

# Psychometric Properties of the Spence Children's Anxiety Scale with an Iranian Sample

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## Abstract

The Spence's children anxiety scale is proposed to measure anxiety in 6-12 years old based on the APA (DSM-IV, 1994) classification system. The scale includes six correlated factors of separation anxiety, social phobia, obsessive-compulsive, panic with agoraphobia, generalized anxiety, disorders and fear of physical injury. The scale was validated using a confirmatory-exploratory factor analysis for the age range of 8-12 and 7-19. It has further been standardized in the Netherlands, Australia, Japan, Germany, England, New Zealand and Austria, demonstrating high reliability and validity. The present study examined its use with 417 male and female students aged 6-12 years old in Tehran, Iran. The confirmatory factor analysis of six uncorrelated factors supported the six hypothesized factors, with strong internal consistency of subscales and the total score and indicated a good fit index for six factors. The Chi-square value also explains the covariance of the data. An exploratory factor analysis was also performed using Varimax original and rotative which is consistent with the proposed factor structure. The Cronbach alpha was calculated for the internal reliability of the scale and the internal consistency of the total score was high, which is consistent with the results reported by other investigators.

The results of this study have shown that the SCAS is a suitable psychometric property among the Iranian primary school children and it is probably a clinical valuable tool in the assessment of childhood anxiety.

*Key words: Anxiety Disorders; Confirmatory Factor Analysis; Validity; Reliability.*

## **Introduction**

Anxiety disorders are the most common forms of child and adolescent psychopathology. Previous studies suggest that about 8%-12% of children and 5%-10% of adolescents meet the diagnostic criteria of anxiety disorders. Daily life and social, scholastic and personal adjustment of these children are severely impaired by such disorders (Spence, Barrett, & Turner, 2003; Sadock, Caplan, & Sadock, 2003).

Anxiety disorders appear in different forms including separation anxiety, social phobia, generalized anxiety, and panic with agoraphobia, obsessive compulsive and specific phobic disorders. The evidence suggests children's anxiety disorders are not transient phenomena and may persist till adolescence and adulthood, if left untreated. Thus, may cause numerous problems in their future life (Spence et al., 2003); (Harvey, Clark, Ehlers, & Rapee, 2000; Hudson & Rapee, 2000; Schniering, Hudson, & Rapee, 2000).

Early intervention depends on access to valid and reliable measures. Most of the available instruments have two main limitations. First, most measures are based on the assumption that child anxiety reflects the same symptoms as adult anxiety and developmental differences are ignored. For example, two of the most highly used instruments, the Revised Children's Manifest Anxiety Scale (RCMAS, Reynolds & Richmond, 1978) and Anxiety Inventory Children State-Trait (STAI-C, Spielberger, Gorsuch, & Lushene, 1983) are based on assessment instruments for adults. Though results of studies show convergent symptoms in children and adults, there are obvious developmental differences in the presentation of anxiety syndromes of children and adults of which separation anxiety disorder is a clear example. Also, most previous instruments focused on general symptoms of anxiety, rather than symptoms that reflect the spectrum of anxiety disorders. In response to these limitations, researchers have attempted to develop instruments to help in diagnosis of specific anxiety disorders in children and to clarify the developmental differences in the presentation of anxiety in children as compared to adults. One of such instruments is SCARED (Screen for Child Anxiety Related Emotional Disorder; (Muris et al., 2000). However, this measure was developed for use in clinical populations rather than as a screen for anxiety among community samples. Second, previous measures merely detected symptoms of anxiety in general; whereas, clinicians require information about clusters of specific patterns of anxiety problems. Evidence shows that; despite considerable co morbidity among children's anxiety disorders children experience particular groups or clusters of anxiety symptoms, as suggested in diagnostic classification systems such as DSM-IV(1994); (Spence, 1997).

The Spence Children Anxiety Scale has been developed to measure reflect subtypes of anxiety disorders in children, and also including a series of items relating to physical injury fears that were identified in pilot work to be a group of anxiety symptoms that affect children. The scale was developed and standardized initially with a large community sample (Spence, 1997, 1998). Several studies using confirmatory exploratory factor analysis have supported the validity of the six anxiety factors contained within the scale, with children aged 8 through to 17 years (Muris, Meesters, & van Melick, 2002; Muris & Merckelbach, 1998); (Spence, 1997, 1998; Spence et al., 2003). The six factors closely resembled those outlined in DSM-IV (1994) namely generalized anxiety, obsessive-compulsive disorder, separation anxiety, social phobia, and panic-agoraphobia, plus the physical injury fears. Higher order factor analysis supported the use of a total scale, with the six factors loading strongly on a single, higher order factor. In all instances the internal reliability of the scale has been shown to be high. The psychometric properties of the scale have now been examined in Australia, Netherlands, Japan, Germany, England, New Zealand and Australia (Muris, Merckelbach, Mayer, & Meesters, 1998; Muris, Merckelbach, Mayer, & Snieder, 1998; Muris, Merckelbach, Ollendick, King, & Bogie, 2002), (Spence, 1997, 1998; Spence et al., 2003). As such the scale presents a useful measure to facilitate the process of diagnosis of anxiety disorders in children and adolescents.

The present study was designed to examine the internal validity and reliability of the SCAS with primary school children in Tehran, Iran. The study was originally reported in PhD thesis form (Mousavi, 2005).

## **Method**

### **Participants**

The participants were randomly selected from the 1<sup>st</sup> - 5<sup>th</sup> grade students (6-12 years old) from nine public schools of three Tehran's districts. Five students with middle socioeconomic status from each class responded to questionnaire. The sample consisted of 208 boys ( $M = 9.14$ ,  $SD = 1.61$ ) and 209 girls ( $M = 9.12$ ,  $SD = 1.47$ ) of mean age 9.13 years ( $SD = 1.54$ ). The distributions of subjects on based of age are as follow: 7 years = 82, 8 years = 82, 9 years = 73, 10 years = 83, 11 years = 73, and 12 years = 24.

## **Measure**

The Spence Children's Anxiety Scale includes 44 items, 38 of which indicate specific anxiety syndrome; six questions are positive filler items and planned to prevent orientation toward anxiety problem ones. Among 38 questions, 6 are related to obsessive-compulsive disorder; six to separation anxiety; six to social phobia; 6 to generalized anxiety; 5 deal with fear of physical injuries; and the remaining questions reflect panic with agoraphobia. This measure is based on Likert type 4 point scale / never/ some times/ often/ always rating from 0-3. A maximum score of 114 represent the highest anxiety level. Details regarding it's psychometric properties with other samples were described in Table 1.

After translating SCAS into **Persian Language (Farsi)**, five English as Foreign Language instructors judged the translation and revised it. Then four psychologists confirmed the translated version of the scale. Next, a pilot was carried out with 5 students and three items which were ambiguous were modified to be easily understood by the intended age group. The scale was then administered to 28 children, who were randomly selected from a school sample. The data were analyzed for internal consistency. Each item correlated with total items and also with the items related to each factor. All items had high correlation except 2 items. The questionnaire was once more revised for the final version.

## **Procedure**

For the standardization process, Tehran city in Iran was divided into three scholastic areas: north, center and south. Three schools in each region were randomly selected, including both male and female subjects. Through a systematic sampling 5 subjects were randomly selected from five classes in each school using teachers' roll-calls. The researcher gave the students clear explanations for filling out the questionnaire. Students were able to ask the researcher for clarification if they were unable to understand an item. First to 3<sup>rd</sup> grade students filled out the questionnaire individually, while the fourth and fifth graders completed it in groups. The final sample consisted of 450 questionnaires, of which 417 had complete data and were coded and analyzed for reliability and validity. Lisrel (2001) was used for confirmatory- factor analysis and cronbachs alphas for reliability were computed through SPSS.

## Results

Means and standard deviations for SCAS scores for each subscale and total score are shown in Table 1 by gender. No statistically significant differences were found between boys and girls for mean total score or any of the subscale score.

**Table 1. Descriptive Statistics of Samples**

<i>Disorder</i>	<i>Samples</i>	<i>N</i>	<i>Mean</i>	<i>Std. Deviation</i>	<i>Levene's Test for Equality of Variances</i>		<i>t-test for Equality of Means</i>	
					<i>F</i>	<i>Sig.</i>	<i>t</i>	<i>Sig.</i>
Panic Attack and agoraphobia	Boy	208	5.26	4.870	0.458	0.499	-0.278	0.781
	Girl	209	5.40	5.224				
Separation Anxiety	Boy	208	7.06	4.550	2.122	0.146	1.655	0.099
	Girl	209	6.34	4.308				
Physical Injury Fears	Boy	208	4.88	3.746	0.190	0.663	0.937	0.349
	Girl	209	4.54	3.643				
Social Phobia	Boy	208	4.86	4.243	1.672	0.197	-0.316	0.752
	Girl	209	4.99	3.839				
Obsessive Compulsive	Boy	208	5.80	3.951	1.253	0.264	-0.935	0.350
	Girl	209	6.16	3.799				
Generalized Anxiety Disorder	Boy	208	5.63	3.784	0.071	0.790	-0.625	0.532
	Girl	209	5.87	3.925				
Total Score	Boy	208	33.50	19.292	0.009	0.923	0.107	0.914
	Girl	209	33.29	19.337				

The results of the confirmatory factor analysis of the SCAS showed a Comparative Fit Index (CFI) of .97, Goodness of Fit Index (GFI) of .85 and Adjusted Goodness of Fit Index (AGFI) of .83, which indicates a good fit index for the six correlated factor model. The RMSEA was .045 and RMR = .063 which also supports the 6-factor model. CFI is between zero and one which compares the predicted covariance matrix of the model with the hypothesized model. A CFI value close to one is indicative of a better goodness of fit of the model. The Chi-square value explains the covariance of the data. Smaller numbers of Chi-square show the models better goodness of fit indices (Giles & David, 2002). Although the overall chi-square value was significant,  $\chi^2 = 1668$ ,  $df = 650$ , this is frequently the case when large sample sizes are involved. An exploratory factor analysis was also performed using Varimax original and rotative indices, resulting in a small difference with the questionnaire factors, but generally consistent with the proposed factor structure.

The Cronbach alpha was calculated for the internal reliability of the scale. The coefficients for all six factors: social anxiety, separation anxiety, fear of physical injuries,

generalized anxiety, obsessive-compulsive and panic with agoraphobia disorders are presented in Table 2, which also compares reliability coefficients of the SCAS in different studies and the present one. The internal consistency of the total score was high, although was lower for individual subscales, and was consistent with the results reported by other investigators.

**Table 2- The comparison of reliability of the scale in different studies**

	Spence (1998)	Spence, Barrett & Turner (2003)	Muris (2000)	Muris (2002)	Present Study
<b>N</b>	<b>2052</b>	<b>875</b>	<b>1011</b>	<b>521</b>	<b>417</b>
<b>Panic Disorder</b>	<b>0.82</b>	<b>0.80</b>	<b>0.81</b>	<b>0.83</b>	<b>0.75</b>
<b>Social Phobia</b>	<b>0.70</b>	<b>0.72</b>	<b>0.73</b>	<b>0.75</b>	<b>0.67</b>
<b>Separation Anxiety</b>	<b>0.70</b>	<b>0.71</b>	<b>0.74</b>	<b>0.62</b>	<b>0.69</b>
<b>Generalized Anxiety</b>	<b>0.73</b>	<b>0.77</b>	<b>0.77</b>	<b>0.81</b>	<b>0.72</b>
<b>Obsessive-Compulsive Disorder</b>	<b>0.73</b>	<b>0.75</b>	<b>0.75</b>	<b>0.76</b>	<b>0.62</b>
<b>Fear of Physical Injury</b>	<b>0.60</b>	<b>0.60</b>	<b>0.57</b>	<b>0.54</b>	<b>0.65</b>
<b>Total</b>	<b>0.92</b>	<b>0.92</b>	<b>0.92</b>	<b>0.90</b>	<b>0.89</b>

## **Discussion**

This study examined the psychometric properties of SCAS to evaluate anxiety symptoms among 6–12 years old children in Tehran, Iran. The SCAS was developed to assess a wide range of anxiety symptoms, while providing information about specific childhood anxiety disorder. The measure differed from the majority of child- report questionnaires that focus on more general psychological, emotional and behavioral indicators of anxiety.

Confirmatory factor analysis demonstrated that a model with 6 correlated factors provided a good fit the data. Based on the data displayed in table (3) validity of SCAS the Comparative Fit Index (CFI) is a good fit index for the 6 correlated factors model. RMSEA is less than 0.05 which is also a good index. The confirmatory factor analysis of the 6 correlated factors placed the factorial load on a mathematical model; so that the questionnaire items were loaded on the 6 predict factors.

The findings are consistent with results reported by Spence and colleagues (Spence, 1997; Spence et. al, 2000) who found a model with 6 first – order factors and a single 2<sup>nd</sup> order factor to provide a good fit the data for SCAS with a large sample of children. Also, the present study showed the SCAS to have high internal consistency for the total score, with

subscales that showed an acceptable level of internal consistency, albeit lower. This finding was also consistent with the results reported by other investigators.

No significant difference was found between boys and girls in for the total symptom ratings. This finding is in contrasts with much of the literature relating to children from Western cultures, which has been widely shown that girls report higher levels of anxiety and anxiety disorders than boys. Generally, the literature has shown that elementary school girls obtain higher scores than boys on the fear survey questionnaires, with girls tending to report more fears of the unknown, minor injury and animals, and danger and death, whereas no gender differences are found for fears of failure and criticism or medical fears. Epidemiological studies using structured clinical interviews with primary school-aged children and adolescents also typically report anxiety disorder to be more prevalent in girls than boys (Donovan & Spence, 2000; Spence, Donovan, & Brechman-Toussaint, 2000). It was interesting in the present study with Iranian school children to find similar levels of anxiety across boys and girls for all types of anxiety. This may represent a cultural difference and may indicate a higher level of anxiety symptoms in boys within this culture than is evident among Western cultures. Certainly this possibility warrants further investigation in future research.

In summary, this research demonstrated the SCAS to have acceptable psychometric properties among the Iranian primary school children and is likely to be a clinically valuable tool in the assessment of childhood anxiety. The measure provides an indication of symptoms related to specific forms of anxiety disorder among children. The finding of a lack of gender difference in anxiety symptoms contrasts with previous studies using the SCAS with other cultural groups. Possible reasons for this effect warrant further research in this area.

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