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Brief report

The validation of the self-report Strengths and Difficulties Questionnaire for use by 6- to 10-year-old children in the UK

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Objective. To examine the factor structure of the self-report Strengths and Difficulties Questionnaire (SDQ) for data from a sample of British children aged 6–10 years.

Method. The self-report SDQ was administered to 900 children aged 6–10 years via interviews with trained counsellors.

Results. Confirmatory and exploratory factor analyses showed that a two-factor solution comprising 'externalizing and peer problems' and 'internalizing problems' fit the data well for both the 6- to 7- and 8- to 10-year-old samples. The factors were correlated in both samples.

Conclusions. Children between 6 and 10 years of age provided meaningful SDQ data. The identified two-factor model maps broadly onto the constructs of externalizing and internalizing behaviour.

Practitioner points

- The findings suggest that children in the United Kingdom younger than 11 years of age are able to complete the Strengths and Difficulties Questionnaire (SDQ), providing practitioners with a picture of a child's insight and understanding of their problems.
- The findings show that, with children aged 6–10 years, the self-report SDQ provides information about two factors that map broadly onto the constructs of externalizing and internalizing behaviour.
- This study is the first in the United Kingdom to examine the self-report SDQ in young children, adding weight to an emerging literature base.
- To support understanding in very young children, the self-report SDQ should to be delivered via interview, so that self-descriptions are appropriate to the child's developmental level.

The Strengths and Difficulties Questionnaire (SDQ) is used to screen for emotional and behavioural problems in children aged 4–16 years. In addition to parent and teacher versions of the questionnaire, a self-report version is available for 11- to 16-year olds

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(Goodman, Meltzer, & Bailey, 1998). This self-report version is similar to the adult and teacher versions, allowing comparability between ratings.

Due to its brevity and cost effectiveness, the parent, teacher, and self-report versions of the SDQ are widely used in clinical practice in the United Kingdom (Glazebrook, Hollis, Heussler, Goodman, & Coates, 2003). Indeed, the CAMHS Outcomes Research Consortium (CORC) is currently working with National Health Service (NHS) Child and Adolescent Mental Health Services (CAMHS) across the United Kingdom to promote use of the SDQ to improve clinical practice. Furthermore, the SDQ is a routine outcome measure in the Children and Young People's Improved Access to Psychological Therapies project (CYP IAPT), which aims to change services for children and young people in the United Kingdom (see http://www.iapt.nhs.uk/cyp-iapt).

The self-report version of the SDQ is intended for use with 11- to 16-year olds (Goodman *et al.*, 1998). The simplicity of this SDQ also makes it a candidate for use with younger children (Di Riso *et al.*, 2010). In addition, Harter (1999) argues that by 8 years, a child integrates behavioural features and competencies (e.g., academic achievement) into higher order concepts (e.g., being clever), which allow for an evaluation of the self; thus, children aged 8 years should be able to offer views of themselves in line with statements in the self-report SDQ.

Children younger than 8 years also understand the process of self-evaluation and can comment on their behaviour and offer self-information (Anderson & Adams, 1985). To enable the evaluation of self in children aged 4–7 years, specific forms of self-description are needed (Harter & Pike, 1984). The self-report SDQ provides such self-descriptions: the SDQ uses trait labels (i.e., 'I am restless'), but follows these statements with behavioural descriptions (i.e., 'I cannot stay still for long'). This means that even young children may be able to complete the self-report SDQ. The completion of the self-report SDQ for young children means that statements should be presented in graphic format or verbally as is done for other questionnaires used by preschoolers that examine aspects of self (Harter & Pike, 1984; Mantzicopoulos, 2004).

Gathering SDQ data via interview reduces the quickness and cost effectiveness of the measure, but it offers clinicians the opportunity to understand the emotional world of the young child from his or her perspective. Furthermore, having self-report mental health information from young children is important because it offers opportunities to investigate (1) the stability of self-reported psychopathology from early childhood into late childhood and adolescence and (2) whether it progresses into adult psychiatric disorders.

Studies have noted good psychometric properties for the self-report version of the SDQ when used with children as young as 8 years (Di Riso *et al.*, 2010; Muris, Meesters, Eijkelenboom, & Vincken, 2004). However, there is a question about factor structure: Muris *et al.* proposed a four-factor structure, whereas Di Riso *et al.* propose a three-factor model.

Both of those studies look at the psychometric properties of the self-report SDQ for data collected from children aged 8–10 years; to our knowledge, there are no published investigations looking at the SDQ in children younger than 8 years. In addition, neither study was conducted in the United Kingdom. Given the promotion of the self-report SDQ within CAMHS, there is a need for an examination of the factor structure of the measure among British children aged 8–10 years. Furthermore, work by Harter (1999) highlights the capacity for children aged younger than 8 years to provide accurate self-reports, suggesting that the self-report SDQ could be used with children younger than 8 years. Thus, our aim was to examine the factor structure of the self-report SDQ for data from British children aged 6–8 and 8–10 years.

Method

Participants

Data came from 900 children (55% male) aged 6–10 years. Six hundred and fifty-seven children (males = 357) were aged >8 years; 243 children (males = 139) were aged 6 years to 7 years 9 months. Participants were recruited through the charity Place2Be, who offer counselling to children in 172 schools across the United Kingdom. Participants came from Place2Be sites across the United Kingdom and were all from mainstream primary schools.

Measures

The measure under investigation is the self-report version of the SDQ (Goodman *et al.*, 1998). The SDQ comprises 25 statements; a 3-point scale is used to record responses (0 = *not true*; 1 = *somewhat true*; and 2 = *certainly true*).

Procedure

Children completed SDQs as part of clinical work with Place2Be counsellors. Children over 8 years completed the paper-and-pencil measure; the completion of the self-report SDQ was conducted as an interview for children under the age of 8 years.

Results

Step 1: Confirming previous factor structures of the SDQ used with 8- to 10-year olds

Confirmatory factor analyses (CFA) was conducted to explore the three- and four-factor solutions found by Di Riso *et al.* (2010) and Muris *et al.* (2004), respectively. We tested the model fit of these factor solutions for the full sample of 8- to 10-year olds in Mplus 5.1 (Muthén & Muthén, 1998–2008), using mean- and variance-adjusted weighted least squares (WLSMV) which is appropriate for use with ordinal-level data (Kline, 2011).[1,2] The goodness-of-fit (GOF) statistics used are the chi-square GOF statistic, the comparative fit index (CFI), Tucker-Lewis fit index (TLI), and the root mean square error of approximation (RMSEA). There are rules of thumb about acceptable levels of GOF (Marsh, Hau, & Wen, 2004), such that RMSEA should be between .05 and .08 for a reasonable fit to the data; CFI and TLI should exceed .90. The chi-square index should be as small as possible.

Fit indices revealed that the three- and four-factor solutions did not fit the data (three factors: χ^2(df) = 1,923.70 (249), $p < .001$, RMSEA (CI_{95}) = .10 (.097–.105), CFI = .63, TLI = .68; four factors: χ^2(df) = 1,878.49 (224), $p < .001$, RMSEA (CI_{95}) = .11 (.102–.111), CFI = .57, TLI = .59). Reliability for the subscales of the three-factor solution ranged from $\alpha = .17$ (externalization problems) to .71 (internalization problems). For the four-factor solution, reliability ranged from $\alpha = .31$ (hyperactivity) to .60 (emotional symptoms).

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[1] *In this study, there were very few missing values (<2%). We included cases with a total of not more than three missing values (Goodman, 2001).*

[2] *CFA requires relatively large sample sizes, with a rough guideline of 5:1 ratio of sample size to number of parameters estimated to trust parameter estimates (Bentler & Chou, 1987). This recommendation was met for CFA and EFA for all samples of data used in analyses.*

Step 2: The exploration and confirmation of the factor structure for the current sample

Factor structures found in previous research did not fit the current data well, so we conducted exploratory factor analyses (EFA) on half of our data set (the calibration sample) followed by CFA on the remaining data (validation sample). We used SPSS randomization procedures to determine membership of these random smaller samples. The calibration sample comprised 328 participants (M = 178; M_{age} = 110.72 months) and the validation sample included 329 participants (M = 179; M_{age} = 110.64 months).

Principal axis factoring in the calibration sample revealed the presence of five components with eigenvalues exceeding >1 (5.79, 3.26, 1.29, 1.09, and 1.07). The scree plot suggested two components. Parallel analysis (Velicer, Eaton, & Fava, 2000) also showed two components.

Following oblique rotation, these two factors accounted for 23.18% and 13.05% of the common variance and were labelled (1) externalizing and peer problems, including conduct and hyperactivity problems and negative pro-social behaviour and (2) internalizing problems, including items related to emotional problems. Table 1 shows the items that loaded onto each factor. The internal reliabilities of the two subscales were α = .91 (Factor 1) and .69 (Factor 2); they correlated .60.

Confirmatory factor analyses in Mplus 5.1, using WLSMV estimation, were conducted on data from the validation sample.[2] Fit indices revealed that a two-factor model fit the data reasonably well (χ^2(df) = 218.83 (64), RMSEA (CI_{95}) = .08 (.078–.083), CFI = .90,

Table 1. Standardized factor loadings for (1) the EFA and CFA models for data from children aged 8 years and over and (2) the CFA for children aged under 8 years

Factor and items	Factor loading EFA for ≥8 years of age: PME[a]	Factor loading CFA ≥8 years of age	Factor loading CFA <8 years of age
Factor 1: 'Externalizing problems + peer problems'			
20. I take things that are not mine	.78	.78	.76
11. I am often unhappy, downhearted, or tearful	.72	.73	.54
22. I finish the work I am doing	−.72	−.75	−.56
7. I am constantly fidgeting or squirming	.65	.53	.53
14. I fight a lot	.64	.58	−.54
5. I try to be nice to other people	−.58	−.45	−.45
19. I am helpful if someone is hurt, upset or feeling ill	−.51	−.49	−.46
Factor 2: 'Internalizing problems'			
17. I am nervous in new situations	.63	.71	.67
4. I worry a lot	.59	.65	.58
1. I get headaches, stomach aches, and sickness	.58	.61	.54
24. I have many fears, I am easily scared	.63	.49	.45
16. Other children or young people pick on me	.61	.51	.48

Note. EFA = exploratory factor analyses; CFA = confirmatory factor analyses; PME = pattern matrix element.

CFA model conducted in Mplus 5.1 mean- and variance-adjusted weighted least squares (WLSMV). In the final model, the two factors were allowed to correlate with one another.

[a]Items 2, 3, 6, 8, 10, 12, 13, 15, 16, and 18 all loaded below .45 and are not retained in the final two-factor solution (Tabachnick & Fidell, 2007).

NFI = .91). Factor loadings (standardized estimates) are detailed in Table 1. Reliability was good: α = .89 (Factor 1) and α = .73 (Factor 2). The two factors correlated .65.

Step 3: Confirming the factor structure of the self-report SDQ for a sample of children aged between 6 years and 7 years and 9 months[1]

We tested the model fit of the two-, three-, and four-factor solutions for the younger sample.[2] GOF indexes show that only the two-factor solution fit the data well: (two factors: χ^2(df) = 141.01 (64), $p < .001$, RMSEA (CI_{95}) = .07 (.055–.086), CFI = .95, TLI = .96; three factors: χ^2(df) = 573.86 (249), RMSEA (CI_{95}) = .07 (.066–.082), CFI = .63, TFI = .66; and four factors: χ^2(df) = 575.29 (226), RMSEA (CI_{95}) = .08 (.072–.088), CFI = .53, TFI = .56). Table 1 shows the factor loadings for the two factors. Reliabilities of the two subscales were α = .73 (Factor 1) and .64 (Factor 2).

Discussion

This study examined the factor structure of the self-report SDQ for children aged 6–10 years. We found that a two-factor solution fit the data well for the 6- to 8- and 8- to 10-year-old samples. These factors reflected broadly 'externalizing and peer problems' and 'internalizing problems'. The internal consistency of these two factors was good. Our proposed factor structure is different from that found in previous research examining the self-report SDQ with children aged 8–10 years. The fact that the two-factor structure found using EFA was confirmed through CFA for two other samples suggests that this structure is robust and, thus, of importance for those using the SDQ with children younger than 10 years in their clinical practice. We acknowledge the need for research examining (1) the sensitivity and test–retest reliability of the measure with young children and (2) how the responses of children under 8 years relate to (a) the reports offered by parents and teachers and (b) actual behaviour. However, our findings indicate the potential use of the self-report SDQ with young children.

The identified two-factor model maps broadly onto the constructs of externalizing and internalizing behaviour (Achenbach, 1978). The combining of hyperactivity and conduct problems is not surprising given the amount of work linking hyperactivity and conduct problems (Waschbusch, 2002). Combining peer problems with hyperactivity and conduct problems makes sense, given that externalizing problems are significant risks for poor peer relationships (Eisenberg *et al.*, 2009). Evidence of a link between internalizing problems and peer problems is limited (Karevold, Coplan, Stoolmiller, & Mathiesen, 2011), so the fact that emotional problems are not combined with peer problems is unsurprising.

Our study offers a different solution to the original one of five factors. It joins other studies that also use CFA and do not offer unequivocal support for the original five-factor model of the SDQ (Dickey & Blumberg, 2004; Goodman, Lamping, & Ploubidis, 2010; Sanne, Torsheim, Heiervang, & Stormark, 2009). There are other scale issues highlighted in this study: (1) only 12 of the 25 items from the SDQ contribute to the two-factor solution and (2) the Chronbach's alpha for the internalizing factor at <8 years of age is low at .64. The use of a broader two-factor solution and the fact the self-report SDQ is the least reliable of the three SDQ measurements are issues raised elsewhere with regard to older children (Goodman, 2001; Goodman *et al.*, 2010).

This study has shown that children as young as 6 years are capable of completing the self-report SDQ when the statements are read to them. The SDQ self-report measure is being used with older children as a CORC and CYP IAPT outcome measure and we provide evidence that it can be used with children aged 6–10 years, allowing for tracking of a child's strengths and difficulties over time. The self-report SDQ provides clinicians with data about the child's understanding of their behaviour and, used alongside teacher and parent reports, these self-report data are likely to be invaluable in determining intervention.

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