

Scale Validation of the Strengths and Difficulties Questionnaire in Iranian Children

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Objective: To study the validity and reliability of the Persian version of the Strengths and Difficulties Questionnaire (SDQ).

Method: The data for this study was collected from the psychiatric clinic of Hafez hospital and 16 regular schools in four regions of Shiraz using stratified random sampling .

The 25 items of the SDQ were completed for 379 boys and 377 girls. The 756 participants aged 3-18 were divided to 3 groups according to age classification. The SDQ was completed by parents, teachers and adolescents according to their age. Clinical interview was performed for 155 children and adolescents who referred to the psychiatric clinic.

Results: The mean age of the children was 10.3 years (SD=3.6, range 3-18 years). Children were divided to 3 groups: 1) among the participants 17 (2.3%) were aged 3-4 years;; 2) 409 (54%) were aged 4-11 years, and 3) 330 (43.7%) were aged 11-16 years. Good internal consistencies were found for the self report SDQ scales (mean α for subscales 0.628). For the teacher SDQ scales, the internal consistencies were lower than the self-report scales (mean α for subscales 0.454). The lowest internal consistencies were found for the parents SDQ scales. There was sufficient convergent and discriminant validity.

Conclusions: The Persian translation of the self reported SDQ has acceptable to good psychometric properties. Internal consistency of the self-report SDQ was good. The mean inter-informant correlations of the SDQ scales were satisfactory. The Persian translation of the SDQ worked well.

Key Words:

Child psychiatry, Iran, Mass screening, Psychometrics

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Questionnaires for measuring psychopathological symptoms in children and adolescents are important for three reasons. Firstly, despite the fairly high prevalence rates of behavioral and emotional problems, it should be noted that only a small percentage of children and adolescents actually come in contact with mental health services. Thus, questionnaires that can be used for detecting the youths who are at a high risk for developing behavioral and emotional problems, are highly relevant. Secondly, clinicians can employ such measures as part of the clinical assessments in order to obtain an initial idea about the type and severity of psychiatric problems. Thirdly, standardized questionnaires are also helpful to those clinicians who wish to quantify the effects of treatments.

The Strengths and Difficulties Questionnaire (SDQ) is a brief behavioral screening questionnaire for investigating the mental health of children and adolescents and it asks about 25 attributes, some of which are positive and some negative. Despite being brief enough to fit on a piece of paper, the SDQ functions well like the longer-established questionnaires (1, 2). The 25 SDQ items are divided to five scales and each scale also contains five scales. They guarantee scores for conduct problems, hyperactivity-inattention, emotional symptoms, peer problems and pro-social behaviors. All the mentioned problems (except the last one) are summed to generate

a total difficulties score. An informant-rated version of the SDQ may be completed by either the parents or teachers of 3-16 year olds (1); while, a self-report version of the SDQ can be completed by 11-16 year olds themselves (3).

The SDQ can be used for different purposes: 1) screening; 2) as part of a clinical assessment; 3) as a treatment-outcome measure; 4) and as a research tool (4).

The SDQ differs from related instruments in several ways: 1) it is very short with 25 items that are divided into five scales: emotional symptoms, conduct problems, hyperactivity-inattention, peer problems and pro-social behaviors; 2) the items concern both strengths and difficulties; and 3) all the items can appear on one page. These properties may enhance the acceptability for respondents and, consequently, improve the response rate and the accuracy of the answers.

The SDQ has been translated into more than 40 languages in the recent years (see www.sdqinfo.com), reflecting the field's current need for an economic and user-friendly instrument. However, the very properties of the SDQ also have some drawbacks as only some of the problems that may be assessed in clinical populations or in epidemiological studies are represented in the questionnaire. In addition, the reliability and validity of brief scales may be questioned. Therefore, the psychometric properties of

the SDQ need to be examined extensively (5).

The design of the SDQ with both the strengths and difficulties items supposedly increases the acceptability of the instrument by the informants and makes the questionnaire particularly suitable to study the majority of children.

The SDQ has been evaluated in English in the UK (2) as well as with samples of Dutch (n=562) (6), Arabic (n=322) (7), Swedish (n=900) (6), Bangladeshi (n=261) (8), German (n=273) (9) and Finnish (n=703) (10) children. These studies vary considerably with regard to the properties of the instrument evaluated. Studies of the SDQ conducted with samples in the UK (11), Holland and Sweden have largely offered consistent support for the original five-factor structure of the SDQ in the parent, teacher and youth report formats (6, 12). Only one available study conducted with Arabic children has failed to replicate the predicted factor structure (7).

The internal consistency of the SDQ has also been assessed in Dutch, Swedish, Arabic and Finnish studies (6, 7, 10, 12). Findings across these populations, have generally supported the internal reliability of the instrument (Finnish: 0.63–0.86; Swedish: 0.51–0.75; Dutch: 0.45–0.80). The only questionable support came from the Arabic sample, in which the authors attributed low to moderate coefficients (Arabic: 0.18–0.65) to the unexpected factor structure observed (5).

Research on the test–retest reliability of the SDQ is limited and available findings appear to be mixed. Only one UK study appears to have reported such evidence with a community sample of 34 parents completing the measure 3–4 weeks following the initial administration (2).

The study reported by Muris, Meesters, and van den Berg appears to include the only formal assessment of test–retest reliability to come from a sample outside the UK (4). Parent and youth reports on the SDQ were obtained for 91 children from the study's original sample (n=562) 2 months after the initial administration.

In populations outside the UK, evidence of the discriminant validity of the SDQ subscales to date, has been available for Bangladeshi and German samples only (7, 12). In the latter, SDQ parent and teacher-reports on the subscales of the SDQ and CBCL performed comparably in distinguishing between community and clinic samples, while the total difficulties scale on the SDQ discriminated more accurately than that of the CBCL. The SDQ also demonstrated some advantages over the CBCL in discriminating between diagnoses within the clinical sample; the SDQ was significantly superior at predicting hyperactivity (7).

Less impressive, however, were the findings from the Bangladeshi sample, in which the total difficulties scale and the peer problems and pro-social subscales failed to distinguish between clinic and community groups (13). As the SDQ was the only measure employed in this study, the extent to which these findings reflect the

specific properties of the SDQ or the actual sample is unclear.

In summary, while the evidence to date has been largely supportive of the reliability and validity of the SDQ in various populations (6–9, 12), mixed findings (e.g. highlight the need for continued evaluation (5, 12). With a notable lack of evidence pertaining to samples of younger children, further attention to such samples appears particularly warranted.

The aim of this study is to examine the psychometric properties of strengths and difficulties questionnaire (SDQ) for screening mental and behavioral problems in 3–18 year-old children in Iran.

Materials and Method

The Farsi version of the SDQ was provided by its developers. It is available on www.sdqinfo.com. The subjects were taken from Shiraz, one of the largest cities of Iran. All of the Shiraz primary schools were grouped according to four district residential area. The schools in each area were listed in order one under the other, and were selected for the study at a gender stratified random sampling. Then, the classes were also randomly selected by age stratified from the identified schools. The students with special education such as mental retardation, cerebral palsy, autism, and significant sensory defects were not included in this study. These children attend special education groups or special institutions in Iran. 601 students were from 16 regular schools and 155 children were from psychiatric clinic of Hafez hospital.

Different versions for parents, teachers, and (self-reports) adolescents of SDQ contain similar questions concerning children's mental health difficulties and psychological strengths. In fact, different reporters rate the same questions concerning the child or adolescent. The 25 items of the SDQ were completed for 379 boys and 377 girls. The 756 participants aged 3–16 were divided to 3 groups according to age classification (3–4, 4–11 and 11–18). The SDQ was also completed by parents, teachers and adolescents, according to their age. For all the age groups, SDQ was completed by parents. SDQ was completed by teachers in addition to the parents for 3–11 year old age group. For 11–18 year olds, SDQ was completed by the children themselves in addition to their parents.

Clinical interview was performed for 155 children and adolescents who referred to psychiatric clinic and test retest was only performed for 15 subjects. This interview was accomplished according to DSM-IV, using the Farsi translation of KSADS which has enough validity and reliability in Iran (14).

The young participants were asked to complete the set of questionnaires at home. Parent participants received the questionnaires via their child, completed them at home, and returned them.

Statistical analysis

If one or two items of a scale were missing, a scale score was computed by summing the remaining items and multiplying the sum by (number of items) or by

(number of items – number of missing items). No scale score was computed if more than two items were missing. Correlations between variables were investigated using Pearson's product-moment correlation. The criteria for judging the size of the correlation coefficient which were applied were based on the following: correlations <0.3 were considered small; correlations ≥ 0.30 and <0.50 were considered medium and ≥ 0.50 were considered strong (15). Cronbach's alpha was used to investigate internal consistency.

Results

Our samples consisted of 379 (50.4%) boys and 377 (49.6%) girls. The mean age of the children was 10.3 years ($SD=3.6$, range 3-18 years). Children were divided to 3 groups: 1) among the participants 17 (2.3%) were aged 3-4 years; 2) 409 (54%) were aged 4-11 years; 3) and 330 (43.7%) were aged 11-18 years. The response rate was 95.5%.

Internal reliability

Table 1 demonstrates the internal reliability analysis on the subscale score and the total score (except for the pro-social subscale which does not contribute to the total score) for all the three informants. As shown in Table 1, Cronbach's α coefficient for the SDQ scales were computed for all the three informants. Good internal consistencies were found for the self report SDQ scales (mean α for subscales 0.628). For the teacher SDQ scales, the internal consistencies were lower than the self-report scales (mean α for subscales 0.454). The lowest internal consistencies were found for the parents SDQ scales.

Parents' version

The internal reliability testing of the total difficulties scale which consisted of 20 items, showed a Cronbach's alpha of 0.73.

The alpha coefficients of the subscales were: 1) pro-social subscale 0.70; 2) hyperactivity subscale 0.71; 3) emotional symptoms subscale 0.70; 4) conduct problems subscale 0.63; 5) and the peer problems subscale 0.009. The lowest internal reliability was related to the peer problems.

Self reports

The internal reliability testing of the total difficulties scale which consisted of 20 items, showed a Cronbach's alpha of 0.74.

The alpha coefficients of the subscales were: 1) pro-social subscale 0.67; 2) hyperactivity subscale 0.70; 3) emotional symptoms subscale 0.79; 4) conduct problems subscale 0.70; 5) and the peer problems subscale 0.28.

The weak internal consistencies of the self-report SDQ pro-social and peer problems subscales may indicate that one or two items do not fit with the rest of the

Table 1 Cronbach's alpha coefficients of the parents, teachers and self report

	Parents	teachers	self report
Total scale	0.732	0.731	0.743
Prosocial	0.70	0.77	0.67
Hyperactivity	0.71	0.73	0.70
Emotional Problem	0.70	0.70	0.79
Conduct Disorders	0.63	.062	0.70
Peer Problem	0.009	0.11	0.28

The weak internal consistencies of the self-report SDQ pro-social and peer problems subscales may indicate that one or two items do not fit with the rest of the

Teachers' version

The internal reliability testing of the total difficulty scale which consisted of 20 items, showed a Cronbach's alpha of 0.73.

The alpha coefficients of the subscales were: 1) pro-social subscale 0.77; 2) hyperactivity subscale 0.73; 3) emotional symptoms subscale 0.70; 4) conduct problems subscale 0.62; 5) and the peer problems subscale 0.11

The weak internal consistencies of the teacher-report SDQ conduct and peer problems subscales may indicate that one or two items do not fit with the rest of the scale and/or that conduct and peer problems are partly reported.

Convergent Validity

Convergent validity indicates that the assessment is related to what it theoretically should be related to.

In this study, the correlation among the items which made up the subscales should be high. For example, hyperactivity items should have high correlation with the hyperactivity subscale. Table 2 demonstrates a high correlation between all the subscales and related items (except for correlation between items "14" and "23" in peer problem subscale for all the three versions). Convergent validity is shown with a bold number in table 2, 3 and 4. The highest correlation is found for hyperactivity items and hyperactivity subscale for all the three versions, especially items "2" and "10" with the hyperactivity subscale. Other item-subscale correlations worth noticing are item 13 which strongly correlated with the emotional subscale; and item 12 which correlated strongly with the conduct problem. However, item "23" correlated with peer problems by mean correlation coefficient of 0.05.

Discriminant Validity

Discriminant validity describes the degree to which the operations is not similar to (diverges from) other operations that it theoretically should not be similar to.

Table 2. Correlations of items to subscales and of items to total difficulties scale (parents-rated version).

Subscales	Prosocial	Hyperactivity	Emotional symptoms	Conduct problems	Peer problems	Total scale [†]
Prosocial items						
Considerate of other people's feelings...	.650	-.374	-.173	-.396	-.146	-.339
Shares readily with other children (treats, toys, pencils etc.)...	.645	-.253	-.123	-.285	-.105	-.224
Helpful if someone is hurt, upset or feeling ill...	.741	-.297	-.213	-.413	.132	-.356
Kind to younger children...	.668	-.272	-.190	-.355	.322	-.363
Often volunteers to help others (parents, teachers, other children)...	.662	-.342	-.203	-.360	-.125	-.325
Hyperactivity items						
Restless, overactive, cannot stay still for long...	-.213	.715	.443	.486	.145	.617
Constantly fidgeting or squirming...	-.211	.706	.386	.422	.154	.641
Easily distracted, concentration wanders...	-.237	.697	.448	.477	.228	.655
Can stop and think things over before acting...	-.438	.699	.277	.473	.091	.472
Sees tasks through to the end, good attention span...	-.522	.686	.315	.532	.154	.547
Emotional symptoms items						
Often complains of headaches, stomach-aches or sickness...	-.194	.378	.612	.401	.135	.560
Many worries, often seems worried...	-.126	.304	.657	.291	.132	.507
Often unhappy, downhearted or tearful...	-.276	.323	.697	.444	.092	.592
Nervous or clingy in new situations, easily loses confidence...	-.244	.448	.683	.477	-.252	.659
Many fears, easily scared...	-.044	.255	.579	.290	.243	.477
Conduct problems items						
Often has temper tantrums or hot tempers...	-.179	.473	.473	.604	.034	.597
Generally obedient, usually does what adults request...	-.493	.486	.261	.597	.152	.451
Often fights with other children or bullies them...	-.315	.484	.405	.715	.286	.629
Often argumentative with adults...	-.393	.413	.437	.706	.322	.616
Can be spiteful to others...	-.361	.334	.273	.578	.271	.487
Peer problems items						
Rather solitary, tends to play alone...	-.203	.125	.279	.241	.596	.439
Has at least one good friend...	-.377	-.297	.145	.282	.596	.288
Generally liked by other children...	-.500	.310	.200	.327	.465	.353
Picked on or bullied by other children...	-.112	.156	.324	.237	.550	.358
Gets on better with adults than with other children...	.524	-.335	-.178	-.368	.034	-.282

[†] Note that the prosocial subscale does not contribute to the total sum.

A successful evaluation of discriminant validity shows that a test of a concept is not highly correlated with other tests designed to measure theoretically different concepts.

Although no standard value exists for discriminant validity, a result less than .85 tells us that discriminant validity is likely to be present between the two scales. A result greater than .85, however, tells us that the two constructs overlap greatly and they are likely to measure the same thing. Therefore, we cannot claim the discriminant validity between them.

In this study, discriminant validity indicates that an item is not highly correlated with other subscales designed to measure theoretically different concepts; for example, there is a little correlation between

hyperactivity items and peer problems subscale in all the three versions.

Evaluation of cross informant agreement

Agreement between self-reports and adult informant rated scores was determined by calculating spearman correlations between the corresponding scales (Table 5). Although all the coefficients attained statistical significance, it was noted that the peer problems subscale and pro-social subscale showed a much weaker cross informant agreement than the other SDQ scores particularly when compared to the total difficulty score and hyperactivity.

Principal components analysis was performed for replication purposes and exploratory and confirmatory

Table 3. Correlations of items to subscales and of items to total difficulties scale (Teachers-rated version)

Subscales	Prosocial	Hyperactivity	Emotional symptoms	Conduct problems	Peer problems	Total Scale [†]
Prosocial items						
Considerate of other people's feelings...	.739	-.496	-.264	-.449	-.154	-.437
Shares readily with other children (treats, toys, pencils etc.)...	.689	-.364	-.125	-.301	-.063	-.242
Helpful if someone is hurt, upset or feeling ill...	.733	-.361	-.245	-.469	-.308	-.427
Kind to younger children...	.739	-.374	-.382	-.394	-.339	-.382
Often volunteers to help others (parents, teachers, other children)...	.753	-.390	-.178	-.288	-.173	-.322
Hyperactivity items						
Restless, overactive, cannot stay still for long...	-.238	.701	.442	.491	.286	.620
Constantly fidgeting or squirming...	-.306	.701	.406	.437	.261	.560
Easily distracted, concentration wanders...	-.344	.679	.477	.472	.110	.606
Can stop and think things over before acting...	-.601	.714	.304	.385	.188	.541
Sees tasks through to the end, good attention span...	-.605	.677	.235	.428	.233	.527
Emotional symptoms items						
Often complains of headaches, stomach-aches or sickness,,,	-.151	-.388	.686	.460	.317	.583
Many worries, often seems worried,,,	-.182	.434	.651	.346	.223	.542
Often unhappy, downhearted or tearful,,,	-.323	.316	.702	.479	.213	.556
Nervous or clingy in new situations, easily loses confidence...	-.212	.474	.692	.366	.212	.580
Many fears, easily scared...	-.132	.231	.650	.365	.296	.494
Conduct problems items						
Often has temper tantrums or hot tempers...	-.282	.509	.490	.602	.233	.579
Generally obedient, usually does what adults request...	-.610	.523	.340	.627	.214	.559
Often fights with other children or bullies them...	-.352	.438	.425	.733	.245	.596
Often argumentative with adults...	-.306	.384	.389	.687	.407	.564
Can be spiteful to others...	-.219	.138	-.256	.552	.248	.372
Peer problems items						
Rather solitary, tends to play alone...	-.278	.262	.326	.299	.590	.469
Has at least one good friend...	-.338	.228	.146	.278	.567	.316
Generally liked by other children...	-.531	.425	.241	.390	.517	.449
Picked on or bullied by other children...	-.138	.256	.345	.344	.587	.425
Gets on better with adults than with other children...	.500	-.463	-.256	-.353	.053	-.317

[†] Note that the prosocial subscale does not contribute to the total sum.

Table 4 Correlation of items to subscale and of items to total difficulties (Self-rated version)

Subscales	Prosocial	Hyper-activity	Emotional symptoms	Conduct problems	Peer problems	Total scale
Prosocial items						
Considerate of other people's feelings...	.623	-.339	-.244	-.408	.242	-.362
Shares readily with other children (treats, toys, pencils etc.)...	.637	-.212	-.084	-.173	.103	-.123
Helpful if someone is hurt, upset or feeling ill...	.697	-.237	-.134	-.238	-.143	-.311
Kind to younger children...	.668	-.352	-.268	-.346	-.270	-.375
Often volunteers to help others (parents, teachers, other children)...	.661	-.233	-.236	-.402	-.157	-.447
Hyperactivity items						
Restless, overactive, cannot stay still for long...	-.296	.762	.332	.497	.209	.653
Constantly fidgeting or squirming...	-.217	.718	.521	.508	.171	.734
Easily distracted, concentration wanders...	-.246	.671	.539	.451	.161	.722
Can stop and think things over before acting...	-.228	.522	.202	.353	.171	.373
Sees tasks through to the end, good attention span...	-.378	.555	.268	.351	.185	.314
Emotional symptoms items						
Often complains of headaches, stomach-aches or sickness,,,	-.247	.193	.703	.559	-.099	.715
Many worries, often seems worried,,,	-.221	.400	.713	.389	.202	.627
Often unhappy, downhearted or tearful,,,	-.304	.494	.753	.589	.288	.758
Nervous or clingy in new situations, easily loses confidence...	-.240	.425	.700	.540	.294	.730
Many fears, easily scared...	.002	.164	.640	.201	.124	.529
Conduct problems items						
Often has temper tantrums or hot tempers...	-.385	.555	.508	.740	-.281	.628
Generally obedient, usually does what adults request...	-.399	.363	.317	.561	.197	.382
Often fights with other children or bullies them...	-.288	.458	.507	.785	.201	.734
Often argumentative with adults...	-.220	.432	.402	.654	.204	-.375
Can be spiteful to others...	-.214	.248	.248	.389	.287	.554
Peer problems items						
Rather solitary, tends to play alone...	-.123	.243	.270	.239	.642	.517
Has at least one good friend...	-.303	.074	.126	.086	.602	.180
Generally liked by other children...	-.398	.318	.195	.274	.567	.381
Picked on or bullied by other children...	-.219	.261	.212	.273	.597	.450
Gets on better with adults than with other children...	.374	-.217	-.151	-.259	.057	-.077

Table 5 Correlation between SDQ scales from different informant (inter rater correlation)

SDQ scale	Self Parent	Teacher Parent
<i>Prosocial</i>	.681	.647
<i>Hyperactivity</i>	.763	.666
<i>Conduct Disorders</i>	.743	.587
<i>Emotional Problems</i>	.779	.557
<i>Peer Problems</i>	.489	.283
<i>Total SDQ</i>	.834	.709

factor analyses were performed to extract the underlying factors. The predicted five-component structure (emotional, hyperactivity, pro-social, peer, conduct) was not entirely confirmed.

Some items that were intended to assess the conduct problems were more closely related to hyperactivity; and some items intended to assess peer problems were more strongly correlated with emotional or pro-social problems.

Factor analyses revealed a stable three-factor model consisting of externalization problems, internalization problems, and a positive construal factor.

The principal component analysis of all the cases together generated 5 factors explaining 43.5 % of the variance. However, a varimax rotated solution with a specified number of 3 factors which explained 38.6% of the variance was the easiest to interpret and confirmed the postulated 5 subscales.

Cut off, Sensitivity and specificity

We determined the cut off point for SDQ. The best cut off point for this questionnaire was 12.5. At this (cut off) point, according to the diagnosis, sensitivity identifies over 90 % of the individuals with any kind of psychiatric problems. According to clinical diagnosis, specificity identifies 67% of the healthy individuals.

Discussion

One of the most attractive aspects of the SDQ is its brevity. The results of the present study demonstrate that the Farsi translation of the SDQ has acceptable to good psychometric properties. Internal consistency of the self-report SDQ was good. Parent and teacher SDQ were generally acceptable. The mean inter-informant correlations of the SDQ scales were satisfactory.

The low internal consistency of the conduct problems and peer problems may suggest that many children and adolescents and probably their parents and teachers only partially report the existing problems in these areas.

With respect to our analyses on the study sample, the internal reliability of the total difficulty scale and of the hyperactivity and the pro-social subscales, were satisfactory (16). Cronbach's alpha of the emotional symptoms, the conduct problems, and the peer

problems subscales were lower. This finding may reflect that the underlying concepts of these subscales are more heterogeneous while the subscales still contain only 5 items. Base on the current results, we conclude that the internal reliability of the Subscales is acceptable.

The present study gives further evidence of the usefulness of the SDQ as a promising screening instrument for epidemiological research and for clinical purposes. The present study also supports the validity of the SDQ .

Our results demonstrate that the Persian translation of the SDQ works well. The questionnaire is short and designed to be applicable in the same version for the parents' or teachers' ratings of 3-18 year old children and in a modified version for self-reports in 11-18 year olds (8).

However, there are some limitations that should be mentioned. First: SDQ data from both self-report and teachers were not obtained. Therefore, self-parent correlation can not be provided. Secondly, a part of the sample was taken from the clinic of child and adolescent psychiatry. However, some other studies such as Norwegian study had used this method (17). Thirdly, we did not have access to the subjects who have not responded. Therefore, it could not be possible to compare the possible differences between the two groups of respondents and non-respondents.

In conclusion, the Persian version of the SDQ shows adequate psychometric properties of the instrument. Future studies on the Persian SDQ should include further investigations of gender specificity.

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