

Psychometric Properties of the Bulgarian Translation of the Spence Children's Anxiety Scale

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Abstract

The present study examined the psychometric properties of the Bulgarian translation of the Spence Children's Anxiety Scale (SCAS) in a community sample of adolescents (N=700), aged 13 to 17 years, in Bulgaria. In addition to the SCAS, all participants completed the Strengths and Difficulties Questionnaire (SDQ), and the Centre for Epidemiological Studies Depression Scale for Children (CES-DC). The internal consistency (Cronbach's alpha=0.92) and the validity of the Bulgarian translation of the SCAS was excellent. The SCAS total scores correlated significantly with the CES-DC and the SDQ total scores. Confirmatory factor analysis revealed the same six-factor structure as the original SCAS. The SCAS proved to be a reliable and valid measure of anxiety symptoms among adolescents in Bulgaria.

Keywords: Anxiety symptoms; Cross-cultural; Adolescents; Depression; Spence children's anxiety scale

Introduction

Anxiety disorder is a common disorder in adolescence with prevalence rates ranging from 15-31.9% [1-10]. Studies conducted among adolescents in Western industrialized countries have indicated that anxiety disorder is associated with psychosocial impairment in various life domains, particularly in social and academic domains [4,10]. Furthermore, anxiety disorders often increase the risk of having a wide range of psychiatric disorders in adulthood such as depression and substance abuse [11]. These findings emphasized the importance of identifying clinically anxious adolescents so that appropriate treatment can be provided. However, accurate identification of clinical anxiety in children and adolescents depends on the availability of reliable and valid screening tools. Although reliable diagnostic interview schedules are available, they are time consuming to administer and require trained interviewers. Self-report questionnaires, by contrast, are less time consuming and less expensive to administer. Given the advantages of self-report questionnaires, numerous self-report screenings for the assessment of anxiety symptoms (e.g., Fear Survey Schedule for Children-Revised [12]; the Revised Children's Manifest Anxiety Scale [13]; State-Trait Anxiety Inventory for Children [14]) in children and adolescents have been developed over the past decades. While these questionnaires have sound psychometric properties, they cannot be used to measure symptoms of DSM-IV anxiety disorders. An exception is the Spence Children's Anxiety Scale [15,16].

The SCAS was developed to measure anxiety symptoms based on criteria of DSM-IV anxiety disorders: generalized anxiety disorder, separation anxiety disorder, social phobia, panic disorder and agoraphobia, obsessive-compulsive disorder, and fears of physical injury. The SCAS has been translated into several languages including Italian [17], German [18], Chinese [19], Japanese [20], Cypriot [21], Farsi [22], and Dutch [23]. The first paper that described the development of SCAS [15] reported high internal consistency, with Cronbach's alpha for the total scale being 0.92. The Cronbach's alphas for the six subscales were also high, with values ranging from 0.60 (for physical injury fears) to 0.82 (for panic-agoraphobic symptoms). Subsequent studies have similarly shown SCAS to have high alpha coefficients [18-26].

Several other studies have examined the factor structure of the SCAS. Spence [15] compared four models (i.e., single-factor, six uncorrelated factors, six correlated factors, and six factors loading onto a single higher-order factor) and found that the six-factor, higher-order

model fitted better than the other models. The six-correlated factor model has received support from studies conducted in Australia [25], and Cyprus [21], but not in Germany [18], China [19], or Japan [20]. Differences in socialization practices and cultural values (e.g., social norms, theoretical worldviews, environmental factors, educational and parenting practice) have been suggested as an explanation for these inconsistent findings [18].

There is a lack of psychometrically sound and valid self-report measures to assess anxiety symptoms in Bulgarian adolescents. Therefore, the main aim of the present study was to examine the psychometric properties (i.e., reliability and validity) and factor structure of the Bulgarian translation of the SCAS in adolescents in Bulgaria. Bulgaria is located in the eastern part of the Balkan Peninsula, with a total population of 7.6 million. With the fall of the Eastern Bloc, Bulgaria had undergone a transition from a centralized government to a market economy. For example, since 1989, the Bulgarian Health care reform has undergone three stages [27]. The first stage involved the abolishment of the state monopoly in the health system, whereas the second stage involved the introduction of the new health insurance system. The third stage involved the completion of the legislative foundation of the health care reform with the adoption of new laws and amendments and additions of the existing regulatory acts. Despite these changes, the Bulgarian health system is still described as economically unstable; its health care establishments, particularly the hospitals, are reported to suffer from underfunding. Among the most common problems and challenges in mental health care in Bulgaria include (a) lack of programmes for early diagnosis, and (b) insufficient training and lack of mental health professionals [27]. To our knowledge, there are no studies that have examined the prevalence of anxiety and other psychiatric disorders among adolescents in Bulgaria. Among adults, it

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is estimated that about 20% of the adults in the general population in Bulgaria met the diagnosis of a mental disorder, with the most common being that of anxiety disorders (13.1%), followed by depressive disorders (8.5%) [27]. The prevalence of anxiety disorders among adolescents is expected to be similarly high.

Of importance therefore is the question as to whether the different subtypes of anxiety are universal or cultural-specific. Knowledge on the universality or culture specificity of anxiety has practical implications because questionnaires developed in one culture can be valid for assessment in another culture. Existing results have indicated that the various translations of SCAS are reliable and valid for use among adolescents in both community and clinical samples. In all studies, the Cronbach's alpha for the total SCAS has been reported to be 0.92 [15,16,22]. The Cronbach's alphas for all subscales have similarly been reported to be high (ranging from 0.70 for separation anxiety and social phobia to 0.82 for panic-agoraphobic symptoms), except for physical injury fears (Cronbach's alpha being 0.60).

In terms of its convergent validity, numerous studies have reported significant correlation between SCAS and other measures which have been developed to assess the construct of anxiety such as the Screen for Child Anxiety Related Emotional Disorders [28] and the Revised Children's Manifest Anxiety Scale [13]. Other studies have reported its positive discriminant validity in that it successfully differentiated between children and adolescents with and without anxiety disorders [16,20,23,25]. Results in relation to its factor structures have been inconsistent. The first confirmatory factor analysis of SCAS suggested the six-correlated factor, higher-order model to fit better than the other models (i.e., single-factor, six uncorrelated factors, and six factors loading onto a single higher-order factor) [15,16]. Recent studies among adolescents in Cyprus [21] and in Iran [22] have provided support for a six-correlated factor model which came from a study by Spence and her colleagues [25], based on data of Australian adolescents.

Based on previous findings, we hypothesized that the Bulgarian translation of the SCAS to be a reliable and valid instrument when used among adolescents in Bulgaria. Such psychometric evaluation should indicate whether the SCAS is useful for screening anxiety symptoms in Bulgarian populations. In terms of construct validity, two additional self-report questionnaires were administered, the Strengths and Difficulties Questionnaire (SDQ), and the Centre for Epidemiological Studies Depression Scale for Children (CES-DC). SCAS total scores were hypothesized to correlate significantly positive with emotional problems as measured by the SDQ and total depressive symptoms as measured by the CES-DC. Previous studies conducted among adolescents in Western countries have indicated girls to report significantly higher anxiety symptoms than boys. Of the different subtypes of anxiety disorders, significantly more girls compared to boys had higher scores on social and specific phobia, and generalized anxiety [29]. Gender difference for symptoms of separation anxiety and panic disorder has been less conclusive [29]. In addition to gender differences, there may be age differences in the overall prevalence of anxiety and also within each subtypes of anxiety disorders. Separation anxiety has been reported to decrease with age, whereas other anxiety disorders such as social phobia and panic disorder tend to increase as the adolescents grow older [18,30,31]. It is, however, not known whether or not these findings may be replicated in Bulgaria. Therefore, another aim of the study was to examine gender and age patterns of anxiety symptoms among Bulgarian adolescents.

Methods

Procedure and participants

Approval to conduct the present study was obtained from the University of Roehampton Ethic Board. In this study, schools were randomly selected from a telephone directory book for Central and Northern Bulgaria. A total of 10 schools from urban and suburban schools in Veliko Tarnovo city region in Bulgaria were approached and the study's aims and design were explained. Of the ten schools that were approached, eight agreed to participate. Once school approval was obtained, a meeting was arranged with the head-teachers. This allowed them to ask any questions which he/she may have about the study, and to discuss the "practical" aspects of running this study (e.g., room availability, schedule of the study to take place, etc.). Once the head teacher agreed that the study can take place in his/her school, arrangements were made to distribute a letter to the parents together with a parental consent form. Eight hundred and fifty were distributed, and signed consent forms were received from 708 adolescents; due to missing data and inclusion criteria for age (i.e. 13 to 17 years), data of 700 adolescents was used in the analyses. Parental written informed consent was obtained before participation in the study. Adolescents' participation was voluntary, and they were not paid for participating in this study. The adolescents completed the questionnaires in a designated classroom and a research assistant was available to provide assistance if necessary and to ensure independent responding. Of the 700 adolescents who participated in this study, 53.9% were boys and 46.1% were girls. They ranged in age from 13 to 17 years (mean=15.31 years, SD=1.002). Most of the participants reported their religious affiliation as Christian (83.6%). 6.4% were Islamic, Judaist, and Buddhist, and 9.7% reported that they were not affiliated with any religious organizations. Almost all of them were Caucasian (93.7%); 1.3% were Roman and 5% were Turkish or other ethnic groups.

Measures

In addition to the SCAS, the participants also completed a brief questionnaire consisting of demographic information, the Strengths and Difficulties Questionnaire (SDQ), and the Centre for Epidemiological Studies Depression Scale for Children (CES-DC). The Strengths and Difficulties Questionnaire (SDQ [32] was used to assess general difficulties and positive attributes. Its 25 items are divided into 5 scales, which generate scores for conduct problems, hyperactivity-inattention, emotional symptoms, peer problems, and prosocial behaviour. Each of the items are rated on a 3-point scale, ranging from "not true" (0) to "certainly true" (2). Five items are negatively scored, and the rest are positively scored. The total difficulties score can be obtained by adding the items of the four problem scales (excluding the prosocial behaviour scale). Both the internal consistency and test-retest stability of the SDQ has been reported to be satisfactory [32]. The SDQ has been shown to be highly correlated with other measures of child and adolescent psychopathology including the Youth Self-Report [33]. In the present study, the Cronbach's alpha for the total SDQ scores was 0.69. The official translation was used in the present study (<http://www.sdqinfo.com/b3.html>). The Centre for Epidemiological Studies Depression Scale for Children (CES-DC) [34] is a 20-item measure of depressive symptoms for children and adolescents. Each item is rated on a 4-point scale in terms of its frequency, during the last week, from "not at all"=0 to "a lot"=3. A total depression score is calculated by summing up all the items (items 4, 8, 12 and 16 with reversed scored). In the present study, the Cronbach's alpha for the total CES-DC scores was 0.84.

Translation of Instruments

The English version of the questionnaires was adapted and

translated according to guidelines that are widely accepted for the successful translation of instruments in cross-cultural research [35]. One bilingual translator who was also a native speaker and culturally aware blindly translated the questionnaires from the original language (English) to the second language (Bulgarian), and another bilingual person translated it back to the original language (Bulgarian back to English). Differences in the original and the back-translated versions were discussed and resolved by joint agreement of both translators.

Results

Psychometric properties of SCAS in Bulgaria

The reliabilities (internal consistencies) of the SCAS (total scores and for each of its subscales) were estimated using Cronbach's alpha. Cronbach's alpha for the total SCAS score was 0.92. Of all the SCAS subscales, fears of physical injury subscale showed the lowest alpha, with the value of 0.63. The subscale with the highest alpha was that of panic, with the value of 0.82. Separation anxiety disorder, social phobia, obsessive-compulsive disorder, and generalized anxiety disorder yielded values of 0.71, 0.75, 0.65, and 0.77, respectively. These findings are in line with previous studies done in other European countries [11].

The validity of the SCAS was further examined by correlating it with the SDQ and CES-DC (Table 1). The SCAS total anxiety score and its subscales correlated significantly with the total difficulties SDQ scores and its emotional symptoms subscale score in particular. That is, a higher frequency of anxiety symptoms was associated with a higher level of emotional symptoms. The correlations ranged from .26 to .51 for the total difficulties SDQ scores, and .35 to .59 for emotional symptoms subscale.

Significant correlations were also found between CES-DC, SCAS total anxiety score, and each of the subscales. The correlation between CES-DC and total anxiety was 0.52, whereas the correlation between the subscales and CES-DC ranged from 0.26 to 0.48. The high correlation with measures of general distress and depression demonstrate the external validity of the Bulgarian SCAS.

Factor analysis of the Bulgarian SCAS

Confirmatory factor analysis was conducted to examine the fit of the original 6-correlated factor model reported by Spence [16] using Bulgarian data. All analyses were done on EQS [36] with least squares estimation using raw data. Model fit was examined using a variety of fit indices which depict different aspects of the model's ability to represent the data. In order to enable comparison with previous studies [16], we chose NFI, NNFI, and CFI to be examined. Higher values of NFI, NNFI, and CFI indicate adequate fit, the conventional rule of thumb of acceptability being values higher than 0.90 [37]. RMSEA provides a fit index unaffected by the size of the model by taking degree of freedom into account. RMSEA of 0.05 or lower is considered to be indicative of close fit [38].

The present model showed excellent fit (chi-square=3471.79, df=650, p<0.001, NFI=0.92, NNFI=0.98, CFI=0.99, RMSEA=0.018). These values were better than the report by Spence [16] (chi-square=1394, df=650, p<0.001, NFI=0.94, NNFI=0.97, CFI=0.97), giving strong support to the 6-factor structure of the Bulgarian SCAS. Further analyses showed substantial inter-correlations among SCAS subscales. All correlations were significant (p<0.01 or 0.05). The strongest correlation was found between obsessive-compulsive disorder and generalized anxiety disorder (r=0.85), and the weakest between obsessive compulsive disorder and fears of physical injury (r=0.60) (Table 2).

Factor loadings are reported in Table 3. Some of the items showed low loadings on the hypothesized factor. Specifically, items 13 and 35 of obsessive-compulsive disorder, and item 16 of fears of physical injury had factor loadings lower than 0.40. Other than these items, however, all items had loadings between 0.40 to 0.72. Overall, the factor loadings were high in comparison to previous studies. This suggests that the items measured each target factor adequately.

Age and gender differences

Table 4 shows the means and standard deviations of the SCAS total scores and its subscales for the total sample and for boys and

SCAS	Total SDQ score	Emotional symptoms	Conduct problems	Hyperactivity/inattention	Total CES-D score
Total anxiety score	0.51**	0.59**	0.06	0.18**	0.52**
Separation anxiety	0.35**	0.43**	0.05	0.11**	0.39**
Social phobia	0.39**	0.46**	-0.04	0.08*	0.38**
Obsessive-compulsive disorder	0.47**	0.52**	0.15**	0.25**	0.46**
Fears	0.26**	0.35**	0.05	0.05	0.26**
Panic disorder	0.46**	0.52**	0.08*	0.21**	0.48**
Generalized anxiety	0.43**	0.51**	0.00	0.12**	0.46**

SCAS: Spence Children's Anxiety Scale; SDQ: Strengths and Difficulties Questionnaire; CES-DC: Center for Epidemiologic Studies-Depression Scale for Children
*significant (p<.05), **significant (p<0.01)

Table 1: Correlations between SCAS, SDQ, and CES-DC in Bulgaria.

	F1	F2	F3	F4	F5
F1: Separation anxiety					
F2: Social phobia	0.74*				
F3: Obsessive-compulsive disorder	0.81**	0.67**			
F4: Fears	0.84*	0.73*	0.60**		
F5: Panic disorder	0.79*	0.71*	0.73**	0.82*	
F6: Generalized anxiety	0.84*	0.80*	0.85**	0.76*	0.77*

SCAS: Spence Children's Anxiety Scale
*significant (p<0.05), **significant (p<0.01)

Table 2: Correlations between the SCAS factors.

DSM-IV category	Item	Factor loadings					
		F1	F2	F3	F4	F5	F6
Separation anxiety disorder	5	0.59					
	8	0.63					
	11	0.49					
	14	0.69					
	15	0.47					
38	0.48						
Social phobia	6		0.56				
	7		0.45				
	9		0.71				
	10		0.46				
	26		0.67				
31		0.68					
Obsessive-compulsive disorder	13			0.34			
	17			0.57			
	24			0.52			
	35			0.32			
	36			0.72			
37			0.55				
Physical injury fears	2				0.61		
	16				0.38		
	21				0.57		
	23				0.53		
	29				0.40		
Panic attack and agoraphobia	12					0.58	
	19					0.58	
	25					0.51	
	27					0.50	
	28					0.67	
	30					0.42	
	32					0.70	
	33					0.70	
34					0.56		
Generalized anxiety disorder/overanxious disorder	1						0.55
	3						0.56
	4						0.65
	18						0.55
	20						0.60
22						0.71	

Table 3: Confirmatory factor analysis loadings.

girls, and different ages? The highest score found in the total sample was for generalized anxiety disorder, whereas the lowest was obtained in the separation anxiety subscale. Two-way analyses of variance were conducted to determine gender and age effects. The analyses yielded a main effect of the gender for total SCAS score, (F (1, 699)=110.27, p<0.001), separation anxiety, (F (1,699)=67.97, p<0.001), social phobia, (F (1,699)=75.15, p<0.001), panic, (F (1,699)=69.02, p<0.001), fears of physical injury, (F (1,699)=94.11, p<0.001), and generalized anxiety disorder, (F (1,699)=93.05, p<0.001). These results suggested that girls significantly reported higher levels of anxiety symptoms compared to boys.

The only significant main effect of age was found for the panic subscale, (F (4,699) =4.92, p<0.001). Further analysis showed that the youngest age group had significantly higher number of panic symptoms than the older age groups. There was no significant interaction effect between gender and age for total SCAS score and on any of the SCAS subscales.

Discussion

The present study examined the psychometric properties of the Bulgarian translation of the SCAS, and the frequency of anxiety symptoms among adolescents in Bulgaria. Overall, our results provided further support for the good psychometric properties and reliability of the SCAS to assess anxiety symptoms in Bulgarian adolescents. Our findings showed that the SCAS has a good reliability with Cronbach's alpha of 0.92 for the total SCAS score. The Cronbach's alpha for the subscales of the SCAS ranged from 0.63 (fears of physical injury) to 0.77 (generalized anxiety disorder). Our finding showing the lowest internal consistency for fears of physical injury is in line with our previous study [11], which could have been related to the low number of items for this scale. Another explanation could have been related to the content of this subscale in that the items have objects which can arouse children's fear, but are loosely related to one another [39].

	Total SCAS Mean (SD)	SAD Mean (SD)	Socph Mean (SD)	OCD Mean (SD)	Panic Mean (SD)	Fears Mean (SD)	GAD Mean (SD)
Total sample	25.23 (14.9)	2.89 (2.8)	5.00 (3.4)	5.05 (3.7)	3.17 (3.6)	3.29 (2.9)	5.83 (3.2)
Male	19.87 (11.6)	2.11 (2.1)	3.95 (3.0)	4.59 (3.1)	2.06 (2.7)	2.36 (2.3)	4.80 (2.7)
13 years	18.07 (9.5)	1.85 (2.1)	3.41 (2.4)	4.59 (3.2)	2.30 (2.5)	2.19 (1.6)	3.74 (2.3)
14 years	22.57 (11.7)	2.56 (2.3)	4.36 (3.1)	4.62 (3.0)	2.98 (2.8)	2.85 (2.5)	5.20 (2.6)
15 years	20.16 (13.8)	2.03 (2.3)	4.29 (3.4)	4.82 (3.6)	2.30 (3.2)	2.09 (3.2)	4.62 (2.9)
16 years	20.15 (12.1)	2.26 (2.2)	4.00 (2.8)	4.71 (3.0)	1.79 (2.7)	2.41 (2.4)	4.99 (2.9)
17 years	17.25 (8.03)	1.60 (1.5)	3.31 (2.9)	4.06 (2.6)	1.41 (1.6)	2.18 (2.2)	4.69 (2.1)
Female	31.48 (15.9)	3.79 (3.1)	3.79 (3.1)	3.59 (3.2)	4.47 (4.2)	4.37 (2.7)	7.03 (3.4)
13 years	35.35 (20.3)	4.70 (4.2)	6.22 (3.4)	6.54 (3.8)	5.67 (5.2)	4.76 (3.2)	7.46 (3.9)
14 years	29.80 (16.8)	3.38 (3.0)	5.80 (3.6)	5.32 (3.4)	4.29 (2.3)	4.40 (2.9)	6.60 (3.4)
15 years	30.05 (13.3)	3.56 (2.8)	5.98 (3.3)	5.32 (2.5)	4.74 (4.3)	4.08 (2.7)	6.37 (2.9)
16 years	33.76 (16.1)	4.06 (3.1)	6.73 (3.7)	5.60 (2.9)	4.39 (3.9)	4.82 (2.6)	7.78 (3.6)
17 years	29.38 (14.7)	3.60 (2.8)	6.35 (3.5)	5.00 (3.5)	3.52 (3.4)	3.81 (2.5)	7.12 (3.1)

SCAS: Spence Children's Anxiety Disorder; SAD: Separation anxiety; SOCPH: Social Phobia; OCD: Obsessive Compulsive; PANIC: Panic disorder; FEARS: Physical injuries fears; GAD: Generalized Anxiety Disorder

Table 4: Descriptive data on the SCAS.

Our finding in relation to the factor structure suggested that the Bulgarian version of the SCAS was in favour of the original six-factor model [16]. The fit indices indicated the same factor structure for Bulgaria, with values showing the same range as the original model; this finding was similar to our recent studies in Iran and Cyprus, and similar to one conducted in Australia [15] despite differences in cultural values. Surprisingly, findings of studies that were conducted in countries with values similar to Australia such as in Germany [18] and in the Netherlands [40] failed to replicate the six-factor model. Thus, it could be that other factors (e.g., personality) in addition to cultural values could have contributed to these inconsistent findings.

In agreement with previous studies, significant correlation was found between total anxiety and depressive symptoms [20]. Our findings also showed a significant correlation between the total score of the SCAS and the emotional symptoms and the hyperactivity-inattention subscale in the SDQ. However, the correlation between SCAS and SDQ hyperactivity-inattention symptom was weaker than the correlation between the SCAS and the SDQ emotional problems. This would also support the convergent validity between the SCAS and another emotional symptoms measure, and the divergent validity with externalizing problems (i.e., SDQ hyperactivity-inattention).

The mean SCAS total score found in our study was 25.23, which was similar to the mean scores reported in studies carried out in various countries. For example, the mean SCAS reported in Cyprus, England, the Netherlands, Australia, Germany, Japan, and Hong Kong ranged from 18.11 to 38.78 [16,17,19,20]. In line with numerous previous studies [4,7,30,40], girls scored significantly higher on total anxiety than boys. Within the SCAS subscales, girls also showed higher rates except for obsessive compulsive symptoms [4,7,30,40,41]. It has been suggested that the psychological and social challenges during adolescence tend to be more demanding for girls than for boys, which in turn lead to higher levels of anxiety [42].

There are some limitations in the present study which need to be considered when interpreting our findings. First, because we only included 13 to 17 year-olds in our study, it is not clear whether our findings can be generalized to other populations. Second, the participants were recruited from schools and not from clinical settings. Because no diagnostic interview was conducted, the clinical and diagnostic utility of the Bulgarian version of the SCAS has not yet been established. Third, the data were based on adolescent self-report. Although it is widely acknowledged that the best method of assessing psychopathology in adolescents is via multiple informants [43], studies have found parents less satisfactory as informants of internalizing problems compared to externalizing problems [44,45]. Given the low agreement among informants, the use of adolescent self-report measures seemed justified given the fact that anxiousness is an internally-derived experience. Fourth, the present study did not examine the test-retest reliability of the Bulgarian translation of the SCAS. Thus, measurement stability of the Bulgarian SCAS across time is not known. Finally, the samples may not be representative of all adolescent groups in Bulgaria. Future studies should replicate our study in larger cities in Bulgaria, where more heterogeneous samples would be expected.

Conclusion

Findings of the present study show that the Bulgarian version of the SCAS seems to be a reliable and valid instrument to assess Bulgarian adolescents for symptoms of anxiety disorders. Because the SCAS is easy to administer and score, inexpensive, and time-efficient, it may be a valuable tool for screening Bulgarian adolescents with anxiety symptoms to identify them as requiring further assessment and treatment.

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