1919) = 3.55$, $p < .01$, $\eta^2 = .011$; mothers: $F(6,1919) = 4.45$, $p < .001$, $\eta^2 = .014$). Except for separation anxiety and physical injury fears, adolescents were found to score significantly higher on the total scale and on the other subscales than children in both the fathers' and mothers' reports (fathers: $Fs > 24.13$, $ps < .01$; mothers: $Fs > 4.44$, $ps < .05$). With the exception of obsessive–compulsive disorder, girls scored significantly higher on the total scale and on the other subscales than boys for both the fathers' and mothers' reports (fathers: $Fs > 7.87$, $ps < .01$; mothers: $Fs > 12.13$, $ps < .01$).

Significant age by gender interactions were found for separation anxiety (fathers: $F(1,1924) = 8.37$, $p < .01$, $\eta^2 = .004$; mothers: $F(1, 1924) = 12.58$, $p < .001$, $\eta^2 = .006$), physical injury fears (fathers: $F(1, 1924) = 16.74$, $p < .001$, $\eta^2 = .009$; mothers: $F(1,$

Table 2 Standardized factor loadings for six correlated factors of father's report (and mother's in parentheses)

SCAS-P item	SAD	SoP	OCD	Panic	Fear	GAD
5 My child would feel afraid of being on his/her own at home	.58 (.46)					
8 My child worries about being away from us/me	.58 (.56)					
11 My child worries that something awful will happen to someone in our family	.49 (.49)					
14 My child is scared if (s)he has to sleep on his/her own	.61 (.56)					
15 My child has trouble going to school in the mornings because (s)he feels nervous or afraid	.43 (.37)					
38 My child would feel scared if (s)he had to stay away from home overnight	.57 (.55)					
6 My child is scared when (s)he has to take a test		.53 (.55)				
7 My child is afraid when (s)he has to use public toilets		.44 (.37)				
9 My child feels afraid that (s)he will make a fool of him/herself in front of people		.67 (.67)				
10 My child worries that he/she will do badly at school		.68 (.67)				
26 My child worries what other people think of him/her		.61 (.59)				
31 My child feels afraid when (s)he has to talk in front of the class		.49 (.48)				
13 My child has to keep checking that (s)he has done things right (like the switch is off, or the door is locked)			.51 (.48)			
17 My child can't seem to get bad or silly thoughts out of his/her head			.55 (.54)			
24 My child has to think special thoughts (like numbers or words) to stop bad things from happening			.59 (.53)			
35 My child has to do some things over and over again (like washing his/her hands, cleaning or putting things in a certain order)			.51 (.49)			
36 My child gets bothered by bad or silly thoughts or pictures in his/her head			.62 (.64)			
37 My child has to do certain things in just the right way to stop bad things from happening			.53 (.50)			
12 My child complains of suddenly feeling as if (s)he can't breathe when there is no reason for this				.54 (.53)		
19 My child suddenly starts to tremble or shake when there is no reason for this				.58 (.46)		
25 My child feels scared if (s)he has to travel in the car, or on a bus or train				.48 (.44)		
27 My child is afraid of being in crowded places (like shopping centres, the movies, buses, busy playgrounds)				.47 (.41)		
28 All of a sudden my child feels really scared for no reason at all				.64 (.63)		
30 My child complains of suddenly becoming dizzy or faint when there is no reason for this				.53 (.52)		
32 My child complains of his/her heart suddenly starting to beat too quickly for no reason				.57 (.58)		
33 My child worries that (s)he will suddenly get a scared feeling when there is nothing to be afraid of				.68 (.68)		
34 My child is afraid of being in small closed places, like tunnels or small rooms				.48 (.47)		
2 My child is scared of the dark					.66 (.64)	
16 My child is scared of dogs					.39 (.38)	
21 My child is scared of going to the doctor or dentist					.43 (.46)	
23 My child is scared of heights (e.g. Being at the top of a cliff)					.51 (.47)	
29 My child is scared of insects or spiders					.54 (.53)	
1 My child worries about things						.50 (.50)
3 When my child has a problem, (s)he complains of having a funny feeling in his/her stomach						.43 (.38)
4 My child complains of feeling afraid						.58 (.56)
18 When my child has a problem, s(he) complains of his/her heart beating really fast						.56 (.49)

Table 2 continued

SCAS-P item	SAD	SoP	OCD	Panic	Fear	GAD
20 My child worries that something bad will happen to him/her						.64 (.61)
22 Hen my child has a problem, (s)he feels shaky						.65(.66)

SAD separation anxiety, *SoP* social phobia, *OCD* obsessive–compulsive disorder, *Panic* panic/agoraphobia, *Fear* fear of physical injuries, *GAD* generalized anxiety disorder

Table 3 Tests of factorial invariance across age (children and adolescents) and gender (boys and girls) groups of father's report (and mother's in parentheses)

	χ^2	df	p	NFI	RFI	IFI	NNFI	CFI	RMSEA	RMR
Invariance across age groups										
Unconstrained model	6189	1300	.00	.96	.95	.97	.97	.97	.043	.025
	(6110)	(1300)	(.00)	(.94)	(.94)	(.96)	(.96)	(.96)	(.044)	(.028)
Constrained model	6434	1338	.00	.95	.95	.97	.97	.97	.043	.031
	(6423)	(1338)	(.00)	(.94)	(.94)	(.96)	(.96)	(.96)	(.044)	(.036)
Invariance across gender groups										
Unconstrained model	5910	1300	.00	.95	.95	.97	.97	.97	.046	.027
	(5781)	(1330)	(.00)	(.95)	(.94)	(.96)	(.96)	(.96)	(.045)	(.028)
Constrained model	6061	1338	.00	.95	.95	.97	.97	.97	.044	.034
	(5925)	(1338)	(.00)	(.94)	(.94)	(.96)	(.96)	(.96)	(.044)	(.033)

NFI normed fit index, *NNFI* non-normed fit index, *CFI* comparative fit index, *IFI* incremental fit index, *RFI* relative fit index, *RMSEA* root mean square error of approximation, *RMR* root mean square residual

Table 4 Correlations between the SCAS-P scale and the internalizing and externalizing score for father's report (and mother's in parenthese)

	Internalizing	Externalizing
SAD	.40** (.39**)	.28** (.26**)
SoP	.54** (.52**)	.36** (.33**)
OCD	.41** (.38**)	.30** (.31**)
Panic	.47** (.46**)	.36** (.34**)
Fear	.37** (.34**)	.23**(.19**)
GAD	.53** (.49**)	.42** (.37**)
Total	.58** (.56**)	.42** (.38**)

SAD separation anxiety, *SoP* social phobia, *OCD* obsessive–compulsive disorder, *Panic* panic/agoraphobia, *Fear* fear of physical injuries, *GAD* generalized anxiety disorder

** $p < .01$

Table 5 Correlations between father-reports and mother-reports, and child self-reports and parental-reports on corresponding subscales

	Father–mother	Child–father	Child–mother
SAD	.68**	.33**	.38**
SoP	.64**	.41**	.48**
OCD	.61**	.32**	.36**
Panic	.65**	.30**	.31**
Fear	.71**	.25**	.29**
GAD	.60**	.26**	.29**
Total	.71**	.36**	.42**

SAD separation anxiety, *SoP* social phobia, *OCD* obsessive–compulsive disorder, *Panic* panic/agoraphobia, *Fear* fear of physical injuries, *GAD* generalized anxiety disorder

** $p < .01$

1924) $= 19.32$, $p < .001$, $\eta^2 = .010$) and generalized anxiety disorder (fathers: $F(1, 1924) = 4.90$, $p < .05$, $\eta^2 = .003$; mothers: $F(1, 1924) = 6.87$, $p < .01$, $\eta^2 = .004$). The results of simple effects analyses indicated that the differences between boys and girls on anxiety scores were larger in adolescents than in children.

Discussion

The primary purpose of this study was to examine the psychometric properties of the SCAS-P in a large sample of Mainland Chinese children and adolescents and their parents. The results of this study indicated that the Chinese

Table 6 Means, standard deviations and between sample differences for SCAS-P

	Fathers' report				Mothers' report			
	Community (n = 1943)	Clinical (n = 26)	t	Cohen's d	Community (n = 1943)	Clinical (n = 51)	t	Cohen's d
SAD	2.24	4.18	3.92***	.91	2.32	5.19	5.39***	1.16
SoP	2.83	5.99	6.02***	.26	2.84	6.84	8.00***	1.85
OCD	1.76	5.01	4.32***	1.95	1.76	4.41	6.04***	1.81
Panic	1.30	3.85	4.13***	1.81	1.34	4.50	5.43***	1.69
Fear	2.93	3.14	.41	.12	3.03	4.24	3.19***	.32
GAD	2.26	5.01	6.55***	2.09	2.42	5.41	6.90***	1.76
Total	13.32	27.17	6.33***	2.02	13.71	30.59	7.80***	1.92

SAD separation anxiety, *SoP* social phobia, *OCD* obsessive–compulsive disorder, *Panic* panic/agoraphobia, *Fear* fear of physical injuries, *GAD* generalized anxiety disorder

*** $p < .001$

SCAS-P has appropriate psychometric properties and is a relatively reliable and valid instrument to measure the anxiety symptoms of Chinese children and adolescents.

Based on 1943 father-mother dyads, confirmatory factor analysis suggested that the structure of the parent scale (for both the fathers' report and the mothers' report) could be explained by six correlated factors proposed by Nauta et al. [20]. Further multi-group analyses supported the factorial invariance of this model across age and gender groups in the Chinese community sample. Consistent with the the findings of the Chinese children's self-report [19], the findings in this study indicated that the parent-reporting anxiety symptoms of the Chinese sample reflected a six-correlated-factor structure and that both children and adolescents, including both boys and girls, presented the same pattern of anxiety symptoms.

Results from this study supported the reliability of SCAS-P. The internal consistency of the SCAS-P total score was high. The SCAS-P subscales also showed acceptable levels of internal consistency. Consistent with several previous studies [20, 22], Cronbach's alphas of physical injuries revealed a lower coefficient (α = .64 for fathers' report and α = .63 for mothers' report) in comparison to other subscales. One possible explanation for this finding is that children who are scared of one specific fear may not necessarily be scared of others. For example, children who are scared of the dark may not necessarily be scared of dogs. This finding suggested that the individual items of this subscale may have greater utility on its own than the aggregation of these items [15]. Moreover, the total scale and subscales of SCAS-P demonstrated acceptable test–retest reliability after a 4-week period.

The results from this study also supported the validity of SCAS-P. First, the correlations between SCAS-P scales and the internalizing score were significantly higher than those between SCAS-P scales and the externalizing score, which supported the convergent and divergent validity for SCAS-P. Second, the congruent validity of SCAS-P was supported by significant pairwise correlations among the father's report, the mother's report, and the child's report on corresponding subscales. Similar to previous studies, the agreement between the child and parent reports was low, particularly referring to internal processes (such as GAD and OCD) [17, 18], which may be because children may not share all their thoughts with their parents [20]. Finally, the discriminant validity of SCAS-P was supported by significant differences in mean scores between the community sample and the clinical sample on the total scale and most subscales, which was consistent with the results of previous studies [15, 20, 22]. One subscale (fear of physical injuries for fathers' report) showed non-significant differences. One possible reason for this finding is that the sample of clinical fathers in this study may be too small to detect significant differences.

Consistent with the study of SCAS with Chinese children and adolescents [19], this study showed significant age and gender differences for both fathers' and mothers' reports within the SCAS-P. Adolescents showed significantly higher scores for the total score and most subscales. These findings contradicted the studies in Western cultures [20, 27] but were in accordance with a self-reported study with Chinese children and adolescents [19]. One possible reason for these results may be that adolescents may experience higher learning stress than children in Mainland China, which may explain the elevated level of anxiety symptoms of Chinese adolescents [19]. Consistent with most previous studies, significant gender differences were found in this study; girls showed significantly higher scores for the total score and most subscales. It could be that girls are biologically wired to be more anxious than boys, and a

type of genetic-determined gender difference may explain girls' high level of anxiety [35]. Gender role orientations and expectations that masculinity was associated with a lower level of anxiety may be another explanation for the gender differences [36]. Additionally, we found that gender differences in anxiety were larger in adolescents than in children. It is likely that socialization may make gender expectations increasingly more obvious to boys and girls as children grow older.

It should be noted that this study suffers from several limitations. First, the participants were considered to be representative of Chinese students and parents who live in Jinan City and those who live in similar urban areas; however, they may not be representative of the overall population in China. Further studies should recruit representative samples from different regions in China to replicate these findings. Second, this study was limited by the small sample size of a clinical sample, which consisted of 26 fathers and 51 mothers. Further research that includes more clinical samples will be necessary. Third, fathers and mothers were instructed to complete the questionnaires separately at home. However, this approach provides opportunities for biases. For instance, bias may exist if parents discussed the items in the questionnaires before completing them or a parent completed the questionnaire on behalf of the other. Although we attempted to decrease this by distributing parent-specific packets of questionnaires and requesting parents complete their questionnaires separately, we could not ensure that parents would do as our instruction. In this regard, future research could gather information by interviewing fathers and mothers separately in different rooms. Finally, this study failed to measure the anxiety level of parents. Research has shown that the anxiety level of parents can influence their judgement of the level of their child's anxiety [37]. Further research needs to address the issue of parent bias in reporting on anxiety symptoms in children and adolescents.

Despite these limitations, this study provides a first psychometric evaluation of the SCAS-P in a large sample of Mainland Chinese children and adolescents. This instrument can provide us with information on how parents perceive anxiety symptoms in their child, and it can be employed as an effective parent questionnaire for assessing the possible anxiety symptoms in children and adolescents. Moreover, most previous studies with community samples solely included data from one parent or combined data from fathers and mothers. This is the first study, to our knowledge, to include the data from both fathers and mothers within the same family in assessing the psychometric properties of SCAS-P. The results of this study indicated that the correlations between child and mother ratings were significantly higher than those between child and father ratings. The possible reason for the bias of parent reporting is that mothers are primary caregivers of their children at home in China and may understand their children's anxiety better than fathers. These results suggest that the mothers' report may be more close to the actual level of the child's anxiety.

Summary

This study supports use of the SCAS-P for the screening of anxiety symptoms in terms of internal consistency and test–retest reliability as well as convergent, divergent, congruent, and discriminant validity in Mainland Chinese children and adolescents.

References

1. Baumeister H, Härter M (2007) Prevalence of mental disorders based on general population surveys. Soc Psychiatry Psychiatr Epidemiol 42:537–546
2. Kessler RC, Berglund P, Demler O, Jin R, Merikangas KR, Walters EE (2005) Lifetime prevalence and age-of-onset distributions of DSM-IV disorders in the National Comorbidity Survey Replication. Arch Gen Psychiatry 62:593–602
3. Costello EJ, Egger HL, Copeland W, Erkanli A, Angold A (2011) The developmental epidemiology of anxiety disorders: phenomenology prevalence and comorbidity. Anxiety Disord Child Adolesc Res Assess Interv 2:56–75
4. Axelson DA, Birmaher B (2001) Relation between anxiety and depressive disorders in childhood and adolescence. Depress Anxiety 14:67–78
5. Merikangas KR, Avenevoli S (2002) Epidemiology of mood and anxiety disorders in children and adolescents. Textb Psychiatr Epidemiol 2:657–704
6. Spence SH (1998) A measure of anxiety symptoms among children. Behav Res Ther 36:545–566
7. Keller MB, Lavori PW, Wunder J, Beardslee WR, Schwartz CE, Roth J (1992) Chronic course of anxiety disorders in children and adolescents. J Am Acad Child Adolesc Psychiatry 31:595–599
8. Muris P, Loxton H, Neumann A, du Plessis M, King N, Ollendick T (2006) DSM-defined anxiety disorders symptoms in South African youths: their assessment and relationship with perceived parental rearing behaviors. Behav Res Ther 44:883–896
9. Silverman WK, Ollendick TH (2005) Evidence-based assessment of anxiety and its disorders in children and adolescents. J Clin Child Adolesc Psychol 34:380–411
10. Reynolds CR, Richmond BO (1978) What I think and feel: a revised measure of children's manifest anxiety. J Abnorm Child Psychol 6:271–280
11. Spielberger CD, Edwards CD (1973) STAIC preliminary manual for the State-Trait Anxiety Inventory for Children ("How I feel questionnaire"). Consulting Psychologists Press, Palo Alto
12. Ollendick TH (1983) Reliability and validity of the revised fear survey schedule for children (FSSC-R). Behav Res Ther 21:685–692

13. Spence SH (1997) Structure of anxiety symptoms among children: a confirmatory factor-analytic study. J Abnorm Psychol 106:280

14. American Psychiatric Association (1994) Diagnostic and statistical manual of mental disorders. American Psychiatric Association, Washington, pp 471–475

15. Whiteside SP, Brown AM (2008) Exploring the utility of the Spence Children's Anxiety Scales parent-and child-report forms in a North American sample. J Anxiety Disord 22:1440–1446

16. Essau CA, Sasagawa S, Anastassiou-Hadjicharalambous X, Guzmán BO, Ollendick TH (2011) Psychometric properties of the Spence Child Anxiety Scale with adolescents from five European countries. J Anxiety Disord 25:19–27

17. Ishikawa SI, Sato H, Sasagawa S (2009) Anxiety disorder symptoms in Japanese children and adolescents. J Anxiety Disord 23:104–111

18. Li JCH, Lau WY, Au TKF (2011) Psychometric properties of the Spence Children's Anxiety Scale in a Hong Kong Chinese community sample. J Anxiety Disord 25:584–591

19. Zhao J, Xing X, Wang M (2012) Psychometric properties of the Spence Children's Anxiety Scale (SCAS) in Mainland Chinese children and adolescents. J Anxiety Disord 26:728–736

20. Nauta MH, Scholing A, Rapee RM, Abbott M, Spence SH, Waters A (2004) A parent-report measure of children's anxiety: psychometric properties and comparison with child-report in a clinic and normal sample. Behav Res Ther 42:813–839

21. Nauta MH, Scholing A, Emmelkamp PM, Minderaa RB (2003) Cognitive-behavioral therapy for children with anxiety disorders in a clinical setting: no additional effect of a cognitive parent training. J Am Acad Child Adolesc Psychiatry 42:1270–1278

22. Arendt K, Hougaard E, Thastum M (2014) Psychometric properties of the child and parent versions of Spence Children's Anxiety Scale in a Danish community and clinical sample. J Anxiety Disord 28:947–956

23. Lin LH, Ho YL (2009) Confucian dynamism culture and ethical changes in Chinese societies—a comparative study of China Taiwan and Hong Kong. Int J Hum Resour Manag 20:2402–2417

24. Bouldin P, Pratt C (1998) Utilizing parent report to investigate young children's fears: a modification of the Fear Survey Schedule for Children—II: a research note. J Child Psychol Psychiatry 39:271–277

25. Wang W (2005) Chinese version of the Spence Children's Anxiety Scale—parent version. http://scaswebsite.com/docs/scas-parent-chinese.pdf

26. Wang M, Liu L, Jin Y (2015) Parental psychological aggression and children's anxiety: mediating role of children's self-esteem Chinese. Chin J Clin Psychol 23:273–276

27. Achenbach TM, Howell CT, Quay HC, Conners CK, Bates JE (1991) National survey of problems and competencies among four-to sixteen-year-olds: parents' reports for normative and clinical samples. Monogr Soc Res Child Dev 56:1–130

28. Liu L, Wang M (2015) Parenting stress and children's problem behavior in China: the mediating role of parental psychological aggression. J Fam Psychol 29:20

29. Marsh HW, Hau KT (1996) Assessing goodness of fit: is parsimony always desirable? J Exp Educ 64:364–390

30. Hu LT, Bentler PM (1999) Cutoff criteria for fit indexes in covariance structure analysis: conventional criteria versus new alternatives. Struct Equ Model Multidiscip J 6:1–55

31. Cheung GW, Rensvold RB (2002) Evaluating goodness-of-fit indexes for testing measurement invariance. Struct Equ Model 9:233–255

32. Sawilowsky SS (2007) Real data analysis. Oxford University Press, New York

33. Marsh HW, Hocevar D (1985) Application of confirmatory factor analysis to the study of self-concept: first-and higher order factor models and their invariance across groups. Psychol Bull 97:562

34. Meng XL, Rosenthal R, Rubin DB (1992) Comparing correlated correlation coefficients. Psychol Bull 111:172

35. Lewinsohn PM, Gotlib IH, Lewinsohn M, Seeley JR, Allen NB (1998) Gender differences in anxiety disorders and anxiety symptoms in adolescents. J Abnorm Psychol 107:109

36. Ginsburg GS, Silverman WK (2000) Gender role orientation and fearfulness in children with anxiety disorders. J Anxiety Disord 14:57–67

37. Najman JM, Williams GM, Nikles J, Spence S, Bor W, O'Callaghan M, Shuttlewood GJ (2001) Bias influencing maternal reports of child behaviour and emotional state. Soc Psychiatry Psychiatr Epidemiol 36:186–194