The Strengths and Difficulties Questionnaire Self-Report: A Valid Instrument for the Identification of Emotional and Behavioral Problems

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Abstract

Objective: Validated questionnaires help community pediatric services to identify emotional and behavioral problems (EBPs). This study assesses the psychometric properties of the self-report version of the Strengths and Difficulties Questionnaire (SDQ) for the identification of EBPs in adolescents (13 to 14 years old) and the added value of the SDQ parent-form version.

Methods: We obtained data on 500 adolescents (mean age 13.5 years) from community well-child services and schools. Adolescents completed the SDQ self-report and the Youth Self-Report (YSR). Parents completed the SDQ parent-form and the Child Behavior Checklist (CBCL) for their children. We assessed the internal consistency and validity using the YSR and CBCL as the criteria, and the degree to which the SDQ parent-form provides additional information by comparison with the self-report.

Results: The internal consistency of the SDQ total score was good (Cronbach's alpha, 0.75). Sensitivity and specificity using the YSR as the criterion were 0.75 and 0.91, respectively. When the CBCL was adopted as the criterion, these validity indices were lower. The SDQ parent-form does not provide additional information by comparison with self-reporting only when the YSR score is used as the criterion (odds ratio, 0.48; 95% confidence interval, 0.14−1.65); however, it does do so when the CBCL is the criterion (odds ratio, 10.9; 95% confidence interval, 4.23−27.9).

Conclusions: The SDQ self-report is valid for the detection of EBPs in adolescents, and the SDQ parent-form provides additional information by comparison with the self-report. This indicates that it is useful to involve adolescents and their parents as informants for the identification of EBPs in adolescents.

Keywords: adolescents; emotional and behavioral problems; screening; Strengths and Difficulties Questionnaire

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What's New

The self-report version of the Strengths and Difficulties Questionnaire is a valid instrument for the detection of emotional and behavioral problems in adolescents 13 and 14 years old. The Strengths and Difficulties Questionnaire parent-form can provide additional information about externalizing problems in adolescents.

About 10% to 25% of adolescents have symptoms of mental health problems, such as low self-esteem, depressive thoughts, and impulsive or maladaptive behaviors.[1,2] These emotional and behavioral problems (EBPs) can negatively impact an adolescent's development and later evolve into serious mental health problems.[3,4] The early recognition and identification of EBPs can improve prognosis.[5−7]

Community pediatric services play a major role in the identification of EBPs in children and adolescents. Validated short questionnaires have been shown to support identification; however, most of the evidence relates to parent-reported questionnaires such as the Strengths and Difficulties Questionnaire parent-form (SDQ-PF).[8,9] The SDQ is currently one of the most widely used behavioral screening questionnaires. It can be completed by both parents and the adolescents themselves (ages 11 to 16 years). The psychometric properties of the SDQ-PF have been shown to be good in various settings and countries,[9−13] including the Netherlands[14−20]; however, in community pediatrics services, self-report questionnaires are usually used for adolescents.

Evidence about the self-report version of the SDQ (SDQ-SR) is more limited, although the available studies generally show that the SDQ-SR is a reliable tool for the assessment of psychological adjustment in adolescents in

a community setting.[8,14,15,21] There is a need to validate the SDQ-SR among adolescents and to provide norms in a community setting, as available studies are rather old[8,14,15] and have methodological limitations[14,15,21]; for example, they do not present norms and sensitivity and specificity indices. Furthermore, research is necessary to determine whether the self-report and parent-form versions of the SDQ are equally valid and to what extent the SDQ-PF adds unique information compared to information obtained from the self-report version. The limited available evidence suggests that there are meaningful differences between adolescent and parental reports of problems.[22–24] The first aim of this study was therefore to assess the psychometric properties (internal consistency, scale structure, and validity) of the SDQ-SR for the identification of EBPs in adolescents. The second aim of this study was to assess whether the SDQ-PF provides additional information about EBPs as compared to adolescent reporting only.

METHODS

Adolescents and their parents completed the SDQ-SR and the SDQ-PF, respectively, as well as the questionnaires that we used as criteria: the Youth Self-Report (YSR) and the Child Behavior Checklist (CBCL), respectively. The data were obtained from schools and in the context of the routine Preventive Child Healthcare (PCH) assessments that are provided regularly for all Dutch children. The CBCL, YSR, and SDQ-PF were included for research purposes, as completion of these questionnaires is not a standard procedure during routine PCH assessment. Ethical approval for this study was obtained from the Medical Research Ethics Committee of Leiden University Medical Center in the Netherlands.

SAMPLE

We used 2 samples to collect data from PCH assessments and schools about EBPs in adolescents:

1) *PCH assessment sample*—We obtained data from routine PCH assessments provided to all Dutch children free of charge in the second year of high school, at the age of 13 or 14 years. Four services invited 961 adolescents and their parents to participate in the study: 602 (62.6%) of them participated by completing the YSR and either the SDQ-SR or another questionnaire (not included in this article). Adolescents who completed the YSR and the SDQ-SR resulted in a response of n = 299. Differences between respondents and non-respondents were small (Cohen's effect sizes 0.10 for age and 0.12 for gender; both $P < .05$). Analyses were limited to adolescents who filled out the SDQ-SR (and the YSR). Written informed consent for participation in the study was obtained from the parents.
2) *School sample*—We also obtained data from a school sample, as the PCH assessment sample resulted in insufficient data to assess the validity of the SDQ with a statistical power of 0.80. We obtained data directly from 6 high schools covering all educational levels and selected 12 second-year classes (ages 13 to 14 years), resulting in 201 students who completed the SDQ-SR and YSR questionnaires in the classroom under the supervision of a teacher. Informed consent for participation was obtained from parents, but no parent-form questionnaires were completed.

MEASURES

We used the SDQ-SR (covering ages 11 to 17 years) and SDQ-PF (covering ages 4 to 17 years). Both questionnaires consist of 25 items relating to children's strengths and difficulties. Each item is scored on a 3-point scale (0 = not true, 1 = somewhat true, and 2 = certainly true). The SDQ consists of 5 subscales, 4 on difficulties (emotional symptoms, conduct problems, hyperactivity-inattention, and peer problems) and 1 on strengths (pro-social behavior). An SDQ total difficulties score (TDS) can be calculated by adding up the scores for the first 4 subscales. Adolescents were allocated to a normal range or an elevated TDS based on the SDQ-SR using the score that was associated with a specificity of at least 0.90 in our sample, with the elevated YSR as the criterion. This resulted in a cutoff point of >11 for the SDQ-SR TDS (ie, 16.4% elevated scores). Adolescents were allocated to a normal range or an elevated range on the SDQ-PF using the score that was associated with a percentage of children with elevated scores similar to the percentage for the SDQ-SR. This cutoff point was >9 for the SDQ-PF TDS, resulting in a percentage of elevated scores of 15.3%.

The YSR (covering ages 11 to 18 years) and CBCL (covering ages 6 to 18 years) were used as the criteria for assessment of EBPs. The YSR and CBCL are, respectively, self-reports and parental reports about children's emotional and behavioral problems in the preceding 6 months. Their good reliability and validity have been established.[25–28] Both questionnaires are comprised of 112 problem items that are combined with a total problem score (TPS) and internalizing and externalizing problem scores, the latter two representing emotional and behavioral problems, respectively. Adolescents were allocated to a normal range or an elevated range using 90th-percentile sex-specific cutoff points.[25]

PROCEDURE

In the first sample, adolescents ages 13 and 14 years were invited for a routine health assessment at school, where child health care professionals completed routine examinations. In addition to these routine assessments, questionnaires were sent to the adolescents' homes to be completed by the parents (SDQ-PF and CBCL) and adolescents (YSR). These longer questionnaires were completed at home and then returned to the research institute. In the second sample, adolescents in the second year of high school completed questionnaires (SDQ-SR and YSR) in the classroom under the supervision of a teacher. Data about child age, gender, and educational level;

Table 1. Demographic Characteristics of the Adolescents (N = 500)

Demographic	n (%)*
Gender	
Boy	219 (44.1)
Girl	278 (55.9)
Child's age (yr)	
12	12 (2.5)
13	240 (51.0)
14	200 (42.5)
Older than 14	19 (4.0)
Ethnicity	
Dutch	405 (90.2)
OECD (except for Turkey)	9 (2.0)
Turkish or non-OECD country	35 (7.8)
Adolescent educational level	
Vocational school	106 (29.8)
Medium and higher education	250 (70.2)
Parental educational level	
Lower education	71 (19.3)
Medium education	124 (33.7)
Higher education	173 (47.0)

OECD indicates Organisation for Economic Co-operation and Development.

*Data are missing for gender (n = 3), child's age (n = 29), ethnicity (n = 51), adolescent educational level (n = 144), and parental educational level (n = 132).

ethnic background; and parental educational level were obtained from the adolescents.

ANALYSIS

Our first step was to assess the background characteristics of the sample. Second, we assessed the psychometric properties (internal consistency, scale structure, and validity) of the SDQ-SR for identifying EBPs in adolescents. Internal consistency was assessed by computing Cronbach's alphas. We examined the fit between the scale structure and the observed data with confirmatory factor analysis using Mplus structural equation modeling.[29] In the confirmatory factor analysis, the models were considered to be a good fit when the parsimony comparative fit index (PCFI) was >0.90. Because the PCFI is a strict criterion, we considered the model to be an approximate fit when the root mean square error of approximation (RMSEA) was <0.08 and a good fit when the RMSEA was <0.05. Items with regression weights < 0.30 were considered not to be a fit.[29] The validity of the SDQ-SR was assessed with sensitivity and specificity indices using YSR TPS and CBCL TPS, with internalizing and externalizing problem scores as criteria. Cohen's kappa and Spearman's correlation coefficients were calculated to assess overall agreement between the SDQ and the criteria. Third, we assessed whether the SDQ-PF provides additional information by comparison with the self-report version. Logistic regression analysis was performed with the YSR and CBCL criterion measures (TPS, internalizing or externalizing). In the first step, the SDQ-SR or SDQ-PF TDS was included in the analyses (crude analyses), and the SDQ-PF TDS score was added to the SDQ-SR TDS as an independent variable in the second step.

Table 2. Internal Consistency of Scores on SDQ-SR Total Difficulties and Subscales

SDQ Scales	Cronbach's alpha
Total difficulties	0.75
Emotional symptoms	0.68
Conduct problems	0.55
Hyperactivity	0.71
Peer problems	0.54
Pro-social	0.57

SDQ-SR indicates Strengths and Difficulties Questionnaire self-report.

RESULTS

BACKGROUND CHARACTERISTICS OF THE SAMPLE

The mean age of the sample was 13.5 years (standard deviation, 0.6 years). Further demographic information is presented in Table 1.

INTERNAL CONSISTENCY AND SCALE STRUCTURE

The internal consistency of the SDQ-SR TDS was 0.75. The Cronbach's alphas for the 5 subscales of the SDQ-SR varied between 0.54 and 0.71 (Table 2). Structural equation modeling for a model with the 5 SDQ subscales produced a PCFI of 0.82 and a RMSEA of 0.05 (confidence interval, 0.045−0.056), suggesting an approximate/good fit. One item had a regression weight < 0.30 (item 11).

Table 3. Spearman Correlation Coefficients Between Continuous SDQ-SR Scores and YSR/CBCL Total Scores for Internalizing and Externalizing Problems

	YSR (N = 500)			CBCL (N = 289)		
SDQ Scales	Total	Internalizing	Externalizing	Total	Internalizing	Externalizing
Total difficulties	0.68**	0.62**	0.51**	0.54**	0.41**	0.41**
Emotional symptoms	0.59**	0.72**	0.29**	0.35**	0.47**	0.20**
Conduct problems	0.37**	0.23**	0.45**	0.37**	0.15**	0.39**
Hyperactivity	0.47**	0.30**	0.43**	0.39**	0.17**	0.32**
Peer problems	0.22**	0.31**	0.10*	0.31**	0.33**	0.18**
Pro-social	−0.10*	−0.06	−0.20**	−0.28**	−0.18**	−0.28**

SDQ-SR indicates Strengths and Difficulties Questionnaire self-report; YSR, Youth Self-Report; and CBCL, Child Behavior Checklist.

*$P < .05$.

**$P < .01$.

Table 4. Test Characteristics of the SDQ-SR Total Difficulties Score Using Elevated YSR and CBCL Scores as Criteria

	YSR (N = 500)			CBCL (N = 289)		
Test Characteristics	Total	Internalizing	Externalizing	Total	Internalizing	Externalizing
Kappa	0.52	0.46	0.34	0.44	0.26	0.33
Sensitivity	0.75	0.70	0.57	0.59	0.39	0.50
Specificity	0.90	0.90	0.88	0.92	0.90	0.90
AUC (95% CI)	0.91 (0.87–0.95)	0.90 (0.85–0.94)	0.85 (0.80–0.90)	0.83 (0.75–0.92)	0.71 (0.62–0.81)	0.79 (0.71–0.88)

SDQ-SR indicates Strengths and Difficulties Questionnaire self-report; YSR, Youth Self-Report; CBCL, Child Behavior Checklist; AUC, area under the curve; CI, confidence interval.

Validity

The SDQ-SR scales correlated significantly with the YSR and CBCL scales (Table 3). The highest correlation coefficient was found between the SDQ-SR emotional symptoms score and the YSR internalizing score (Spearman's $r = 0.72$), and the lowest was between the SDQ pro-social score and the YSR TPS score. Table 4 presents Cohen's kappa, sensitivity, and specificity for all criteria. Cohen's kappa for the SDQ-SR TDS varied between 0.34 and 0.52 for the YSR criterion and between 0.26 and 0.44 for the CBCL criterion. Sensitivity and specificity for the SDQ-SR TDS varied from 0.57 to 0.75 and 0.88 to 0.90, respectively, for the YSR criterion and from 0.39 to 0.59 and 0.90 to 0.92, respectively, for the CBCL criterion.

Added value

Table 5 presents the added value of the SDQ-PF TDS for the assessment of EBPs by comparison with adolescent reporting on the basis of YSR and CBCL criteria (TPS, internalizing, or externalizing). These results show that the SDQ-PF TDS does not improve the identification of EBPs compared to adolescent reporting using only an elevated YSR score as the criterion. The adjusted odds ratios for elevated SDQ-PF TDS scores were non-significant, ranging from 0.48 to 1.20. When the CBCL criterion was used, elevated SDQ-PF TDS scores significantly added to the SDQ-SR TDS scores for identification. The adjusted odds ratios for elevated SDQ-PF TDS scores ranged from 3.66 to 10.9.

Discussion

This study examined the psychometric properties of the self-report version of the SDQ and the degree to which the SDQ parent-form provides additional information for the identification of emotional and behavioral problems as compared with adolescent reporting only. Our findings show that the SDQ-SR discriminated between adolescents with and without problems as measured by the YSR and CBCL. When the CBCL criterion was applied rather than the YSR criterion, the validity indices were slightly lower. The SDQ-SR was somewhat more sensitive to internalizing problems than to externalizing problems when using adolescent reporting (YSR) as the criterion; when parental reporting (CBCL) was used as the criterion, the reverse was seen. The SDQ-PF did not improve the identification of EBPs as compared to adolescent reporting using elevated YSR scores as the criterion; however, when parent reporting was adopted as the criterion (CBCL), SDQ-PF identified EBPs better than adolescent reporting only.

Match with Previous Literature

Our study showed that the SDQ-SR is a valid tool for the identification of EBPs in adolescents. The internal consistency of the SDQ-SR TDS was good (Cronbach's alpha was 0.75), and the sensitivity and specificity of the SDQ-SR TDS were 0.75 and 0.90, respectively, when YSR was the criterion. Similarly good psychometric properties have been reported in studies assessing the validity of the SDQ-SR[14,15] and SDQ-PF.[14,15,18] Not unexpectedly, the validity indices were slightly lower with the CBCL criterion than with the YSR criterion. A possible explanation for this finding is that, when the CBCL criterion was used, the results of SDQ self-reporting by adolescents were compared with parent reports, which may lead to a lower level of agreement given the limited agreement between these two informants that has been found elsewhere.[22–24] Cronbach's alpha for the SDQ-SR TDS was good (0.75), but for the 5 subscales of the SDQ these alphas varied between 0.54 and 0.71, some of them being quite low but in line with other research reporting moderate SDQ subscale internal consistencies.[14,18,30] The internal consistency of the SDQ subscales does not justify using these subscales for decisions about whether individual children require further attention.

The SDQ-SR was slightly more sensitive to internalizing problems than to externalizing problems when adolescent reporting (YSR) was the criterion; the reverse was observed when parent reporting (CBCL) was the criterion. A possible explanation is that adolescents identify their own internalizing problems more accurately and that parents identify externalizing problems in their children more effectively.[23]

We found that the SDQ-PF did not have any added value in the assessment of EBPs as compared to adolescent reporting only when the elevated YSR score was the criterion; however, when parental reporting was the criterion (CBCL), the SDQ-PF did improve identification. This indicates that parents can add some information about adolescent EBP that is not reported by the adolescents themselves. The combination of self- and parental reporting would therefore seem to provide the best information about EBPs in adolescents. This is in line with the findings of Kuhn et al,[24] who found that combined

Table 5. Results from Separate Logistic Regression Analyses of SDQ-PF with Elevated YSR and CBCL Scores Taking Identification by the SDQ-SR into Account

	YSR			CBCL		
	Total Problems OR (95% CI)	Internalizing Problems OR (95% CI)	Externalizing Problems OR (95% CI)	Total Problems OR (95% CI)	Internalizing Problems OR (95% CI)	Externalizing Problems OR (95% CI)
N	281	281	281	288	287	288
Crude						
Elevated SDQ-SR TDS yes (vs no)	47.6 (16.0–141.6)	35.6 (12.7–99.6)	19.7 (7.24–53.5)	13.4 (5.77–30.9)	8.39 (4.81–14.6)	8.05 (3.43–19.9)
Elevated SDQ-PF TDS yes (vs no)	3.94 (1.60–9.70)	5.95 (2.46–14.4)	3.11 (1.18–8.23)	18.0 (7.5–43.1)	7.37 (3.29–16.5)	6.17 (2.62–14.5)
Adjusted*						
Elevated SDQ-SR TDS yes (vs no)	68.4 (19.3–243.1)	32.8 (10.3–103.9)	25.0 (7.89–79.2)	5.74 (2.18–15.1)	2.27 (0.87–5.92)	4.61 (1.75–12.1)
Elevated SDQ-PF TDS yes (vs no)	0.48 (0.14–1.65)	1.20 (0.38–3.79)	0.60 (0.17–2.04)	10.9 (4.23–27.9)	5.83 (2.39–14.2)	3.66 (1.40–9.61)

SDQ-PF indicates Strengths and Difficulties Questionnaire parent-form; YSR, Youth Self-Report; CBCL, Child Behavior Checklist; OR, odds ratio; CI, confidence interval; SDQ-SR, Strengths and Difficulties Questionnaire self-report; TDS, total difficulties score.

*Adjusted ORs take into account the identification of problems with SDQ-SR TDS or SDQ-PF TDS.

parental and SDQ self-reports were more discriminating than SDQ self-reports alone. In addition, Aebi et al[23] showed that the SDQ-SR and SDQ-PF were both discriminating but that the combination of both is most effective. They found that the SDQ-SR is most informative in terms of detecting emotional problems and that the SDQ-PF is more suitable for the identification of behavioral problems. The combination of self-reporting and parental reporting therefore provides the best information on EBPs in adolescents, with self-reporting being most effective for internalizing problems and parental reporting being more suitable for identifying externalizing problems.

Strengths and Limitations

The strengths of our study are the large and representative sample and its community-based nature. Moreover, we used the YSR and CBCL as the validation criteria. Both questionnaires are well validated for emotional and behavioral problems. Some limitations should also be taken into account when interpreting our findings. First is the use of the YSR, a self-reported questionnaire, as criterion for validation of the short SDQ-SR. The use of the same informant could have increased indices for validity.[31] Clinical assessments such as psychiatric interviews may provide additional information, but because of their complexity and high costs they were not used as criteria in this study. Second, our study was in part embedded in routine PCH practice. Adolescents in the PCH sample may have been more likely to under-report their EBPs for social desirability reasons than adolescents in the school sample. This may limit the generalization of our results to a PCH setting.

Implications

Our results show that the self-report version of the SDQ is a valid instrument, or at least a valid short alternative for the much longer YSR, for the detection of EBPs in adolescents ages 13 to 14 years in a community setting in the Netherlands. The SDQ is a promising instrument for use with adolescents in other countries and settings, as well, because the SDQ has been shown to be cross-culturally valid and it is available in a broad range of languages. Nevertheless, further study is necessary to confirm this conclusion. The early detection of EBPs in adolescents may be improved if the SDQ-SR is used in combination with the SDQ-PF. The SDQ-PF has added value by comparison with adolescent reporting only, particularly for the identification of externalizing problems that may be under-reported by adolescents themselves. Attention should be paid to barriers to the implementation of 2 short questionnaires during routine assessments in community pediatric services.

Conclusions

The self-report version of the SDQ is a valid instrument, or at least a valid alternative for the YSR, for the detection of EBPs in adolescents ages 13 and 14 years. The SDQ parent-form can provide additional information

about externalizing problems in adolescents. It is preferable to obtain information from both adolescents and their parents in order to establish a complete picture of EBPs in adolescents.

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