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ORIGINAL ARTICLE

The Parent-Version of the Spence Children's Anxiety Scale (SCAS-P) in Chinese and Italian Community Samples: Validation and Cross-Cultural Comparison

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Abstract The current study aimed to validate the parent-version of the Spence Children's Anxiety Scale (SCAS-P) among Chinese and Italian community adolescents and to compare adolescents' anxiety symptoms in these two countries. Chinese ($N = 456$) and Italian ($N = 452$) adolescents and their parents participated in the study. Results showed that: (1) the six correlated-factor structure was demonstrated and invariant across countries. (2) The reliability of the total scale was good in both samples, whereas reliabilities of subscales were acceptable and moderate in Chinese and Italian samples, respectively. (3) The SCAS-P showed good convergent and divergent validity. (4) Adolescent–parent agreement was from low to medium while mother–father agreement ranged from medium to high. (5) There were cultural and gender differences in levels of parent-report anxiety symptoms. In conclusion, SCAS-P seems to be a promising parent-report instrument to assess Chinese and Italian adolescents' anxiety symptoms.

Keywords Anxiety symptoms · Adolescents · Parent-report scale

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Introduction

Anxiety disorder is a common internalizing problem in adolescents [1]. Assessment of adolescents' anxiety disorder is an important line of research of this field. The Spence Children's Anxiety Scale (SCAS) [1, 2] is a promising self-report measure which was developed to assess multiple anxiety symptoms in nonclinical children and adolescents according to the diagnostic criteria of DSM-IV [3]. This measure has been globally used to assess children's and adolescents' anxiety symptoms [4–8], and it has been used to compare adolescents' anxiety symptoms cross-culturally [9–11].

Although it is believed that self-report is sufficient to assess one's internalizing problems such as anxiety symptoms in adolescents because one may know their own emotions better than others, some scholars consider that other-informant (e.g. parents) is also important even for internalizing problems because it may provide additional information that may help assess or diagnose such problems [12, 13]. Therefore, the parent-version of the SCAS (SCAS-P) was developed in Australian and Dutch samples [14]. Since its development, it has been translated into different languages, including Chinese and Italian, and validated in some countries and regions, including Brazil [15], Demark [16], Japan [17], Hong Kong [18], and North America [19].

However, there are some gaps in the literature. First, as far as we know, no research has been done to validate the SCAS-P among mainland Chinese and Italian adolescents. Li et al. [18] validated the SCAS-P in Hong Kong Chinese, but the involved subjects were children rather than adolescents. Second, scholars have considered that fathers, like mothers, play a crucial role in their child's anxiety problems [20] and that fathers are also important in the

assessment of a child's anxiety [21]. However, in most of the extant studies, mother-report and father-report are usually not distinguished and father-report is not much underscored. Scholars have discussed that the scarcity of father's involvement in psychological research has led to an incomplete picture of the familial context involved in the assessment of adolescents' functioning and, thus, including fathers in the research process is highly necessary [21]. Therefore, inclusion of father-report in the assessment of adolescents' anxiety is greatly meaningful and warrants further investigation. Last, literature has employed the SCAS to compare anxiety symptoms between Chinese and Italian adolescents [9]. However, this issue is seldom explored with parent-report measure. To fill these gaps in the literature, the current study aimed to validate the SCAS-P in mainland Chinese and Italian adolescents and to use it to investigate adolescents' anxiety symptoms of these two cultures. Several questions were examined.

Our first question was about the factor structure of the SCAS-P and whether it is invariant across countries. The SCAS-P includes six dimensions that correspond to the anxiety symptoms specified by DSM-IV [3]. These six anxiety symptoms are *panic and agoraphobia*, *fears of physical injury*, *social phobia*, *obsessive–compulsive disorders*, *generalized anxiety/overanxious symptoms*, and *separation anxiety*. In the original report [14], several models were proposed, and results showed that the six correlated factors model outperformed other models and this structure has been replicated in other studies [15, 16, 18, 19]. Moreover, previous study has demonstrated that such factor structure is invariant across Australian and Dutch samples [14].

The second question was about the reliability of the SCAS-P. Previous studies have calculated different reliabilities (e.g., Cronbach's α, corrected α using Spearman–Brown formula, and test–retest reliability) for the total scale and subscales, demonstrating that the total scale displays excellent reliability while reliabilities of subscales are generally satisfactory with few exceptions such as *fears of physical injury* [14, 15, 18].

Examination of the convergent and divergent validity of the SCAS-P was our third question. Previous studies have examined this issue by relating it with internalizing and externalizing problems as assessed by the Children Behavioral Check List [14] or Strengths and Difficulties Questionnaires (SDQ) [15], showing that the total scale and subscales are related to internalizing problems more strongly than to externalizing problems.

Our fourth question was to investigate the cross-informant agreement. Previous studies have found that self-report anxiety symptoms are significantly related to parent-report anxiety symptoms [14, 18]. In addition, it is commonly believed that mothers are the main caregivers and they are supposed to be more perceptive to their children's inner feelings. In this sense, mother–adolescent agreement is supposed to be stronger than father–adolescent agreement, but this assumption receives little study.

The last question was how Chinese and Italian parents rate their child's anxiety symptoms. As far as we know, no study has compared Chinese and Italian adolescents' anxiety with parent-report measure, but there are studies that have parallel addressed Chinese and Italian adolescents' anxiety and directly compared the two using self-report measure. For example, Zhao and colleagues used SCAS to investigate Chinese adolescents' anxiety, finding that girls reported higher anxiety scores than boys on the total scale and all subscales except *obsessive–compulsive disorder* and that Chinese adolescents showed more anxiety compared to Dutch and German adolescents [8]. Some scholars found that Italian girls reported higher scores on SCAS than boys and that Italian adolescents' anxiety level was lower than adolescents in United Kingdom [5]. There is also a study that has compared Chinese and Italian adolescents' anxiety using SCAS, which found that Chinese adolescents reported more anxiety than their Italian counterparts except *generalized anxiety/overanxious symptoms* and that girls reported more anxiety than boys [9]. However, no previous study has examined this issue using parent-report measure and thus it warrants further investigation.

Collectively, the present exploratory study examined the factor structure and its invariance, reliability, convergent and divergent validity, cross-informant agreements of the SCAS-P and parents' ratings on adolescents' anxiety symptoms with this scale. According to the literature reviewed above, we expected that: (1) the six correlated-factor structure would be supported and invariant across Chinese and Italian samples; (2) the total scale of the SCAS-P would show excellent reliability whereas reliabilities of subscales would be less satisfactory; (3) the SCAS-P would be associated with internalizing problems more strongly than with externalizing problems; (4) parent–adolescent agreement would be generally low whereas mother–father agreement would be moderate; and (5) there would be cultural and gender differences in parents' ratings on adolescents' anxiety.

Methods

Participants

Participants were adolescents and their parents. Very few adolescents were from single-parent family and only a small proportion of adolescents were rated only by one

parent. We excluded these cases in order to balance the sample, leaving all adolescents included in this study from two-parent family and rated both by mother and father. Chinese sample consisted of 456 adolescents and their parents recruited from Guangzhou, China. Italian sample included 452 adolescents and their parents recruited from towns in the Venetian Region, Italy. Demographic information is displayed in Table 1. Adolescents were from private and public schools which mainly served middle-class families (absolute SES, [22]), with similar basic quality of life. Chinese and Italian participants were residents of their respective countries, with Chinese and Italian as their primary language, respectively.

Measures

Parent-Report Anxiety

The Spence's Children Anxiety Scale-parent version (SCAS-P) was used to assess adolescents' anxiety symptoms. SCAS-P includes 38 items that can be divided into 6 dimensions as stated above. Mothers and fathers rated their children's anxiety symptoms on a 4-point scale (from "0 = never" to "3 = always"), and a higher score indicates more anxiety. This scale has been translated into Chinese and Italian (http://www.scaswebsite.com/). The Chinese and Italian parents completed the Chinese and Italian version of SCAS-P, respectively.

Parent-Report Internalizing and Externalizing Problems

The parent-report version of the Strengths and Difficulties Questionnaires (SDQ-P) [23] was used to assess adolescents' internalizing and externalizing problems. This scale has been translated into Chinese and Italian (http://www.sdqinfo.org/). Chinese and Italian parents answered the Chinese and Italian versions of the SDQ-P, respectively. This measure includes 25 items which are designed to assess individuals' negative and positive aspects. Some studies supported a five factor model (i.e., emotional symptoms, conduct problems, hyperactivity attention, peer problems, and prosocial behaviors, while other researches demonstrated a three-factor model (i.e., internalizing problems, externalizing problems, and prosocial behavior) [24, 25]. In this study, the three-factor model was employed because this was more useful for us to examine the convergent and divergent validity of the SCAS-P. All the 25 items are rated on a three-point scale (from "0 = not true" to "2 = certainly true") and a higher score indicates more internalizing and/or externalizing problems. Sample items include "Often unhappy, depressed or tearful" (internalizing problems) and "Often lies or cheats" (externalizing problems).

Table 1 Description of the sample

	N	%	Age range	M_{age}	SD
Chinese sample					
Father	456	–	34–62	44.30	4.30
Mother	456	–	32–57	41.44	3.63
Adolescents	187 boys	41	12–18	14.14	1.87
	269 girls	59	12–18	14.32	1.92
Italian sample					
Father	452	–	29–66	48.23	5.18
Mother	452	–	33–63	45.41	4.56
Adolescents	184 boys	40.7	12–18	14.13	1.87
	268 girls	59.3	12–18	14.33	1.93

Self-Report Anxiety

Adolescents reported their anxiety symptoms by filling the Spence's Children Anxiety Scale-child version (SCAS). There are 44 items in SCAS, of which 38 reflect specific anxiety symptoms and 6 relate to positive, filler items. The 38 items consists of six dimensions as the ones of parent version. The SCAS is also rated on a 4-point scale (from "0 = never" to "3 = always"), and a higher score indicates more anxiety. This scale has been translated into Chinese and Italian (http://www.scaswebsite.com/). The Chinese and Italian adolescents completed the Chinese and Italian version of SCAS, respectively. The SCAS has been used both in Chinese and Italian adolescents, finding that this scale in both samples showed good fit of the 6-factor model, good overall reliability, and convergent as well as divergent validity [9].

Procedures

This research was part of a large collaboration between the University of Padua (Italy) and Guangzhou University (China). Before data collection, approval was obtained from both universities and signed consent were obtained from parents. Adolescents provided their oral consent and were willing to participate. Voluntary participation was highlighted and no monetary incentives were awarded. Adolescents completed the questionnaire during regular classes. After that, they took the SCAS-P and the SDQ-P that were put in a sealed envelope to their parents. Parents filled in these questionnaires at home. Subsequently, they were asked to put them back to the envelope and seal it again before their children took it back to school. Both adolescents and parents were asked to be honest and not to share their answers with others (e.g., classmates or spouse). We replaced adolescents' and parents' personal information with a numeric code to ensure confidentiality.

Data Analyses

Several analyses were performed. First, we conducted confirmatory factor analyses to examine the factor structure of the SCAS-P. We used diagonally weighted least squares (DWLS) robust method based on polychoric correlations because the observed variables were ordinal. Root Mean Square Error of Approximation (RMSEA) and Comparative Fit Index (CFI) and Tucker-Lewis Index (TLI) were selected to evaluate model fit. The value of RMSEA below .08 and CFI and TLI values over .90 suggest acceptable mode fit [26, 27]. Second, we performed multi-group confirmatory factor analyses to investigate whether the factor structure was invariant across countries following the suggestions by van de Schoot et al. [28]. ΔCFI was used to evaluate measurement invariance because Chi square is sensitive to sample size [29]. Measurement invariance would be supported if (1) ΔCFI was below .01 and (2) the value of RMSEA would be below .08 and values of CFI and TLI were over .90 [29]. Third, we examined the reliability of the total scale and subscales. Similar to previous study [14], Cronbach's α and Spearman–Brown's corrected α were examined. Fourth, to investigate the convergent and divergent of the SCAS-P, we associated the total score and scores of subscales with the internalizing and externalizing problems, and tested if the correlations between the SCAS-P and internalizing problems were significantly stronger than those between the SCAS-P and externalizing problems by using the Steiger's Z test [30] following the suggestions provided by Meng et al. [31]. Fifth, we carried out Pearson correlation analyses to examine three types of agreement: adolescent–mother, adolescent–father, and mother–father. We also tested if adolescent–mother agreement was higher than adolescent–father agreement using Steiger's Z test [30]. Last, we performed ANOVA and MANOVA on the total score and subscales of the SCAS-P respectively, with country and gender as independent variables. Results would be interpreted if F value was significant (i.e., $p < .05$) and effect size (partial eta squared) was substantial (.01 and .02 for ANOVA and MANOVA, respectively) [32, 33].

Results

Factor Structure of SCAS-P Across Cultures

We performed confirmatory factor analyses to investigate the factor structure of the SCAS-P. Akin to previous studies [14, 15], several plausible models were examined. Model 1 was the 1-factor model, with all the 38 items loading on a single latent variable. Model 2 was the 6 uncorrelated-factor model, with the 38 items loading on 6 uncorrelated latent variables. Model 3 was the 6 correlated-factor model, with the 38 items loading on 6 correlated latent variables. Model 4 was the 6 first-order variables and 1 higher-order variable. In this model, the 38 items were loaded to the 6 first-order latent variables, and these 6 first-order latent variables were loaded to one higher-order variable. As shown in Table 2, model 3 (i.e., the 6 correlated-factor model) outperformed other three models regardless of informant or nations. Thus, model 3 was used in subsequent analyses.

Measurement Invariance of SCAS-P Across Cultures

Based on the six correlated-factor structure, multi-group confirmatory factor analyses were carried out to examine measurement invariance across countries. As shown in Table 3, configural invariance, metric invariance and scalar invariance were sequentially supported both for mother-report and father-report SCAS-P, as the decrease of CFI in each nested model was below .01 and other indexes showed good fit.

Reliability of SCAS-P

As presented in Table 4, the Cronbach's α of the total SCAS-P was over .90 and .85 for Chinese and Italian samples, respectively, but reliabilities of the subscales were lower. Regarding the Chinese sample, the reliabilities of the six subscales were satisfactory in general (>.70). With respect to the Italian sample, reliability of *fears of physical injury* and *separation anxiety* was moderate (>.50) while reliabilities of other subscales were acceptable (>.60).

Convergent and Divergent Validity

As shown in Table 5, the correlation coefficients between the total scale and subscales and internalizing problems were significantly stronger than the ones between the total scale and subscales and externalizing problems across informant and countries except that in Italian sample, the correlation between mother-report *obsessive–compulsive disorder* and internalizing problems was not significantly stronger than the one between *obsessive–compulsive disorder* and externalizing problems.

Relationships Between Parent-Report and Adolescent-Report Anxiety

As shown in Table 6, as for the Chinese sample, adolescent–mother and adolescent–father agreements on the total scale were .33 ($p < .01$) and .29 ($p < .01$), respectively.

Table 2 Confirmatory factor analyses of Spence's Children Anxiety Scale

Country	Informant	Model	χ^2	*df*	RMSEA	CFI	TLI
China (N = 456)	Mother-report	1 factor	1995.625	665	.066	.968	.966
		6 uncorrelated	29,617.102	665	.272	.305	.265
		6 correlated	1448.840	650	.052	.981	.979
		6 correlated + 1 higher-order	1513.457	659	.053	.979	.978
	Father-report	1 factor	1959.342	665	.065	.977	.976
		6 uncorrelated	46,096.350	665	.347	.205	.159
		6 correlated	1429.528	650	.051	.986	.985
		6 correlated + 1 higher-order	1502.702	659	.053	.985	.984
Italy (N = 452)	Mother-report	1 factor	1269.599	665	.045	.977	.975
		6 uncorrelated	10,238.142	665	.175	.632	.611
		6 correlated	1034.778	650	.036	.985	.984
		6 correlated + 1 higher-order	1093.226	659	.038	.983	.982
	Father-report	1 factor	1414.732	665	.050	.975	.973
		6 uncorrelated	12,027.238	665	.189	.614	.592
		6 correlated	1064.601	650	.038	.986	.985
		6 correlated + 1 higher-order	1117.743	659	.039	.984	.983

Table 3 Measurement invariance of Spence's Children Anxiety Scale across countries

	χ^2	*df*	RMSEA	CFI	TLI	ΔCFI
Mother-report						
Model 1 configural invariance	2368.278	1300	.043	.987	.986	–
Model 2 metric invariance (equivalence of factor loadings)	2422.527	1338	.042	.987	.986	<.001
Model 3 scalar invariance (equivalence of factor loadings and threshold)	2477.247	1376	.042	.987	.986	<.001
Father-report						
Model 1 configural invariance	2408.699	1300	.043	.990	.989	–
Model 2 metric invariance (equivalence of factor loadings)	2430.541	1338	.042	.990	.990	<.001
Model 3 scalar invariance (equivalence of factor loadings and threshold)	2487.341	1376	.042	.990	.990	<.001

Table 4 Reliabilities of the total scale and subscales across countries

	Chinese mother-report		Chinese father-report		Italian mother-report		Italian father-report	
	α	Corrected α	α	Corrected α	α	Corrected α	α	Corrected α
TOT	.92	–	.94	–	.86	–	.87	–
PAN	.83	.87	.87	.88	.68	.74	.77	.80
PHY	.61	.64	.66	.69	.52	.54	.58	.54
SOC	.74	.79	.76	.74	.66	.71	.68	.76
OCD	.73	.77	.78	.78	.66	.71	.57	.66
GAD	.77	.73	.80	.79	.61	.64	.66	.64
SAD	.71	.71	.74	.73	.55	.54	.56	.50

TOT total scale, *PAN* panic and agoraphobia, *PHY* fears of physical injury, *SOC* social phobia, *OCD* obsessive–compulsive disorders, *GAD* generalized anxiety/overanxious symptoms, *SAD* separation anxiety

Adolescent–mother agreements on the six subscales were significant, ranging from .15 to .44, while adolescent–father agreements on the six subscales were also significant, ranging from .10 to .39.

Regarding the Italian sample, adolescent–mother and adolescent–father agreements on the total scale were .35 ($p < .01$) and .27 ($p < .01$), respectively. Adolescent–mother agreements on the six subscales were significant,

Table 5 Correlations between the SCAS-P and parent-report internalizing and externalizing problems

	China			Italy		
	Internalizing problems	Externalizing problems	*z*	Internalizing problems	Externalizing problems	*z*
PAN	.507** (.529**)	.281** (.368**)	5.09** (3.98**)	.334** (.421**)	.195** (.232**)	2.700** (3.95**)
PHY	.293** (.356**)	.125** (.236**)	3.45** (2.71**)	.228** (.272**)	.122** (.111*)	2.00* (3.19**)
SOC	.490** (.469**)	.270** (.302**)	4.90** (3.96**)	.504** (.515**)	.183** (.198**)	6.60** (6.85**)
OCD	.473** (.438**)	.237** (.291**)	5.19** (3.43**)	.309** (.458**)	.234** (.223**)	1.46 (4.97**)
GAD	.489** (.576**)	.270** (.347**)	4.88** (5.77**)	.398** (.419**)	.098* (.168**)	5.87** (5.20**)
SAD	.466** (.489**)	.254** (.294**)	4.36** (4.65**)	.338** (.370**)	.159** (.214)	3.46** (3.19**)
TOT	.572** (.585**)	.303** (.378**)	6.29** (5.29**)	.503** (.566**)	.227** (.258**)	5.71** (6.90**)

Numbers in parentheses are father-report

PAN panic and agoraphobia, *PHY* fears of physical injury, *SOC* social phobia, *OCD* obsessive–compulsive disorders, *GAD* generalized anxiety/overanxious symptoms, *SAD* separation anxiety

* $p < .05$; ** $p < .01$

ranging from .14 to .48. Adolescent–father agreements on the six subscales were also significant, ranging from .13 to .37.

Mother–father agreement on the total score was .62 ($p < .01$) and .74 ($p < .01$) for Chinese and Italian samples, respectively. As for Chinese sample, mother–father agreements on the six subscales were significant, ranging from .54 to .63. Regarding Italian sample, such agreements were also significant, ranging from .60 to .69.

Differences in Adolescent–Mother Agreement and Adolescent–Father Agreement

As shown in Table 7, results indicated that there was a qualitative trend that adolescent–mother agreements were in general higher than adolescent–father agreements. However, adolescent–mother agreement was significant higher than adolescent–father agreement only on *fears of physical injury* in Italian sample ($z = 2.016$, $p = .044$).

Cultural and Gender Differences in Total Score of SCAS-P

The means and standard deviations were displayed in Table 8. ANOVAs were performed and results were presented in Table 9. Regarding mother-report, Chinese mothers rated their children to be more anxious than did Italian mothers, $F(1, 904) = 33.55$, $p < .001$, $\eta^2 p = .036$. Mothers considered girls to have higher anxious level than boys, $F(1, 904) = 20.24$, $p < .001$, $\eta^2 p = .022$. No significant interaction was detected. With respect to father-report, Chinese fathers thought their children to be more anxious than did Italian fathers, $F(1, 904) = 26.32$, $p < .001$, $\eta^2 p = .028$. Similarly, fathers also reported higher anxious level for girls than boys, $F(1, 904) = 29.67$, $p < .001$, $\eta^2 p = .032$. No significant interaction was found.

Cultural and Gender Differences In Specific Parent-Report Anxiety Symptoms

MANOVAs were carried out and results were displayed in Table 10. Regarding mother-report anxiety, a significant multivariate main effect was found for country (Wilk's $\lambda_{country} = .610$, $F(6, 899) = 95.83$, $p < .001$, $\eta^2 p = .390$), and gender (Wilk's $\lambda_{gender} = .935$, $F(6, 899) = 10.34$, $p < .001$, $\eta^2 p = .065$), but no significant interaction was found. Given the significance of the overall test, a subsequent univariate test was done. In comparison to Italian mothers, Chinese mothers thought that their children had higher *panic and agoraphobia*, *fears of physical injury*, *obsessive–compulsive disorder* and *separation anxiety*, but lower *generalized anxiety/overanxious symptoms*. Furthermore, girls were considered to be more anxious than boys on *fears of physical injury*, *social phobia*, and *generalized anxiety/overanxious symptoms*. No significant interaction was found.

With respect to father-report anxiety, a significant multilevel effect was found for country (Wilk's $\lambda_{country} = .644$, $F(6, 899) = 82.87$, $p < .001$, $\eta^2 p = .356$), gender (Wilk's $\lambda_{gender} = .922$, $F(6, 899) = 12.76$, $p < .001$, $\eta^2 p = .078$), and their interaction (Wilk's $\lambda_{country \times gender} = .976$, $F(6, 899) = 3.68$, $p = .001$, $\eta^2 p = .024$). A univariate analysis was performed. Results showed that Chinese fathers rated their children to have more anxiety than Italian fathers on *panic and agoraphobia*, *fears of physical injury*, *obsessive–compulsive disorder* and *separation anxiety*, but lower on *generalized anxiety/overanxious symptoms*. Moreover, except *obsessive–compulsive disorder*, fathers considered girls to have higher level of *panic and agoraphobia*, *fears of physical*

Table 6 Correlations between adolescent-report and parent-report anxiety

	Adolescent-report						
	PAN	PHY	SOC	OCD	GAD	SAD	TOT
China							
Self-report							
PAN	–						
PHY	.38**	–					
SOC	.54**	.45**	–				
OCD	.54**	.32**	.46**	–			
GAD	.71**	.44**	.64**	.52**	–		
SAD	.52**	.50**	.56**	.37**	.55**	–	
TOT	.83**	.65**	.79**	.70**	.84**	.75**	–
Mother-report							
PAN	.29**	.12**	.21**	.15**	.22**	.19**	.26**
PHY	.15**	.44**	.23**	.15**	.22**	.26**	.31**
SOC	.14**	.13**	.31**	.12**	.23**	.18**	.24**
OCD	.15**	.08	.09*	.15**	.17**	.12*	.17**
GAD	.29**	.14**	.27**	.19**	.33**	.23**	.32**
SAD	.19**	.22**	.17**	.12**	.18**	.34**	.26**
TOT	.25**	.24**	.27**	.18**	.28**	.28**	.33**
Father-report							
PAN	.20**	.16**	.20**	.09	.19**	.18**	.22**
PHY	.15**	.39**	.27**	.13**	.23**	.28**	.30**
SOC	.12*	.15**	.29**	.08	.19**	.19**	.22**
OCD	.17**	.15**	.19**	.10*	.22**	.17**	.22**
GAD	.18**	.14**	.24**	.06	.24**	.20**	.23**
SAD	.14**	.21**	.23**	.11*	.21**	.30**	.25**
TOT	.19**	.24**	.29**	.11*	.26**	.27**	.29**
Italy							
Self-report							
PAN	–						
PHY	.41**	–					
SOC	.46**	.41**	–				
OCD	.60**	.26**	.51**	–			
GAD	.57**	.47**	.62**	.56**	–		
SAD	.50**	.33**	.42**	.45**	.48**	–	
TOT	.81**	.62**	.77**	.76**	.83**	.67**	–
Mother-report							
PAN	.14**	.16**	.13**	.10*	.10*	.18**	.17**
PHY	.21**	.48**	.18**	.12**	.20**	.26**	.31**
SOC	.17**	.17**	.31**	.17**	.20**	.24**	.28**
OCD	.12*	.15**	.17**	.25**	.11*	.22**	.22**
GAD	.21**	.16**	.20**	.16**	.21**	.33**	.27**
SAD	.18**	.09	.13**	.20**	.15**	.38**	.24**
TOT	.24**	.28**	.27**	.23**	.23**	.38**	.35**
Father-report							
PAN	.15**	.12*	.15**	.17**	.13**	.16**	.19**
PHY	.17**	.37**	.16**	.14**	.19**	.22**	.26**
SOC	.17**	.14**	.26**	.13**	.16**	.21**	.24**
OCD	.12*	.04	.12*	.18**	.07	.18**	.15**

Table 6 continued

	Adolescent-report						
	PAN	PHY	SOC	OCD	GAD	SAD	TOT
GAD	.11*	.08	.14**	.05	.13**	.23**	.16**
SAD	.17**	.05	.13**	.11*	.07	.30**	.18**
TOT	.20**	.19**	.23**	.18**	.18**	.30**	.27**
	Mother-report						
	PAN	PHY	SOC	OCD	GAD	SAD	TOT
China							
Self-report							
PAN							
PHY							
SOC							
OCD							
GAD							
SAD							
TOT							
Mother-report							
PAN	–						
PHY	.44**	–					
SOC	.55**	.45**	–				
OCD	.63**	.38**	.52**	–			
GAD	.69**	.43**	.62**	.59**	–		
SAD	.62**	.56**	.62**	.58**	.65**	–	
TOT	.83**	.68**	.79**	.77**	.83**	.84**	–
Father-report							
PAN	.58**	.31**	.39**	.41**	.47**	.41**	.54**
PHY	.30**	.63**	.33**	.23**	.33**	.41**	.46**
SOC	.36**	.32**	.61**	.32**	.37**	.39**	.50**
OCD	.39**	.25**	.31**	.56**	.37**	.31**	.46**
GAD	.42**	.28**	.39**	.35**	.54**	.37**	.49**
SAD	.40**	.41**	.41**	.37**	.43**	.56**	.54**
TOT	.51**	.44**	.50**	.46**	.51**	.50**	.62**
Italy							
Self-report							
PAN							
PHY							
SOC							
OCD							
GAD							
SAD							
TOT							
Mother-report							
PAN	–						
PHY	.40**	–					
SOC	.38**	.35**	–				
OCD	.50**	.36**	.30**	–			
GAD	.49**	.39**	.54**	.39**	–		
SAD	.43**	.39**	.41**	.45**	.51**	–	

Table 6 continued

	Mother-report						
	PAN	PHY	SOC	OCD	GAD	SAD	TOT
TOT	.70**	.67**	.74**	.66**	.78**	.73**	–
Father-report							
PAN	.57**	.28**	.27**	.44**	.35**	.31**	.50**
PHY	.35**	.69**	.24**	.31**	.33**	.31**	.51**
SOC	.31**	.29**	.65**	.31**	.41**	.39**	.57**
OCD	.30**	.27**	.28**	.61**	.40**	.44**	.53**
GAD	.37**	.25**	.38**	.30**	.60**	.39**	.53**
SAD	.31**	.35**	.38**	.35**	.46**	.67**	.59**
TOT	.50**	.49**	.53**	.51**	.59**	.57**	.74**
	Father-report						
	PAN	PHY	SOC	OCD	GAD	SAD	TOT
China							
Self-report							
PAN							
PHY							
SOC							
OCD							
GAD							
SAD							
TOT							
Mother-report							
PAN							
PHY							
SOC							
OCD							
GAD							
SAD							
TOT							
Father-report							
PAN	–						
PHY	.52**	–					
SOC	.55**	.53**	–				
OCD	.69**	.45**	.51**	–			
GAD	.72**	.57**	.64**	.61**	–		
SAD	.65**	.63**	.65**	.60**	.68**	–	
TOT	.86**	.75**	.79**	.78**	.86**	.86**	–
Italy							
Self-report							
PAN							
PHY							
SOC							
OCD							
GAD							
SAD							
TOT							

Table 6 continued

	Father-report						
	PAN	PHY	SOC	OCD	GAD	SAD	TOT
Mother-report							
PAN							
PHY							
SOC							
OCD							
GAD							
SAD							
TOT							
Father-report							
PAN	–						
PHY	.37**	–					
SOC	.39**	.39**	–				
OCD	.46**	.36**	.42**	–			
GAD	.49**	.39**	.56**	.45**	–		
SAD	.29**	.38**	.49**	.48**	.56**	–	
TOT	.67**	.66**	.78**	.70**	.80**	.73**	–

PAN panic and agoraphobia, *PHY* fears of physical injury, *SOC* social phobia, *OCD* obsessive–compulsive disorders, *GAD* generalized anxiety/overanxious symptoms, *SAD* separation anxiety

* $p < .05$; ** $p < .01$

Table 7 Differences in self-mother coefficients and self-father coefficients

	China				Italy			
	Adolescent–mother	Adolescent–father	z	p 2-tailed	Adolescent–mother	Adolescent–father	z	p 2-tailed
PAN	.29	.20	1.442	.149	.14	.15	−.153	.878
PHY	.44	.39	.909	.363	.48	.37	2.016	.044*
SOC	.31	.29	.331	.740	.31	.26	.816	.415
OCD	.15	.10	.765	.444	.25	.18	1.100	.271
GAD	.33	.24	1.476	.140	.21	.13	1.235	.217
SAD	.34	.30	.671	.502	.38	.30	1.357	.175
TOT	.33	.29	.666	.505	.35	.27	1.327	.184

PAN panic and agoraphobia, *PHY* fears of physical injury, *SOC* social phobia, *OCD* obsessive–compulsive disorders, *GAD* generalized anxiety/overanxious symptoms, *SAD* separation anxiety. *Self-mother* the coefficients between self-report and mother-report, *Self-father* the coefficients between self-report and father-report

* $p < .05$

injury, *social phobia*, *generalized anxiety/overanxious symptoms*, and *separation anxiety*. Although there were significant interactions for *obsessive–compulsive disorder* and *separation anxiety*, their effect sizes were not sufficient enough to be worth interpreting.

Discussion

Few good measures that assess anxiety have been validated and used both in Chinese and Italian adolescents, such as the self-rating anxiety scale (SAS), state-trait anxiety inventory (STAI), and screening for child anxiety related disorder (SCARED). Most of them are self-report measures. The SCAS-P is a promising parent-report measure that could be used to assess child and adolescents' anxiety symptoms. This study validated the SCAS-P in Chinese and Italian parents and used this scale to compare Chinese and Italian adolescents' anxiety. Several findings were obtained. First, the six correlated-factor structure was supported, and such factor structure was invariant across cultures. Second, the internal consistency reliability for the overall scale was excellent for both samples, but the

Table 8 Means and standard deviations of parent-report anxiety across countries

	Mother-report						Father-report					
	Total ($N = 908$)		China ($N = 456$)		Italy ($N = 452$)		Total ($N = 908$)		China ($N = 456$)		Italy ($N = 452$)	
	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD
SCAS total												
Total	18.85	11.55	21.01	13.28	16.66	9.00	18.69	12.43	20.88	14.42	16.48	9.55
Boys	16.84	11.83	19.12	14.10	14.51	8.39	16.08	11.75	17.48	13.61	14.65	9.33
Girls	20.23	11.15	22.32	12.53	18.14	9.13	20.50	12.57	23.25	14.52	17.74	9.52
PAN												
Total	1.68	2.67	2.50	3.23	.86	1.57	1.81	3.06	2.70	3.68	.92	1.89
Boys	1.39	2.70	2.15	3.48	.61	1.12	1.47	2.80	2.27	3.56	.65	1.27
Girls	1.89	2.63	2.74	3.03	1.03	1.79	2.04	3.21	2.99	3.73	1.10	2.21
PHY												
Total	3.20	2.57	4.01	2.74	2.38	2.10	3.19	2.53	3.80	2.66	2.57	2.23
Boys	2.51	2.40	3.43	2.63	1.58	1.72	2.41	2.23	2.96	2.40	1.85	1.89
Girls	3.67	2.58	4.41	2.75	2.92	2.17	3.73	2.58	4.39	2.67	3.06	2.31
SOC												
Total	5.16	2.89	5.12	3.00	5.20	2.76	4.97	2.96	4.91	3.05	5.02	2.86
Boys	4.77	2.85	4.84	3.02	4.70	2.68	4.39	2.89	4.40	3.07	4.39	2.70
Girls	5.43	2.88	5.31	2.98	5.54	2.77	5.36	2.94	5.27	2.99	5.46	2.90
OCD												
Total	2.12	2.36	2.83	2.56	1.40	1.89	2.26	2.40	2.99	2.69	1.52	1.79
Boys	2.01	2.40	2.78	2.77	1.22	1.63	2.08	2.36	2.56	2.67	1.58	1.87
Girls	2.20	2.33	2.86	2.41	1.53	2.04	2.39	2.43	3.29	2.68	1.48	1.74
GAD												
Total	3.85	2.43	3.24	2.51	4.47	2.20	3.62	2.53	3.08	2.62	4.15	2.31
Boys	3.51	2.41	2.87	2.49	4.16	2.15	3.22	2.40	2.50	2.26	3.95	2.32
Girls	4.09	2.43	3.50	2.49	4.69	2.21	3.89	2.58	3.49	2.77	4.30	2.30
SAD												
Total	2.84	2.42	3.32	2.69	2.35	2.00	2.85	2.57	3.40	2.93	2.30	2.00
Boys	2.65	2.51	3.05	2.73	2.23	2.21	2.51	2.40	2.79	2.50	2.23	2.27
Girls	2.97	2.35	3.50	2.65	2.43	1.85	3.09	2.66	3.83	3.14	2.34	1.79

PAN panic and agoraphobia, *PHY* fears of physical injury, *SOC* social phobia, *OCD* obsessive–compulsive disorders, *GAD* generalized anxiety/overanxious symptoms, *SAD* separation anxiety

Table 9 ANOVA analyses of the total scores of parent-report anxiety

	Country			Gender			Country × gender		
	$F(1, 904)$	p	η^2p	$F(1, 904)$	p	η^2p	$F(1, 904)$	p	η^2p
Mother-report anxiety	33.55	<.001	.036	20.24	<.001	.022	.08	.775	.000
Father-report anxiety	26.32	<.001	.028	29.67	<.001	.032	2.72	.099	.003

reliabilities of subscales were lower. Third, the SCAS-P in general showed adequate convergent and divergent validity. Fourth, adolescent–parent agreements were generally low, while mother–father agreements were moderate. Fifth, adolescent–father agreement was generally as strong as adolescent–mother agreement across countries, except *fears of physical injury* in Italian sample. Sixth, Chinese adolescents were rated to have more anxiety symptoms than Italian adolescents on the total scale and subscales except *social phobia* and *generalized anxiety/overanxious* symptoms. Last, cultural and gender differences in parents' ratings on adolescents' anxiety symptoms were found. In the following we will address each question in line with our findings.

Consistent with the previous studies [14–16, 18, 19], our results indicated that SCAS-P consisted of 6 correlated

Table 10 MANOVA analyses of the subscale scores of parent-report anxiety

	Country			Gender			Country × gender		
	$F(1, 904)$	p	η^2p	$F(1, 904)$	p	η^2p	$F(1, 904)$	p	η^2p
Mother-report anxiety									
PAN	**89.57**	**<.001**	**.090**	8.64	.003	.009	.24	.626	.000
PHY	**108.41**	**<.001**	**.107**	**52.15**	**<.001**	**.055**	1.29	.256	.001
SOC	.059	.808	.000	**11.54**	**.001**	**.013**	.92	.339	.001
OCD	**90.41**	**<.001**	**.091**	1.65	.199	.002	.51	.477	.001
GAD	**61.23**	**<.001**	**.063**	**13.35**	**<.001**	**.015**	.09	.758	.000
SAD	**35.03**	**<.001**	**.037**	4.05	.044	.004	.63	.429	.001
Father-report anxiety									
PAN	**79.51**	**<.001**	**.081**	**8.69**	**.003**	**.010**	.47	.491	.001
PHY	**58.58**	**<.001**	**.061**	**68.26**	**<.001**	**.070**	.46	.499	.001
SOC	.22	.642	.000	**24.29**	**<.001**	**.026**	.24	.626	.000
OCD	**81.95**	**<.001**	**.083**	4.12	.043	.005	7.19	.007	.008
GAD	**46.88**	**<.001**	**.049**	**16.54**	**<.001**	**.018**	3.72	.054	.004
SAD	**36.90**	**<.001**	**.039**	**11.59**	**.001**	**.013**	7.58	.006	.008

PAN panic and agoraphobia, *PHY* fears of physical injury, *SOC* social phobia, *OCD* obsessive–compulsive disorders, *GAD* generalized anxiety/overanxious symptoms, *SAD* separation anxiety. Fonts in bold are substantially significant

factors. The six factors included in the SCAS-P are consistent with the specification of the DSM-IV and the assumption that these anxiety symptoms are supposed to be related [3]. As DSM-V is similar to DSM-IV concerning the criteria and categories of anxiety disorder, this means that the SCAS-P is also aligned with the updated classification of anxiety disorders. Furthermore, we also demonstrated that this factor structure was equivalent across collectivistic (i.e., China) and individualistic (i.e., Italy) countries, suggesting that the factor structure of the SCAS-P could be applicable in different cultures.

Results of reliabilities of the SCAS-P were mixed. On one hand, reliability of the total scale was above .85, which was comparable to previous studies [14, 15, 18]. On the other hand, reliabilities of subscales were acceptable (>.60) in Chinese sample, whereas reliabilities of *fears of physical injury* and *separation anxiety* were problematic in Italian sample, as they were less than .60 in both of forms of reliabilities. Although reliability of *fears of physical injury* of the SCAS-P also has been found to be problematic in other studies [14, 15, 18] because of its small number of items, the low (corrected) Cronbach's α of *separation anxiety* of the SCAS-P may be relatively less common. Revising items that are less appropriate for Italian adolescents and adding homogeneous items may help mitigate such problem.

Regarding the convergent and divergent validity, the SCAS-P showed good convergent and divergent validity across countries, as in general the correlations between the SCAS-P and internalizing problems were more strongly than the ones between SCAS-P and externalizing problems. It should be noted that the correlation between mother-report *obsessive–compulsive disorder* and internalizing problems in Italian sample was not significantly higher than the one with externalizing problems. Nevertheless, there was a trend to be so.

We found that adolescent–parent agreement was generally low in both countries. Previous studies have addressed this issue and found a low to moderate correlation between self-report and other-report, and there are a number of factors influencing such cross-informant agreement [34–36]. In the current study, weak adolescent–parent agreement can be interpreted in two ways. On one hand, internalizing problems such as anxiety is a subjective feeling and relatively difficult to be observed by others compared to externalizing problems like aggression, especially for adolescents [34, 35]. On the other hand, adolescents and parents may have different understanding and focus on different aspects of child psychopathology, and such difference leads to low child–parent agreement [37, 38]. In addition, the moderate mother–father agreement suggests that mothers and fathers may simultaneously have similar and different views about their child's anxiety symptoms, which suggests that information provided by one parent could be complemented by the other one. We are aware that the moderate mother–father agreement may be related to the characteristics of our sample. In our sample, fathers and mothers are living together and both involved in child-rearing activities. We are conservative that the magnitude of mother–father agreement may vary in incomplete or complicated families (e.g., parents live apart).

Furthermore, our findings revealed that in general adolescent–father agreement was as strong as adolescent–mother agreement in both samples except *fears of physical injury* in Italian adolescents. Although mothers are primary caregivers of their children at home and are supposed to understand their children's feelings better than fathers, our findings demonstrated that fathers in general are as attuned as mothers. This implicates that either mother-report or father-report is important to the assessment of children's psychopathology.

With respect to parents' rating on adolescents' anxiety symptoms, our current findings were largely consistent with Delvecchio et al.'s results [9] except *social phobia*. One possible explanation is that items of *social phobia* are mainly about how a child is afraid of something in public situations (e.g., school, public bathroom), but parents may know less about how their children feel in such situations because they are not likely to accompany them in these situations. That Chinese adolescents have more anxiety symptoms is supposed to be due to higher social and emotional restraint because of cultural requirement, more obedience to parents and authorities and higher academic and social pressure [9].

Regarding gender difference in anxiety symptoms, mothers had different ratings from fathers on *fears of physical injury* and *separation anxiety*. We notice that the difference in *fears of physical injury* between mother-report and father-report is trivial whereas there is a big difference in *separation anxiety* between mother-report and father-report. Fathers rated girls to have substantially higher *separation anxiety* than boys, whereas mothers rated both genders as equal in this regard. We think a possible explanation is due to the differences in biological and socially reinforced masculine qualities that predispose fathers to view and treat their children's behavior differently from mothers [39]. In child-rearing processes, mothers are usually supposed to have more intimate interaction with their children whereas fathers often encourage their independence. It looks like that fathers think that girls are more sensitive and more afraid of separation and independence. Actually, difference in parents' rating on children's separation anxiety is not a new issue and such results were consistent with findings drawn from children and adolescents in previous research, but the exact reason still remains unclear and further effort should be exerted to better understand this problem [39].

As any other study, the present research has some limitations. The first is that we only include normal sample but not clinical sample, which precludes us to examine the discriminant validity of the SCAS-P. Second, there are still some problems left in this study concerning the Italian version SCAS-P such as the low reliabilities of the *fears of physical injury* and *separation disorder* subscales and the less satisfied convergent and divergent validity of the mother-report *obsessive–compulsive disorder* subscale. As this may be the first study that has validated the SCAS-P in Chinese and Italian samples, further investigation is needed. Last, we examined the cultural difference in anxiety in this study. However, the development of anxiety is related to attachment [40], parenting [41], heredity [42], temperament [43], social learning [44], and social factors such as rapid urbanization [45]. This suggests that combining broader factors may help examine this issue in more depth.

Nonetheless, this study bears some contributions. The most important contribution is the inclusion of father-report in assessment of adolescents' anxiety. Fathers may have different attitudes about a child's feelings and behavior from mothers. Therefore, fathers may provide valuable information about their child's anxiety from a different perspective, which may help understand and diagnose child's anxiety disorder more comprehensively and more accurately. Furthermore, the SCAS-P validated in this study may serve as a promising parent-report measure to assess Chinese and Italian adolescents' anxiety symptoms as there are few good other-informant measures in these two countries.

In conclusion, the present study demonstrated that the Chinese and Italian versions of the SCAS-P in general appeared to be reliable and valid in assessing adolescents' anxiety symptoms in both countries and there are cultural and gender differences in adolescents' anxiety symptoms.

Summary

The current study validated SCAS-P in Chinese and Italian populations. Participants contained 456 Chinese and 452 Italian parent–adolescent dyads. Confirmatory factor analyses showed that the six correlated factor structure of SCAS-P was fit better than other alternative factor structure. Multi-group confirmatory factor analyses demonstrated the six correlated factor structure was invariant across Chinese and Italian samples. Internal consist reliability was good in both samples but varied in subscales in the two countries. The SCAS-P also showed good convergent and divergent validity. Parent–adolescent agreement was from low to medium while mother–father agreement was from medium to high in both countries. Chinese mothers and fathers rated their adolescent children to be more anxious than did Italian parents in general and in four out of six dimensions (i.e., except social phobia, and generalized anxiety/overanxious symptoms). Mothers considered that girls had more anxiety on fears of physical injury, social phobia, and generalized anxiety/overanxious symptoms than boys, whereas fathers thought girls were more anxious than boys on all the dimensions except

obsessive–compulsive disorders. These findings were largely consistent with previous study which used self-report version of SCAS. We briefly addressed limitations and strengths of the current study.

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