Convergent and divergent validity of K-SADS-PL diagnoses in a clinical sample of children and adolescents with obsessive compulsive disorder

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Heilbrigðisvísindasvið Háskóla Íslands

Vor 2018

Prentun: Háskólaprent

Reykjavík, Ísland 2018

Abstract

The presence of comorbid conditions associated with paediatric obsessive-compulsive disorder (OCD) is reported to range from 50% to 80% and to have an impact on treatment outcome. Hence, the accurate identification of comorbid psychiatric disorders in children and adolescents with OCD is necessary in order to provide adequate treatment. Reliable and valid diagnostic interviews are important in the process of accurately identifying psychiatric problems. The objective of this study was to evaluate the convergent and divergent validity of anxiety, depression, attention deficit hyperactivity disorder (ADHD), and oppositional defiant disorder (ODD) diagnoses generated by the Schedule for Affective Disorders and Schizophrenia for School-Age Children - Present and Lifetime Version (K-SADS-PL) in a clinical sample of youth aged 7-17 years (N=269), all of whom are participating in the Nordic long-term OCD-treatment study (NordLOTS). In addition, the children and their parents reported anxiety symptoms using the Screen for Child Anxiety Related Disorders (SCARED), and depression symptoms with the Mood and Feelings Questionnaire (MFQ). Parents also reported symptoms of ODD and ADHD with the Child Behaviour Checklist (CBCL). Convergent and divergent validity of K-SADS-PL anxiety diagnosis was supported based on both SCARED self- and parent-reports. Similarly, we found support for convergent and divergent validity of ADHD and ODD diagnoses based on CBCL reports. For depressive disorder, we found support for convergent validity based on the MFQ self-report but not on the MFQ parent-report. Support was found for divergent validity based on both the MFQ self- and parent-reports. The K-SADS-PL generates valid diagnoses of comorbid anxiety disorders, depression disorders, ODD, and ADHD in children and adolescents with OCD.

Keywords: Convergent validity, divergent validity, K-SADS-PL, paediatric OCD, comorbidity.

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Psychiatric disorders among children and adolescents are common, with a lifetime prevalence between 40-50% (Costello, Mustillo, Erkanli, Keeler, & Angold, 2003; Merikangas et al., 2010). Collectively, these disorders are a major financial burden for the families and the society in which they live. In 2010, the estimated total cost of all child and adolescent psychiatric disorders in Europe was € 21.3 billion (Olesen, Gustavsson, Svensson, Wittchen, & Jönsson, 2012). In addition, childhood and adolescent psychopathology is the strongest predictor of adult psychopathology (Copeland, Shanahan, Costello, & Angold, 2009; Harrington, Fudge, Rutter, Pickles, & Hill, 1990; Pine, Cohen, Gurley, Brook, & Ma, 1998; Rutter, Kim-Cohen, & Maughan, 2006), leading to more expense.

Obsessive Compulsive Disorder (OCD) in children and adolescents has been associated with several psychiatric disorders such as tic disorder, anxiety disorders, depressive disorders, and disruptive disorders, with reported rates of co-morbidity ranging from 50-80% (Geller, Biederman, Griffin, Jones, & Lefkowitz, 1996; Ivarsson, Melin, & Wallin, 2008; Swedo, Rapoport, Leonard, Lenane, & Cheslow, 1989). Treatment follow-up studies on OCD indicate that, if treated, the majority of sufferers achieve the same quality of life as the general population, but not when comorbid disorders are present (Weidle, Ivarsson, Thomsen, Lydersen, & Jozefiak, 2015). Children and adolescents with OCD and higher levels of internalizing and externalizing comorbidity have been shown to have poorer treatment outcomes with cognitive behavioural therapy (Garcia et al., 2010; Piacentini, Bergman, Jacobs, McCracken, & Kretchman, 2002; Storch et al., 2008; Torp, Dahl, Skarphedinsson, Compton, et al., 2015) and with medication (Geller et al., 2003) than those with lower levels of comorbid symptoms. This makes accurate identification of comorbid psychiatric problems in children and adolescents with OCD crucial in the process of providing adequate treatment.

Reliable and valid diagnostic interviews are an important part in the process of correctly identifying psychiatric diagnoses, constituting the base for choosing appropriate treatment strategies. Structured methods, including diagnostic interviews such as the Schedule for Affective Disorders and Schizophrenia for School-Age Children - Present and Lifetime Version (K-SADS-PL) (Kaufman et al., 1997) and the Anxiety Disorders Interview schedule for the DSM-IV (ADIS) (Silverman & Albano, 1996) have been shown to be significantly better than unstructured methods when conducting a psychiatric diagnosis, and

provide more consistent diagnostic practices (Angold & Fisher, 1999; Miller, 2001; Miller, Dasher, Collins, Griffiths, & Brown, 2001).

The K-SADS-PL is a semi-structured psychiatric interview that evaluates current and lifetime diagnosis based on DSM-IV criteria in children and adolescents aged 6-18 years (Kaufman et al., 1997), and is widely used in research and clinical settings. The K-SADS-PL has shown good inter-rater reliability (Birmaher et al., 2009; Hodgins et al., 2007; Jeppesen et al., 2015; Kaufman et al., 1997; Kim et al., 2004; Larsson et al., 2009; Lauth, Magnusson, Ferrari, & Petursson, 2008), and construct validity has been tested with good results (Kaufman et al., 1997). Support has been found for both convergent and, to some extent, divergent validity for a depression diagnosis (Lauth et al., 2010). Villabø, Oerbeck, Skirbekk, Hansen, and Kristensen (2016) found support for both convergent and divergent validity for anxiety diagnoses and ADHD, although the interviews were performed with mothers only. Brasil and Bordin (2010) found evidence for the convergent validity of any diagnosis and any disruptive diagnosis, but not for any affective/anxiety diagnosis when comparing K-SADS-PL results with the Child Behaviour Checklist (CBCL). Birmaher et al. (2009) also found evidence of convergent validity when comparing K-SADS-PL results with the CBCL, as well as acceptable divergent validity for emotional disorders. Convergent validity is typically demonstrated when the relationship between independent assessment methods of the same diagnostic construct is strong, while divergent validity is demonstrated when the relationship between measures assessing conceptually separate diagnostic constructs is weak. Predictive validity ranging from good to excellent agreement with LEAD (longitudinal expert all data) diagnoses has been shown for anxiety, depressive, behavioural, and tic disorders, as well as ADHD (Jarbin, Andersson, Råstam, & Ivarsson, 2017). A DSM-5 version of K-SADS-PL has been released, but the psychometric properties of the interview have not been examined (Kaufman et al., 2016).

To the best of our knowledge, the utility of K-SADS-PL has not been examined before in a clinical sample of children and adolescents with OCD. Thus, this study provides new insights into the diagnostic procedures for children with OCD. With the high comorbidity rates of OCD and other psychiatric disorders in children and adolescents (Geller et al., 1996; Ivarsson et al., 2008; Swedo et al., 1989), it is important to have a diagnostic tool with strong psychometric properties that allows accurate identification of comorbid disorders in young people with OCD and contributes to choosing the adequate treatment strategy.

Aims

The aim of the present study is to investigate the utility of the K-SADS-PL for the assessment of children diagnosed with OCD, using data from the Nordic long-term OCD-treatment study (NordLOTS). The present study examines the convergent and divergent validity of four broad and common categories of psychiatric disorders: anxiety disorders, depressive disorders, attention deficit hyperactivity disorder (ADHD), and oppositional defiant disorder (ODD). (1) We expected that the presence of a K-SADS-PL diagnosis (e.g., anxiety) would predict symptom ratings on a corresponding scale (e.g., SCARED) (convergent validity), (2) but not symptoms on a non-corresponding scale (e.g., ADHD scale) (divergent validity).

Material and method

The present study is part of the NordLOTS, and thus the study design, participants, and procedures are described in more detail elsewhere (Thomsen et al., 2013; Torp, Dahl, Skarphedinsson, Thomsen, et al., 2015).

Participants

Patients were referred from community health care centres, general practitioners, or parents who contacted the clinics directly. A total of 767 children and adolescents were screened for participation, with 491 meeting the inclusion criteria for the assessment and 269 being included in step 1 of the study. All 269 participants were diagnosed with OCD according to the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition, Text Revision (DSM-IV-TR) (American Psychiatric Association, 2000). The exclusion criteria were the presence of psychiatric disorder(s) with a higher treatment priority, mental retardation or a pervasive developmental disorder. The participants were children 7-17 years of age (mean 12.8, SD 2.7) from Denmark, Norway, and Sweden. Gender was equally represented, with 138 females (51.3%). The sample was primarily of Scandinavian ethnicity (97%).

Procedures

The study was approved by the National Ethical Committees in Norway, Sweden, and Denmark and by the data authorities in all three countries. Oral and written information was given to all participants, and written consent from parents and children was obtained. All assessments used in the present study were conducted by certified independent evaluators (IEs) at baseline, before treatment started. All K-SADS-PL assessments were audiotaped.

Parents and children were generally interviewed on separate occasions, depending on the children's age and independence.

Measures

K-SADS-PL. All children were assessed using the K-SADS-PL, a semi-structured psychiatric interview that assesses a range of child and adolescent psychopathology (Kaufman et al., 1997). The K-SADS-PL is an interview that collects data from both parents and children. Each individual symptom is rated on a scale ranging from 0-3, where a score of 3 represents a clinical threshold that is required for a criterion to be met and symptoms can be classified as "*not present*", "*possible*", "*in remission*", or "*certain*". In the NordLOTS study (Torp, Dahl, Skarphedinsson, Thomsen, et al., 2015) and the present paper, all diagnoses were based on symptoms classified as "*certain*" only. The diagnoses in the present study include current diagnoses only, not lifetime ones. A total of 15 audiotapes were randomly selected from the Norwegian database that consisted of more than 100 participants, and they were blindly rescored for measures of inter-rater reliability. Cohen's kappa (Landis & Koch, 1977) was 1.00 for any anxiety disorder, any depressive disorder, and any tic disorder, respectively. There was perfect agreement for ADHD and ODD.

The Screen for Child Anxiety Related Disorders. SCARED is a 41-item rating scale with both parent (SCARED-P) and child (SCARED-C) report forms (Birmaher et al., 1999; Birmaher et al., 1997). The scale assesses symptoms associated with all the major child anxiety disorder diagnoses. Scores range from 0 to 82, with higher scores indicating greater impairment and severity. Internal consistency was excellent, with a Cronbach's alpha of 0.93 for the SCARED-P and 0.91 for the SCARED-C.

The Mood and Feelings Questionnaire. MFQ is a 13-item rating scale with both parent (MFQ-P) and child (MFQ-C) report forms, and it assesses the presence of depressive symptoms. Scores range from 0 to 26, with higher scores indicating greater impairment and severity (Angold, Costello, Messer, & Pickles, 1995). Internal consistency was good, with a Cronbach's alpha of 0.90 for the MFQ-P and 0.85 for the MFQ-C.

The Child Behaviour Checklist. CBCL is a 113-item parent report form designed to measure a wide range of child emotional and behavioural problems (Achenbach, 1994; Achenbach & Edelbrock, 1983), where parents rate items on a three-point scale (0 = *not true*; 1 = *somewhat true* or *sometimes true*; and 2 = *very* or *often true*). In the present paper, the CBCL/6-18 – DSM-oriented scales were used to assess ADHD problems and ODD problems.

Internal consistency was good for the CBCL-ADHD DSM scale with a Cronbach's alpha of 0.80, and was acceptable for the CBCL-ODD DSM scale with a Cronbach's alpha of 0.78.

Statistical Analyses

The Statistical Package for Social Sciences (SPSS) was used for data analysis, and means comparisons were analysed using student's t-tests. The convergent and divergent validity of K-SADS-PL anxiety disorders, depressive disorders, ADHD, and ODD were examined using hierarchical simple and multiple linear regressions. The diagnostic status was coded as dichotomous variables (present/absent), with a rating scale (e.g., MFQ-P/C) entered as the dependent variable. In step 1, the corresponding diagnostic category in question, depression, was entered as the independent variable, with a different category (e.g. anxiety) entered in step 2. Analyses were conducted separately for each rating scale. If the diagnostic category in step 1 significantly predicted the dependent variable, convergent validity was confirmed. If the first diagnostic category still predicted the dependent variable in step 2 and the second diagnostic category did not, divergent validity was confirmed.

Results

Sample characteristics

In total, 52 (19.3%) children and adolescents met the diagnostic criteria for any anxiety disorder, 10 (3.7%) met the diagnostic criteria for any depressive disorder, 21 (7.8%) met the diagnostic criteria for ADHD, and 10 (3.7%) met it for ODD. Parent-child agreement of depressive symptoms was moderate ($r = 0.50$, $p < .01$) on the MFQ-questionnaire, and also for anxiety symptoms on the SCARED-questionnaire ($r = 0.57$, $p < .01$).

Table 1

Mean comparisons of self- and parent reported symptoms of anxiety, depression, ADHD, and ODD

	All (*n*= 229 - 258 (205))		Any anxiety disorder (*n*= 48-50)		No anxiety disorder (n= 201-205)			ADHD (*n* = 20)		No ADHD (*n* = 209)		
	M	*(SD)*	*M*	*(SD)*	*M*	*(SD)*	*d*	*M*	*(SD)*	*M*	*(SD)*	*d*
SCARED-P	20.58	(13.36)	29.54	(13.55)	18.45	(12.46)	0.85	22.86	(14.48)	20.34	(13.28)	0.18
SCARED-C	21.85	(12.71)	28.66	(12.11)	20.01	(12.16)	0.71	20.75	(9.53)	21.82	(12.86)	-0.09
CBCL-ADHD	3.59	(3.15)	3.98	(3.61)	3.49	(3.04)	0.15	8.55	(2.82)	3.11	(2.75)	1.95
MFQ-P	6.59	(5.56)	7.72	(5.98)	6.34	(5.45)	0.24	8.10	(5.98)	6.47	(5.52)	0.28
MFQ-C	6.44	(4.95)	7.57	(4.98)	6.15	(4.90)	0.29	5.60	(4.28)	6.49	(4.99)	-0.19
CBCL-ODD	2.87	(2.35)	2.78	(2.51)	2.88	(2.32)	-0.04	4.80	(2.71)	2.69	(2.25)	0.85
			Any depression disorder (*n* = 10)		No depression disorder (*n* = 242 - 247)			ODD (*n* = 10)		No ODD (*n* = 235)		
			M	*(SD)*	*M*	*(SD)*	*d*	*M*	*(SD)*	*M*	*(SD)*	*d*
SCARED-P			29.40	(13.46)	20.19	(13.27)	0.69	22.22	(12.74)	20.57	(13.42)	0.13
SCARED-C			27.70	(13.32)	21.49	(12.55)	0.48	17.22	(10.08)	21.90	(12.68)	-0.41
CBCL-ADHD			4.25	(2.87)	3.56	(3.17)	0.23	7.30	(3.77)	3.42	(3.02)	1.14
MFQ-P			9.90	(6.26)	6.46	(5.51)	0.58	10.60	(6.17)	6.43	(5.49)	0.71
MFQ-C			10.00	(4.62)	6.28	(4.90)	0.78	4.30	(3.13)	6.51	(4.98)	-0.53
CBCL-ODD			4.75	(3.24)	2.80	(2.30)	0.69	6.70	(1.83)	2.70	(2.24)	1.96

Note. Means comparisons with a student's t-test. SCARED-P: Screen for Child Anxiety Related Disorders, 41-item version, parent report; SCARED-C: Screen for Child Anxiety Related Disorders, child version; MFQ-P: The Mood and Feelings Questionnaire, 13-item version, parent report; MFQ-C: The Mood and Feelings Questionnaire, child report; CBCL-ADHD: The Child Behaviour Checklist, CBCL/6-18 - DSM-Oriented Scales for Attention Deficit Hyperactivity Disorder, 7 items; CBCL-ODD: The Child Behaviour Checklist, CBCL/6-18 DSM-Oriented Scales for Oppositional Defiant Disorder, 5 items. ADHD, attention deficit hyperactivity disorder; ODD, oppositional defiant disorder. M, mean; (SD), standard deviation; d; Cohen's *d* (effect size).

Convergent and divergent validity of anxiety diagnosis

Children and adolescents who met the diagnostic criteria for any current anxiety diagnosis based on the K-SADS-PL had significantly higher self- and parent-reported anxiety symptoms on the SCARED-P/C compared with children without an anxiety diagnosis (self-report: $t = 4.50$, $p < .001$; parent report: $t = 5.46$, $p < .001$) (see Table 1). The effect sizes for mean differences were large for parent-report (ES = 0.85) and medium for self-report (ES = 0.71). The hierarchical regression models confirmed the convergent validity of an anxiety diagnosis, as the presence of an anxiety diagnosis significantly predicted self- and parent-reported rated symptoms of anxiety (see Table 2). Explained variance ranged from 0.08 (child report) to 0.11 (parent report).

Self- and parent-reported depression symptoms and parent-reported ADHD and ODD symptoms did not differ significantly between children with or without any anxiety diagnosis. In the hierarchical regression model that predicted symptoms of ADHD based on the CBCL-

ADHD, the presence of an anxiety diagnosis did not predict symptoms of ADHD, confirming the divergent validity of a K-SADS-PL anxiety diagnosis (see Table 3).

Table 2

Convergent validity of anxiety and divergent validity of ADHD, ODD, and depression diagnoses.

		SCARED-P			SCARED-C		
Model	Diagnostic category	B	SE	ΔR^2	B	SE	ΔR^2
1	Any anxiety diagnosis	11.09**	2.03	0.11**	8.65**	1.92	0.08**
2	Any anxiety diagnosis	11.09**	2.03	0.00	8.65**	1.92	0.00
	Any ADHD	2.50	2.89		-1.08	2.84	
		SCARED-P			SCARED-C		
		B	SE	ΔR^2	B	SE	ΔR^2
1	Any anxiety diagnosis	11.09**	2.03	0.11**	8.65**	1.92	0.08**
2	Any anxiety diagnosis	11.16**	2.04	0.00	8.83**	1.92	0.01
	ODD	-2.01	4.32		-5.91	4.13	
		SCARED-P			SCARED-C		
		B	SE	ΔR^2	B	SE	ΔR^2
1	Any anxiety	11.09**	2.03	0.11**	8.65**	1.92	0.08**
2	Any anxiety	10.63**	2.05	0.01	8.38**	1.94	0.00
	Any depression diagnosis	5.78	4.13		3.59	3.97	

Note. Hierarchical simple and multiple linear regressions. SCARED-P: Screen for Child Anxiety Related Disorders, 41-item version, parent report; SCARED-C: Screen for Child Anxiety Related Disorders, child version. ADHD, attention deficit hyperactivity disorder; ODD, oppositional defiant disorder. B, unstandardized coefficients B; SE, Standard error; ΔR^2, R square change.
** $p<.01$
* $p<.05$

Convergent and divergent validity of ADHD diagnosis

Children and adolescents who met the diagnostic criteria for ADHD based on the K-SADS-PL had significantly higher parent-reported ADHD symptoms on the CBCL-ADHD compared with those who did not meet the criteria ($t = 8.43$, $p < .001$), with a large effect size (ES = 1.95) (see Table 1). Hierarchical regressions confirmed the convergent validity of an ADHD diagnosis (see Table 3), as an ADHD diagnosis significantly predicted parent-reported ADHD symptoms. Explained variance was 0.24.

Self- and parent-reported anxiety and depression symptoms did not differ significantly between children and adolescents with or without an ADHD diagnosis, supporting convergent validity. However, children with an ADHD diagnosis had significantly higher parent-reported ODD symptoms compared with those without ADHD ($t = 3.95$, $p < .001$), with a large effect size (ES = 0.85) (see Table 1). Hierarchical regression models lent further

support to the divergent validity of a K-SADS-PL ADHD diagnosis, as the presence of ADHD did not predict symptoms of anxiety on the SCARED-P/C (see Table 2).

Convergent and divergent validity of ODD diagnosis

Individuals who met the diagnostic criteria for K-SADS-PL ODD diagnosis had significantly higher parent-reported ODD symptoms on the CBCL-ODD compared with those without ODD ($t = 5.57$, $p < .001$), with a large effect size (ES = 1.96) (see Table 1). Hierarchical regression models confirmed the convergent validity of ODD, as the presence of ODD significantly predicted parent-reported ODD symptoms (see Table 3). Explained variance was 0.11.

Parent- and self-reported anxiety symptoms, and self-reported depression symptoms, did not differ significantly between individuals diagnosed with ODD compared with those without ODD, supporting divergent validity of an ODD diagnosis. Parent-reported depression symptoms were, however, significantly higher for children and adolescents with ODD compared with those without ODD ($t = 2.34$, $p < .05$), with a medium effect size (ES = 0.71), as well as parent-reported ADHD symptoms ($t = 3.93$, $p < .001$) with a large effect size (ES = 1.14) (see Table 1). In the hierarchical regression model predicting symptoms of parent-reported ADHD symptoms, the presence of ODD significantly predicted symptoms of ADHD (see Table 3). In the model predicting self- and parent-reported anxiety symptoms, the presence of ODD did not predict any symptoms of anxiety (see Table 2), thus supporting the divergent validity of a K-SADS-PL ODD diagnosis.

Table 3

Convergent validity of ADHD and ODD and divergent validity of anxiety and ODD diagnoses.

		CBCL-ADHD		
Model	Diagnostic category	B	SE	ΔR^2
1	Any ADHD	5,44**	0,65	0,24**
2	Any ADHD	5,44**	0,65	0,00
	Any anxiety diagnosis	0,46	0,46	
		CBCL-ADHD		
		B	SE	ΔR^2
1	Any ADHD	5.44**	0.65	0.24**
2	Any ADHD	5.06**	0.66	0.02*
	ODD	2.23*	0.91	
		CBCL-ODD		
		B	SE	ΔR^2
1	ODD	4.00**	0.72	0.11**
2	ODD	4.02**	0.72	0.00
	Any anxiety disorder	-0.22	0.37	

Note. Hierarchical simple and multiple linear regressions. CBCL-ADHD: The Child Behaviour Checklist, CBCL/6-18 - DSM-Oriented Scales for Attention Deficit Hyperactivity Disorder, 7 items; CBCL-ODD: The Child Behaviour Checklist, CBCL/6-18 DSM-Oriented Scales for Oppositional Defiant Disorder, 5 items. ADHD, attention deficit hyperactivity disorder; ODD, oppositional defiant disorder. B, unstandardized coefficients B; SE, Standard error; ΔR2, R square change.
** $p<.01$
* $p<.05$

Convergent and divergent validity of depression diagnosis

Children and adolescents who met the diagnostic criteria for any current depression disorder based on the K-SADS-PL had significantly higher self-reported depressive symptoms compared with those without a depression disorder ($t = 2.36$, $p < .05$), with a medium effect size (ES = 0.78) (see Table 1), thus supporting convergent validity. However, parent-reported depression symptoms did not differ significantly between participants diagnosed with a depression disorder and those with no depression disorder ($t = 1.92$, $p = .056$), with a medium effect size (ES = 0.58). The convergent validity of any current depression disorder was partly confirmed using hierarchical regressions (see Table 4), as the presence of a depressive disorder significantly predicted self-reported depression symptoms on the MFQ-C, but this was not found for parent reports on the MFQ-P. Explained variance was 0.02 for both parent report and child report.

Parent-reported ADHD symptoms and self-reported anxiety symptoms did not differ significantly between children and adolescents with a depressive disorder and those with no depressive disorder, supporting divergent validity. Those with depression did, however, have significantly higher parent-reported ODD symptoms ($t = 2.32$, $p < .05$), with a small effect size (ES = 0.69), and parent-reported anxiety symptoms ($t = 2.15$, $p < .05$), with a small effect

size (ES = 0.69). In the hierarchical regression model predicting self- and parent-reported anxiety symptoms, the presence of a depression diagnosis did not predict any symptoms of anxiety (see Table 2), thus supporting the divergent validity of a K-SADS-PL depression diagnosis.

Table 4

Convergent validity of depression and divergent validity of an ADHD diagnosis.

		MFQ-P			MFQ-C		
Model	Diagnostic category	B	SE	ΔR^2	B	SE	ΔR^2
1	Any depression diagnosis	3.44	1.79	0.02	3.73*	1.58	0.02*
2	Any depression diagnosis	3.59	1.79	0.01	3.67*	1.58	0.00
	Any ADHD	1.79	1.29		-0.74	1.14	

Note. Hierarchical simple and multiple linear regressions. MFQ-P: The Mood and Feelings Questionnaire, 13-item version, parent report; MFQ-C: The Mood and Feelings Questionnaire, child report. B, unstandardized coefficients B; SE, Standard error; ΔR2, R square change.
** $p<.01$
* $p<.05$

Discussion

This study was conducted to evaluate the utility of using K-SADS-PL for accurately diagnosing comorbid disorders in children and adolescents diagnosed with OCD. The results of the present study replicate and extend previous studies suggesting that the K-SADS-PL interview provides valid diagnosis of the broader diagnostic categories of anxiety disorder, depressive disorder, ADHD, and ODD. The findings support the convergent and divergent validity of a K-SADS-PL anxiety diagnosis when compared with the SCARED-P/C. Similarly, support was found for the convergent and divergent validity of K-SADS-PL generated ADHD and ODD diagnoses when compared with CBCL-ADHD and CBCL-ODD parent reports. For K-SADS-PL depressive disorder, support was found for convergent validity when compared with MFQ self-reports but not for MFQ parent-reports. However, support was found for divergent validity based on both self- and parent-report.

Similar to findings reported in previous studies (Kim et al., 2004; Villabø et al., 2016), but contrary to the findings of Brasil and Bordin (2010), support was found for the convergent validity of a K-SADS-PL generated ADHD diagnosis. The young participants who met the K-SADS-PL criteria for ADHD had significantly higher parent-reported ADHD symptoms on CBCL-ADHD compared with those without ADHD, and the presence of an ADHD diagnosis also predicted parent-rated symptoms of ADHD. Although the present

results yielded support for the convergent validity of a K-SADS-PL ADHD diagnosis, the explained variance of such a diagnosis found in Villabø et al. (2016) was larger, ranging from 0.36 (teacher report) to 0.56 (mother report). The CBCL-ADHD scale has only seven items related to ADHD symptoms based on the DSM, whereas the scale used by Villabø and colleagues, known as the Disruptive Behaviour Rating Scale, is more extensive and has 18 items related to ADHD symptoms based on the DSM, which may explain this difference.

Support was found for the divergent validity of a K-SADS-PL ADHD diagnosis, as the presence of ADHD did not predict any symptoms of anxiety on the SCARED-P/C. There were no significant differences in self- and parent-reported symptoms of anxiety and depression between participants with and without ADHD on the SCARED-P/C or the MFQ-P/C. However, those with ADHD had significantly higher parent-reported ODD symptoms on the CBCL-ODD compared with those without ADHD.

In line with comparable studies, albeit with a different clinical sample in respect to age and ethnicity (Birmaher et al., 2009; Brasil & Bordin, 2010), convergent validity of a K-SADS-PL ODD diagnosis was confirmed using the CBCL-ODD. Individuals with ODD had significantly higher parent-reported ODD symptoms compared with those without the diagnosis, and the presence of an ODD diagnosis significantly predicted symptom ratings of ODD.

Children and adolescents diagnosed with ODD had significantly higher ADHD symptom scores on the CBCL-ADHD as well, compared with those without an ODD diagnosis. The presence of ODD significantly predicted symptoms of ADHD on the CBCL-ADHD scale, not supporting the divergent validity of a K-SADS-PL ODD diagnosis. Previous studies show that there is substantial comorbidity between the disorders, with 33-50% of children and adolescents with one disorder meeting the criteria for the other (Nock, Kazdin, Hiripi, & Kessler, 2007; Waschbusch, 2002). In the present study, the comorbidity between ADHD and ODD was only 19.05%. An explanation may be the overlap in clinical presentation between patients with ADHD and patients with ODD (Ghosh & Sinha, 2012), where individuals may have symptoms of both diagnoses but only meet the diagnostic criteria for one of them. Interestingly, those with ODD also had significantly higher parent-reported depressive symptoms compared with those without ODD. Previous studies show substantial comorbidity between depressive disorders and ODD in children and adolescents (Boylan, Vaillancourt, Boyle, & Szatmari, 2007; Burke & Loeber, 2010), which may account for the associations found in the present study. However, the comorbidity between depression and ODD was only 20% in the present study. Self- and parent-reported anxiety symptoms did not,

however, differ between young participants with or without ODD, and the presence of ODD did not predict any symptoms of anxiety, thus, supporting the divergent validity of the K-SADS-PL ODD diagnosis.

Similar to previous findings (e.g. Villabø et al., 2016), convergent validity for a K-SADS-PL anxiety diagnosis was confirmed. Children and adolescents with an anxiety diagnosis had significantly higher self- and parent-reported anxiety symptoms on the SCARED-C/P compared with those without an anxiety diagnosis. The presence of an anxiety diagnosis also significantly predicted self- and parent-reported anxiety symptoms of anxiety. The findings of Brasil and Bordin (2010) did not support the convergent validity of a K-SADS-PL anxiety disorder using the CBCL-scale. As mentioned in Villabø et al. (2016), this discrepancy may be explained by the use of different rating scales in the studies, whereas scales such as the SCARED or the Multidimensional Anxiety Scale for Children are specifically designed to measure anxiety symptoms, as opposed to the CBCL-scale that combines multiple symptom areas.

Contrary to Villabø et al. (2016), no association was found between the presence of an anxiety diagnosis and symptom ratings of ADHD in the model predicting ADHD symptoms, thus confirming the divergent validity of a K-SADS-PL anxiety diagnosis. In addition, self- and parent-reported depression symptoms and parent-reported ADHD and ODD symptoms did not differ between the participants who had or did not have an anxiety disorder. Previous studies have reported as many as one third of children with ADHD having comorbid anxiety disorders (Biederman, Newcorn, & Sprich, 1991). One possible explanation of why our sample did not reveal the same association may be due to the nature of the sample, with only 19.05% of the individuals diagnosed with both ADHD and an anxiety disorder, in addition to OCD, whereas in Villabø et al. (2016) the comorbid anxiety and ADHD was 39.06%.

Convergent validity for a K-SADS-PL depression diagnosis was supported, as children and adolescents with depression had significantly higher levels of self-reported depressive symptoms on the MFQ-C compared with those without depression. Also, the presence of a depression diagnosis significantly predicted self-reported depression symptom ratings. However, no such association was found using parent reports of depressive symptoms. There was no significant difference in depressive symptoms on the MFQ-P between individuals with or without depression, nor did the presence of depression significantly predict parent-reported depression symptoms. An important aspect is that parents are often considered as poorer informants than the children and adolescents themselves for symptoms of depression and other internalizing disorders (Achenbach,

McConaughy, & Howell, 1987; Grills & Ollendick, 2002; Jensen et al., 1999) and the self-reports may therefore better explain reported symptoms of depression compared to the parent-reports.

One possible explanation may be that individuals with OCD often suffer from comorbid depression at some time during the course of their illness (Andrews, Slade, & Issakidis, 2002; Pigott, L'Heureux, Dubbert, Bernstein, & Murphy, 1994), and many of the youth in this study may have had subsyndromal symptoms of depression or experience sadness due to OCD, without meeting the diagnostic criteria in the K-SADS-PL. Another possible explanation may be that the K-SADS-PL is not suitable for detecting a depressive disorder in this sample due to the extensive focus on OCD, and hence there is no connection between the K-SADS-PL and the MFQ-P.

Unlike Lauth et al. (2010), support was found for the divergent validity of a K-SADS-PL depression diagnosis, as the presence of a depression did not predict self- nor parent-reported anxiety symptoms on the SCARED-C/P. No association was found between a depression diagnosis and parent-reported ADHD symptoms as well as self-reported anxiety symptoms. However, young participants with depression had significantly higher parent-reported ODD and anxiety symptoms. Irritability is a core diagnostic criteria in both ODD and depression disorder although with a different presentation. It may have been difficult for the parents to differentiate between irritability as a part of a depression disorder and irritability as a part of ODD, which might account for the association found between the disorders in the present study. Another aspect is the newcomer in psychiatric nosology, Disruptive mood dysregulation disorder (DMDD), which criteria are also irritability as well as severe temper outbursts. This disorder is included in the newest version of the K-SADS-PL DSM-5, but not the one used in the present study. In line with Lauth et al. (2010), the difficulty of finding better support for the divergent validity of a depressive disorder may also be due to the comorbid nature of the sample, with all participants having an additional OCD diagnosis.

To the best of our knowledge, the utility of the K-SADS-PL for assessment in a clinical sample of children and adolescents with OCD has not previously been examined. Thus, this study provides new insight into the diagnostic procedures in children with OCD, and adds to previous literature on the convergent and divergent validity of the K-SADS-PL. With the co-morbidity rates of OCD and other psychiatric disorders in children and adolescents ranging between 50-80% (Geller et al., 1996; Ivarsson et al., 2008; Swedo et al., 1989), it is crucial to have a diagnostic tool with strong psychometric properties that allows

accurate identification of primary and comorbid disorders, and that contributes to choosing an adequate treatment strategy for children and adolescents.

Limitations

All participants were diagnosed with OCD as their primary diagnosis, limiting the generalizability of the results to other paediatric populations. Another limitation of this study is the assessing of inter-rater reliability using audiotaped K-SADS-PL interviews, as this makes it more difficult for the second evaluator to make an individual assessment when scoring is based on sound recordings only, as opposed to video or in person. Comorbid diagnoses were limited in this sample of children and adolescents with OCD and therefore only broad diagnostic categories of anxiety disorder, depressive disorder, ADHD, and ODD were examined. Further studies should examine the validity of these diagnoses more specifically.

Conclusion

The present study provides additional insight into the convergent and divergent validity of the K-SADS-PL, providing support for the utility of this diagnostic instrument in the assessment of children and adolescents with OCD.

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