

Research Article

iMedPub Journals
<http://www.imedpub.com>ACTA PSYCHOPATHOLOGICA
ISSN 2469-6676

2017

Vol. 3 No. 1:4

DOI: 10.4172/2469-6676.100076

Factor Structure of the Urdu Version of the Strengths and Difficulties Questionnaire in Pakistani Adolescents

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Abstract

The Strengths and Difficulties Questionnaire (SDQ) is a widely used brief screening measure for general difficulties and positive attributes in children and adolescents. The main aim of this study was to examine the psychometric properties and factor structure of the Urdu translated version of the SDQ (SDQ-U) among Pakistani adolescents. A total of 1277 adolescents (708 boys and 569 girls), aged 13-17 years, participated in the study. The adolescents were recruited from 13 schools in Rawalpindi, Pakistan. In addition to the SDQ, the adolescents completed the Spence Children's Anxiety Scale (SCAS). The internal consistency of the SDQ-U total difficulties was good, with a Cronbach's alpha of 0.70. Confirmatory factor analysis showed that the three-compared to the five-factor model provided a better fit. The SDQ-U total scores correlated significantly with the SCAS total scores and with all its subscales. The SDQ-U proved to be a reliable and valid measure of emotional and behavioural problems in the Pakistani context.

Keywords: Spence Children Anxiety Scale (SCAS); Psychometric properties; Pakistan; Adolescents

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Received: February 20, 2016; **Accepted:** March 05, 2017; **Published:** March 14, 2017

Introduction

One in five adolescents in developed countries are estimated to have emotional and behavioural problems that cause impairment in their daily functioning [1,2]. However, many symptoms of mental health problems are often undetected, leaving these adolescents not being treated for their mental health problems [2,3]. When left untreated, mental health problems that have their onset during adolescence tend to persist and may lead to psychosocial impairment and severe forms of mental disorders in adulthood [4,5]. These findings underline the importance of having a reliable and valid screening scale for early detection of mental health problems and identifying targets for prevention [6]. The Strength and Difficulties Questionnaire (SDQ) was developed in response to the need for a brief and reliable screening instrument to measure common emotional and behavioural problems in children and adolescents [7] so that high risk cases could be selected for further assessment and treatment.

Since its publication in 1997 [7], the SDQ has been translated into more than 70 languages and is widely used in both clinical and community settings throughout the world. Several characteristics of the SDQ make it a useful scale for screening emotional and

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Citation: Essau CA, Qadir F, Maqsood A, et al. Factor Structure of the Urdu Version of the Strengths and Difficulties Questionnaire in Pakistani Adolescents. *Acta Psychopathol.* 2017, 3:1.

behavioural problems among adolescents in developing countries like Pakistan where financial and human resources for youth mental health services are limited. First, the SDQ is user friendly because of its length and its simplicity [7]. Second, the SDQ has three versions (teacher, parent, and self-report) which enable the use of multiple informants to screen the presence of mental health problems from childhood to adolescence [7]. The present study was based on the self-report version of the SDQ. Third, the SDQ is publicly available (<http://www.sdqinfo.org>) which can be

used without incurring any expense. Finally, the SDQ has been reported to have good reliability and validity [8-15].

In the original paper describing the development of the SDQ [16] the internal consistency for the total difficulty score was reported to be satisfactory with a mean Cronbach of 0.73. Studies conducted in Australia [10], Cyprus [9], the Netherlands [11,12,14], China [15], France [8], Germany [9], Sweden [9], and Italy [9,13] have reported the Cronbach's Alpha for the total SDQ difficulty scores to range from 0.70 to 0.81.

The test-retest reliability coefficients have also been reported to be high, ranging from 0.60 to 0.71, for retest intervals between two and six months [15,16]. The internal consistency of the subscales was acceptable for emotional symptoms (0.63-0.78), hyperactivity-inattention (0.66-0.73), and pro-social behaviour (0.59-0.87). The Cronbach's Alphas for two of its subscales were low: conduct problems (0.41-0.67) and peer problems (0.27-0.52) [10-12,14,15]. Overall, these findings have shown the SDQ to be a reliable scale, but have called into question some of the subscales.

As originally reported by Goodman [7], the SDQ has factor structures which correspond to four domains of difficulties (i.e., conduct problems, hyperactivity/inattention, emotional symptoms, peer problems) and one domain of personal strengths (i.e., pro-social behaviour). Although some studies [11,16-18] using exploratory factor analyses (EFA) have provided support for the original five-factor structure [7], other studies that used a confirmatory factor analysis (CFA) have reported inconsistent findings. Support for the five-factor solution that corresponds with the proposed subscales of hyperactivity-inattention, emotional symptoms, peer problems, conduct problems, and pro-social behaviour have been reported in several factor analytic studies conducted in community samples in Australia [10], England [16], Germany, the Netherlands [11], Sweden [18,19], China [15], and Norway [20]. However, the five-factor structure has not always fit the other translated versions of the SDQ. For example, American [21], and Italian studies [18] conducted in community samples found the best-fitting factor solution involved three factors comprised of externalizing, internalizing, and pro-social behaviour. In a recent study by Essau et al. [9] conducted in five European countries, the three-factor model fit somewhat better than the five-factor model. However, the factor structure differed across countries, with the three-factor model showing better fit indices in Cyprus, whereas the five-factor model fitted better in Germany. Fit indices for the UK, Sweden, and Italy were poor for both models.

Although the Urdu version of the SDQ (SDQ-U) has been used in several studies in Pakistan [22-25], to our knowledge no studies have examined its factor structure. Thus, it remains unclear at this time whether the factor structure of the SDQ as determined by Goodman [7] can be applied to adolescents in Pakistan. Therefore, the main aim of this study was to examine the psychometric properties and factor structure of the Urdu translation of the self-report version of the SDQ (SDQ-U) in adolescents in Pakistan. The more specific aims were: (1) to examine the factor structure in Pakistan; (2) to investigate the reliability and validity of the (SDQ-U); and (3) to examine the correlations among the measure

of SDQ-U and its subscales with emotional symptoms.

Method

Participants

A total of 1277 adolescents (55.4% boys and 44.6% girls) were recruited from 13 schools in Rawalpindi, Pakistan. From a complete list of schools that was acquired from the Directorate of Federal Government Educational Institutions (Cantt/Garrison), "active data" software was used to randomly select the schools and the classes within the schools from the list of total schools. Participants' ages ranged between 13 and 17 years (mean=14.67 years; standard deviation=1.25). Almost all the children (99.6%) reported Islam as their religious affiliation. Most adolescents (76.3%) reported their ethnicity as Punjabi, followed by Pathan (11.3%). The familial arrangement seemed congruent to Pakistani society where majority of the mothers were housewives (90.2%), while the fathers (94.8%) were employed outside of the home. Furthermore, almost half of the fathers (44.2%) and only 29% of the mothers have 11-16 years of education.

Procedure

The ethical approval for the study was obtained from the "Research Committee" of Fatima Jinnah Women University, Pakistan. Meetings with Directorate, Federal Government Educational Institutions (Cantt/Garrison), Rawalpindi Cantt, were held to secure formal permission to contact adolescents within schools/colleges premises. The adolescents completed questionnaires in their classroom and one research assistant and one of the research team members in Pakistan (AM, NS, NB) were available to provide assistance if necessary and to ensure independent responding.

Instruments

The Strengths and Difficulties Questionnaire (SDQ) [7] Urdu version [22] was used to assess general difficulties and positive attributes that are divided into five subscales: conduct problems, hyperactivity-inattention, emotional symptoms, peer problems, and pro-social behaviour. It has 25 items, with each of the subscales containing five items which are rated on a three-point Likert-type scale (0=Not true, 1=Somewhat true, or 2=Certainly true). To generate a subscale score, each subscale was calculated by adding scores on the relevant items (after reversing indicated items). A total difficulties score can be calculated by adding the scores of the four difficulties subscales (emotional symptoms, conduct problems, hyperactivity-inattention, and peer problems), with higher scores reflecting greater difficulties. By contrast, higher scores on the pro-social behaviour subscale indicate more strength. The SDQ also contains an extended set of items measuring the impact of mental health problem (called "impact supplement") on everyday life. The Urdu version of the self-report form of the SDQ (SDQ-U) was downloaded from <http://www.sdqinfo.com>.

The Spence Children's Anxiety Scale (SCAS) [26] is a 38-item measure of symptoms of anxiety disorders based on the criteria of DSM-IV in children and adolescents. The SCAS consists of six subscales: separation anxiety, social phobia, obsessive-

compulsive disorder, panic/agoraphobia, physical injury fears, and generalized anxiety disorder. Each item is rated on a four-point scale in terms of its frequency from “never” (0) to “always” (3). Internal consistency and test–retest reliability of the SCAS have been reported as satisfactory, with Cronbach’s alpha generally well above 0.70 and a test–retest correlation coefficient of 0.60 [26]. In the present study, the Cronbach’s alpha for the total SCAS was 0.87.

SCAS was translated into Urdu by four bilinguals (research team members) with special focus on content equivalence with the original version. The translated items were evaluated by a committee of five experts. This process helped to select most suitable URDU translation of the items. The refined Urdu version was then given to another group of five bilinguals for back translation. For evaluation, a follow up committee approach was adopted to critically evaluate the appropriateness of the Urdu version. Since diffusion in Urdu language is quite high, therefore certain words from English language were retained, examples are *Dentist* (item 23), *train* (item 28), *shopping centers* (item 30), *switch* (item 14) and *toilet* (item 7). Five experts examined the face validity of the translated version. All the experts and committee members were senior faculty members in a Pakistani University and had extensive knowledge of the subject.

Results

The mean and standard deviation of the study variables are listed on **Table 1**. The mean of the total SDQ-U was 10.58 (SD=4.8). The mean of the SDQ-U pro-social behaviour, internalizing and externalizing problems subscales were 9.41 (SD=1.8), 4.99 (SD=2.9), and 5.59 (SD=2.7), respectively. The mean of the SCAS subscales ranged from 4.76 (for physical fear) to 10.29 for OCD.

Construct validity of SDQ-U

A series of preliminary analyses were performed before conducting reliability and validity analyses of the SDQ-U. The distribution of responses across the rating scale for each item was examined. Screening of the data was also performed, including analysis of the normality of each variable, skewness and kurtosis, outliers, and missing data. Normality was within the accepted level (± 3.29) of skewness and kurtosis. Following Tabachnick and Fidel [27], replacement of missing values with the mean was done if each variable has at least 5% missing value. In the present data, more than 5% of the given responses had missing values. Thus, each item with missing values was removed from the further analysis. After removing the missing values, 1033 cases remained.

As reviewed above, several studies have reported either the five-factor and three-factor structure of the SDQ. Therefore, the Exploratory Factor Analysis was initially run to evaluate the overall factor structure of 25 items SDQ-U. Thereafter, confirmatory factor analysis was conducted. In order to conduct exploratory and confirmatory factor analysis, the data were randomly divided into two by utilizing SPSS 22 splitting data.

Exploratory factor analysis

A total of 506 cases were subjected to a principal component

Table 1 Demographics characteristics of participants (n=1277).

Characteristic	N	(%)
Gender	Girl	569 -44.6
	Boy	708 -55.4
Grades	Grades 7-8	594 -46.5
	Grades 9-10	609 -47.7
	Grades 11-12	74 -5.8
Mother’s employment status	Not employed/Home Makers	1134 -90.2
	Employed	120 -9.5
	Father’s employment status	
Father’s employment status	Not employed	49 -3.8
	Employed	1196 -94.8
Mother’s educational level	0-5 years	324 -27.2
	6-10 years	410 -34.5
	11-16 years	345 -29
	Don’t know	111 -9.3
Father’s educational level	0-5 years	111 111 (9.3)
	6-10 years	448 448 (37.6)
	11-16 years	526 526 (44.2)
	Don’t know	106 106 (8.9)
Religion	Islam	1262 1262 (99.6)
	Christianity	5 5 (0.4)
Ethnicity	Punjabi	935 935 (76.3)
	Pathan	138 138 (11.3)
	Sindhi	6 6 (0.5)
	Balochi	2 2 (0.2)
	Others	145 145 (11.8)

analysis. Graphical and numerical inspection of sample data suggested that sample distribution exhibited moderate kurtosis and did not severely deviate from normality. Sample data did not include outliers. The results of the Kaiser-Meyer-Olkin measure of sampling adequacy (KMO=0.82) and the Bartlett’s test of sphericity (BTS=1517, $p<0.001$) indicated that the data were suitable for factor analysis. An oblique rotation with the Kaiser Normalization procedure was performed to facilitate the interpretability of results. Three criteria were used to determine the number of factors to rotate: the priori hypothesis stemming from the original study that the measure has three or five main factors, the scree-test together with the eigenvalues and interpretability of the factor solution. The scree plot and eigenvalues indicated that the five-dimensionality was not suitable for the Pakistani sample. Consequently, three factors were obliquely rotated. Oblimin rotation of a principal axis produced a three-factor solution explaining 31.5% of the total variance. The first factor accounted for 16.2% of the total variance. The second and the third factors explained 10.1% and 5.1% of the total variance, respectively. The results of the factor analysis showed that the present factor structure does not match up with the Goodman’s study [7] which had reported five main factors.

Confirmatory factor analysis

A confirmatory factor analysis was conducted by using the AMOS 22.0 programme on the three factors, 25 items model as in the earlier studies [9]. The analysis was performed on the separate

sample with 527 cases. Results revealed that Chi-square test was significant indicating good fit ($\chi^2=545.49$, $df=269$). Because the χ^2 statistics is easily influenced by the sample size, multiple goodness of fit indices was also used to evaluate the fit between the model and the sample data [28]. The goodness-of-fit index (GFI, value above 0.90), the adjusted goodness-of-fit index (AGFI, value above 0.80), and the root mean square error approximation (RMSEA, value smaller than 0.10) are suggested as criteria for acceptable fit [29,30]. Thus, confirmatory factor analysis for the three factor model for the SDQ-U was tested. The results of the analysis yielded a good fit ($\chi^2=545.49$, $df=269$, $\chi^2/df=2.02$; GFI=0.92; AGFI=0.91; RMSEA=0.044 90%, CI=0.050–0.066). The fit indices suggested that a three factor solution with 25 items was a good fit for the sample data.

Discriminant validity

To provide further evidence for the validity of the scores, discriminant validity was established using the non-missing sample of 1033 participants. The Pearson's correlations among the participants' SDQ-U Scale and the SCAS scores were in the expected direction. As shown in **Table 2**, the total SCAS scores correlated significantly with the total SDQ-U scores and with all its difficulty subscales. This finding indicated that the higher the difficulty scores, the higher the anxiety symptoms. Of all the SDQ-U subscales, the strongest correlation coefficients were found between SDQ-U internalising problems and with both the total SCAS ($r=0.49$, $p<0.01$) and all its subscales, with correlation coefficients ranging from 0.24 to 0.44.

Reliability

The internal consistency of the SDQ-U total difficulties was found to be adequate, with a Cronbach's alpha of 0.70. The Cronbach's alpha for the SDQ-U pro-social behaviour subscale was much lower, indicating that some items do not fit with the rest of the items on this subscale. Of all the difficulty subscales, internalising problems had the highest internal consistency coefficients (0.61), followed by externalising problems (0.52). As the reversed items have been reported to confound the SDQ factors [13,31], the internal consistency of the SDQ-U total difficulties score and the three factors were analysed without the reversed items (i.e., items 7, 11, 14, 21 and 25). The internal consistency values of the total difficulties score (Cronbach's alpha=0.71) and the pro-social behaviour subscale (Cronbach's alpha=0.65) improved after removing the reversed items.

Age and sex differences in SDQ-U

Two-way MANOVA was conducted to examine gender and age differences on the total SDQ-U and its subscales. A significant multivariate effect of gender on SDQ-U was found, $F(3, 1017)=6.55$, $p=0.02$ partial $\eta^2=0.02$, Wilks' Lambda=0.98. A univariate analysis indicated differences in the total SDQ-U, $F(1, 1023)=12.34$, $p=0.01$, and in internalizing problems, $F(1, 1023)=30.39$, $p=0.001$. These findings suggested that girls, compared to boys, reported significantly higher levels on total difficulty and in internalising problems. Results revealed neither an age difference nor gender x age interaction on any of SDQ-U subscales.

Two-way MANOVA was also conducted to examine gender and age differences on the total SDQ-U and its subscales. A significant multivariate effect of gender on the total SDQ-U, $F(3, 1023)=4.28$, $p=0.01$, and on the internalizing problems, $F(3, 1023)=10.29$, $p=0.001$ was found (**Table 3**).

Discussion

The present study examined the factor structure and the psychometric properties of the Urdu version of the SDQ (SDQ-U). The generalizability of the five-factor model as originally proposed by Goodman [32] has been controversial. In the present study, the three-factor models that consisted of pro-social behaviour, internalizing and externalizing problems provided a better fit than the five-factor model for the Pakistani adolescents. Our previous study showed differences in the factor structures across five European countries, with a better fit being found in Cyprus for the three-factor similar to the present study; in other countries (e.g. Germany), the five-factor structure had a better fit [9] and in the UK, Sweden, and Italy, the fit indices were relatively poor for both models. Why the factor structure for the SDQ differs across countries is not clear, although it could be that differences in socialization practices and cultural values (e.g., social norms, educational and parenting practice) might have accounted for these inconsistent findings.

To examine the discriminant validity of the SDQ-U, correlation coefficients were calculated between the SDQ-U and the SCAS. Consistent with previous studies [9], the total and the subscales scores of both these measures were significantly correlated. Within the SDQ-U subscales, the strongest correlation was found between emotional symptoms and total anxiety symptoms. Our findings also showed significant positive correlations between externalizing and internalizing problems; thus, in line with numerous previous studies, this finding suggested the high comorbidity both within the internalizing problems (i.e., between anxiety and depression) [12,26,33], as well as between internalizing (i.e., anxiety/depression) and externalizing problems (i.e., conduct problems/hyperactivity) [34]. The internal consistency of the total SDQ-U was good, replicating numerous studies [8,10-15].

Compared to previous studies conducted in several European countries [9], the adolescents in Pakistan reported higher levels of internalizing and externalising problems. While it is not the focus of this study to explain why there is this high level of internalizing and externalising problems among Pakistani adolescents, this finding could have been attributed to high academic stress, poverty and political instability in Pakistan. Future studies are needed to investigate whether this speculation could be supported. Gender differences were found for the total SDQ-U and the internalising subscale, indicating that significantly more girls than boys reported higher levels of difficulty and internalising problems. The finding that girls had higher difficulty and internalising problems than boys were in line with numerous previous studies [9]. Unlike previous studies [35,36] that reported higher levels of externalizing problems in boys, the present study did not find any gender difference for externalizing problems. The possible reason for this discrepancy was unclear although

Table 2 Means and standard deviations of the study variables by gender and age groups.

Study variables	Total Mean (SD)	Male Mean (SD)	Female Mean (SD)	13-14 years Mean (SD)	15-17 years Mean (SD)
SDQ-U					
Total SDQ-U	10.58 (4.8)	10.11 (4.8)	11.13 (4.9)	10.48 (5.0)	10.65 (4.7)
Internalising	4.99 (2.9)	4.53 (2.8)	5.53 (2.9)	5.02 (3.0)	4.96 (2.9)
Externalising	5.59 (2.9)	5.58 (2.7)	5.59 (2.6)	5.46 (2.7)	5.69 (2.7)
Pro-social behavior	9.41 (1.8)	9.48 (1.9)	9.33 (1.7)	9.49 (1.7)	9.35 (1.9)
SCAS					
Total SCAS	41.42 (15.9)	36.56 (13.9)	47.08 (16.3)	41.74 (16.7)	41.16 (15.4)
Separation anxiety	7.02 (3.6)	6.07 (3.2)	8.13 (3.7)	7.34 (3.9)	6.74 (3.4)
Social anxiety	6.88 (3.8)	5.99 (3.5)	7.92 (3.8)	6.70 (3.9)	7.07 (3.7)
OCD	10.29 (3.7)	10.55 (3.7)	9.97 (3.8)	9.81 (3.8)	10.72 (3.6)
Panic	5.07 (4.2)	4.25 (3.9)	6.03 (4.3)	5.35 (4.3)	4.81 (4.0)
Physical fear	4.76 (3.5)	3.15 (2.7)	6.63 (3.4)	5.02 (3.5)	4.51 (3.5)
Generalised anxiety	7.40 (3.3)	6.55 (3.0)	8.40 (3.4)	7.53 (3.5)	7.31 (3.2)

SCAS: Spence Children's Anxiety Scale; SDQ-U: Urdu Version of the Strength and Difficulties Questionnaire; OCD: Obsessive-Compulsive Disorder

Table 3 Correlations between SDQ and SCAS.

	1	2	3	4	5	6	7	8	9	10
1. Tot SDQ	-	-	-	-	-	-	-	-	-	-
2. ProSocBeh	-0.11**	-	-	-	-	-	-	-	-	-
3. IntProb	0.87**	-0.02	-	-	-	-	-	-	-	-
4. ExtProb	0.85**	-0.18**	0.48**	-	-	-	-	-	-	-
5. TotSCAS	0.45**	0.04**	0.49**	0.28**	-	-	-	-	-	-
6. SepAnx	0.23**	0.04	0.28**	0.11**	0.75**	-	-	-	-	-
7. SocPho	0.39**	0.02	0.39**	0.27**	0.75**	0.47**	-	-	-	-
8. OCD	0.24**	0.05	0.24**	0.17**	0.60**	0.32**	0.37**	-	-	-
9. PanAtAg	0.45**	0.04	0.47**	0.29**	0.77**	0.46**	0.48**	0.33**	-	-
10. PhylnjF	0.22**	0.001	0.26**	0.10**	0.68**	0.51**	0.40**	0.17**	0.45**	-
11. GenAnx	0.43**	0.001	0.44**	0.28**	0.78**	0.48**	0.53**	0.42**	0.52**	0.45**

SDQ: Strength and Difficulties Questionnaire; SCAS: Spence Children's Anxiety Scale; Tot SDQ: Total SDQ scores; Pro Soc Beh: Prosocial Behaviour; Int Prob: Internalizing Problems; Ext Prob: Externalizing Problems; Tot SCAS: Total SCAS Scores; Sep Anx: Separation Anxiety; Soc Pho: Social Phobia; OCD: Obsessive-Compulsive Disorder; Pan/Ag: Panic/Agoraphobia; PhylnjF: Physical Injury Fears; Gen Anx: Generalized Anxiety Disorder

it could have been because of social desirability. Specifically, because behaviour related to conduct or peer problems are frowned upon in collectivistic culture, it is likely that boys are only willing to admit these behaviours partially. The present study found the adolescents to have reported higher level of pro-social behaviours, when compared to previous studies. This finding was not unexpected because Pakistani culture is related to a collectivistic value orientation, which is positively related to pro-social behaviour [37].

The findings of the present study need to be interpreted in light of its limitations. First, our participants were made up of a convenience sample of 13 to 17 year olds who were recruited from urban schools in Pakistan. Although a seemingly representative of urban youth in Pakistan, use of such samples may have implications for the generalizability of our findings to adolescents in other regions in Pakistan. Furthermore, the present study was restricted to adolescents aged 13-17 years, and therefore the findings may not generalize to younger age groups. Second, the data were based solely on the adolescents' self-report and no clinical interviews were used to confirm this self-report measure. Further test of its validity (i.e., convergent and discriminant) should be examined by using parent or teacher reports. Third,

emotional and behavioural symptoms were assessed by means of questionnaires. Future studies might employ clinical diagnostic interviews in order to examine how impairing the reported symptoms are and to further establish the validity of adolescent psychopathology among adolescents in Pakistan. Finally, the SDQ has not been normed on a Pakistani sample, thus, the present study has to rely on normative information from the United Kingdom. These limitations notwithstanding, our findings support the usefulness of the SDQ as an efficient way of screening for emotional and behavioural problems in children and adolescents in Pakistan.

Acknowledgment

This study is part of a research project on "Anxiety among adolescents in Pakistan: From epidemiology to prevention", funded by the Higher Education Commission, Pakistan and the British Council INSPIRE (International Strategic Partnerships in Research and Education) Strategic Partnerships 2011 fund to University of Roehampton, UK and Fatima Jinnah Women University, Pakistan. Project managed by Cecilia A. Essau and Farah Qadir.

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