

Supplementary Materials

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

Authors: Jorien Vugteveen, Annelies de Bildt, Meinou Theunissen, Menno Reijneveld, and Marieke Timmerman

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

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

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

^a incl. 9 adolescents who provided too few item scores to calculate at least one YSR scale score.

^b incl. 5 parents who provided too few item scores to calculate at least one CBCL scale score.

^c 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 ^a	N ^b	Comorbid with ...			
		ADHD	CD/ODD	Anxiety/mood disorder	ASD
ADHD ^c	913	-	.18	.14	.16
Anxiety/Mood disorder ^c	1,372	.09	.03	-	.09
ASD ^c	719	.20	.04	.18	-
CD/ODD ^c	391	.42	-	.09	.08

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

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

^c 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	χ^2	df	p-value	RMSEA	RMSEA 90% CI	CFI	TLI	SEPC	Θ_1	Θ_2	Θ_3	Θ_4
SDQ adolescent version												
CFA-5F	772.988	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	$\Theta_1 = \Theta_{25,15} = .488$	.392			
	484.004	253	<.001	.032	[.027 - .036]	.953	.944	$\Theta_2 = \Theta_{24,16} = .327$	.392	.277		
Final	464.121	252	<.001	.030	[.026 - .035]	.957	.948	$\Theta_3 = \Theta_{20,9} = .313$	.391	.277	.278	
ESEM-5F	304.576	185	<.001	.027	[.021 - .032]	.976	.960					
	272.212	184	<.001	.023	[.017 - .028]	.982	.971	$\Theta_1 = \Theta_{10,2} = .930$	.436			
	259.109	183	<.001	.021	[.015 - .027]	.984	.975	$\Theta_2 = \Theta_{19,14} = .364$	.438	.318		
Final	246.660	182	.001	.020	[.013 - .026]	.987	.978	$\Theta_3 = \Theta_{13,3} = .274$	.440	.317	.253	
SDQ parent version												
CFA-5F	576.368	265	<.001	.047	[.042 - .053]	.926	.916					
	542.354	264	<.001	.045	[.039 - .050]	.934	.925	$\Theta_1 = \Theta_{10,2} = .784$	.539			
	529.366	263	<.001	.044	[.038 - .049]	.937	.928	$\Theta_2 = \Theta_{13,8} = .721$	.539	.478		
	518.685	262	<.001	.043	[.038 - .049]	.939	.930	$\Theta_3 = \Theta_{22,18} = .542$	.539	.477	.470	
Final	502.226	261	<.001	.042	[.036 - .047]	.943	.934	$\Theta_4 = \Theta_{20,9} = .433$	.539	.477	.470	.359
ESEM-5F	274.950	185	<.001	.030	[.023 - .038]	.979	.965					
	250.658	184	<.001	.026	[.017 - .034]	.984	.974	$\Theta_1 = \Theta_{25,15} = 1.733$	.569			
Final	239.155	183	.003	.024	[.014 - .032]	.987	.978	$\Theta_2 = \Theta_{24,16} = .658$	.547	.417		

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

χ^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; Θ : 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	.01	.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					1.00	
PCM						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.

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	.12
13	.69					.82	-.16	.02	.09	.01
16	.80					.50	.13	.05	.19	.01
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		1.00	.39	.14	-.20
HP			1.00	.39	-.31			1.00	.15	-.22
SP				1.00	-.59				1.00	-.23
PB					1.00					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

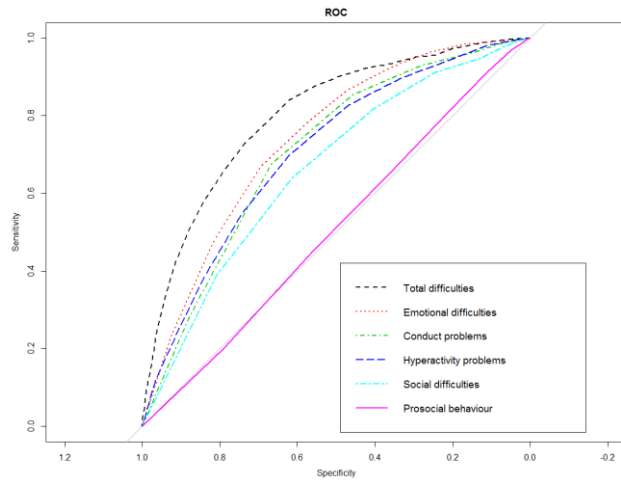


Fig. S1 Using SDQ scales to distinguish between the community and clinical samples

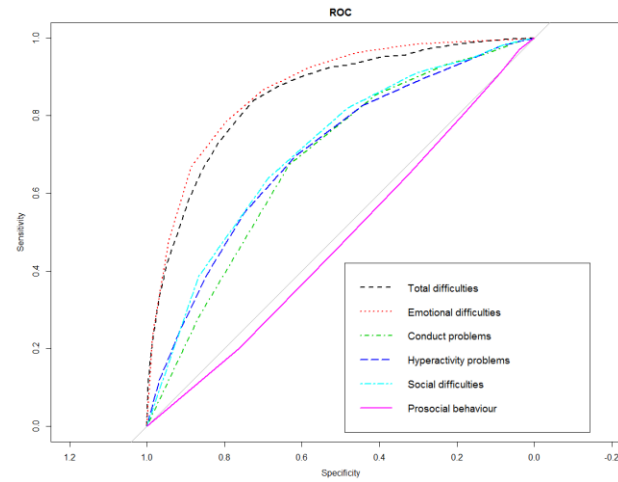


Fig. S2 Using SDQ scales to distinguish between the community sample and clinical sample diagnosed with Anxiety/mood disorder

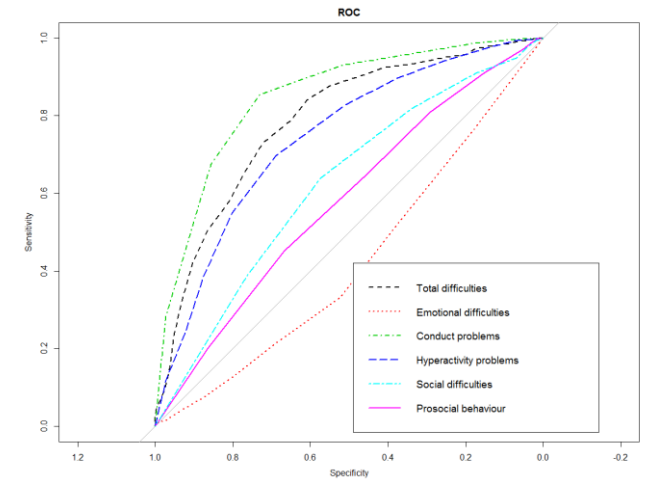


Fig. S3 Using SDQ scales to distinguish between the community sample and clinical sample diagnosed with CD/ODD

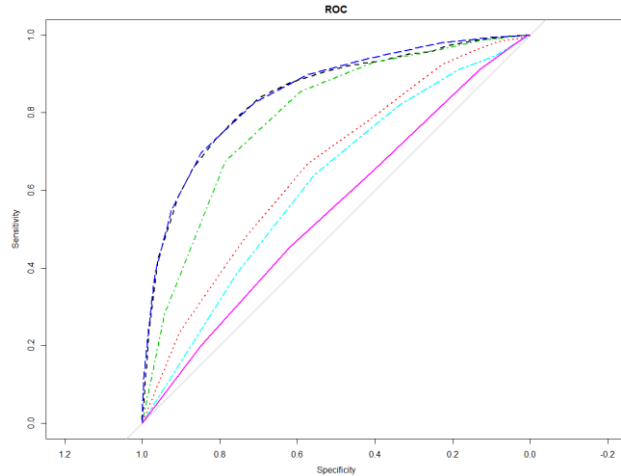


Fig. S4 Using SDQ scales to distinguish between the community sample and clinical sample diagnosed with ADHD

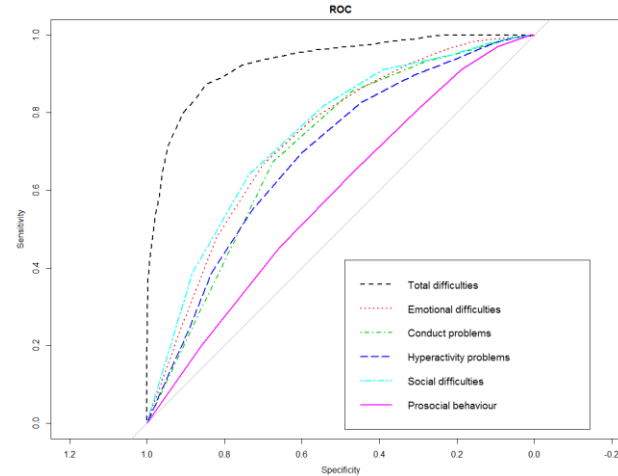


Fig. S5 Using SDQ scales to distinguish between the community sample and clinical sample diagnosed with ASD

SDQ parent-report version

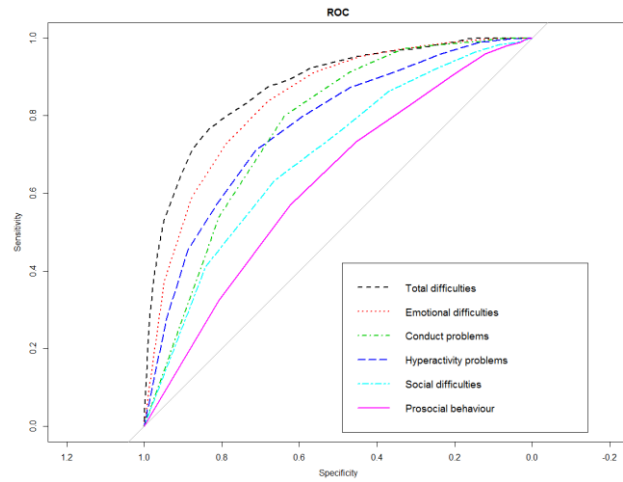


Fig. S6 Using SDQ scales to distinguish between the community and clinical samples

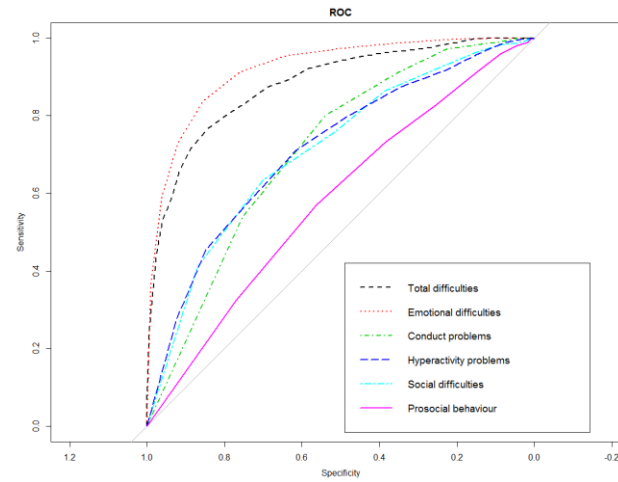


Fig. S7 Using SDQ scales to distinguish between the community sample and clinical sample diagnosed with Anxiety/mood disorder

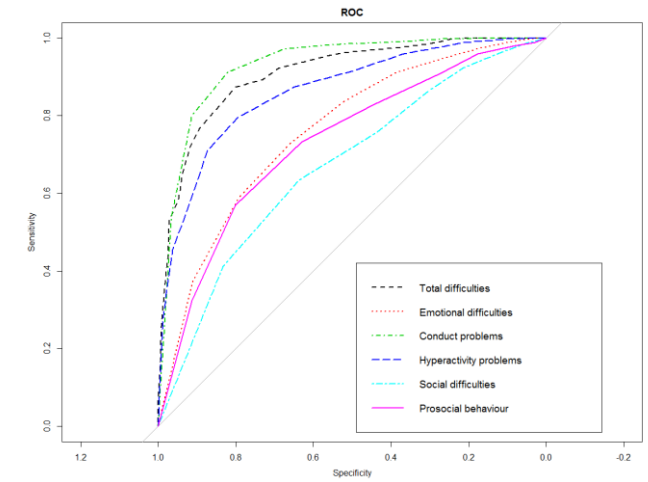


Fig. S8 Using SDQ scales to distinguish between the community sample and clinical sample diagnosed with CD/ODD

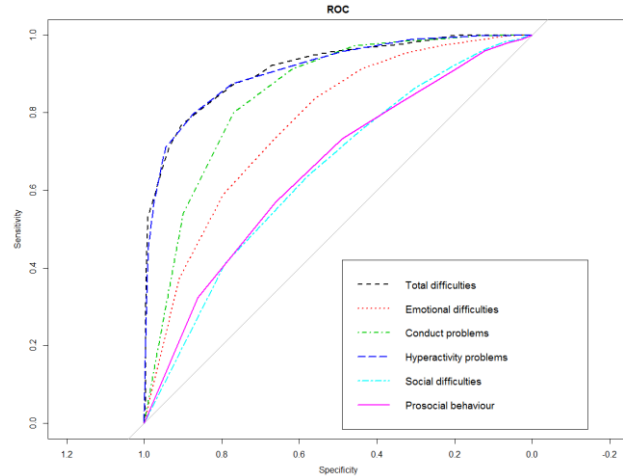


Fig. S9 Using SDQ scales to distinguish between the community sample and clinical sample diagnosed with ADHD

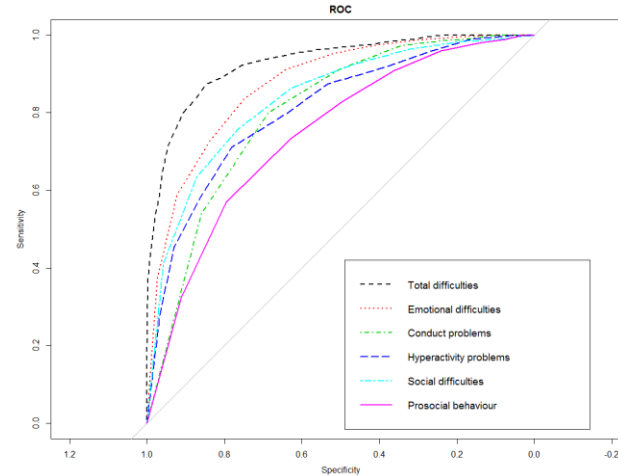


Fig. S10 Using SDQ scales to distinguish between the community sample and clinical sample diagnosed with ASD

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 $\geq .80$ 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

	Community setting				Clinical setting			
	Female ^a		Male ^b		Female ^a		Male ^b	
SDQ scale	α^c	<i>M (SD)</i>	α^c	<i>M (SD)</i>	α^c	<i>M (SD)</i>	α^c	<i>M (SD)</i>
SDQ adolescent version								
Total ^c	.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								
	Female ^a		Male ^b		Female ^a		Male ^b	
SDQ scale	α^c	<i>M (SD)</i>	α^c	<i>M (SD)</i>	α^c	<i>M (SD)</i>	α^c	<i>M (SD)</i>
Total ^d	.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)

^a Adolescent version community setting: *N* = 457 (female), *N* = 442 (male); clinical setting: *N* = 2,002 (female), *N* = 1,792 (male).

^b Parent version community setting: *N* = 252 (female), *N* = 240 (male); clinical setting: *N* = 1,898 (female), *N* = 1,755 (male).

^c 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).

^d 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					
	Female			Male		
	<i>Comm. N</i>	<i>Clin. N^a</i>	<i>AUC (SE)</i>	<i>Comm. N</i>	<i>Clin. N</i>	<i>AUC (SE)</i>
Total	461	2002	.84 (.01)	450	1792	.76 (.01) ^b
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 scale	SDQ parent version					
	Female			Male		
	<i>Comm. N</i>	<i>Clin. N^a</i>	<i>AUC (SE)</i>	<i>Comm. N</i>	<i>Clin. N</i>	<i>AUC (SE)</i>
Total	271	1898	.90 (.01)	251	1755	.85 (.01) ^c
Emotional	271	850	.93 (.01)	251	359	.89 (.01)
Conduct	271	103	.91 (.02)	251	237	.93 (.01)
Hyper	271	279	.92 (.01)	251	570	.89 (.01)
Social	271	233	.87 (.02)	251	431	.80 (.02)
Prosocial	271	233	.75 (.02)	251	431	.73 (.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

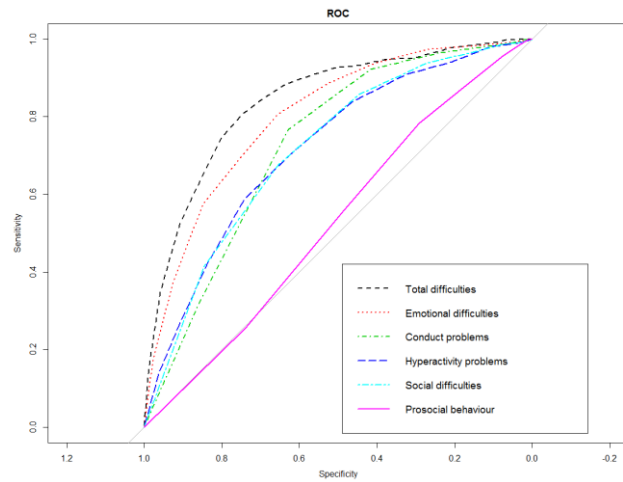


Fig. S11 female adolescents

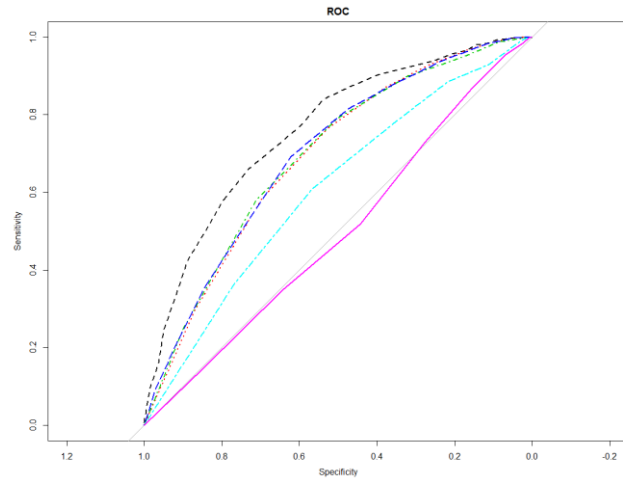


Fig. S12 male adolescents

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

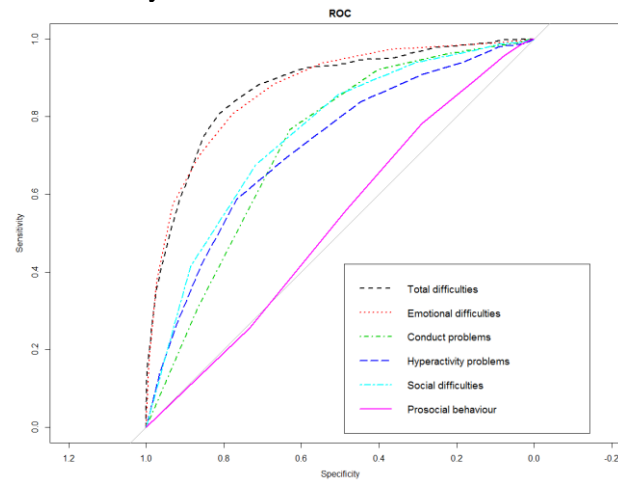


Fig. S13 female adolescents

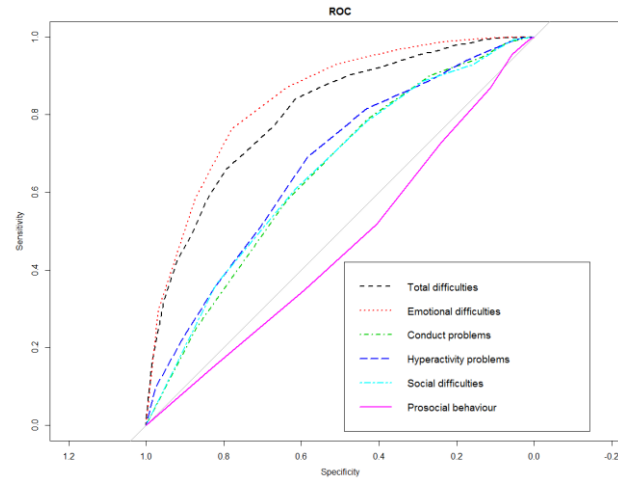


Fig. S14 male adolescents

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

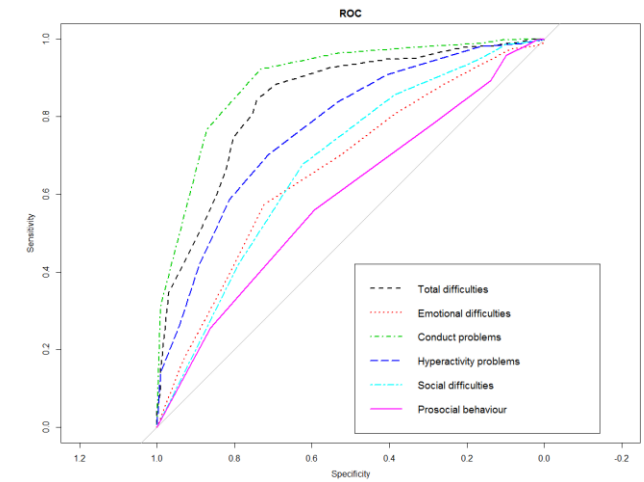


Fig. S15 female adolescents

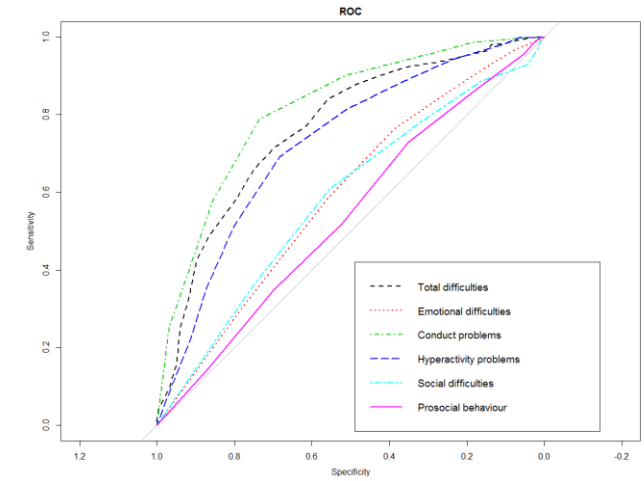


Fig. S16 male adolescents

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

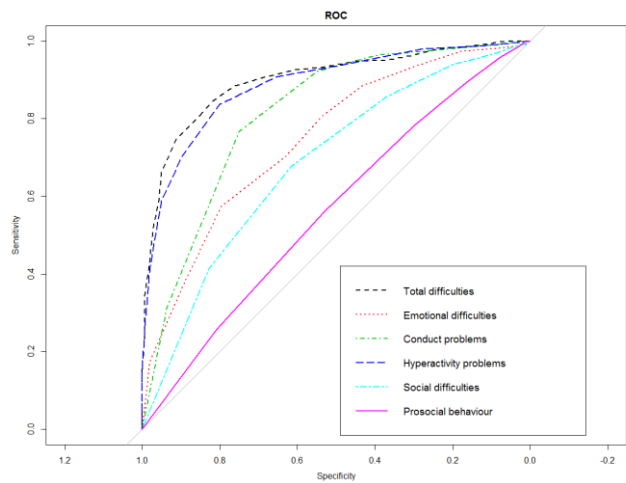


Fig. S17 female adolescents

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

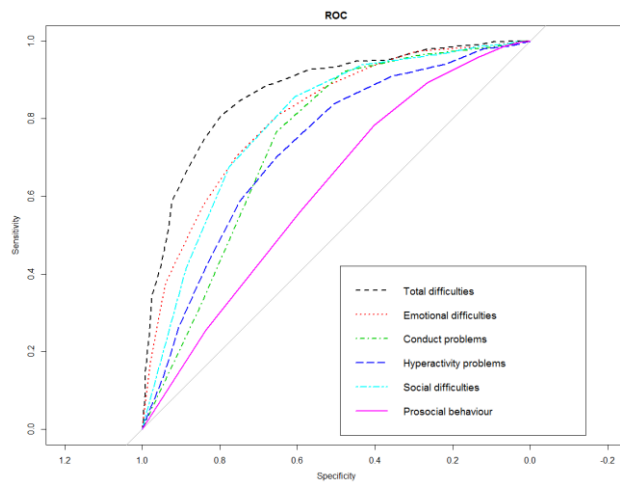


Fig. S19 female adolescents

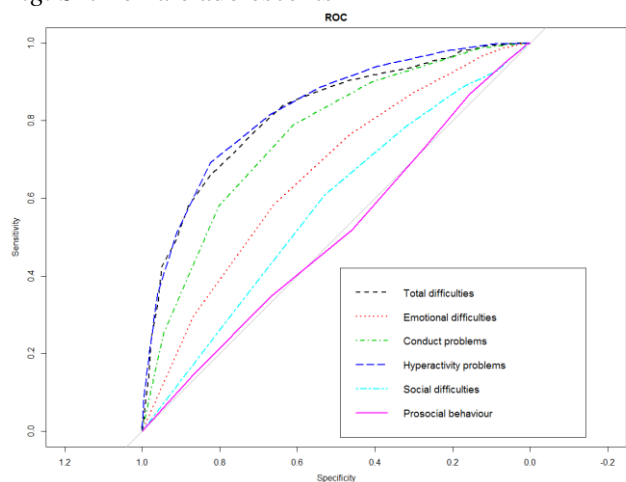


Fig. S18 male adolescents

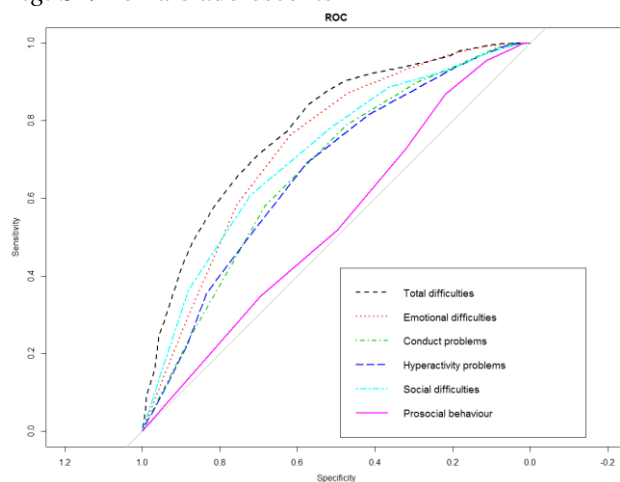
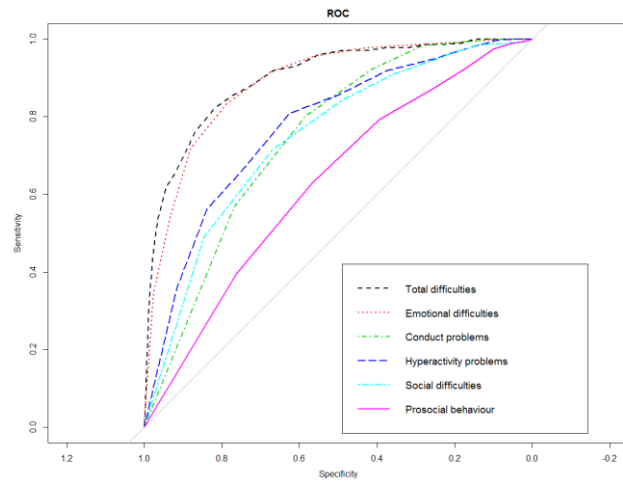


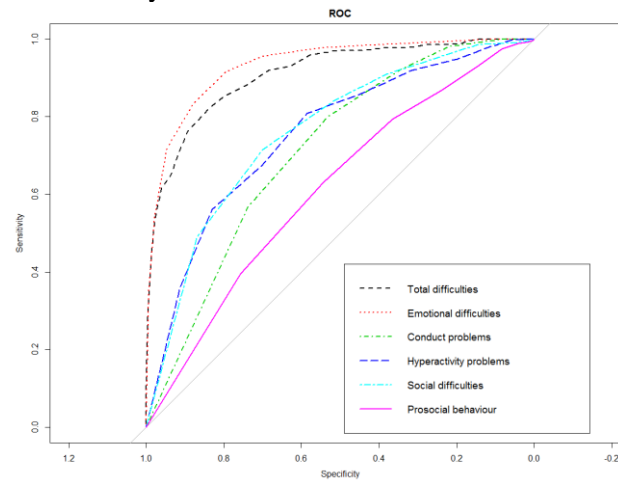
Fig. S20 male adolescents

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

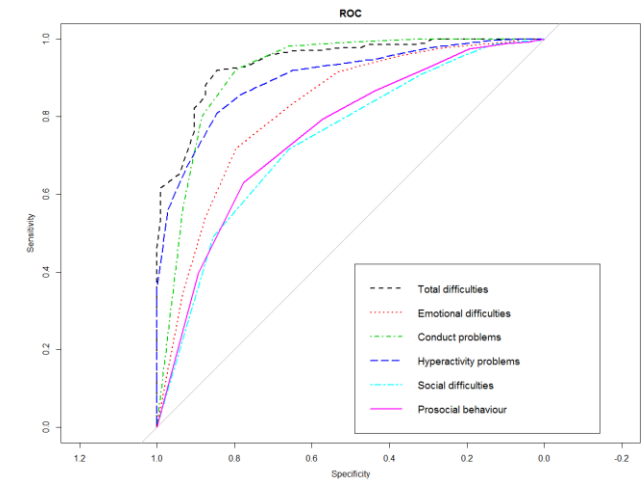


Fig. S21 female adolescents

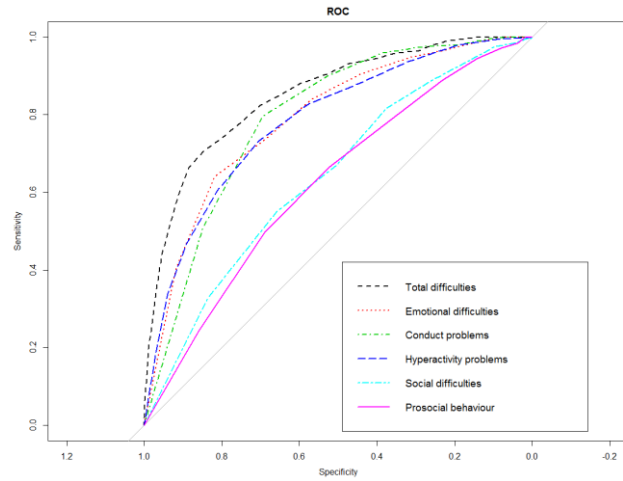


Fig. S23 female adolescents

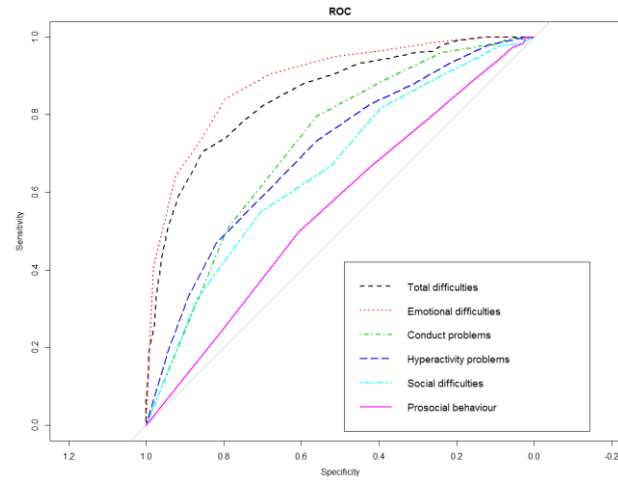


Fig. S25 female adolescents

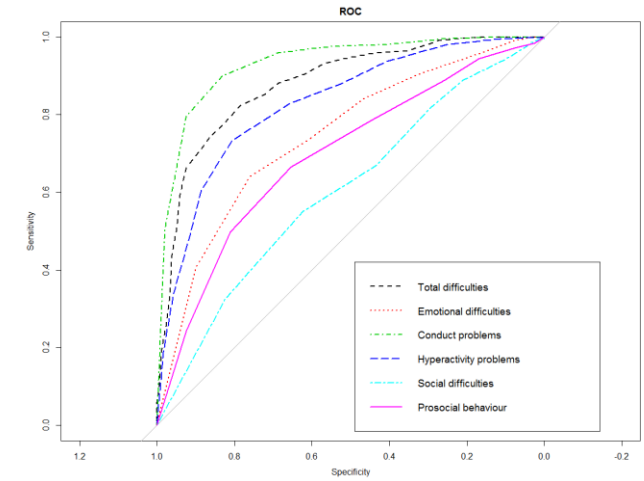


Fig. S22 male adolescents

Fig. S24 male adolescents

Fig. S26 male adolescents

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

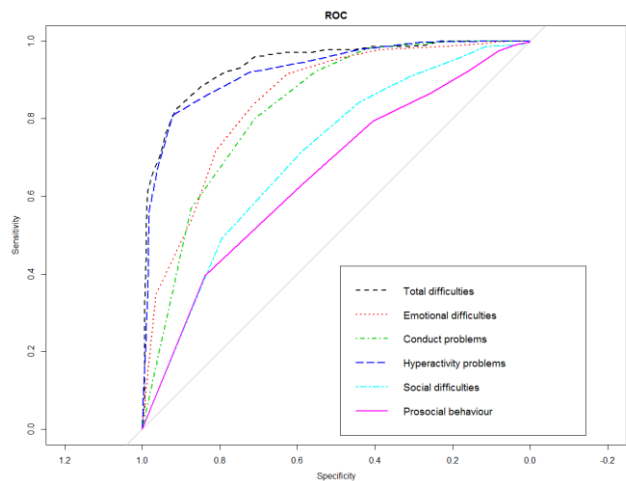


Fig. S27 female adolescents

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

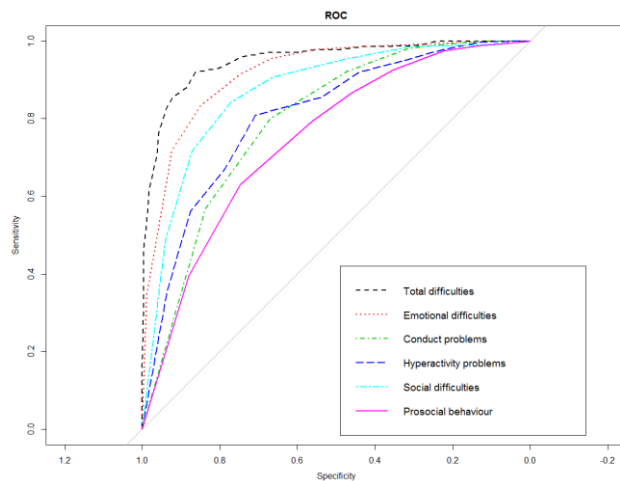


Fig. S29 female adolescents

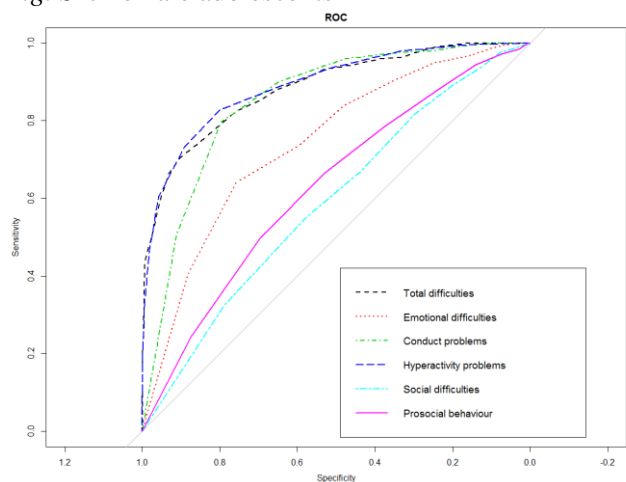


Fig. S28 male adolescents

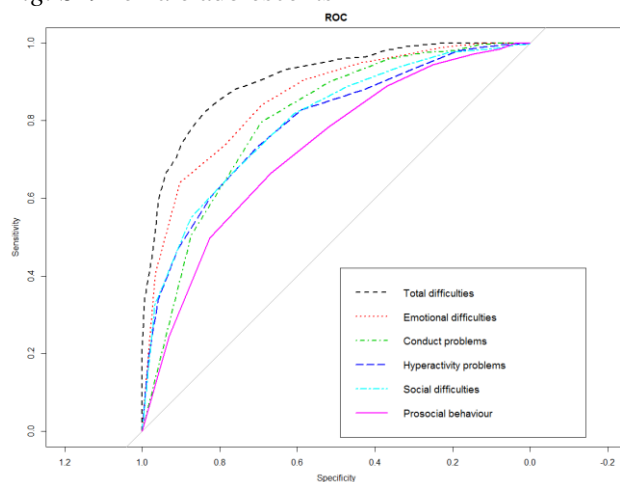


Fig. S30 male adolescents