

# The Reliability and Validity of the Malay Parent-Report Version of the Strengths and Difficulties Questionnaire

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## Abstract

**Background:** The Strengths and Difficulties Questionnaire (SDQ) is a screening questionnaire that measures children's emotional and behavioural problems. This study examines the reliability and validity of the Malay parent-report version of the SDQ.

**Methods:** The Malay adult-report version of the SDQ was administered to 495 parents and 432 teachers, respectively. At the same time, a newly translated Malay child-report version of the SDQ was also administered to 150 children aged 13 to 14 years old in this community study. We measured internal reliability using Cronbach's Alpha for all reported data. Construct validity of the parent-report data was assessed using factor analysis. Confirmatory Factor Analysis (CFA) was also subsequently performed on parent-report data to explain the model fit indices of this questionnaire.

**Result:** Cronbach's Alpha was acceptable for all parent, teacher and child-report data with values of 0.74, 0.77 and 0.78, respectively. Factor analysis of the parent's report showed a five-factor solution, which was consistent with other psychometric evaluations of the SDQ in other languages. CFA showed good model fit of the original five factor model which consists of emotional, conduct, hyperactivity, peer problem and pro-social scale.

**Conclusion:** This study shows that the psychometric properties of the Malay parent-report version of the SDQ were similar to other parent-report version of the SDQ questionnaires in other languages, although cross-cultural differences may still exist.

**Keywords:** reliability, psychometric, parent, Malay, questionnaire, cross cultural, factor analysis

## Introduction

The Strengths and Difficulties Questionnaire (SDQ) was first developed by Goodman (1994) (1) in the United Kingdom (UK) using the DSM-IV classification (2, 3) and

factor analysis (4, 5). The SDQ has been widely used in addition to other questionnaires that measure similar aspects of children's functioning such as the Rutter Questionnaire (6), the Child Behaviour Checklist (CBCL) (7) and the Eyeberg Child Behaviour Inventory (8). It is

based on an expanded Rutter Questionnaire (1) and has the purpose of measuring emotional and behavioural problems in children. The SDQ has been used as a screening tool to measure children's mental health in the community (9, 10) and to estimate treatment outcome (5, 10, 11, 12). It has also been used to assess the need for and effectiveness of existing prevention programmes (13), and can be used to identify children with psychiatric symptoms (4, 14).

The SDQ's advantages include its simplified format and ease of administration in the form of a one-page questionnaire (4). It can also be delivered by practitioners in the community who are not specially trained in assessing mental health (12, 15). Other advantages are the fact that the SDQ measures children's strengths as well as difficulties (4) and gives equal attention to hyperactivity, peer relationships and peer problems (14).

The SDQ is also available in a range of formats (e.g. parent- teacher-and child-report), and can therefore be triangulated (4, 14). The SDQ has a supplementary component measuring the presence of mental health problems, which is then used to assess the burden, chronicity, and level of impairment in everyday life (11).

The cut-off measure indicating problems in the clinical range (4) are scores above the 90th percentile for the Total Difficulties domain (i.e. in which 80% of the children in the community are normal, 10% of children are in the 'abnormal range' and a further 10% are in the 'border line range').

The SDQ has been used widely in research across the world, and has been translated into more than 40 languages, and can be downloaded free from the internet (16). The adult version of the SDQ has also been translated into the Malay Language, which is a major language of the Austronesian family. The psychometric properties of the SDQ have been examined in many countries such as the UK and US (9, 17) and other Eastern countries such as in the Saudi Arabia (18), China (19), Japan (20), Bangladesh (21) and Pakistan (22). Most studies showed mixed results with regard to its reliability and validity.

The SDQ is divided into 25 items which consist of five subscales which are emotional, conduct, hyperactivity, peer-problems and pro-social skills; which can be scored based on a Likert scale (each scale consists of five items). The first four symptoms when added together, would yield Total Difficulties scores (TDS) which

are based on 20 items. This questionnaire can be answered by adults as well as children aged 11–16 years of age. The full psychometric properties of the Malay adult-report version have not yet been explored, although results of reliability tests of the SDQ in the Malay Language have been reported (23).

This paper reports the findings of a study exploring the internal reliability of adult (parents and teachers) and children's version of the SDQ in the Malay Language, as well as construct validity and factor structure of the SDQ parent-report ( $n = 495$ ), whilst comparing these result with other translated versions of the SDQ in other languages. This study was conducted in June 2012 in two districts in Selangor, Malaysia.

## Materials and Method

### Consent

Following approval by the Biomedical Research Ethics Committee (BREC), in the United Kingdom and the Economic Planning Unit and Ministry of Education in Malaysia; an application letter was sent to the Department of Education in Selangor, Malaysia, for approval to conduct the study in two districts in Selangor (i.e. Petaling and Klang). Both areas are situated near the capital of Malaysia. Upon approval, a letter was then sent to the School Principals of six primary and six secondary schools that were randomly selected in both districts, requesting meetings to discuss the conduct of the research. All six primary schools agreed to participate, but only three secondary schools agreed to participate giving a total of nine schools altogether. After the School Principals had given consent for the research to be carried out in their schools, a meeting between the researcher and the School Principals was arranged to explain the nature of the research and method of distributing the questionnaires to the parents, teachers and children. A gate-keeper (usually one of the school's class teachers) was appointed by the School Principle from each school to be in charge of handling the questionnaires and distributing them to the students.

### Translation

The translation of the SDQ questionnaire from English to Malay is only available in the adult report versions and not in the children's version ([www.sdqinfo.co](http://www.sdqinfo.co)). Prior to the actual

distribution of the Malay version of the SDQ to all respondents, the translation of the SDQ questionnaire from English to Malay was undertaken for the children's version which involved grammatical alterations from the third person to the first person (14). The translated version of this child version questionnaire was then compared to the main version of the questionnaire in the English Language by a Public Health Lecturer and an English Language lecturer in two Institutions of Higher Learning in Malaysia. Both were experts in the English Language. Together they corrected the language of the questionnaire, and ensured that the content could be easily understood by respondents.

Although strictly speaking, content validity of these instruments had been reviewed in the initial phase of the development of these questionnaires by the experts who created them; for the purpose of the current research, the content validity of these questionnaires in the Malay Language was verified in terms of the language structure by the two experts referred to, as above.

### *Pre-Survey Evaluation*

#### *Face validity*

Following back to back translation for the children-report version of the SDQ, a pre-test on both the adult and children-report version were conducted to identify problems during the pre-testing phase, before the research proper commenced. The questionnaires were administered to 30 adults and 30 children. This sample size was selected based on study by Perneger et al. (24) in which 32 participants were needed, in order to achieve power of 0.8, and prevalence, 0.05. We could only manage to recruit a total of 30 respondents for both adult and children respectively due to the limited number of Malaysian residing in this part of the UK. The adults who were chosen were Malaysian students who were residing in the United Kingdom and they were parents with children. Similarly, questionnaires were given to Malaysian children between 11 to 16 years of age. The parents were given the translated parents-report version of the SDQ (already available at [www.sdq.info](http://www.sdq.info)) while children were given the newly translated children-report version of the SDQ.

The parents were required to give feedback or comments after they had completed the

questionnaires. A column on the right of the questionnaire was provided for the parents to write their comments about questions that they found vague or difficult to answer. The parents were then interviewed to discuss the sentences in questionnaires that they found difficult to understand or to have ambiguous meaning. Revision of the SDQ items in Bahasa Malaysia in terms of the questions that were unclear to the respondents were made.

### *Full Validation Survey*

The study sample size was calculated using the power and sample size calculation software (PS version 3.1.2, 2014),  $\alpha = 0.05$  and  $\beta = 0.95$ , taking into account the highest and lowest prevalence estimates (12% and 34%, respectively) (25, 26) of emotional and behavioural problems in Asia, giving a total of 480 children. Two aged group of children were selected, i.e. aged 7 and 8 years old (Year 1 and Year 2 in the primary schools) and 13 to 14 years of age (Form 1 and 2 in the secondary schools). These children were selected through simple random sampling based on a list of names from their respective classes from the nine schools. A total of 900 parents-report version of the SDQ questionnaires were given to children (67% were aged 7 to 8 years old while the rest were aged 11–16 years old) by their teachers, who then brought the SDQ home along with the consent form. These questionnaires and consent forms were given to their parents (or caregivers if the parents were not available) to be filled at home. Only 495 parents or caregivers, returned the filled questionnaire along with the consent form, while the respective teachers (altogether 432 teachers who reported on their own students) answered the SDQ during school time. A total of 154 secondary children aged 13 to 14 years old, with parental consents, also completed the SDQ in the classroom. Less number of children were included, as only older children (13 and 14 years of age) in this study were eligible to answer the SDQ. The child version of the SDQ can only be answered by children aged 11 to 16 years of age.

### *Statistical Analysis*

Reliability involved conducting internal consistency using Cronbach's Alpha on all parents', teachers' and children's reports. Inter-rater agreement was undertaken between parents-teachers, parents-children and teachers-children using Pearson correlation coefficient. Further testing of item analysis (i.e item-total

and inter-item) was also conducted. Aspects of factor analysis was assessed using Principle Component Analysis on parents’ report only. These analysis was conducted using SPSS AMOS version 21. During the final stage, Confirmatory Factor Analysis (CFA) was performed on parents’ report based on the assumption that there was a five factor structure which was demonstrated in the original English version of the questionnaire.

## Result

### Reliability Analysis

#### Internal consistency

Data was analysed among 495 parents and 432 teachers who answered SDQ version for adults while 154 children who answered SDQ version for children. Cronbach’s Alpha was used to test the internal consistency of the SDQ. The results showed that the Malay version of the SDQ has acceptable internal consistency, with a Cronbach’s alpha coefficient of 0.77, 0.78 and 0.70 for the 20 items of the Total Difficulties scores for the parents, teachers, and children-reports, respectively (Table 1). These values were acceptable according to Tavakol and

Dennick (27), who suggest that, Cronbach’s Alpha is acceptable if value is between 0.70 and 0.80, and good if the level is above 0.80. However, Table 1 also shows that the Cronbach Alpha scores for the parent-and children scores for the peer problem scale was only 0.25 and 0.22, respectively.

Parent’s conduct disorder and children’s conduct disorder scores were also low (both Cronbach’s Alpha = 0.45).

#### Inter-rater agreement

Table 2 shows the results of the inter-rater correlation or inter-informant assessments undertaken between parents-teachers, parents-children and teachers-children scores in each domain. For the Total Difficulties scores the highest agreement was obtained for parent and children reports ( $r = 0.28$ ). Landis and Koch (28) provide guidelines for interpreting the values, with values from 0.0 to 0.2 indicating slight agreement and 0.21 to 0.40 indicating fair agreement. The lowest agreement was obtained for Total Difficulties scores between teacher's and children's scores ( $r = 0.12$ ). Generally, parents-children reports showed higher agreement across almost all domains compared with the teachers-children reports.

**Table 1.** Reliability (internal consistency) of Cronbach’s  $\alpha$  score according to parent’s, teacher’s and children’s score

	Parent ( $n = 495$ )	Teacher ( $n = 432$ )	Children ( $n = 154$ )
Total difficulties scores	0.77	0.78	0.70
Emotional	0.64	0.71	0.57
Conduct	0.45	0.50	0.45
Hyperactivity	0.60	0.68	0.58
Peer problem	0.25	0.90	0.22
Prosocial skill	0.60	0.74	0.46

**Table 2.** Inter-rater correlation between parents, teachers and children’s SDQ

Domains	Correlation		
	Parent $\times$ Teacher	Parent $\times$ Children	Teacher $\times$ Children
Total difficulties	0.24**	<b>0.28**</b>	0.12
Emotional problems	0.18**	<b>0.30**</b>	0.11
Conduct disorders	0.07	0.23**	0.08
Hyperactivity	0.24**	<b>0.28**</b>	<b>0.32**</b>
Peer relations	0.09	0.14	0.05
Pro-social skills	0.17**	0.23**	<b>0.33**</b>

\*\*Correlation is significant at the 0.01 level (2-tailed)

## Validity Analysis

### Item-total correlation and inter-item correlations

Table 3 shows the item-total correlations and inter-item correlations using the Pearson correlation coefficient. This table shows that all items correlated well with their corresponding items in other subscales.

According to Ferketich (29), levels of inter-item correlations below 0.30 are considered not sufficiently correlated, while for item-total correlations, values above 0.30 are recommended (30). All items were negatively correlated with items in the pro-social skills subscale and all items in the pro-social skills subscale were negatively correlated. Item correlation was highest for the emotional problems subscale ( $r = 0.534-0.739$ ) and lowest for the peer relations subscale ( $r = 0.467-0.536$ ). The highest correlations between item and total scores were found for 'restless, overactive, cannot stay still for long' ( $r = 0.548$ ), and 'easily distracted, concentration wanders' ( $r = 0.589$ ), both of which were in the hyperactivity problems subscale.

The highest correlation was also found between 'nervous or clingy in new situation, easily lose confidence' ( $r = 0.531$ ), and 'many fears, easily scared' ( $r = 0.552$ ), both of which were in the emotional problems subscale. The lowest correlation between item and total scores were found for two pro-social skills items; 'shares readily with other children' ( $r = -0.143$ ) and 'help if someone is hurt, upset or feeling ill' ( $r = -0.160$ ). Most of the item total correlations showed levels of more than 0.4 signifying moderate correlation.

In terms of inter-item correlations, all correlation are within the value of 0.4–0.8 which was above the recommended value of  $r = 0.3$  (30). The results showed there was moderate correlation between the items 'considerate to other people's feeling' (pro-social skills subscale) and the conduct disorders subscale ( $r = -0.370$ ). Items 'constantly fidgeting, or squirming', and 'easily distracted, concentration wanders', both in the hyperactivity subscale, correlated moderately with items in the emotional problems subscale ( $r = 0.356, 0.377$ , respectively). Item 'generally obedient, usually does what adults request' (conduct problem scale) had moderate correlation with item in the pro-social skill subscale ( $r = -0.410$ ), while item 'generally liked by other children' (peer problem subscale) also had a moderate correlation with an item in the pro-social skill subscale ( $r = -0.385$ ), although both were inversely correlated. Item 'nervous or clingy in new situation, easily lose confidence' from the emotional problems subscale also had a moderate correlation with an item in the hyperactivity subscale ( $r = 0.391$ ). This result suggests that in this research, there were moderate correlations between internalising and externalising domains. Internalising symptoms may manifest as anxiety, depression and "phobias", while externalising symptoms include conduct, hyperactivity and disruptive disorder.

### Exploratory Factor Analysis

The data from the parent's questionnaire in the SDQ were analysed by means of a Principle Component Analysis using Varimax Rotation. Five factors with eigenvalues of more than

**Table 3.** Correlations of between item total correlation and inter-item scores of parent's SDQ

Items	Pro-social	Hyperactivity	Emotional	Conduct	Peer problem	Total difficulties scores
Pro-social behaviour						
Item 1. Considerate to other people's feeling	<b>0.622**</b>	-0.203**	-0.109*	-0.370**	-0.176**	-0.275**
Item 4. Shares readily with other children	<b>0.565**</b>	-0.076	-0.097*	-0.113**	-0.136**	-0.143**
Item 9. Help if someone is hurt, upset or feeling ill.	<b>0.700**</b>	-0.172**	-0.086*	-0.128**	-0.058	-0.160**
Item 17. Kind to younger children	<b>0.542**</b>	-0.187**	-0.102*	-0.250**	-0.181**	-0.242**
Item 20. Often volunteers to help others	<b>0.681**</b>	-0.221**	-0.207**	-0.261**	-0.060	-0.260**

(continued on next page)

**Table 3.** (continued)

Items	Pro-social	Hyperactivity	Emotional	Conduct	Peer problem	Total difficulties scores
<b>Hyperactivity</b>						
Item 2. Restless, overactive, cannot stay still for long	-0.108**	<b>0.672**</b>	0.271**	0.296**	0.257**	0.548**
Item 10. Constantly fidgeting, or squirming	-0.083	<b>0.425**</b>	0.356**	0.202**	0.256**	0.416**
Item 15. Easily distracted, concentration wanders	-0.132**	<b>0.709**</b>	0.377**	0.244**	0.256**	0.589**
Item 21. Thinks things out before acting	-0.273**	<b>0.571**</b>	0.167**	0.278**	0.082	0.407**
Item 25. Sees task through to end, good attention span	-0.256**	<b>0.656**</b>	0.232**	0.286**	0.170**	0.495**
<b>Emotional</b>						
Item 3. Often complains of headaches, stomach aches, sickness	-0.051	0.133**	<b>0.543**</b>	0.151**	0.138**	0.337**
Item 8. Many worries, often seemed worried	-0.085	0.277**	<b>0.605**</b>	0.272**	0.193**	0.460**
Item 13. Often unhappy, down hearted or tearful	-0.122**	0.295**	<b>0.534**</b>	0.312**	0.238**	0.470**
Item 16. Nervous or clingy in new situation, easily lose confidence	-0.218**	0.391**	<b>0.640**</b>	0.297**	0.214**	0.531**
Item 24. Many fears, easily scared	-0.142**	0.323**	<b>0.739**</b>	0.318**	0.217**	0.552**
<b>Conduct</b>						
Item 5. Often has temper tantrums and hot temper	-0.146**	0.301**	0.333**	<b>0.716**</b>	0.183**	0.499**
Item 7. Generally obedient, usually does what adults request	-0.410**	0.282**	0.241**	<b>0.609**</b>	0.153**	0.417**
Item 12. Often fights with other children or bullies them	-0.155**	0.189**	0.153**	<b>0.496**</b>	0.175**	0.319**
Item 18. Often lies or cheat	-0.158**	0.299**	0.284**	<b>0.577**</b>	0.194**	0.448**
Item 22. Steals from home, school or elsewhere	-0.061	0.144**	0.180**	<b>0.270**</b>	0.119**	0.225**
<b>Peer Problem</b>						
Item 6. Rather solitary, tends to play alone	-0.108**	0.171**	0.213**	0.157**	<b>0.475**</b>	0.320**
Item 11. Has at least one good friend	-0.147**	0.114*	0.052**	0.042	<b>0.467**</b>	0.204**
Item 14. Generally liked by other children	-0.385**	0.270**	0.231**	0.305**	<b>0.470**</b>	0.418**
Item 19. Picked or bullied by other children	-0.070**	0.300**	0.290**	0.214**	<b>0.463**</b>	0.415**
Item 23. Gets on better with adults than with other children	-0.119**	0.046**	0.087**	0.035**	<b>0.536**</b>	0.211**

Pearson correlation \*\* $P < 0.01$  \* $P < 0.01$  (2 tailed)

1.0 emerged (4.45, 2.16, 1.70, 1.49, 1.26, and 1.18), and this is consistent with the number of factors in the original questionnaire. The KMO (Kaiser-Meyer-Olkin) index was 0.809 with a Bartlett's Test of Sphericity that was significant ( $P < 0.001$ ). This result explained 17.83% of the total variance.

Table 4 also shows the result of the Principle Component Analysis, which revealed that the loading on the predicted factors were high for 19 of the 25 items in the parent's questionnaire which was in the range between 0.385 and 0.714. According to Tabachnick and Fidell (31) who cited that 0.32 as a good cut-

**Table 4.** Five-factor solution of parent's SDQ ( $n = 495$ ) scores as obtained using principle component analysis with Varimax rotation

Items	Factor 1 Pro- social	Factor 2 Hyperactivity	Factor 3 Emotional	Factor 4 Conduct	Factor 5 Peer problem
<b>Pro-social behaviour</b>					
Item 1. Considerate to other people's feeling	<b>0.638</b>				
Item 4. Shares readily with other children	<b>0.470</b>				
Item 9. Help if someone is hurt, upset or feeling ill.	<b>0.589</b>				
Item 17. Kind to younger children	<b>0.532</b>				
Item 20. Often volunteers to help others	<b>0.590</b>				
<b>Hyperactivity</b>					
Item 2. Restless, overactive, cannot stay still for long		0.141			0.478
Item 10. Constantly fidgeting, or squirming		0.136	0.480		
Item 15. Easily distracted, concentration wanders		<b>0.650</b>			
Item 21. Thinks things out before acting		<b>0.584</b>			
Item 25. Sees task through to end, good attention span		<b>0.638</b>			
<b>Emotional</b>					
Item 3. Often complains of headaches, stomach aches, sickness			<b>0.430</b>		
Item 8. Many worries, often seemed worried			<b>0.714</b>		
Item 13. Often unhappy, down hearted or tearful			<b>0.682</b>		
Item 16. Nervous or clingy in new situation, easily lose confidence			<b>0.405</b>		
Item 24. Many fears, easily scared			<b>0.479</b>		
<b>Conduct</b>					
Item 5. Often has temper tantrums and hot temper				<b>0.484</b>	
Item 7. Generally obedient, usually does what adults request		0.567		0.036	
Item 12. Often fights with other children or bullies them				<b>0.573</b>	
Item 18. Often lies or cheat				<b>0.654</b>	
Item 22. Steals from home, school or elsewhere				<b>0.516</b>	
<b>Peer Problem</b>					
Item 6. Rather solitary, tends to play alone	0.480				0.124
Item 11. Has at least one good friend					<b>0.646</b>
Item 14. Generally liked by other children		-0.532			0.167
Item 19. Picked or bullied by other children				0.406	0.264
Item 23. Gets on better with adults than with other children					<b>0.385</b>

off point for the minimum loading of an item. Hyperactivity problems, conduct disorder and peer-problem subscales did not load on a single factor but on two or more factors. For example, two items in the hyperactivity problems subscale loaded highly on other subscales (i.e. ‘restless, overactive, cannot stay still for long’ loaded highly on the emotional problems subscale (factor loading of 0.480) and ‘Constantly fidgeting, or squirming’ loaded highly on the peer relations subscale (factor loading of 0.478). One of the items in the conduct disorder subscale loaded highly on the hyperactivity problems subscale (factor loading of 0.567), while the peer relations subscale loaded on three other subscales—the pro-social skills subscale (factor loading of 0.480), hyperactivity problems subscale (factor loading of -0.532) and emotional problems subscales (factor loading of 0.406). These results also suggest the presence of interactions between externalising and internalising items.

### Confirmatory Factor Analysis (CFA)

Figure 1 shows the model fit indices of the SDQ using Confirmatory Factor Analysis. It shows indices were generated for the parent group ( $\chi^2 = 647.938$ ,  $df = 265$ ,  $P < 0.001$ ,  $\chi^2/df = 2.445$ ; CFI = 0.915; RMSEA = 0.055; TLI = 0.904; IFI = 0.916) showing that the model provided a good fit to the data on parents. These five indices showed that the structural model relationship within the domains in the Malay parent-report version of the SDQ shows a good fit.

### Discussion

The results of this study suggest that internal reliability of a Malay parent-report, teacher-report and child-report versions of the SDQ were satisfactory. The reliability was assessed using internal consistency and inter-rater agreement. The structural validity of the Malay parent-report questionnaire was then

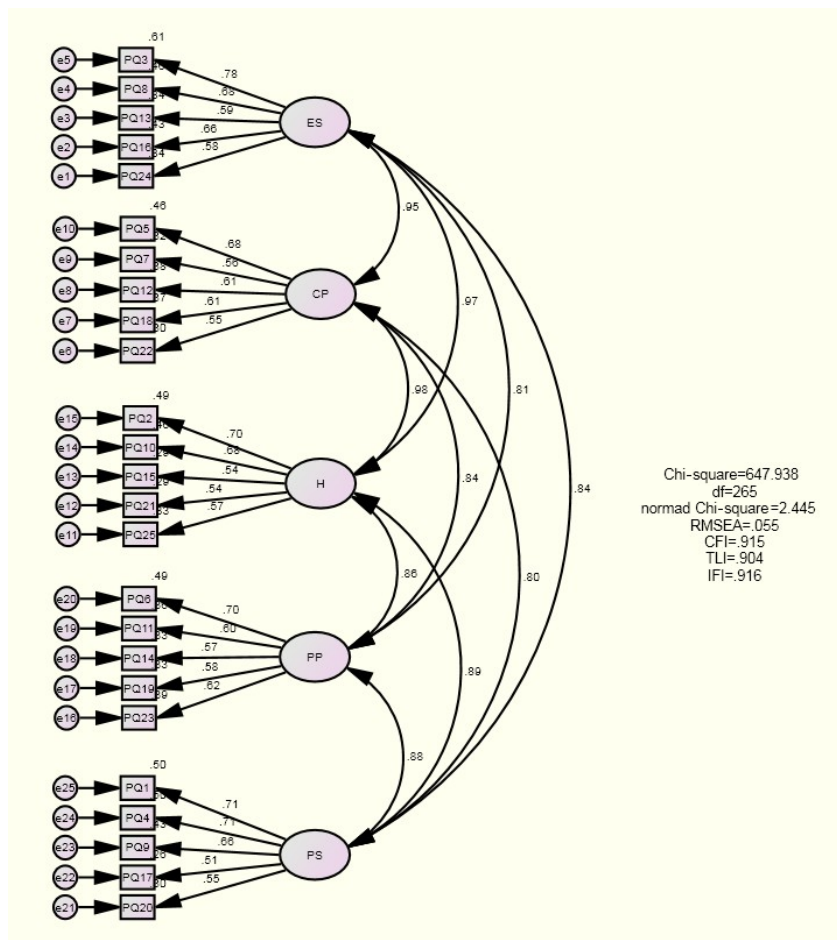


Figure 1. Structure analysis of parent’s SDQ using confirmatory factor analysis



assessed by analysing the item-total and inter-item correlations as well as exploring the factor structure. Finally, CFA was performed on the Malay parent-report questionnaire to confirm the satisfactory stability of the model fit indices.

The result for internal consistency was acceptable for the Total Difficulties scores for all parent, teacher and child-report versions (i.e. > 0.7). However, teacher-report had the highest internal consistency. These findings were similar to those obtained by Goodman (9) although the value in the current study is much lower. The value was much lower in both the parent and teacher-reports for both the conduct disorders and peer relations subscales (e.g. 0.45/0.45 and 0.25/0.25, respectively). A number of other studies (32, 33, 34, 35, and 36) have also shown much lower values for both conduct disorders and peer relations subscales in the parents' and children's reports. Low values for these subscales could be due to the presence of both positive and negative items (29). Van Widenfelt et al. (32) suggested that the low internal consistencies of these subscales, were due to the presence of items that do not fit within the domain.

Although inter-rater agreement may not reflect true reliability, it shows the differences in scores between informants (37). Analysis of the inter-informant agreement found that there was a fair agreement between parents-children scores compared to parents-teachers scores and teachers-children scores.

Surprisingly, all the values in parents and teachers scores and some of the values in the teachers and children scores were much lower than suggested by Achenbach et al. (38), with the bench-mark value of 0.27 for parent-teacher correlations and 0.20 for teacher-children correlations (37). Low agreement between teachers and children's score was also found in the studies by Goodman (9) and Capron et al. (36). One of the reasons given for children's functioning being viewed differently by parents and teachers was, that they report children's emotional and behavioural functioning differently in different situations (38).

In terms of validity of the parent-report questionnaire, we found that each item correlates moderately with its corresponding item in the same sub-scale. We also found that the emotional problems subscale had the highest correlation among its corresponding items. This suggests that the items in the emotional problems

subscale may be more easily comprehended by the respondents compared to other domains. It also suggests that emotional problem had lack of occurrences of other behaviour being measured. In addition the behaviours or emotions within that scale may be more similar to one another compared to items within other scales, leading to a high correlation within that scale. However, we also found that there was a moderate correlation between items in the emotional and hyperactivity problem subscales (0.356–0.391). This was in agreement with the study by Goodman (9) in which there was a higher correlation between externalising/externalising domains compared with internalising/externalising domains. Although externalising and internalising problems have been explained as separate entities, these two problems may co-exist (39, 40).

The factor analysis for the parent-report questionnaire yielded a five-factor solution (e.g. emotional, conduct, hyperactivity, peer problem and pro-social skill subscales), which confirmed the factor solution suggested by Goodman (9). Most previous studies have shown that the exploratory factor analysis confirms the five factors structure (15, 20, 36, 41, and 42). Nevertheless, in the factor analysis, certain items loaded highly on other subscales. For example, a hyperactivity item loaded on both emotional and peer relations subscale while an item in the conduct disorders subscale loaded on the hyperactivity problems subscale. Items in the peer relations subscale also loaded on multiple other items in other subscales-pro-domains co-exist in this sample. Finally during Confirmatory Factor Analysis we found that the model fit the five factor structure for the Malay parent-report version of the SDQ.

There were few limitations in this study. The scope of research which was limited to parents, teachers and children in public schools only, might affect generalisability. Parents who did not use the Malay medium as their first language might not comprehend the questionnaire which was fully translated into Malay. Future studies should incorporate questionnaires of other languages such as Tamil and Chinese as Malaysia is well known for its diversity in terms of its race and culture. A narrow aged range group of children participating in this study could be a limitation in this research. However the large number of parents ( $n = 495$ ) in this psychometric study contributed to the strength of this study.

We should bear in mind that some results such as the Cronbach's alpha values for the conduct and peer relations subscales were slightly lower than comparable scores in other studies (32, 33), and also the presence of other differences, for example, the existence of moderate correlations between internalising and externalising domains. These may be due to cross-cultural and language differences, and diversity in the manifestation of emotional and behavioural problems among children in this community compared with other communities.

## Conclusion

Overall, the reliability of the Malay parent, teacher and children-report version of the Strengths and Difficulties Questionnaire are similar to those obtained for the UK original versions and other translated versions of this questionnaire. In addition, the factor analysis of the Malay parent-report version showed the original five factor model which consist of emotional, conduct, hyperactivity, peer problem and pro-social scale. This increases our confidence that results obtained from prevalence studies on emotional and behavioural problems among children in Malaysia, using the Malay parent-report version of the SDQ; are valid and can be generalised.

Future studies should incorporate questionnaires of other languages as well, such as Tamil and Chinese; as Malaysia is well known for its diversity in terms of its race and culture. More studies are necessary to confirm other psychometric properties of the translated version, such as test-retest reliability as well as other measures of validity (i.e. construct and concurrent validity).

## Abbreviations

BREC: Biomedical Research Ethics Committee  
CBCL: Child Behaviour checklist  
CFA: Confirmatory Factor Analysis  
CFI: Comparative fit index  
DSM IV: Diagnostic and Statistical Manual of Mental Disorders IV  
IFI: Incremental Fit Index  
KMO: Kaiser-Meyer-Olkin  
RMSEA: Root Mean Square of Error Approximation  
SPSS: Statistical Package for the Social Science  
SDQ: Strengths and Difficulties Questionnaire

TESL: Teaching English as Second Language  
TDS: Total Difficulties Scores  
TLI: Taker-Lewis Index  
SPSS: Statistical Package for the Social Science  
UK: United Kingdom

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## Ethics of Study

Approval was obtained by the Biomedical Research Ethics Committee (BREC), University of Warwick, United Kingdom and the Economic Planning Unit and Ministry of Education in Malaysia.

## Conflict of Interest

None.

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## Authors' Contributions

Conception and design: IBI, JB, AD  
Analysis and interpretation of the data: IBI, JB, AD, SS  
Drafting of the article: IBI, JB, AD  
Critical revision of the article for important intellectual content: IBI, JB, AD, SS  
Final approval of the article: IBI, JB, AD, SS  
Provision of study materials or patients: IBI  
Statistical expertise: IBI, SS  
Obtaining of funding: IBI, JB, AD  
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