Convergent and divergent validity of K-SADS-PL anxiety and attention-deficit/hyperactivity disorder diagnoses in a clinical sample of school-aged children

RUNNING HEAD: VALIDITY OF K-SADS-PL

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Abstract

Background: The Schedule for Affective Disorders and Schizophrenia for School Age Children, Present and Lifetime Version (K-SADS-PL) is a commonly used diagnostic interview both in research and clinical settings, yet published data on the psychometric properties of the interview generated diagnoses are scarce. **Aims:** To examine the convergent and divergent validity of the Norwegian version of the K-SADS-PL current diagnoses of anxiety disorders and attention-deficit/hyperactivity disorder (ADHD). **Method**: Participants were 105 children aged 7-13 years referred for treatment at child mental health clinics and 36 controls. Diagnostic status was determined based on K-SADS-PL interviews with mother. Child and mother reported child symptoms of anxiety on the Multidimensional Anxiety Scale for Children and teachers reported anxiety symptoms on the Teacher Report Form. Mother and teacher reported on symptoms of ADHD on the Disruptive Behavior Rating Scale. **Results**: Rating scale data from multiple informants in a clinical sample and healthy controls supported the convergent and divergent validity of K-SADS-PL anxiety diagnoses combined, and, specifically, the diagnoses of separation anxiety disorder, social phobia, and specific phobia. Support was also observed for convergent and divergent validity of ADHD diagnoses, including the predominately inattentive subtype. **Conclusion**: The K-SADS-PL generates valid diagnoses of anxiety disorders and ADHD.

Key words: assessment, convergent validity, divergent validity, K-SADS, anxiety, ADHD

Background

Anxiety disorders and attention-deficit/hyperactivity disorder (ADHD) represent two of the most prevalent disorders in childhood and adolescence causing significant distress and impairment in daily functioning (1, 2). Both anxiety disorders and ADHD are associated with high comorbidity with other psychiatric disorders (3, 4). Additionally, comorbidity between the two conditions is also frequent with prevalence rates of 25-30% (5). Despite high prevalence rates and impairment associated with anxiety disorders and ADHD, many children do not receive adequate treatment for their disorders (6, 7). Accurate identification of psychiatric problems in children is an essential step to provide children and their families with the most empirically supported treatment available. Unlike rating scales, diagnostic interviews can provide sufficient information to determine diagnostic status. While symptom scales are typically brief and easy to administer, they do not produce sufficient information for the clinician to make diagnostic decisions. Diagnostic interviews provide detailed information, and questions can be clarified throughout the interview. Having diagnostic tools with strong psychometric properties is crucial. Yet, for the most commonly used diagnostic interviews, data on reliability and validity are often scarce.

The Schedule for Affective Disorders and Schizophrenia for school-age children (K-SADS-PL; 8) is a widely used semi-structured diagnostic interview appropriate for children and adolescents from 6 to 18 years of age generating current and life-time diagnoses in accordance with the diagnostic criteria in the Diagnostic and Statistical Manual of Mental Disorders (4th ed. [DSM-IV], 9). When considering the extensive use of the K-SADS-PL in clinical practice and research, validation studies of the instrument are surprisingly few. The present study examines the convergent and divergent validity of two diagnostic groups, anxiety disorders and ADHD, using information from multiple informants as indices. Convergent validity is typically demonstrated when one method of assessing a construct, such

as anxiety, is strongly associated with other methods of assessing the same construct. Conversely, divergent validity is supported when a measure of a particular construct, such as anxiety, is *not* associated of measures of an unrelated construct, such as attention deficit/hyperactivity.

Initial assessment of the psychometric properties of the K-SADS-PL found support for the convergent validity of common diagnoses, such as depression, anxiety, and ADHD (8, 10). However, the generalizability of the sample was limited and the authors did not examine divergent validity. More recent studies from different countries using translated versions of the K-SADS-PL have mostly confirmed the findings of Kaufman and colleagues. However, studies are limited by often relying on information from only one informant, small sample sizes, or considering few or very broad diagnostic categories. As an upshot, validity and reliability data for specific K-SADS-PL diagnoses are scant. In a Brazilian clinical sample, the authors found support for convergent validity of any diagnosis and any disruptive diagnosis, but not for any affective/anxiety diagnosis (11). This study only examined broad diagnostic categories without considering specific diagnoses.

Consensual validity of K-SADS-PL diagnoses has been supported by demonstrating agreement between K-SADS-PL generated diagnoses and clinical psychiatric interviews (12-14). However, diagnostic decisions reached by clinical impressions or clinical interviews are often unreliable and typically differ significantly from those reached by way of systematic assessment (15, 16). Consensual validity of ADHD has been demonstrated in several studies (e.g., 12, 13) but findings regarding the validity of anxiety diagnoses are less consistent (14, 17). Lack of consistency in prior work in terms of methodology, as well as findings, underscores the continued need for validated diagnostic instruments that can help clinicians differentiate symptoms that are indications of psychopathology in need of treatment from

normal behaviours and also differentiating between types of disorders with overlapping symptoms.

The present study expands on previous research by examining convergent and divergent validity of two of the most common categories of psychiatric disorders seen community clinics, anxiety and ADHD. In addition to assessing the validity of the two broader diagnostic categories, we also examined specifically the validity of separation anxiety disorder (SAD), social phobia (SOP), and simple phobia (SP) and the ADHD predominately inattentive type. Validity is examined using information from multiple informants, including teachers, reporting child symptoms on commonly used symptom scales with strong psychometric properties as indices. We expected the presence of an anxiety disorder to predict overall symptoms of anxiety (convergent validity) but not symptoms of ADHD (divergent validity). The presence of SAD and SOP was expected to predict specific symptoms of separation anxiety and social anxiety respectively. Correspondingly, we expected the presence of an ADHD diagnoses to predict symptom ratings of attention deficit/hyperactivity (convergent validity) but not symptoms of anxiety (divergent validity). ADHD predominately inattentive type was expected to specifically predict symptoms of inattention.

Material and Method

Participants

Participants were 141 children aged 7-13 years ($M = 10.33$, $SD = 1.93$), 90 boys (63.8%). The clinical sample (n = 105, 65.7% boys) consisted of children referred for treatment to one of two Child and Adolescent Mental Health Services (CAMHS) outpatient clinics in South-Eastern Norway. Controls (n = 36, 58.3% boys) were recruited among non-referred children from neighbouring schools. All but three children were Caucasian. Comorbidity was common in the clinical sample. Table 1 shows the frequency of present

psychiatric disorders based on the K-SADS-PL interview in the total sample. Mean number of

present disorders was 2.18 (SD = 1.03, range 1-7). Sixty-six children met criteria for an

anxiety disorder, the most common being SAD (n = 27), SP (n = 20), and SOP (n = 19).

Sixty-four children met diagnostic criteria for ADHD, including 25 who were diagnosed with

comorbid present anxiety and ADHD. Of the children diagnosed with ADHD, 40 had

predominantly inattentive type, 3 predominantly hyperactive-impulsive type, and 21

combined type. In the control group only one child met diagnostic criteria for a disorder

(Tourette's) but he was relatively unaffected by his diagnosis in everyday life.

(Table 1 about here)

Procedures

The study was approved by the Regional Committee for Medical and Health Ethics. Written

informed consent was obtained by all parents and by children 12 years and older.

In the clinical sample, mothers of consecutively referred children (n=421) over a 17-month

period (fall 2007 to spring 2009) were interviewed with K-SADS-PL at their first appointment

at the clinic. Children who fulfilled criteria for a present anxiety disorder, ADHD, or both

(n=187) were invited to participate. A total of 84 children were excluded due to the following

criteria: Biological mother not available to the study (n=16), mother did not speak Norwegian

(n=19), the child met the diagnostic criteria for Asperger's syndrome (n=12), child had

ADHD and a subthreshold or previous anxiety disorder (n=8, this criterion was chosen to

ensure that the "pure" ADHD group would not include children with anxiety symptoms)[1], the

child had an IQ below 70 (n=9), the child was receiving medication for ADHD or anxiety

(n=16)[2], or the child had a known neurological disease (n=4). Of those eligible for the study

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[1] This criterion did not apply to the group of children with comorbid anxiety disorder and ADHD where full criteria for both diagnostic categories were met.
[2] Data were collected as part of a study examining the association between anxiety disorders and neurodevelopmental problems. The complete test battery thus included neuropsychological assessment. Children who were on medication for ADHD or anxiety were excluded because the medication is likely to interfere with neuropsychological functioning.

(n=187), 105 consented to participate. Participants in the clinical sample did not differ

significantly from those who declined to participate (n=82) in mean age ($M = 10.3$, $SD = 1.9$

vs. $M = 10.5$, $SD = 1.9$, t (185) = -0 588, $p = 0.56$), gender distribution ($X^2 = 0.906$, $p = 0.34$)

or mean score on the Children's Global Assessment Scale (CGAS; 18) ($M = 51.4$, $SD = 5.7$

vs. $M = 51.1$, $SD = 6.2$, $t = 0.357$, $p = 0.72$). There was no reason to believe that the clinics

from which the participants were recruited attracted special subgroups of affected children.

The Norwegian health system is public and services are offered free of charge. Few private

alternatives exist. We thus concluded that the included participants were fairly representative

of the population of treatment-seeking children with anxiety disorders or ADHD. Participants

were recruited for a study examining characteristics of children with anxiety disorder and

ADHD and the effect of their combination in certain clinical presentations

(neurodevelopmental delays and disorders). This aim guided the decision to exclude children

in the "pure" ADHD group with a history of anxiety disorder or who had subclinical levels of

anxiety (other comorbidities were allowed). The combined group included children who

presently met diagnostic criteria for both ADHD and an anxiety disorder.

The control group was a convenience sample. Exclusion criteria were present or prior

anxiety disorder or ADHD according to the K-SADS-PL interview with the mother or prior

referral to mental health or school psychological services. After obtaining informed consent,

the child and parent(s) underwent an assessment battery, relevant measures for the present

study are described below. Questionnaires were also sent to the child's teacher.

Teachers were blind to the child's diagnostic status.

Measures

K-SADS-PL. Diagnostic status was assessed using the K-SADS-PL, a semi-structured

psychiatric interview that ascertains current and lifetime diagnoses based on DSM-IV criteria

(8). Each individual symptom is rated on a 0-3 scale. A score of 3 represents clinical threshold and is required for a criteria to be met. Diagnoses in the present study were based on interview with the mother only and include present diagnoses only, not lifetime. We used the 2007 version including five supplements in addition to the screening interview. The interviews were administered by three members of the research team, all experienced clinicians with years of experience using the K-SADS, both in clinical and research settings. A total of 39 out of 105 randomly selected audiotaped interviews were blindly rescored to assess inter-rater reliability. Cohen's kappa (19) for any anxiety disorder was .88 and for ADHD .90.

Teacher Report Form (TRF; 20) is a teacher-rated questionnaire assessing emotional and behaviour problems and social competencies in children and adolescents 4-18 years. Items are rated on a three-point scale for how well a particular statement describes the child: 0 = not true, 2 = very often true. The TRF produces two broadband scales (i.e., Internalizing problems and Externalizing problems) and six DSM-oriented problem scales (i.e., Affective problems, Anxiety problems, Somatic problems, Attention-Deficit/Hyperactivity problems, Oppositional problems, Conduct problems) (21). The DSM-oriented scales were chosen in the present study as they are better suited for distinguishing between specific symptom categories, such as anxious and affective symptoms, compared to the more traditionally used subscales which combine multiple problem areas. Internal reliability of the DSM-oriented scale for Anxiety problems (TRF-anxiety) used in the present study was $\alpha = .80$.

The Multidimensional Anxiety Scale for Children (22) is a 39-item item rating scale of anxiety symptoms in children. Including a total score, the MASC consists of four subscales: physical symptoms, harm avoidance, social anxiety, and separation/panic. Mothers completed the full scale (39 items, MASC-P) and children the 10-item child version (MASC-C-10). Moderate to strong internal reliability has been shown across all MASC subscales for both the

child and parent versions (23, 24). Findings from previous studies indicate that the subscales of social anxiety and separation anxiety are specifically associated with the diagnoses of SOP and SAD respectively (23, 24). In the present study, internal consistency was good, with Cronbach's alpha for the MASC-P of .94, .91 for the subscale of social anxiety, .82 for the subscale of separation anxiety, and the MASC-C-10 .76.

The Disruptive Behavior Rating Scale (DBRS; 25), parent and teacher form, was used to assess symptoms of attention problems and hyperactivity/impulsivity. The DBRS contains 18 items included in the DSM-IV diagnosis of ADHD. Nine items assess symptoms of inattention and nine assess hyperactivity/impulsivity. Items are rated on a four-point scale, ranging from 0=never to 3=very often, indicating how frequently the symptoms occur. The scores are summed up to an ADHD symptom score. The scale has shown high internal consistency (26). In the present study, the Cronbach's $\alpha = .95$ for total score and .94 for the subscale of inattention based on mother report and .96 for the total score and .94 for the subscale of inattention based on teacher report.

Statistical analyses

Means comparisons were analysed using Student's t-tests. Hierarchical simple and multiple linear regressions examined convergent and divergent validity of the anxiety and ADHD diagnoses. Diagnostic status was coded as dichotomous variables (present/absent). The diagnostic category in question, e.g., anxiety, was entered as the independent variable in step 1, and ADHD was entered in step 2. The corresponding rating scale, e.g., MASC, was entered as the dependent variable. Separate analyses were conducted for each rating scale. Convergent validity was confirmed if the diagnostic category significantly predicted the dependent variable in step 1. Divergent validity was confirmed if the first diagnostic category still predicted the dependent variable in step 2 and the second diagnostic category did not.

Results

Between-informant agreement of anxiety symptoms was small to moderate, correlations

ranged from $r = .26$ for child-teacher agreement on the MASC-C-10 and TRF-anxiety, to $r =$

.43 for mother-teacher agreement of the MASC-P and TFR-anxiety (all ps $< .01$). Mother-

teacher agreement for ADHD symptoms on the DBRS was strong ($r = .65$, $p < .01$). Means

and standard deviations of all symptom measures per diagnostic group are presented in Table

2.

(Table 2 about here.)

Convergent validity of anxiety diagnoses

Children who met diagnostic criteria for any current anxiety disorder based on the K-SADS-

PL had significantly higher symptom scores on ratings of anxiety symptoms per child,

mother, and teacher report compared to children without an anxiety disorder (child report $t =$

4.52, $p < .01$; mother report $t = 12.04$, $p < .01$; teacher report $t = 5.93$, $p < .01$, see Table 2).

Effect sizes for mean differences observed for mother and teacher reports were large and

medium for child report. Hierarchical regression models confirmed the convergent validity of

any anxiety diagnosis. The presence of an anxiety diagnosis significantly predicted symptom

ratings of anxiety as reported by all three informants. Explained variance ranged from .15

(child report) to .51 (mother report) in the full models.

The presence of SAD was associated with significantly higher symptoms of separation

anxiety reported by mother on the MASC-P separation anxiety subscale compared to the

absence of SAD ($t =9.65$, $p <.001$) with a large effect size. Child and teacher reports of

anxiety also differentiated significantly between the presence and absence of SAD (MASC-C-

10 $t = 3.57$, $p < .001$, TRF-anxiety $t = 3.60$, $p < .001$) with medium effect sizes. Hierarchical

regression analysis confirmed the convergent validity of SAD. Explained variance in the full

model was largest for the model predicting diagnosis specific symptoms reported by mother (R^2 = .40). Models predicting anxiety symptoms based on child and teacher report were also significant and remained so after including the presence of ADHD. Explained variance was .09 and .10 for models predicting child and teacher reported symptoms respectively.

Children who met diagnostic criteria for SOP differed significantly from children without SOP on mother-reported symptoms of social anxiety on the MASC subscale (t = 5.59, p < .001) and teacher-rated symptoms of anxiety on the TRF-anxiety (t = 4.55, p < .001) with large effect sizes. Child self-report of anxiety symptoms did not differ significantly between the presence and absence of SOP. Hierarchical regression models confirmed the observations from the means comparisons. Models of SOP predicting mother-reported symptoms of social anxiety and teacher report of anxiety were significant with explained variance of .20 and .14. The observed associations remained significant when ADHD was entered to the model. The model for SOP predicting child-reported anxiety symptoms was not statistically significant.

Support for the convergent validity of SP was indicated by significantly higher symptoms of anxiety based on all three informants when SP was present than when it was deemed absent (child report t = 3.91, p < .001; mother report t = 2.54, p = .012; teacher report t = 2.77, p = .006). Effect sizes were large for child report and medium for mother and teacher report. Hierarchical regression analyses further supported the convergent validity of the diagnosis of SP. SP significantly predicted symptoms of anxiety in all three models and remained significant after entering ADHD in the models. Explained variance ranged from .05 (mother report) to .11 (child report).

Divergent validity of anxiety diagnoses

Symptom ratings of ADHD did not differ significantly between children with any anxiety disorder and children without any anxiety disorder (see Table 2). In the hierarchical

regression model predicting symptoms of ADHD per mother report, the presence of any anxiety disorder significantly predicted symptoms of ADHD (see Table 3). This association was observed when the presence of ADHD diagnosis was already included in the model and indicates a unique association between any anxiety diagnosis and symptoms of ADHD reported by mother. This finding was not observed in the model predicting symptoms of ADHD based on teacher report (see Table 3). The presence of any of the specific anxiety disorders examined was not significantly associated with higher levels of ADHD symptoms compared to the absence of the relevant anxiety disorder. Hierarchical regression models lent further support to the divergent validity of SAD, SOP, and SP as the diagnoses did not predict symptoms of ADHD based on mother and teacher reports.

Convergent validity of ADHD diagnosis

Children who met diagnostic criteria for ADHD based on the K-SADS-PL had significantly higher symptom scores on ratings of ADHD symptoms per mother- and teacher-report compared to children without ADHD (see Table 2). Hierarchical regressions (see Table 3) confirmed the convergent validity of the K-SADS-PL ADHD diagnosis. The presence of ADHD significantly predicted higher scores on the DBRS as reported by mother and teacher. Explained variance ranged from .36 (teacher report) to .56 (mother report).

Convergent validity was examined for ADHD predominately inattentive type. The presence of ADHD inattentive type was associated with significantly higher symptoms of inattention per mother and teacher report compared to the absence of the diagnosis (mother report $t = 11.50$, $p < .001$, teacher report $t = 8.20$, $p < .001$). Hierarchical regression analysis supported this observation. The presence of ADHD inattentive type significantly predicted symptoms of inattention reported by mother and teacher even after including anxiety diagnoses in the model. Explained variance in the full models were .20 and .18.

Divergent validity of ADHD diagnosis

ADHD positive and ADHD negative children did not differ significantly on measures of anxiety symptoms (child report $t = 1.05$, $p = .30$; mother report $t = 0.82$, $p = .42$; teacher report $t = 1.04$, $p = .30$). The regression models further supported the divergent validity of ADHD diagnosis: the presence of an ADHD diagnosis did not predict any of the general anxiety scales (MASC-P Total score, MASC-C-10, TRF-anxiety) and there was little change in explained variance when entering ADHD into models with anxiety diagnosis predicting ratings of anxiety symptoms.

The presence of ADHD inattentive type was not associated with symptom ratings of anxiety and means comparison of symptoms yielded no significant differences in symptoms of anxiety in children with and without ADHD inattentive type. Hierarchical regression models lent further support to the divergent validity of the ADHD inattentive type as the diagnosis did no predict symptoms of anxiety according to child, mother or teacher report.

(Table 3 about here)

Discussion

The results of the present study replicate and extend the extant literature and suggest that the K-SADS-PL interview provides valid diagnoses of anxiety and ADHD in general, and specifically the diagnoses of SAD, SOP, SP, and the inattentive subtype of ADHD in children referred for mental health services. We found strong support for the convergent and divergent validity of K-SADS-PL anxiety diagnosis based on child, mother, and teacher report. Similarly, our findings indicated strong support for the convergent and divergent validity of ADHD diagnosis based on mother and teacher report.

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Similar to findings reported in previous studies (e.g., 8), children in the present study who met criteria for an anxiety disorder had significantly higher symptoms of anxiety compared to those without an anxiety disorder as indicated by all three informants. Contrary to the findings of Basil and Bodin (2010) we found support for the convergent validity of K-SADS-PL generated anxiety diagnosis. Our use of rating scales specifically measuring anxiety symptoms, rather than broader scales combining multiple symptom areas (e.g., affective and anxious symptoms) may explain this discrepancy. Convergent validity was also supported for the specific anxiety diagnoses across informants, with one exception. The presence of SOP was not supported in models predicting child self-report of anxiety. One possible explanation may be that the ten-item short version of the MASC is not sensitive enough to accurately identify specific anxiety diagnoses and may not be a good measure of social anxiety. Scales assessing symptoms of social anxiety more specifically may have yielded different results. Previous studies have found that children can provide important information of social anxiety symptoms relevant for diagnostic accuracy using the full version of the MASC and its subscale of social anxiety (23, 24).

In line with our hypothesis, mean symptoms of attention deficit/hyperactivity did not differ between the anxiety disordered and non-anxiety disordered groups in the present study, confirming the divergent validity of anxiety diagnosis based on the K-SADS-PL interview. However, the model predicting mother-reported symptoms of ADHD showed that there was a small but unique association between the presence of an anxiety disorder and symptoms of ADHD. The association was not very strong, albeit statistically significant. It may reflect some overlap in clinical presentations between children with anxiety problems and children with ADHD. Overlapping symptoms or how symptoms of various diagnoses are expressed or perceived by others may make it more difficult to differentiate between disorders. For example, both children with anxiety disorders and children with ADHD may present with

difficulties concentrating, although the underlying mechanisms for this symptom differ between the two types of disorders (27). Other studies have also reported difficulties establishing validity of diagnoses based on the K-SADS-PL in highly comorbid samples using parent report (28).

Divergent validity of SAD, SOP, and SP was confirmed. Neither diagnosis was associated with symptoms of ADHD by mother or teacher report, nor did any of the specific anxiety diagnoses examined predict symptoms of ADHD.

In line with our hypothesis and previous studies (12, 13), we found strong support for the convergent validity for ADHD diagnosis using symptom reports from both mother and teacher as indices. Mother-teacher agreement on symptoms was quite high in the present study, even though mothers and teachers may have different frames of reference when rating symptoms of ADHD (29). The presence of any ADHD diagnosis was not associated with symptoms of anxiety, suggesting good divergent validity of the K-SADS-PL generated diagnosis. The predominately inattentive subtype of ADHD also evidenced convergent as well as divergent validity. The diagnosis was associated with higher levels of symptoms of inattention but not anxiety.

To the best of our knowledge, ours is one of the first studies to consider teacher ratings of child symptoms in evaluating psychiatric diagnoses generated by the K-SADS-PL. Teachers provide important incremental information to parent and child self-reports as they are able to report on the child's behaviour in a setting often not available for parental observations. Both symptoms of anxiety as well as ADHD may impair the child's functioning in the classroom, academically and socially (30, 31). Information about such interference is relevant in diagnostic decisions and should be included in clinical assessment.

Limitations

This study provides much needed data on the convergent and divergent validity of K-SADS-PL generated diagnoses of anxiety and ADHD. The interviews were performed with mothers only. Although there is reason to expect that the parents of referred children in this age group are aware of both internalizing and externalizing problems in their child, the establishment of a diagnosis based on a single informant is not regarded as best practice. Relying on one particular informant rather than another, or integrating information from multiple informants, can lead to very different conclusions (32) and a multi-informant approach is recommended also for diagnostic considerations. Future studies should include diagnostic interviews with the child in addition to parent interviews.

Another limitation of the present study was that we were only able to examine a small number of specific diagnoses and did not assess the validity of diagnoses other than anxiety and ADHD. Future studies should test the validity of a broader range of specific diagnoses and include a broader age-range.

Conclusion

In research as well as clinical practice it is important to have instruments with good psychometric properties. The present study demonstrated the convergent and divergent validity of anxiety and ADHD diagnoses based on one of the most commonly used diagnostic interviews, the K-SADS-PL.

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Disclosure of interest:

The authors have no conflict of interests to disclose.

Table 1. Frequency of disorders present in the total sample

	All (N=141)	
	N	(%)
Major Depression	4	(2.8)
Dysthymia	3	(2.1)
Depressive NOS	2	(1.4)
Cyclothymic disorder	1	(0.7)
Separation Anxiety Disorder	27	(19.1)
Social Phobia	19	(13.5)
Simple Phobia	20	(14.2)
Generalized Anxiety Disorder	8	(5.7)
Panic disorder	2	(1.4)
Agoraphobia	3	(2.1)
OCD	14	(9.9)
Selective mutism	1	(0.7)
ADHD	64	(45.4)
Inattentive type	40	(28.4)
Hyperactive type	3	(2.1)
Combined type	21	(14.9)
Oppositional Defiant Disorder	22	(15.6)
Conduct disorder	2	(1.4)
Tourette	13	(9.2)
Chronic motor or vocal tics	4	(2.8)
Transient tics	5	(3.5)

Adjustment disorder w depression	1	(0.7)
PDD NOS	2	(1.4)
Enuresis	11	(7.9)
Encopresis	3	(2.1)

Note. NOS = not otherwise specified; ADHD = attention deficit/hyperactivity disorder; PDD = pervasive developmental disorder

Table 2. Symptoms of anxiety and attention deficit/hyperactivity

	All (n = 141)		Any anxiety dx (n = 66)		No anxiety dx (n = 75)			ADHD (n = 64)		No ADHD (n = 77)		
	M	*(SD)*	*M*	*(SD)*	*M*	*(SD)*	*d*	*M*	*(SD)*	*M*	*(SD)*	*d*
MASC-C-10	10.64	(5.85)	12.86	(5.83)	8.68	(5.17)	0.76	11.20	(5.79)	10.17	(5.90)	0.18
MASC-P total	49.01	(19.83)	64.06	(15.82)	35.77	(12.02)	2.01	47.52	(18.51)	50.26	(20.89)	-0.14
MASC-P separation	9.70	(6.03)	14.06	(5.19)	5.85	(3.65)	1.83	9.33	(6.09)	10.00	(6.01)	-0.11
MASC-P social	13.74	(6.61)	17.44	(5.86)	10.49	(5.44)	1.23	14.05	(5.54)	13.49	(7.41)	0.09
TRF-anx	1.80	(2.42)	2.97	(2.76)	0.74	(1.40)	1.02	1.56	(1.92)	2.00	(2.76)	-0.19
DBRS-M total	19.62	(13.55)	20.85	(11.08)	18.56	(15.36)	0.17	30.62	(9.28)	10.42	(8.88)	2.22
DBRS-M inattention	10.60	(7.52)	11.12	(6.09)	10.15	(8.61)	0.13	16.34	(5.56)	5.83	(5.28)	1.94
DBRS-T total	14.59	(13.39)	14.64	(11.60)	14.54	(14.81)	0.01	23.12	(12.73)	7.17	(8.78)	1.46
DBRS-T inattention	8.49	(7.38)	8.95	(6.95)	8.09	(7.76)	0.12	13.17	(6.44)	4.54	(5.62)	1.43

Note: MASC-C-10 = Multidimensional Anxiety Scale for Children, 10-item version, child report; MASC-P = Multidimensional Anxiety Scale

for Children, total score parent report; TRF-anx = Teacher Report Form, DSM-oriented Anxiety problems; Disruptive Behavior Rating Scale-

Mother report; DBRS-T = Disruptive Behavior Rating Scale-Teacher report; ADHD = attention deficit/hyperactivity disorder; SAD = separation

anxiety disorder; SOP = social phobia

Table 3. Convergent and divergent validity of anxiety and ADHD diagnoses

		MASC-P Total			MASC-C-10			TRF-anxiety		
Model	Diagnostic category	B	SE	ΔR^2	B	SE	ΔR^2	B	SE	ΔR^2
1	Any anxiety diagnosis	28.29*	2.35	.51*	4.18*	0.93	.13*	2.23*	0.38	.21*
2	Any anxiety diagnosis	28.47*	2.38	.00	4.42*	0.93	.02	2.21*	0.38	.00
	Any ADHD	1.29	2.39		1.66	0.93		-0.23	0.38	

		MASC-P Separation			MASC-C-10			TRF-anxiety		
Model	Diagnostic category	B	SE	ΔR^2	B	SE	ΔR^2	B	SE	ΔR^2
1	SAD	9.68*	0.90	.40*	4.30*	1.20	.08*	1.83*	0.51	.09*
2	SAD	9.67*	1.01	.00	4.31*	1.20	.01	1.84*	0.51	.01
	Any ADHD	-0.60	0.79		1.07	0.95		-0.46	0.41	

		MASC-P Social anxiety			MASC-C-10			TRF-anxiety		
Model	Diagnostic category	B	SE	ΔR^2	B	SE	ΔR^2	B	SE	ΔR^2
1	SOP	8.26*	1.48	.18*	2.30	1.44	.02	2.61*	0.57	.14*
2	SOP	8.95*	1.51	.02	2.81	1.47	.02	2.60*	0.59	.00
	Any ADHD	1.99	1.03		1.49	1.01		-0.04	0.41	

Model	Diagnostic category	MASC-P Total			MASC-C-10			TRF-anxiety		
		B	SE	ΔR^2	B	SE	ΔR^2	B	SE	ΔR^2
1	Simple phobia	11.93†	4.70	.04†	5.26*	1.35	.10**	1.59**	0.57	.05**
2	Simple phobia	12.09†	4.70	.01	5.21*	1.35	.01	1.62*	0.57	.01
	Any ADHD	-3.06	3.29		0.90	0.94		-0.49	0.41	

Model	Diagnostic category	DBRS-M Total			DBRS-T Total		
		B	SE	ΔR^2	B	SE	ΔR^2
1	Any ADHD	20.20*	1.57	.56*	15.94*	1.91	.36*
2	Any ADHD	20.83*	1.53	.03*	16.04*	1.92	.00
	Any anxiety diagnosis	4.94*	1.53		1.33	1.92	

Model	Diagnostic category	DBRS-M Inattentive			DBRS-T Inattentive		
		B	SE	ΔR^2	B	SE	ΔR^2
1	ADHD Inattentive type	7.12*	1.28	.18*	6.78*	1.31	.17*
2	ADHD Inattentive type	7.44*	1.28	.02	6.97*	1.31	.01
	Any anxiety diagnosis	1.98	1.16		1.56	1.18	

Note: MASC-C-10 = Multidimensional Anxiety Scale for Children, 10-item version, child report; MASC-P = Multidimensional Anxiety Scale

for Children, total score parent report; TRF-anx = Teacher Report Form, DSM-oriented Anxiety problems; Disruptive Behavior Rating Scale-

Mother report; DBRS-T = Disruptive Behavior Rating Scale-Teacher report; ADHD = attention deficit/hyperactivity disorder; SAD = separation

anxiety disorder; SOP = social phobia

* = p < .01; † = p < .05