

Predictive validity for the clinical diagnosis of a new parent questionnaire, the CABI, compared with CBCL

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Abstract

Background: The questionnaires completed by the parents give a first general information on the behavioral problems of the child–adolescent, as a useful orientation to the clinical evaluation. The Child and Adolescent Behavior Inventory (CABI) is a 75-item parent questionnaire, which explores a large number of problem areas. The study of its predictive validity for the clinical diagnosis, in comparison with the Diagnostic and Statistical Manual of Mental Disorders (DSM)-oriented scales of the Child Behavior Checklist (CBCL), can assess whether its use may be advantageous.

Material and Methods: Parents/caregivers of 462 children and adolescents responded to both CABI and CBCL as a preliminary routine investigation. The results were compared with those of diagnoses obtained after the completion of the usual clinical procedure.

Results: Accuracy values (probability of correct classification) resulted high for both instruments and significantly better for CABI anxiety and attention-deficit hyperactivity disorder (ADHD) scales, and for CBCL oppositional defiant disorder (ODD) and conduct disorder (CD) scales; no significant difference was found for depression scales. All the areas under the curve (AUC) of the receiver operating characteristic analysis reached excellent values, suggesting a very good predictive ability of the five scales of the two instruments. The comparison of AUC showed the CABI's anxiety and ADHD scales to give significantly higher values than those of CBCL, indicating that these two scales have a better predictive ability.

Conclusion: The study indicates a very good comparative (vs CBCL) and predictive validity of the CABI, suggesting an advantage in the use of this shorter questionnaire, available for free use both for clinical practice and supposedly for screening and epidemiological evaluations.

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Keywords

Child and Adolescent Behavior Inventory, Child Behavior Checklist, depression, anxiety, attention-deficit hyperactivity disorder, oppositional defiant disorder

Introduction

Parents are the first source of information on the problems of their children and adolescents, especially if these concern their behavior. At the first approach to a patient, parents usually provide crucial information for the initial definition of the case: a standardized series of questions may be particularly useful in orienting the subsequent medical and clinical studies.

Different tools have been constructed and used to collect parent information. They differ in relation to the psychopathological areas of exploration, to the number of items, and to the methods of analysis of the answers.

Among broadband scales to be completed by parents, one of the first and certainly the most widely used is the Child Behavior Checklist (CBCL 6-18; Achenbach, 1991; Achenbach & Rescorla, 2001). The “Pediatric Symptoms Checklist” (PSC; Jellinek et al., 1979; Jellinek et al., 1988) and the “Strengths and Difficulties Questionnaire” (SDQ; Goodman, 1997, 2001) are two brief questionnaires which obtain information on some psychopathological areas: attention, internalizing, externalizing problems, the PSC; emotional, conduct, hyperactivity/inattention, and peer relationship problems the SDQ. Approaching these is the “Brief Assessment Checklist,” in the versions for children and adolescents (BAC-C and BAC-A), specifically aimed at identifying problems in subjects particularly at risk such as those in foster, kinship, residential, and adoptive care (Goemans et al., 2018; Tarren-Sweeney, 2013).

Largely, more comprehensive questionnaires are the “Child and Adolescent Symptom Inventory-4&5” (CASI-4&5) Parent Checklist (Gadow, 2015; Gadow & Sprafkin, 2005) and the “Behavior Assessment System for Children-2&3,” Parent Rating Scales (BASC-2&3, PRS; Reynolds & Kamphaus, 2004, 2015) that explore almost the whole field of psychopathology.

CBCL, CASI, and BASC are copyrighted and therefore require a fee for use. Furthermore, all include a relevant number of items (CBCL has 113, CASI-4 PC has 142, and BASC-2 PRS has 139–175) requiring parents to make a significant commitment in time that can discourage them from giving accurate answers.

About the CBCL, by far, the most widely used (over 2300 citations in PubMed) and the construct validity of the original syndromic scales has been questioned (Hartman et al., 1999): scales do not correspond to the current classification of psychopathological groups, with frequent inclusion of items that do not appropriately refer to the indicated syndromic area. This led to a new grouping of items under six scales (Achenbach et al., 2003) consistent with the Diagnostic and Statistical Manual of Mental Disorders (*DSM*)-IV-TR definitions (American Psychiatric Association, 2000) and valid also for *DSM*-5 (American Psychiatric Association, 2013). In this new scale definition, however, the items used, and usable, for the six *DSM*-oriented scales are only 55 of 113 administered, being the others excluded. Currently, the instrument can have a reference to the clinic only on the basis of these criteria; therefore, later, when we talk about CBCL, we always refer to the evaluation according to the *DSM*-oriented criteria.

The problems about the use of the aforementioned instruments have led to the construction of a new one that was relatively short, while exploring a very large number of psychopathological areas, following the criteria of the *DSM*-IV-TR, which in these specific cases were practically unchanged in the *DSM*-5.

The tool, called Child and Adolescent Behavior Inventory (CABI), was initially standardized and made accessible for free use in 2013 (Cianchetti et al., 2013), and its larger standardization was

published in 2017 (Cianchetti et al., 2017). The CABI, better described below, consists of 75 items, grouped in relation to the problem areas (“subscales”) they explore; this allows an easy and at-glance evaluation of the problems that are reported by parents and of the entity of them, without having to use a manual counting grid or a computer transcription, as required by CBCL.

The present study aimed to evaluate how CABI, in comparison with CBCL, can be accurate in predicting the final clinical diagnosis.

Material and methods

Participants

The study involved four university units of Child & Adolescent Neuropsychiatry in four Italian cities in different regions of the country: Insular Cagliari, South Bari, Center Rome, and North Pavia.

The administration of the instruments took place as part of routine clinical investigations and aimed to occur in the widest possible way, even when it was not known to the operators for which main problems the patient was taken to the hospital. Routine administration of the instrument is recommended for all kind of disorders, with the aim of not neglecting the possible presence of behavioral problems, which is important for a more complete management also in neurological cases (the department involved in the study is neuro-psychiatric). The recommendations were not always respected, and this reduced the number of completed cases. However, some cases that came for headaches and for specific learning disorders were also collected and included in the study, to increase the data for the comparison with false positives.

Instruments and measures

CABI. The complete CABI questionnaire and the illustration of its characteristics are reported with open access in Cianchetti et al. (2013).

The CABI questionnaire consists of 75 questions to parents/caregivers. These explore the following problem areas (number of pertinent items shown in brackets): somatic symptoms (including sleep problems; 4), anxiety (6), phobias (1), obsessive-compulsive symptoms (4), insecurity (2), post-traumatic stress (1), depression (10), irritability (4), oppositional provocative symptoms (6), conduct problems (4), impulsivity (3), hyperactivity (3), attention deficit (3), reality evaluation (4), social relationships (6), sphincter control (2), bulimia (1), anorexia (3), sex interest (2), smoking, alcohol, and substance abuse (3), school performance (2), and being bullied (1). All items and their classification are shown in the supplemental material.

It should be noted that, in CABI, some symptoms that can belong to two or more disorders are grouped separately: “sleep problems,” located among somatic symptoms, according to *DSM-5* can be part of both depression and generalized anxiety; “irritability,” held as a separate subscale, can be part of depression, generalized anxiety, and oppositional defiant disorder (ODD).

Psychometric properties, including internal consistency, factor analysis, and normative data, are reported in Cianchetti et al. (2017), together with a comparative and discriminant evaluation on a small number of cases. The normative data are different in relation to gender and age, and three age groups are distinct: aged 6–10, 11–13, and 14–18 years.

CBCL 6-18. This is a parent/caregiver questionnaire which includes 120 questions related to behavioral problems of children and adolescents aged 6–18 years.

The six *DSM*-oriented scales of CBCL comprise 55 of the total 113 items, selected for their correspondence to the symptoms indicated by the *DSM-IV* (still valid for *DSM-5*) as belonging to the

following diagnostic groups: affective (13 items), anxiety (6), somatic (7), attention-deficit hyperactivity (7), oppositional defiant (5), and conduct (17) problems.

Validity and reliability of the *DSM*-oriented scales have been documented (Achenbach et al., 2003; Achenbach & Rescorla, 2001). Normative data for children and adolescents aged 6–18 years are available and the sold kit includes the ability to get *T* scores by entering raw data into a computer program. Two age groups are distinct: 6–11 and 12–18 years old.

Procedures

Before the clinical investigations or during the very initial phase of these, the parents (or caregivers) were invited to complete the CABI and CBCL questionnaires, both filled in by the same person, mother, father, or tutor. If both parents were available, they were asked to complete both questionnaires together, using pens of different colors, usually black or blue the mother, red the father. In the cases where they agree about the answer to an item, the answer was in black (or blue), while if they were in disagreement, the father marked his answer in red. In this case, the intermediate score between the two was assigned to that item.

The compilation of the questionnaires was subsequently checked, and if missing answers were found, the compilers were invited to complete them. Thanks to this control, very few cases (much less than a dozen) were actually excluded due to a lack of answers.

Patients underwent normal clinical assessment procedures, including clinical interviews, observation, and administration of appropriate instruments (in most cases K-SADS (Kaufman et al., 1997), excluding patients coming for headache and learning disorders), until a final diagnosis according to the *DSM-5* criteria, that took into account any comorbidities, was obtained. Once the diagnoses were clinically defined, the results from the CABI and CBCL questionnaires were compared with these.

The CABI vs CBCL comparison occurred for groups of items belonging to the different subscales/scales, suggestive of the different diagnoses, as follows; the numbers of the items indicated below are as reported in the articles by Achenbach et al. (2003) and Cianchetti et al. (2013).

Depressive problems: CABI-D 10 items, numbers 19–28, vs CBCL-D (“affective problems”) 13 items. Anxiety problems: CABI-A 6 items, numbers 5–10, vs CBCL-A (“anxiety problems,”) 6 items. Attention-deficit hyperactivity problems: CABI-ADHD (attention-deficit hyperactivity disorder) 9 items (n.43 to 51) vs CBCL-ADHD 7 items. Oppositional defiant problems: CABI-ODD 6 items (n.33 to 38) vs CBCL-ODD 5 items. Conduct problems: CABI-CD 4 items (n.39 to 42) vs CBCL-CD 17 items.

The items used for the comparison are in total 35 for the CABI and 48 for the CBCL.

The CBCL “Somatic problem” subscale (7 items), and consequently also the “Somatic problems” of CABI (4 items), were not taken in account because the characteristic of the “Somatic symptom disorder” is not the number of somatic symptoms (which gives the score at the CBCL and CABI scales), but the excessive focus on the symptoms, which causes emotional distress, anxiety, and problem functioning. Therefore, the clinical hallmark of the disorder is a focalized anxiety, and not the presence of greater or lesser number of somatic symptoms.

The clinically different “generalized,” “separation,” and “social” anxiety were all included together as anxiety symptoms, as they are in the anxiety scale both of CABI and CBCL.

For both the CABI and CBCL, points 2 were assigned to each “True” answer, 1 to “Partially or sometimes true” and 0 to “False/Not true.” The raw scores of the CABI items making each subscale were added up and then turned into *T* scores based on the normative data reported in Cianchetti et al. (2017). For the CBCL, the counting was manual with grid or electronic after transcription of the answers to the computer, according to the program provided by the manufacturer (Achenbach & Rescorla, 2001).

For each scale of each instrument, T scores equal to or greater than 70 ($T \geq 70$) were considered to indicate a “clinical” condition, to be compared with the final diagnosis(s). We included the $T=70$ values, in accordance with the criteria used by CBCL.

It should be remembered and emphasized that CABI and CBCL, as other similar tools, evaluate the presence of problems/symptoms belonging to various pathologies according to the *DSM* criteria, and not a *DSM* nosographic diagnosis (such as major depressive disorder and persistent depressive disorder). CABI and CBCL detect the presence of groups of problems, while for the nosographic diagnosis other elements are added, in particular relating to the course of the disorder.

Test–retest was not included in the procedure because the purpose of the study was to evaluate the discriminating capacity of CABI and CBCL on the first or single administration, as normally expected to be used, that is, before a visit or for a screening on the population.

Ethics

The study was approved by the Ethics Committee of the Bari University Hospital with resolution No. 0401 of 24 March 2015.

Data analysis

A first comparison regarded the sensitivity, specificity, and accuracy in relation to the final diagnoses, using the program offered by the website https://www.medcalc.org/calc/diagnostic_test.php. In general, sensitivity and specificity values are considered good when above 70%. Sensitivity and specificity obtained using CABI and CBCL tools were compared by the McNemar chi-square test for paired samples. Accuracy values were compared by the chi-square test with Yates correction.

A more basic and reliable comparison of the diagnostic ability of CABI and CBCL tools, independent of the cut-off score adopted for the sensitivity and specificity evaluation, was done with the construction of receiver operating characteristic (ROC) curves, using XLSTAT software (version 16.06; <https://www.xlstat.com/>). XLSTAT also provided a comparison of the area under the curve (AUC) produced by CABI and CBCL tools, taking into account the paired nature of samples. AUC values significantly greater than .50 indicate that the scale can perform the binary classification better than the chance level. Diagnostic accuracy of an AUC is considered “excellent” with values between 0.9 and 1.0, “good” with values from 0.8 to 0.9, and “fair” with values from 0.7 to 0.8.

Results

The final sample includes 462 children and adolescents, aged 6–18 years, mean age 12.0 (standard deviation (*SD*) 3.2), 181 females and 281 males, referred to hospital centers, mainly evaluated in a day-hospital setting, very few as inpatients or outpatient. After collecting the completed questionnaires, an extensive clinical evaluation leads to the diagnoses (including main diagnosis and comorbidities) as shown in Table 1: The definition of “main” diagnosis is rather subjective, based on the greater negative impact that could be considered that the disorder caused to the patient and therefore more relevant to be addressed in the treatment.

Other final diagnoses were, in total, 112: eating disorders 21, obsessive-compulsive disorder (OCD) 13, other psychiatric (psychotic disorders were excluded at all) 7, headache 62, and specific learning disorders 9.

The final diagnoses of disorders according to *DSM*, and those suggested by T scores ≥ 70 at CABI and at CBCL relative to the five areas explored, were compared. The results are shown in Table 2.

Table 1. Diagnoses (main and comorbid diagnoses) done in the whole population studied.

	Total number of cases with the diagnosis	Females	Males	Main diagnosis, total number of cases	Females	Males
Depressive disorders	241	108 (44.8%)	133 (55.2%)	96	54 (56.2%)	42 (43.8%)
Anxiety disorders	160	77 (48.1%)	83 (51.9%)	57	26 (45.6%)	31 (54.4%)
ADHD	145	22 (15.2%)	123 (84.8%)	127	16 (12.6%)	111 (87.4%)
ODD	137	42 (30.7%)	95 (69.3%)	53	16 (30.2%)	37 (69.8%)
CD	43	14 (32.6%)	29 (67.4%)	17	5 (29.4%)	12 (70.6%)

ADHD: attention-deficit hyperactivity disorder; ODD: oppositional defiant disorder; CD: conduct disorder.
 "Main" diagnosis is based on the greater negative impact that the disorder causes to the patient.

Table 2. Comparison between the final diagnoses of disorders (depression, anxiety, ADHDs, ODD, CD) and those suggested by $T \geq 70$ scores at CABI and at CBCL.

	CABI		<i>p</i> value	CBCL	
Depression	TP=233	FP=46		TP=175	FP=8
	FN=8	TN=175		FN=66	TN=213
	Sensitivity %	96.7 [93.6, 98.6]	<.0001	Sensitivity %	72.6 [66.5, 78.1]
	Specificity %	79.2 [73.2, 84.34]	<.0001	Specificity %	96.4 [93.0, 98.4]
Anxiety	Accuracy %	88.31 [85.0, 91.1]	ns	Accuracy %	84.0 [80.3, 87.2]
	TP=142	FP=29		TP=117	FP=35
	FN=18	TN=273		FN=43	TN=267
	Sensitivity %	88.7 [82.8, 93.1]	<.005	Sensitivity %	73.1 [65.6, 79.8]
ADHD	Specificity %	90.4 [86.5, 93.5]	ns	Specificity %	88.4 [84.3, 91.8]
	Accuracy %	89.9 [86.7, 92.4]	<.005	Accuracy %	83.1 [79.4, 86.4]
	TP=120	FP=27		TP=86	FP=35
	FN=25	TN=290		FN=59	TN=282
ODD	Sensitivity %	82.8 [75.6, 88.5]	<.0001	Sensitivity %	59.3 [50.8, 67.4]
	Specificity %	91.5 [87.9, 94.3]	ns	Specificity %	89.0 [85.0, 92.2]
	Accuracy %	88.7 [85.5, 91.5]	<.0005	Accuracy %	79.7 [75.7, 83.2]
	TP=134	FP=98		TP=95	FP=18
CD	FN=3	TN=227		FN=42	TN=307
	Sensitivity %	97.8 [93.7, 99.5]	<.0001	Sensitivity %	69.3 [60.9, 76.9]
	Specificity %	69.9 [64.5, 74.8]	<.0001	Specificity %	94.5 [91.4, 96.7]
	Accuracy %	78.1 [74.1, 81.8]	<.001	Accuracy %	87.0 [83.6, 89.9]
CD	TP=40	FP=119		TP=35	FP=50
	FN=3	TN=300		FN=8	TN=369
	Sensitivity %	93.0 [80.9, 98.5]	ns	Sensitivity %	81.4 [66.6, 91.6]
	Specificity %	71.6 [67.0, 75.9]	<.0001	Specificity %	88.1 [84.6, 91.0]
CD	Accuracy %	73.6 [69.3, 77.6]	<.0001	Accuracy %	87.5 [84.1, 90.3]

TP: true positive; FP: false positive; FN: false negative; TN: true negative; CABI: Child and Adolescent Behavior Inventory; CBCL: Child Behavior Checklist; ADHD: attention-deficit hyperactivity disorder; ODD: oppositional defiant disorder; CD: conduct disorder.

95% confidence intervals are given in brackets.

"Sensitivity," that is, the probability that the instrument gives a positive result in the presence of the explored disorder (true positive rate), showed significantly higher values in four of the five

CABI scales. “Specificity,” that is, the probability that the instrument gives a negative result when the disturbance is not present (true negative rate), showed significantly higher values in three of the five CBCL scales. All other comparisons were not statistically significant.

The “accuracy,” that is, the overall probability that a patient is correctly classified by combining sensibility and specificity data, resulted significantly better for CABI anxiety and ADHD scales, whereas a better accuracy was found for CBCL ODD and CD scales. No significant difference was found in the depression scales.

ROC curves were calculated for a more accurate analysis, that take in account all the results independently from the cut-off $T \geq 70$. The profiles of the CABI and CBCL ROC curves for each scale are shown in Figure 1. Values of the AUC are shown in Table 3. All reach high values (usually classified as “excellent” between 80 and 90 and “outstanding” between 90 and 100 (Hosmer & Lemeshow, 2000)), which suggest a very good predictive ability of the five scales of the two instruments. However, the comparison of AUC (Table 3) shows that anxiety and ADHD scales of CABI give statistically significant higher values than those of CBCL, indicating a better predictive ability for these two scales; there is no statistically significant difference for the other scales.

Discussion

The results of the study show that both tools have a good level of diagnostic accuracy with respect to the five groups of disturbances explored, that is, they provide important predictive information on the final diagnosis. CABI appears to be more accurate than CBCL in predicting the presence of anxiety and ADHD disorders, while CBCL appears slightly more accurate than CABI for ODD and CD; there is no significant difference between the two tools for depressive disorders. The sensitivity is greater with the CABI in four of the five scales, but the CABI shows less specificity in three of the five scales.

CBCL predictive values observed in this study were comparable with those obtained by other studies specifically oriented to the evaluation of CBCL *DSM*-oriented scales, and this supports the reliability of our results. Highest AUC values for anxiety (.84) and conduct (.84), compared to affective (.75), ADHD (.75), and ODD (.71) problems, were found by Ebesutani et al. (2010). Ferdinand (2008) found AUC values higher for depressive (.83) than anxiety (.70) problems. Good results with CBCL concerning ODD problems were also found by Bellina et al. (2013), who reported moderate results with ADHD, anxiety, and mood disorders.

Different items in relation to the differences in predictive validity

The careful analysis of the items that make up the CABI and CBCL subscales reveals elements that can explain their differences in predictive validity.

1. The depressive problem subscale in the CABI includes just 10 items, thus less than the 13 in the CBCL. Among the 13, the CBCL includes three items related to sleep (“100.SleepProblems” and, in contrast to each other, “76.SleepLess” and “77.SleepMore”), which in the CABI are explored under the scale of somatic problems. However, a good correspondence between the two scales concerns as many as 8 items, although the CBCL item “24.Doesn’t eat well” appears to have poor relevance for depressive disorders.
2. Both CABI and CBCL anxiety scales include 6 items, but in the CBCL 2 items are specifically related to phobic problems (“29.Fears certain animals, situations or places” and “30.Fears going to school,” while in CABI the phobias are separate) and one is only partially relevant to separation anxiety (“11.Clings to adults or too dependent”).

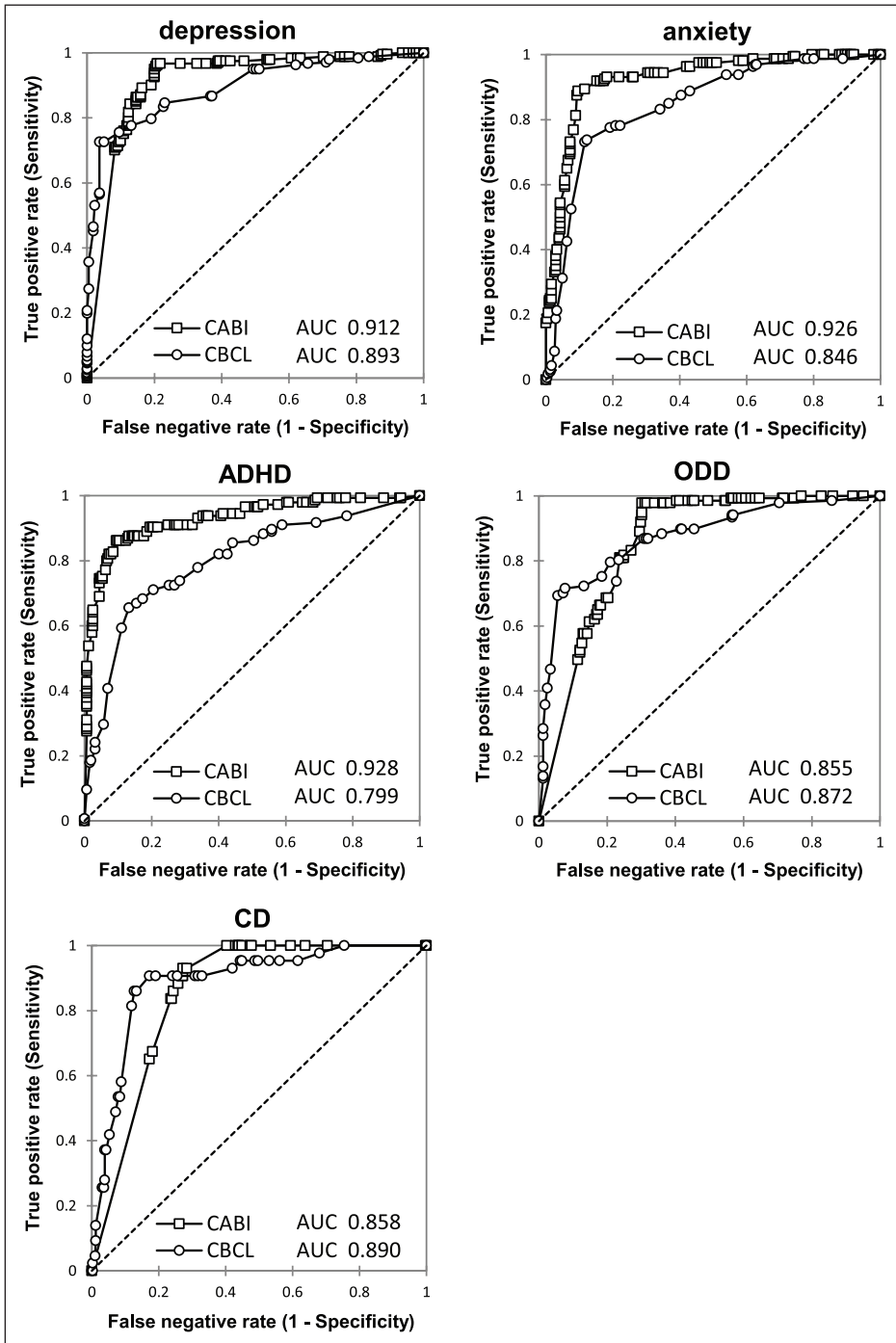


Figure 1. Receiver operating characteristic (ROC) curves of the five scales assessed by CABI and CBCL. The area under the curve (AUC) of each plot is indicated. The differences in the number of points of the curves (e.g. CD CABI and depression CBCL show a small number of points as compared to ADHD CABI or anxiety CABI) depend on the overlap of points. In fact, all curves are formed by 462 points that correspond to the number of patients included in the study. Statistical data and test comparisons are reported in detail in Table 3.

Table 3. Comparison of AUC.

	CABI				CBCL			
	AUC	SE	Lower bound (95%)	Upper bound (95%)	AUC	SE	Lower bound (95%)	Upper bound (95%)
Depression	.912	.014	.884	.940	.893	.015	.864	.922
Anxiety*	.926	.015	.896	.956	.846	.022	.804	.889
ADHD*	.928	.017	.895	.962	.799	.027	.747	.852
ODD	.855	.019	.818	.892	.872	.022	.829	.916
CD	.858	.018	.822	.894	.890	.027	.837	.944

AUC: area under the curve; CABI: Child and Adolescent Behavior Inventory; CBCL: Child Behavior Checklist; SE: standard error; ADHD: attention-deficit hyperactivity disorder; ODD: oppositional defiant disorder; CD: conduct disorder.

All AUCs are significantly higher than 0.5 ($p < .0001$).

*CABI AUC significantly higher than CBCL AUC ($p < .0001$).

3. Major differences concern ADHD, a problem to which the CABI dedicates 9 items, while the CBCL has 3 items assessing attention and only one each the hyperactivity and impulsivity, while CABI has 3 items for each disorder.
4. The better accuracy obtained by the CBCL in the ODD scale, where both instruments have 6 items, is probably due to the fact that in CABI, “angry/irritable mood” (*DSM-5*) is calculated as a group apart, separated from the ODD, as they can also be part of depressive disorder, intermittent explosive disorder, and disruptive mood dysregulation disorder. The angry/irritable dimension is of primary importance in ODD (Moreno & Zuddas, 2019). Therefore, the separate location of this dimension is likely to have disadvantaged the results with the CABI. It will be necessary in the future to establish normative values also for the combination of the two areas.
5. The CBCL has 17 items exploring conduct problems against only 5 of the CABI, and this, therefore, appears to be an important element to provide better accuracy.

As said before (section “Instruments and measures”), some symptoms that may be part of two or more different disorders are placed separately in the CABI. If this complicates the quantitative assessment under conditions such as those of this study, in practical use, the clinician may benefit from separate evidence.

Comparison of the instruments in their practical use

CABI and CBCL represent a mode of first contact with the parents (or caregivers) of patients, before the actual visit, constituting a kind of pre-anamnesis. Parents, invited to evaluate a long series of behavioral signs that their child could manifest, are led to an analysis that can be useful for becoming aware of problems that the child may presents and are better prepared for the subsequent clinical interview. It is not uncommon for them to become aware of symptoms to which they had not paid due attention before and that they would not have reported in the subsequent clinical interview.

At the same time, with a minimum amount of time, the examiner obtains information useful to make the appropriate in-depth analyses and checks. The CABI’s items are grouped according to discrete symptomatologic areas. When compared to CBCL, this offers the advantage that a simple “at-glance” evaluation of the answers allows a first orientation on the main problem areas and their

entity. Instead, the reading of the results of CBCL requires the manual scoring via grid or a non-short transcript of the 113 answers in the electronic scoring program.

The general greater sensitivity of the CABI, to the detriment of less specificity, can in practice prove useful because it induces the clinician to evaluate the reported problem, even if they eventually turn out to be false positives. However, this is an advantage over a failure to report (false negativity) on the basis of which the problem can escape.

The CABI has the additional advantage of allowing the exploration of problems affecting areas not explored by the CBCL, such as OCD (items 12–15) and psychogenic eating disorders (anorexia items 65–67, bulimia item 64), item 11 phobias, insecurity 16–17, post-traumatic stress disorder 18, irritability 29–32, evaluation of reality 52–55, social relations 56–61, sphincter control 62–63, aspects related to sex 68–69, substance abuse 70–72, academic performance 73–74, and bullying 75 (Cianchetti et al., 2013). Therefore, the CABI covers an almost complete spectrum of behavioral problems, an understandable difference compared to the CBCL, a valiant pioneer of this type of instrument, built 20 years before CABI, when the nosography was still led by *DSM-III-R*. A modification of some items of the CABI is, however, opportune, particularly for the oppositional defiant and conduct problems.

Screening on large populations

CBCL has been widely used as a screening tool for years. The importance of screening for the early detection of psychiatric problems in the developmental age is widely reported in literature (Fazel et al., 2014; Weist et al., 2007; Weitzman et al., 2015).

As a screening tool, compared to CBCL, the CABI provides a higher percentage of false positives in the depression, ODD, and CD scales. This is not a disadvantage, since a subsequent clinical check of the cases reported to have problems (this second stage evaluation being compulsory for a correct methodology) will allow to identify those falsely given for positive, while in case of poor sensitivity (false negatives), the suspicion is not highlighted and the pathology escapes. Another advantage of CABI is the reduced number of questions, which facilitates parents (or caregivers) not always very available to answer. Finally, for the screenings, it is not to be overlooked the cost of an instrument that used on many subjects entails a considerable burden.

On the other hand, it should be noted that, as shown also recently (Terrelonge & Fugard, 2017), for more effective screening, it is appropriate to associate the collection of data from other sources (“multi-informant assessment”), such as teachers and minors themselves, through self-administered tools, especially if they are adolescents

CABI use by the pediatrician

A simple tool like the CABI can also be used by the pediatrician to whom the parent addresses worried about their child’s behavior: a tool to be completed in the pediatric waiting room, the same way the PSC was proposed from the beginning (Jellinek et al., 1979). The availability of time for the pediatrician is usually not such as to allow him to obtain accurate information on the behavior of the child–adolescent; therefore, a quick collection of guidance information through the questionnaire can be useful to better orient him to the opportunity or not to submit the child–adolescent to the evaluation of the child–adolescent psychiatrist.

Conclusion

The study indicates a good comparative (vs CBCL) and predictive validity for the final clinical diagnosis of the CABI, a relatively short questionnaire, which however examines a wide range of

psychiatric problems of the child and adolescent. The CABI is available for free use, both for clinical practice, mainly before the visit, or as an aid to the pediatrician, and supposedly for screening and epidemiological studies.

Declaration of conflicting interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Ethical approval

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Supplemental material

Supplemental material for this article is available online.

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