Supplementary Materials

Paper title: Validity aspects of the Strengths and Difficulties Questionnaire (SDQ) adolescent self-report and parent-report versions among Dutch adolescents

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Table S1 Available questionnaires within the community sample (n = 962)

| SDQ version | Achenbach questionnaires | IDS-2 |
|-------------|--------------------------|-------|
|             | YSR  | CBCL | YSR & CBCL | None | Total |       |
| Adolescent  | 361  | 0    | 33          | 43    | 437   | 81    |
| Parent      | 0    | 18   | 10          | 17    | 45    | 13    |
| Adolescent and parent | 31  | 9    | 425         | 15    | 480   | 126   |
| Total       | 392a | 27b  | 468c        | 75    | 962   | 220   |

SDQ: Strengths and Difficulties Questionnaire; YSR: Youth Self Report; CBCL: Child Behavior Checklist.
IDS-2: Intelligence Development Scales 2.

* incl. 9 adolescents who provided too few item scores to calculate at least one YSR scale score.
* incl. 5 parents who provided too few item scores to calculate at least one CBCL scale score.
* incl. 1 pair of parent and adolescent who provided too few item scores to calculate at least one CBCL of YSR scale.
Table S2 Prevalence of DSM-IV diagnoses and comorbid DSM-IV diagnoses in the clinical sample (n = 4,053)

| DSM category<sup>a</sup> | N<sup>b</sup> | ADHD | CD/ODD | Anxiety/mood disorder | ASD |
|--------------------------|-------------|------|--------|-----------------------|-----|
| ADHD<sup>c</sup>         | 913         | -    | .18    | .14                   | .16 |
| Anxiety/Mood disorder<sup>c</sup> | 1,372      | .09  | .03    | -                     | .09 |
| ASD<sup>c</sup>          | 719         | .20  | .04    | .18                   | -   |
| CD/ODD<sup>c</sup>       | 391         | .42  | -      | .09                   | .08 |

<sup>a</sup> ADHD: Attention-Deficit/Hyperactivity Disorder, ASD: Autism Spectrum Disorder, CD/ODD: Conduct/Oppositional Defiant Disorder

<sup>b</sup> The numbers in this column add up to more than 2,812 (sample size) due to comorbidity

<sup>c</sup> The proportion of adolescents within each DSM category (row), also diagnosed with any of the other disorders
Table S3 Goodness-of-fit statistics and correlated errors of the CFA and ESEM models for the SDQ adolescent and parent versions in the community sample

| Model               | $\chi^2$  | df  | p-value | RMSEA | RMSEA 90% CI | CFI  | TLI  | SEPC | $\Theta_1$ | $\Theta_2$ | $\Theta_3$ | $\Theta_4$ |
|---------------------|-----------|-----|---------|-------|--------------|------|------|------|------------|------------|------------|------------|
| **SDQ adolescent version** |           |     |         |       |              |      |      |      |            |            |            |            |
| CFA-5F              | 577.988   | 265 | <.001   | .046  | [.042 -.049] | .896 | .883 |      |            |            |            |            |
| CFA-6F              | 525.249   | 255 | <.001   | .034  | [.030 -.038] | .945 | .935 |      |            |            |            |            |
|                     | 493.887   | 254 | <.001   | .032  | [.028 -.036] | .951 | .942 | O1 = $\Theta_{25,15} = .488$ |            |            |            |
|                     | 484.004   | 253 | <.001   | .032  | [.027 -.036] | .953 | .944 | O2 = $\Theta_{24,16} = .327$ | .392 |            |            |
| Final               | 464.121   | 252 | <.001   | .030  | [.026 -.035] | .957 | .948 | O3 = $\Theta_{20,9} = .313$ | .391 | .277 |            |
| ESEM-5F             | 304.576   | 185 | <.001   | .027  | [.021 -.032] | .976 | .960 |      |            |            |            |            |
|                     | 272.212   | 184 | <.001   | .023  | [.017 -.028] | .982 | .971 | O1 = $\Theta_{10,2} = .930$ | .436 |            |            |
|                     | 259.109   | 183 | <.001   | .021  | [.015 -.027] | .984 | .975 | O2 = $\Theta_{19,14} = .364$ | .438 | .318 |            |
| Final               | 246.660   | 182 | <.01    | .020  | [.013 -.026] | .987 | .978 | O3 = $\Theta_{13,3} = .274$ | .440 | .317 | .253        |
| **SDQ parent version** |           |     |         |       |              |      |      |      |            |            |            |            |
| CFA-5F              | 576.368   | 265 | <.001   | .047  | [.042 -.053] | .926 | .916 |      |            |            |            |            |
| CFA-6F              | 542.354   | 264 | <.001   | .045  | [.039 -.050] | .934 | .925 | O1 = $\Theta_{10,2} = .784$ | .539 |            |            |
|                     | 529.366   | 263 | <.001   | .044  | [.038 -.049] | .937 | .928 | O2 = $\Theta_{13,8} = .721$ | .539 | .478 |            |
|                     | 518.685   | 262 | <.001   | .043  | [.038 -.049] | .939 | .930 | O3 = $\Theta_{22,18} = .542$ | .539 | .477 | .470        |
| Final               | 502.226   | 261 | <.001   | .042  | [.036 -.047] | .943 | .934 | O4 = $\Theta_{20,9} = .433$ | .539 | .477 | .470        |
| ESEM-5F             | 274.950   | 185 | <.001   | .030  | [.023 -.038] | .979 | .965 |      |            |            |            |            |
|                     | 250.658   | 184 | <.001   | .026  | [.017 -.034] | .984 | .974 | O1 = $\Theta_{25,15} = 1.733$ | .569 |            |            |
| Final               | 239.155   | 183 | .003    | .024  | [.014 -.032] | .987 | .978 | O2 = $\Theta_{24,16} = .658$ | .547 | .417 |            |

Notes. For the SDQ adolescent version: n = 917; for the SDQ parent version: n = 525.

$\chi^2$: chi square value; df: degrees of freedom; RMSEA: root mean square error of approximation; CFI: comparative fit index; TLI: Tucker-Lewis index; SEPC: standardized expected parameter change; $\Theta$: correlated residuals
## Table S4 Standardized parameter estimates of the final CFA and ESEM models with correlated errors for the SDQ adolescent version

| Item/ factor | CFA six-factor model | ESEM five-factor model |
|--------------|----------------------|-----------------------|
|              | ES  | CP  | HP  | SP  | PB  | PCM | ES  | CP  | HP  | SP  | PB  |
| 3            | .49 |     |     |     |     |     | .38 | .12 | .10 | .05 | .03 |
| 8            | .74 |     |     |     |     |     | .67 | .13 | .02 | .07 | .16 |
| 13           | .80 |     |     |     |     |     | .62 | .04 | .08 | .19 | .09 |
| 16           | .59 |     |     |     |     |     | .70 | -.07| -.02| .01 | -.10|
| 24           | .73 |     |     |     |     |     | .76 | .18 | .06 | .15 | -.06|
| 5            | .78 |     |     |     |     |     | .30 | .61 | .08 | .03 | .02 |
| 7            | .03 | .63 |     |     |     |     | -.01| .27 | .18 | -.23| -.31|
| 12           | .61 |     |     |     |     |     | -.19| .58 | .10 | .13 | -.06|
| 18           | .67 |     |     |     |     |     | -.17| .57 | .15 | .29 | .03 |
| 22           | .62 |     |     |     |     |     | .05 | .53 | .01 | .09 | -.09|
| 2            |     | .82 |     |     |     |     | -.02| .12 | .66 | -.02| .08 |
| 10           | .77 |     |     |     |     |     | .18 | .17 | .49 | -.05| .09 |
| 15           | .73 |     |     |     |     |     | -.04| -.14| .99 | .10 | .11 |
| 21           | .34 | .41 |     |     |     |     | .11 | .29 | .33 | -.24| -.19|
| 25           | .38 | .33 |     |     |     |     | .004| -.10| .65 | -.05| -.21|
| 6            |     | .64 |     |     |     |     | .21 | .05 | -.07| .54 | -.14|
| 11           | .39 | .30 | .12 | .03 | .31 | .25 |
| 14           | .58 | .36 | .13 | .22 | -.01| .31 | .27 |
| 19           | .74 |     |     |     |     |     | .15 | .21 | .06 | .48 | .09 |
| 23           | .55 |     |     |     |     |     | .08 | .04 | -.03| .56 | .01 |
| 1            |     | .78 |     |     |     |     | .21 | -.37| -.01| -.12| .51 |
| 4            |     | .45 |     |     |     |     | -.07| -.05| .08 | -.14| .42 |
| 9            |     | .55 |     |     |     |     | .06 | .23 | -.12| -.21| .72 |
| 17           |     | .64 |     |     |     |     | -.06| -.17| -.01| -.02| .50 |
| 20           |     | .48 |     |     |     |     | -.05| .05 | .01 | .12 | .68 |

**Factor correlations**

|       | ES  | CP  | HP  | SP  | PB  | PCM | ES  | CP  | HP  | SP  | PB  |
|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| ES    | 1.00| .34 | .38 | .60 | -.01| -.03| 1.00| .12 | .27 | .38 | .02 |
| CP    | 1.00| .53 | .50 | -.55| .44 | 1.00| .43 | .27 | -.33|     |
| HP    | 1.00| .17 | -.21| .36 | 1.00| .09 | .24 |
| SP    | 1.00| -.30| -.07|     | 1.00| -.33|     |
| PB    | 1.00| -.73|     |     |     |     |     |
| PCM   |     |     |     |     |     |     |     |     |     |     |

ESEM = exploratory structural equation modelling, CFA = confirmatory factor analysis, ES = emotional symptoms, CP = conduct problems, HP = hyperactivity/attention problems, SP = social problems, PB = prosocial behaviour, PCM = positive construal method. Per item, its loading on its intended factor is printed in bold.
Table S5 Standardized parameter estimates of the CFA and ESEM models with correlated errors for the SDQ parent version

| Item/ 
| factor | CFA five-factor model | ESEM five-factor model |
|--------|-----------------------|-----------------------|
|        | ES       | CP       | HP       | SP       | PB       | ES       | CP       | HP       | SP       | PB       |
| 3      | .34      |          |          |          |          | .49      | .05      | -.01     | -.21     | .01      |
| 8      | .76      | .91      | .01      | -.08     | .09      |          |          |          |          |          |
| 13     | .69      | .82      | -.16     | .02      | .09      |          |          |          |          |          |
| 16     | .80      | .50      | .13      | .05      | .19      |          |          |          |          |          |
| 24     | .80      | .45      | .21      | -.01     | .26      | .01      |          |          |          |          |
| 5      | .60      | .38      | .17      | .19      | -.10     | -.10     |          |          |          |          |
| 7      | .55      | .09      | .30      | .18      | -.20     | -.35     |          |          |          |          |
| 12     | .40      | .13      | .22      | .21      | .07      | .11      |          |          |          |          |
| 18     | .65      | .01      | .57      | .25      | -.05     | -.13     |          |          |          |          |
| 22     | .40      | -.09     | 1.06     | -.20     | .15      | .15      |          |          |          |          |
| 2      | .68      | -.18     | -.02     | .93      | .14      | .09      |          |          |          |          |
| 10     | .65      | -.07     | -.08     | .88      | .20      | .18      |          |          |          |          |
| 15     | .88      | .06      | .13      | .66      | .02      | .03      |          |          |          |          |
| 21     | .63      | .07      | .09      | .54      | -.23     | -.25     |          |          |          |          |
| 25     | .84      | .15      | .07      | .58      | -.11     | -.13     |          |          |          |          |
| 6      | .53      | .12      | .01      | -.13     | .47      | -.22     |          |          |          |          |
| 11     | .63      | .002     | -.02     | .10      | .59      | -.18     |          |          |          |          |
| 14     | .75      | .15      | .04      | .08      | .42      | -.34     |          |          |          |          |
| 19     | .80      | .28      | .11      | .24      | .51      | .09      |          |          |          |          |
| 23     | .66      | .08      | .06      | .01      | .65      | -.09     |          |          |          |          |
| 1      | .91      | -.01     | -.19     | -.15     | -.12     | .64      |          |          |          |          |
| 4      | .78      | -.09     | -.08     | .13      | -.22     | .67      |          |          |          |          |
| 9      | .68      | .09      | .09      | -.02     | -.13     | .80      |          |          |          |          |
| 17     | .62      | -.04     | .26      | .02      | -.22     | .64      |          |          |          |          |
| 20     | .53      | .15      | -.15     | .03      | .13      | .77      |          |          |          |          |

Factor correlations

|        | ES       | CP       | HP       | SP       | PB       | ES       | CP       | HP       | SP       | PB       |
|--------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| ES     | 1.00     | .57      | .42      | .71      | -.24     | 1.00     | .30      | .39      | .43      | -.17     |
| CP     | 1.00     | .74      | .49      | -.60     | .31      | 1.00     | .39      | .14      | -.20     |          |
| HP     | 1.00     | .39      | -.31     | 1.00     | .15      | .22      |          |          |          |          |
| SP     | 1.00     | -.59     | 1.00     | .23      |          |          |          |          |          |          |
| PB     | 1.00     |          |          |          |          |          |          |          |          |          |

ESEM = exploratory structural equation modelling, CFA = confirmatory factor analysis, ES = emotional symptoms, CP = conduct problems, HP = hyperactivity/attention problems, SP = social problems, PB = prosocial behaviour, PCM = positive construal method. Per item, its loading on its intended factor is printed in bold.
SDQ self-report version

Fig. S1 Using SDQ scales to distinguish between the community and clinical samples

Fig. S2 Using SDQ scales to distinguish between the community sample and clinical sample diagnosed with Anxiety/mood disorder

Fig. S3 Using SDQ scales to distinguish between the community sample and clinical sample diagnosed with CD/ODD

Fig. S4 Using SDQ scales to distinguish between the community sample and clinical sample diagnosed with ADHD

Fig. S5 Using SDQ scales to distinguish between the community sample and clinical sample diagnosed with ASD
SDQ parent-report version

**Fig. S6** Using SDQ scales to distinguish between the community and clinical samples

**Fig. S7** Using SDQ scales to distinguish between the community sample and clinical sample diagnosed with Anxiety/mood disorder

**Fig. S8** Using SDQ scales to distinguish between the community sample and clinical sample diagnosed with CD/ODD

**Fig. S9** Using SDQ scales to distinguish between the community sample and clinical sample diagnosed with ADHD

**Fig. S10** Using SDQ scales to distinguish between the community sample and clinical sample diagnosed with ASD
Per setting and gender, Table S6 provides mean scale scores and cronbach’s alpha coefficients. For the SDQ adolescent version, gender differences were found for the prosocial behaviour scale and the emotional, conduct and social difficulties scales in the community setting. In the clinical setting, gender differences were found for the same scales and additionally for the total difficulties scale. For the parent version, gender differences were found for the prosocial behaviour scale and the hyperactivity, social and total difficulties scales in the community setting. For the clinical setting, differences were found for all scales except the social difficulties scales. As SDQ scores differ across gender, it is not unlikely that gender differences also exist in the SDQ scales’ ability to distinguish between groups. The AUC values per SDQ version and gender are provided in Table S4. Graphical representations are provides as well (Figures S11 to S30). Considering AUC values ≥ .80 as indicating sufficient ability to distinguish between samples, the main gender difference is found for the SDQ adolescent version’s total difficulties scale. For females, this scale is sufficiently accurate at distinguishing between the community and clinical samples, for males it is not.
Table S6 Per SDQ version (adolescent, parent) and per setting (community, clinical): Mean scale scores, standard deviations and Cronbach’s Alpha for female and male adolescents

| SDQ adolescent version | Community setting | Clinical setting |
|------------------------|-------------------|-----------------|
|                        | Female<sup>a</sup> | Male<sup>b</sup> | Female<sup>a</sup> | Male<sup>b</sup> |
| SDQ scale              | α<sup>c</sup>   M (SD) | α<sup>c</sup>   M (SD) | α<sup>c</sup>   M (SD) | α<sup>c</sup>   M (SD) |
| Total                  | .78              8.1 (4.8) | .75              8.1 (4.7) | .77              15.6 (5.9) | .76              13.3 (5.7) |
| Emotional              | .71              2.6 (2.2) | .56              1.6 (1.6) | .73              5.5 (2.6) | .70              3.1 (2.4) |
| Conduct                | .45              1.1 (1.1) | .51              1.6 (1.5) | .57              2.4 (1.8) | .59              2.8 (1.9) |
| Hyper                  | .77              3.2 (2.3) | .71              3.5 (2.3) | .75              5.2 (2.6) | .76              5.3 (2.6) |
| Social                 | .53              1.2 (1.4) | .53              1.5 (1.6) | .52              2.4 (1.9) | .55              2.1 (1.8) |
| Prosocial              | .53              8.4 (1.4) | .59              7.5 (1.7) | .62              8.2 (1.7) | .64              7.5 (1.9) |

| SDQ parent version | Community setting | Clinical setting |
|-------------------|------------------|-----------------|
| SDQ scale         | Female<sup>a</sup> | Male<sup>b</sup> | Female<sup>a</sup> | Male<sup>b</sup> |
| Total             | .78              5.5 (4.6) | .81              7.4 (5.3) | .79              15.6 (6.5) | .79              16.2 (6.5) |
| Emotional         | .67              1.7 (1.9) | .68              1.6 (1.9) | .66              5.8 (2.6) | .67              4.2 (2.7) |
| Conduct           | .34              0.7 (1.0) | .55              0.9 (1.3) | .72              2.5 (2.2) | .74              3.1 (2.5) |
| Hyper             | .76              3.0 (2.5) | .78              1.9 (2.1) | .75              4.5 (2.7) | .74              5.9 (2.6) |
| Social            | .61              1.1 (1.6) | .65              1.9 (2.1) | .64              2.9 (2.2) | .68              3.0 (2.4) |
| Prosocial         | .72              8.6 (1.7) | .71              8.0 (1.9) | .75              7.6 (2.2) | .73              7.0 (2.2) |

SDQ: Strengths and Difficulties questionnaire; α: Cronbach’s index of internal consistency (alpha)
<sup>a</sup> Adolescent version community setting: N = 457 (female), N = 442 (male); clinical setting: N = 2,002 (female), N = 1,792 (male).
<sup>b</sup> Parent version community setting: N = 252 (female), N = 240 (male); clinical setting: N = 1,898 (female), N = 1,755 (male).
<sup>c</sup> For the SDQ adolescent version, t-tests for comparing means revealed gender differences for all scales with the exception of the SDQ total difficulties scale (community setting) and the hyperactivity scale (both settings).
<sup>d</sup> For the SDQ parent version, t-tests for comparing means revealed gender differences for all scales with the exception of the emotional and conduct difficulties scales (community setting) and the social problems scale (clinical setting), reported prosocial behaviour scale.
Table S7 Per SDQ version and gender, the SDQ scales’ abilities to distinguish between community and clinical (sub)samples

| SDQ scale | SDQ adolescent version | SDQ parent version |
|-----------|------------------------|--------------------|
|           | Female                 | Male               |
|           | Comm. N | Clin. N | AUC (SE) | Comm. N | Clin. N | AUC (SE) | Comm. N | Clin. N | AUC (SE) |
| Total     | 461     | 2002   | .84 (.01) | 450     | 1792    | .76 (.01) |
| Emotional | 461     | 934    | .87 (.01) | 450     | 385     | .84 (.01) |
| Conduct   | 461     | 101    | .90 (.02) | 450     | 256     | .81 (.02) |
| Hyper     | 461     | 284    | .89 (.01) | 450     | 583     | .83 (.01) |
| Social    | 461     | 231    | .79 (.02) | 450     | 429     | .71 (.02) |
| Prosocial | 461     | 231    | .62 (.02) | 450     | 429     | .54 (.02) |

SDQ: Strengths and Difficulties Questionnaire; Comm.: Community sample; Clin.: Clinical (sub)sample; AUC: Area Under the Curve

a Per SDQ scale, the clinical subsamples consisted of adolescent with a DSM-IV diagnosis content-wise matching the SDQ scale: Anxiety/Mood disorder for the SDQ emotional scale, Conduct/Oppositional Deviant Disorder for the SDQ conduct scale, Attention-Deficit/Hyperactivity Disorder for the SDQ hyperactivity scale and Autism Spectrum Disorder for the SDQ social problems and prosocial behaviour scales. For the SDQ total scale, the total clinical sample was used.

b For the SDQ adolescent version, row wise comparison of the ROC values revealed significant gender differences for all scales except the emotional difficulties scale.

c For the SDQ parent version, row wise comparison of the ROC values revealed significant gender differences for the total, emotional and social difficulties scales.
SDQ self-report version

Using SDQ scales to distinguish between the community and clinical samples

Using SDQ scales to distinguish between the community sample and clinical sample diagnosed with Anxiety/mood disorder

Using SDQ scales to distinguish between the community sample and clinical sample diagnosed with CD/ODD

Fig. S11 female adolescents

Fig. S13 female adolescents

Fig. S15 female adolescents

Fig. S12 male adolescents

Fig. S14 male adolescents

Fig. S16 male adolescents
Using SDQ scales to distinguish between the community sample and clinical sample diagnosed with ADHD

Using SDQ scales to distinguish between the community sample and clinical sample diagnosed with ASD

**Fig. S17** female adolescents

**Fig. S19** female adolescents

**Fig. S18** male adolescents

**Fig. S20** male adolescents
SDQ parent-report version

Using SDQ scales to distinguish between the community and clinical samples

Using SDQ scales to distinguish between the community sample and clinical sample diagnosed with Anxiety/mood disorder

Using SDQ scales to distinguish between the community sample and clinical sample diagnosed with CD/ODD

Fig. S21 female adolescents

Fig. S23 female adolescents

Fig. S25 female adolescents

Fig. S22 male adolescents

Fig. S24 male adolescents

Fig. S26 male adolescents
Using SDQ scales to distinguish between the community sample and clinical sample diagnosed with ADHD

Fig. S27 female adolescents

Using SDQ scales to distinguish between the community sample and clinical sample diagnosed with ASD

Fig. S29 female adolescents

Fig. S28 male adolescents

Fig. S30 male adolescents