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Reliability and validity of the Structured Clinical Interview for DSM-5-Clinician Version (SCID-5-CV) Attention Deficit/Hyperactivity Disorder Criteria: preliminary evidence from a sample of 217 Italian adolescents

Summary

Objectives

The aim of this study was to evaluate the psychometric properties of the Italian translation of the Structured Clinical Interview for DSM-5 Clinician Version (SCID-5-CV) Attention Deficit Hyperactivity Disorder (ADHD) module in a community sample of male adolescents.

Methods

217 male adolescents with problem behavior/poor performance at school were administered the SCID-5-CV ADHD module by trained clinicians during school time. Participants received also the Italian translations of the Adult ADHD Self-Report Scale, the Wender Utah Rating Scale, and the Personality Diagnostic Questionnaire-4+ Conduct Disorder Scale. Official school behavior and subject grades were collected.

Results

Our findings suggested that DSM-5 adult ADHD diagnostic criteria may be reliably assessed using the SCID-5-CV ADHD module, at least in a community sample of male adolescents with problem behavior/performance at school. More than 6% of the participants qualified for a DSM-5 ADHD diagnosis; this finding was consistent with the available literature and supported the usefulness of adult ADHD diagnosis. All convergent validity coefficients were large (i.e., $\geq .50$). A confirmatory bi-factor model proved to be the best fitting model of the SCID-5-CV ADHD symptom items.

Conclusions

We feel that our data provide first support to the reliability and validity of the SCID-5-CV ADHD module, at least among community male adolescents.

Key words

SCID-5-CV • ADHD • Adolescence • Reliability • Validity

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Attention-deficit hyperactivity disorder (ADHD) is classified in the American Psychiatric Association's Diagnostic and Statistical Manual of Mental Disorders (5th edition; DSM-5) as a childhood-onset neurodevelopmental disorder, defined by the presence of developmentally inappropriate and impairing levels of inattention, hyperactivity, and impulsivity ¹. Epidemiological studies showed that 5-6% of children meet diagnostic criteria for ADHD ²⁻⁴; although the behavioral manifestations of the disorder are known to vary with subject's gender, the ADHD prevalence has been consistently found to be higher in boys than in girls ⁵, with a ratio of approximately 2:1 in children and 1.6:1 in adults ¹.

Meta-analysis of follow-up studies of children with ADHD found that 15% of children retained the full diagnostic criteria by the age of 25 years, with a further 50% of those meeting subthreshold criteria with persistence of ADHD symptoms causing continued impairments⁶. Recently, this evidence has been consistently replicated in two follow-up studies showing high persistence of ADHD symptoms from childhood to young adulthood, with approximately 80% still meeting criteria for ADHD^{7,8}. Moreover, Agnew-Blais and colleagues⁹ documented both high persistence rate of childhood-onset ADHD into adulthood and late-onset ADHD.

These considerations lead the DSM-5 task force on ADHD to recognize the importance of diagnosing ADHD in adults, reducing from six to five criteria the number of criteria to meet the diagnostic threshold for ADHD diagnosis¹. Moreover, an attempt to improve the criteria by including more age-appropriate descriptions has been included in DSM-5².

The Structured Clinical Interview for DSM-5 (SCID-5) is a semi-structured interview for making the major DSM-5 diagnoses¹⁰; it is administered by a clinician familiar with the DSM-5 classification and diagnostic criteria (American Psychiatric Association 2013). Work on revising the SCID for DSM-5 began in 2012; changes in the DSM-5 criteria sets¹ required the development of many new SCID questions, as well as adjustments to the SCID algorithm. Interestingly, the final version of the Structured Clinical Interview for DSM-5-Clinician Version (SCID-5-CV)¹⁰ included an ADHD section. The ADHD presentation types (i.e., predominantly inattentive, predominantly hyperactive/impulsive, and combined) are included in the SCID-5-CV because they are required to determine the diagnostic code. Recently, the SCID-5-CV has been translated into Italian¹¹, using a backtranslation approach to ensure both translation accuracy and translation correspondence to the original US version¹⁰. One intriguing aspect of the SCID-5-CV is that its language and diagnostic coverage make it appropriate for use both with adults (age 18 and over) and adolescents¹⁰. Although the Diagnostic Interview for ADHD in Adults^{12,13} represents the most widely used instrument for assessing ADHD in adults, the availability of an ADHD section in a general semi-structured interview for DSM-5 mental disorders may prove helpful to improve the assessment of ADHD in the transition from adolescence to adulthood and may be useful to increase clinician's awareness towards ADHD in adolescent and adult subjects.

Starting from these considerations, we aimed at testing the basic psychometric properties of the SCID-5-CV ADHD scale in a sample of male adolescents who were attending high school while showing problem behaviour according to their teachers' reports (e.g., poor school

behaviour, truancy, high rates of failure, drug abuse, temper tantrums, anger outbursts etc.). We preferred relying on a community sample of adolescents because clinical samples are known to be poorly representative of the population of interest (the so-called Berkson's bias; Berkson, 1946)¹⁴. Male participants with poor school behaviour/performance were chosen as potential candidates for this study to maximize the likelihood to detect ADHD symptoms.

Methods

Participants

The sample was composed of male adolescents who were attending a vocational school in Northern Italy. Although 219 subjects originally agreed to participate in the study, 2 participants (0.9%) yielded incomplete questionnaires. The small number of participants with missing values prevented from missing value analysis. Participants' mean age was 17.63 years, $SD = 1.50$ years. All participants gave their informed assent to participate in the study; for participants of minor age, the written informed consent form was signed by their parents/legal guardians after detailed description of the study. To prevent linguistic bias, all participants were asked to be native Italian speaker. None of the participants received an incentive for participating in the study. After obtaining approval from the school principal, adolescents were contacted for their initial assent to participate in the study. All participants were assessed anonymously by trained clinical psychologists during school time; an alphanumeric code was used to allow matching adolescent's graded with his/her corresponding test scores. All measures were administered individually in random order. SCID-5-CV ADHD was administered blind to self-reports and school grade scores. In the present study, time considerations allowed for testing only SCID-5-CV ADHD module.

Measures

Structured Clinician Interview for DSM-5-Clinician Version Attention-deficit/Hyperactivity Disorder Module (SCID-5-CV ADHD)¹⁰. The SCID-5-CV ADHD is a semi-structured interview for assessing DSM-5 ADHD criteria. It provides at least one question for each DSM-5 ADHD criteria and impairment and exclusion criteria are explicitly tested. The assessment for ADHD begins with two screening questions that are designed to determine whether or not to proceed with the full assessment of the 18 ADHD items; then, questions concerning the nine inattention symptoms and the nine hyperactive/impulsive symptoms are asked¹⁰.

Adult ADHD Self-Report Scale (ASRS-6)¹⁵. The ASRS is a 6-item Likert-type screening measure designed to

assess the presence of ADHD symptoms in adult populations. It showed adequate psychometric properties¹⁵, also among Italian adolescents¹⁶.

Wender Utah Rating Scale (WURS)¹⁷. The WURS is a self-report questionnaire designed to retrospectively assess the severity of ADHD symptoms during childhood. Adequate reliability and validity were reported for the WURS; moreover, it significantly predicted the treatment outcome of subjects with adult ADHD, and the WURS, together with the CAARS, showed the best psychometric properties among 14 scales for adult ADHD¹⁸. The Italian translation of the WURS showed adequate reliability and validity¹⁹.

Personality Diagnostic Questionnaire-4+ (PDQ-4+) Conduct Disorder Scale²⁰. The PDQ-4+ is a 99 true/false item self-report questionnaire designed to assess the diagnostic criteria of personality disorders (PDs) included in DSM-IV Axis II. It includes a scale for Conduct Disorder (CD) assessment. In the present study, participants were administered only the PDQ-4+ CD scale; the higher the total score, the higher the number of CD criteria reported by a given participant. The psychometric properties of the Italian translation of the PDQ-4+ were detailed elsewhere²¹.

School grades were obtained from official school records.

Data analysis

Cronbach's α was used to evaluate the internal consistency reliability of SCID-5-CV ADHD criteria for the DSM-5 ADHD diagnosis, as well as for the two sub-scales – namely, Inattention and Hyperactive/Impulsive; Cronbach's α values were expected to be adequate (i.e., $> .70$)²².

The convergent validity of the SCID-5-CV ADHD scores (i.e., number of symptoms) was assessed by computing the Pearson r values with two self-report measures of ADHD, namely, the six-item version of the ASRS-6 and the WURS. To provide further evidence of the SCID-5-CV ADHD module validity, we computed correlations (i.e., Pearson r value) between the SCID-5-CV ADHD scores and the number of self-reported conduct disorder symptoms on the PDQ-4+ corresponding scale and with official school grades for participants' behaviour at school and subjects' performance, respectively.

The factor validity of the SCID-5-CV ADHD criteria was assessed using weighted least square mean and variance adjusted (WLSMV) confirmatory factor analysis (CFA); the following models were tested: a) a unidimensional model, with a single latent factor underlying the 18 SCID-5-CV ADHD items; b) a two-factor model, with SCID-5-CV Inattention items defining the Inattentive factor and SCID-5-CV Hyperactivity/Impulsivity items loading on the Hyperactive factor; a second-order ADHD factor was hypothesized to explain the correlation

between the two first-order factors; c) a CFA bi-factor model, with all SCID-5-CV ADHD criteria loading on the general factor, and two specific factors corresponding to the Inattentive factor and the Hyperactive factor, respectively. We used several measures to identify model fit, including the χ^2 goodness-of-fit statistic, Browne and Cudeck's²³ root mean square error of approximation (RMSEA), the Tucker-Lewis index (TLI), and comparative fit index (CFI). Following Hu and Bentler's²⁴ suggestions, TLI and CFI values $\geq .95$, RMSEA values close to $.06$, and SRSMR $< .08$ were considered as indicating good model fit, whereas TLI and CFI values of $.90$ and higher, and an RMSEA of $.08$ and lower were considered as suggestive of an adequate fit. In bi-factor models, observable indicators are thought to measure all the same latent dimension (i.e., the general factor), while specific factors are hypothesized to explain only residual covariation²⁵. The reliability of the factors was assessed by computing omega-hierarchical and omega-specific coefficients²⁵.

Results

Participants were 217 male adolescents who were attending a vocational school in Northern Italy; participants' mean age was 17.63 years ($SD = 1.50$ years). Seventy-three (33.6%) participants previously experienced one or more school failures; 45 (20.7%) adolescents manifested severe behavior problem at school. Descriptive statistics, reliability (Cronbach α) coefficients, and Pearson r values for all measures used in the present study are listed in Table I.

Based on SCID-5-CV ADHD module, 14 (6.5%) participants met DSM-5 criteria for adult ADHD diagnosis. Participants who met DSM-5 criteria for adult ADHD diagnosis received on average significantly lower behavior (7.50 vs 8.14 , $t(215) = -2.28$, $p < .05$, $d = -0.31$) and school (6.4 vs 6.8 , $t(215) = -2.03$, $p < .05$, $d = -0.28$) grades than participants who did not meet DSM-5 criteria for ADHD. Previous school failures were not significantly associated with adult ADHD, $t(215) = 0.74$, $p > .40$, $d = 0.10$.

Goodness-of-fit indices for the CFA models of the SCID-5-CV ADHD module are listed in Table II. According to Hu and Bentler²⁴ the bifactor model was the besting model for SCID-5-CV ADHD symptom criteria. Standardized factor loadings and omega-hierarchical/specific coefficients for the best-fitting model (i.e., confirmatory bi-factor model of SCID-5-CV ADHD criteria) are listed in Table III. The general omega coefficient value was $.88$; the general ADHD factor explained 81.0% of the SCID-5-CV ADHD criteria reliable score variance, whereas the Inattentive and Hyperactive/Impulsive specific factors explained 66.5% and 4.6% of the reliable score variance that was independent from the general

TABLE I. Structured Clinical Interview for DSM-5-Clinician Version Attention-Deficit/Hyperactivity Disorder Scale: Descriptive statistics, internal consistency reliability (Cronbach α values are listed on the main diagonal), convergent validity (i.e., Pearson r) coefficients with the adult ADHD Self-Report Scale-6 Item Version and the Wender Utah Rating Scale Total Scores, and External Validity (i.e., Pearson r) coefficients with the Personality Diagnostic Questionnaire-4+ Conduct Disorder Scale Score and School Grades ($n = 217$).

	M	SD	1	2	3	4	5	6	7	8
1. SCID-5- CVADHD Total Score (Number of Symptoms)	6.00	3.67	.85							
2. SCID-5- CVADHD Hyperactivity Score (Number of Symptoms)	2.64	2.22	--	.82						
3. SCID-5- CVADHD Inattentive Score (Number of Symptoms)	3.36	2.12	--	.44	.73					
4. ASRS-6 Total Score	8.42	4.39	.55	.43	.49	.74				
5. WURS Total Score	23.95	15.04	.54	.50	.43	.57	.91			
6. PDQ-4+ Conduct Disorder Total Score	2.24	2.28	.37	.40	.22	.29	.50	.73		
7. School Behavior Grade	8.10	1.02	-.23	-.11	-.28	-.17	-.23	-.20	--	
8. School Subjects Average Grade	6.77	0.79	-.07	-.01	-.11	-.11	-.14	-.16	.36	--

Note. SCID-5-CV ADHD: Structured Clinical Interview for DSM-5-Clinician Version Attention-Deficit/Hyperactivity Disorder Module; ASRS-6: Adult ADHD Self-Report Scale-6 Item Version; WURS: Wender Utah Rating Scale; PDQ-4+: Personality Diagnostic Questionnaire-4+. Since a total of 26 correlations were computed, the nominal significance level was corrected according to the Bonferroni procedure and set at $p < .0019$. Pearson r coefficients greater than $|\cdot21|$ are significant at Bonferroni-corrected nominal p -level. Bold highlights significant r coefficients.

--: Statistic not computed.

TABLE II. Structured Clinical Interview for DSM-5 Clinician Version Attention Deficit Hyperactivity Disorder Module: Confirmatory Factor Analysis Models and Confirmatory Bifactor Model Goodness-of-Fit Indices ($n = 217$).

Factor Models of SCID-5-CV ADHD Criteria	WLSMV χ^2	df	RMSEA	RMSEA 90% CI	CFI	TLI
a) 1 factor	223.343***	135	.055	.042 - .067	.891	.876
b) 2 correlated factors with one second-order ADHD factor	191.788***	134	.045	.029 - .058	.928	.918
c) Confirmatory bifactor model: 1 general factor and 2 specific factors	140.068	116	.031	.000 - .048	.970	.961

Note. SCID-5-ADHD: Structured Clinical Interview for DSM-5 Clinician Version Attention Deficit Hyperactivity Disorder module; WLSMV: weighted least square mean and variance adjusted; χ^2 : WLSMV goodness-of-fit chi-square; df: degrees of freedom; TLI: Tucker-Lewis index; CFI: Comparative fit index; RMSEA: root mean square error of approximation; CI: Confidence interval for RMSEA.

* $p < .05$; ** $p < .01$; *** $p < .001$.

ADHD factor, respectively.

Discussion

To our knowledge, the present study represents the first attempt at evaluating the psychometric properties of the ADHD module of the Italian translation of the SCID-5-CV in a sample of adolescents. Consistent with our hypotheses, our findings suggested that DSM-5 adult ADHD diagnostic criteria may be reliably assessed using the SCID-5-CV ADHD module, at least in a community sample of male adolescents with problem behavior/performance at school. These findings may be important for the assessment of ADHD; indeed, structured interviews (i.e., SCID-5-CV ADHD module) have been specifically

designed to improve on the limitations of unstructured clinical interview. The SCID-5-CV ADHD module represents a user-friendly instrument which can be used to enhance the reliability and validity of ADHD diagnostic assessment, particularly in clinical settings. Moreover, the User's Guide for the SCID-5-CV^{10 11} represents an important instrument for clinicians who seek to integrate time-tested interview questions corresponding to the DSM-5 criteria into their DSM-5 diagnostic assessment process. Indeed, the User's Guide provides comprehensive instructions on how to use the SCID-5-CV accurately, describes the rationale and usage of the SCID-5-CV, and discusses in detail how to interpret and apply the specific DSM-5 criteria for each ADHD criterion^{10 11}.

TABLE III. *Confirmatory Bi-Factor Model of SCID-5-CV ADHD Criteria: Standardized Factor Loadings and Omega-Hierarchical-Specific Coefficients (n = 217).*

SCID-5-CV ADHD Criteria	General ADHD factor	Inattentive specific factor	Hyperactivity/Impulsivity specific factor
	λ	λ	λ
H2. Missed details	.20*	.31**	---
H3. Had trouble staying focused	.49***	.35**	---
H4. Mind was elsewhere	.56***	.45***	---
H5. Started and dropped things	.10	.57***	---
H6. Had trouble organizing things	.16	.40***	---
H7. Avoided/disliked tasks	.33**	.50***	---
H8. Lost or misplaced things	.29**	.24	---
H9. Easily distracted by things	.37***	.31*	---
H10. Been very forgetful	.12	.53***	---
H12. Fidgeted/squirmed/tapped	.66***	---	-.60***
H13. Left seat	.66***	---	-.28
H14. Physically restless	.61***	---	-.61***
H15. Unable doing things quietly	.49***	---	.09
H16. Uncomfortable being still	.74***	---	-.43*
H17. Often talked too much	.43***	---	.14
H18. Finished people's sentences	.51***	---	.17
H19. Trouble waiting for "turn"	.37***	---	-.10
H20. Often interrupted	.88***	---	.45*
Omega-hierarchical/-specific	.71	.50	.04
Explained common variance	.60	.22	.18
Construct replicability (H index)	.90	.68	.64

Note. SCID-5-CV: Structured Clinical Interview for DSM-5 Clinician Version; ADHD: Attention Deficit Hyperactivity Disorder; λ : Standardized factor loading. * $p < .05$; ** $p < .01$; *** $p < .001$.

According to SCID-5-CV ADHD module assessment, the internal consistency reliability estimates of the DSM-5 ADHD criteria were adequate both for the full set of criteria and for the two sub-sets (i.e., Hyperactivity/Impulsivity and Inattentive). In our sample of community youngsters, 6.5% of the adolescents qualified for a DSM-5 diagnosis of ADHD. This finding was pretty consistent with prevalence estimates of adult ADHD in community samples²⁶, and further stressed the importance of assessing ADHD also in adolescence and later age⁹. Indeed, our school-based interview assessment prevented us from testing the inter-rater reliability of the SCID-5-CV ADHD module, as well as from administering the full interview. Although this method issue may represent a major limitation of our study, it should be observed that in our sample the SCID-5-CV ADHD scores (i.e., number of DSM-5 ADHD criteria met by each participant) showed significant associations with

self-report measures of ADHD whose effect size would be considered large by conventional standards²⁷. This finding could be hardly compatible with poor consistency of ADHD criteria ratings between independent interviewers. Interestingly, the number of ADHD symptoms (particularly, Hyperactivity/Impulsivity symptoms) based on SCID-5-CV assessment was significantly associated with the number of self-report CD criteria; this finding was consistent with previous longitudinal studies documenting that ADHD may represent a risk factor for antisocial behavior in adolescence/adulthood⁹. Consistent with our expectations, the association between SCID-5-CV ADHD symptoms and PDQ-4+ self-reports of CD was somewhat smaller than the convergent validity correlations with self-report measures of ADHD, further stressing the validity of the SCID-5-CV module as a measure of ADHD. Interestingly, our data suggested that the number of SCID-5-CV ADHD symp-

toms (as well as the WURS total score) was significantly associated with adolescents' current poor behavior at school. Adolescents who qualified for a DSM-5 ADHD diagnosis based on the SCID-5-CV interview showed significantly poorer behavior at school and school performance than non-ADHD adolescents, although the effect size estimates for these differences were small. Of course, we do not mean not to say that poor academic performance in adolescence is always related to ADHD. Rather, we feel that our findings stress the importance of identifying ADHD in adolescence to prevent early dropout from school^{9,28}.

Our WLSMV CFA results suggested that the tetrachoric correlations among the 18 SCID-5-CV ADHD symptom items are best explained by a bi-factor model hypothesizing a general ADHD factor, and two specific factors corresponding to the a priori DSM-5 Hyperactivity/Impulsivity and Inattentive dimensions. With the exception of three (16.7%) of SCID-5-CV ADHD symptom items, all other ADHD symptoms significantly loaded on the ADHD general factor, with an omega-hierarchical value that may be considered adequate by conventional standards²⁹. When this general ADHD dimension was held constant, the majority of SCID-5-CV ADHD Inattentive symptom items showed positive, significant loadings on the Inattentive specific factor. Rather, none of the SCID-5-CV Hyperactivity/Impulsivity symptom item loaded positively and significantly on the Hyperactivity/Impulsivity specific factor.

In our study, the explained common variance and the omega-hierarchical coefficient values for the ADHD general factor were .60 and .71, respectively. Under these conditions, Reise and colleagues³⁰ suggested that the presence of some multidimensionality may not be severe enough to disqualify the interpretation of the instrument – i.e., the SCID-5-CV ADHD module – as primarily unidimensional. However, the Inattentive specific factor showed a non-trivial omega-specific value; moreover, the proportion of reliable score variance in

the Inattentive factor sub-scale that was independent from the general ADHD factor was .665. In other terms, in our sample a non-negligible amount of reliable score variance in SCID-5-CV Inattentive symptoms was independent from the general ADHD factor; this finding was consistent with studies suggesting that attention problems are heterogeneous in nature and are not wholly captured by the inattention symptoms used to assess, diagnose, and treat ADHD^{31,32}.

Of course, our findings should be considered in the light of several limitations. The sample size was moderate and included only community male participants; this limits the generalizability of our findings clinical samples as well to samples including female adolescents and to community adult samples. We were not able to provide full assessment of DSM-5 mental disorder diagnoses included in the SCID-5-CV, thus not providing data on ADHD co-morbidity. As we mentioned above, we were not able to provide data on the inter-rater reliability of the SCID-5-CV ADHD criteria; however, the pattern of associations that we observed for the SCID-5-CV ADHD module was hardly compatible with poor rater agreement. Further studies on this topic are badly needed before accepting our conclusions. The reduced number of participants who met DSM-5 criteria for ADHD diagnosis prevented us from sub-typing the disorder. It might be claimed that relying on CFA for testing the latent structure of the SCID-5-CV ADHD symptom items may not be consistent with the categorical nature of the DSM-5 ADHD diagnosis. However, available evidence clearly supports the dimensional latent structure of ADHD³³.

Even keeping these limitations in mind, we feel that our data provides first support to the reliability and validity of the SCID-5-CV ADHD module, at least among community male adolescents.

Conflict of Interest

The authors have no conflict of interests.

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