Reliability Comparison of Obsessive-Compulsive Disorder Assessment Instruments in Children and Adolescents: A Meta-Analysis Based on Cronbach's Alpha

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Abstract

Currently, no quantitative comparison of reliability exists for OCD assessment tools. For clinical practitioners, selecting appropriate scales may be challenging. Therefore, this study systematically reviewed OCD scales used in child and adolescent populations over the past 30 years, providing a comprehensive evaluation of the reliability of each scale. Meta-analytic results indicate that the overall reliability of current OCD assessment tools for children and adolescents is satisfactory. Among all OCD scales for children and adolescents, the Children's Florida Obsessive Compulsive Inventory Symptom Checklist demonstrates the lowest internal consistency coefficient, whereas the Padua Inventory exhibits the highest. It is recommended that mental health professionals in primary and secondary schools in China utilize the Children's Obsessive Beliefs Questionnaire to assess obsessive thoughts, and employ the Padua Inventory or the Adolescent Obsessive-Compulsive Symptoms Questionnaire to evaluate compulsive behaviors.

Full Text

Preamble

Reliability Comparison of Assessment Instruments for Obsessive-Compulsive Disorder in Children and Adolescents: A Meta-Analysis Based on Cronbach's Alpha

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Abstract: Currently, no quantitative comparisons of reliability exist for assessment tools for obsessive-compulsive disorder (OCD), making scale selection potentially challenging for clinicians. This study systematically reviewed OCD

scales used in child and adolescent populations over the past 30 years to comprehensively evaluate their reliability coefficients. Meta-analytic results indicated that the overall reliability of current OCD assessment instruments for children and adolescents is good. Among all OCD scales for this population, the Children's Florida Obsessive Compulsive Inventory symptom checklist exhibited the lowest internal consistency coefficient, while the Padua Inventory demonstrated the highest. We recommend that mental health practitioners in Chinese primary and secondary schools use the Obsessive Belief Questionnaire-Child Version to assess obsessive thoughts and either the Padua Inventory or the Obsessive-Compulsive Symptoms Questionnaire of Adolescent to assess obsessive-compulsive behaviors.

Keywords: Obsessive-Compulsive Disorder, assessment tools, reliability, meta-analysis

1.1 Obsessive-Compulsive Disorder

Obsessive-compulsive disorder is a complex neurotic disorder characterized by recurrent obsessions and compulsions that cause significant distress and interfere with daily functioning (Abramowitz & Jacoby, 2014). Epidemiological surveys in China report a lifetime prevalence of 2.4% and an annual prevalence of 1.6% (Meng et al., 2019), while international studies indicate a worldwide adult prevalence of 2-3% and a child/adolescent prevalence of 1% (Olatunji et al., 2013; Ruscio et al., 2010). Approximately 65% of individuals with OCD report that their symptoms have caused significant functional impairment and considerable distress, with severe cases even developing suicidal ideation (Pittenger et al., 2011), posing serious threats to social safety and stability. As mental health awareness becomes increasingly widespread, even in less developed regions that are beginning to emphasize screening for psychological disorders, the reported prevalence of OCD may continue to rise. Due to its substantial impact, the World Health Organization has listed OCD as one of the ten most debilitating disorders (Westwell-Roper & Stewart, 2019). Individuals with OCD experience intense distress, lose control over obsessive thoughts, and repeatedly engage in compulsive behaviors that cause both psychological and potential physical harm. The disorder severely affects patients' family functioning, finances, and energy. Research on OCD has grown substantially in recent years, covering both etiology and treatment approaches.

1.2 Assessment of Obsessive-Compulsive Disorder

Currently, identifying OCD in minors presents certain challenges. Some children conceal their symptoms due to fear of social evaluation, making detection difficult for caregivers, while others may exhibit symptoms months or even years before diagnosis. According to diagnostic criteria such as DSM-IV, ICD-10, and CCMD-3, diagnosis is based on: (1) clinical manifestations primarily involving obsessions or compulsions; (2) patient recognition that these symptoms are ex-

cessive and unrealistic, causing distress due to inability to eliminate them; (3) functional impairment in daily life, work, learning, or social activities; and (4) exclusion of other neuropsychiatric disorders or symptoms better explained by other mental disorders. Numerous assessment instruments for OCD in children and adolescents currently exist. For example, the Children's Yale-Brown Obsessive Compulsive Scale (CY-BOCS) has been widely used in research and clinical practice, with multiple language translations demonstrating good reliability and validity across cultural contexts, establishing it as a well-validated measurement tool (Scahill et al., 1997). Its assessment of OCD symptom severity does not depend on specific symptom content, providing a more comprehensive evaluation that avoids missed detection or misdiagnosis due to incomplete scale design. The Leyton Obsessional Inventory-Child Version (LOI-CV) is commonly used for screening adolescent OCD patients, comprising four dimensions: general obsessional thoughts, fear of dirt and contamination, lucky numbers, and schoolwork. Administration first determines symptom presence, then rates severity on a four-point scale if present (Berg et al., 1986). Chinese scholars Li Zhanjiang and Wang Jisheng (1999) revised this questionnaire, optimizing its four dimensions to lucky numbers, neatness and cleanliness, checking and repeating, and general obsessive thoughts, with the revised version demonstrating good reliability and validity.

1.3 Research Questions

However, no quantitative comparisons of reliability currently exist for OCD assessment tools, making appropriate scale selection potentially difficult for clinicians. Therefore, this study systematically reviewed OCD scales used in child and adolescent populations over the past 30 years to comprehensively evaluate reliability coefficients and provide recommendations for clinical practice.

2.1 Literature Search and Screening

We first searched Chinese databases (CNKI, Wanfang, and VIP) using the keywords "obsessive-compulsive disorder," "children," and "adolescents" through July 30, 2022, retrieving X articles. Next, we searched English databases (Web of Science, PubMed, PsycARTICLES, and ScienceDirect) using combinations of "OCD" with "child" and "adolescence." To avoid omissions, we supplemented our search by tracking citations and monitoring literature updates.

Literature was imported into EndNote X9 and screened according to the following criteria: (1) must be empirical research (survey or experimental), excluding purely theoretical, review, or case studies; (2) must have used measurement tools to assess OCD-related symptoms and reported internal consistency coefficients; (3) included studies were not limited to journal articles but also included dissertations and conference papers; (4) for duplicate publications, only the most comprehensive report was retained; and (5) sample size must be clearly specified.

2.2 Literature Coding

Each study was coded according to: (A) author; (B) publication year; (C) sample size; (D) OCD assessment scale; (E) number of scale items; and (F) reliability coefficient (Cronbach's α).

2.3 Model Selection

Based on our literature review, we determined that OCD measurement methods across included studies were inconsistent, with insufficient justification to assume a fixed true effect size. Therefore, we employed a random-effects model for estimation. We also conducted heterogeneity tests to verify the appropriateness of this model selection. If Q-test results were significant, the random-effects model would be more appropriate than the fixed-effects model (Huedo-Medina et al., 2006).

2.4 Data Processing

All statistical analyses were conducted in R 4.2.0 using the metafor package, including overall effect testing, publication bias testing, and moderator testing (Viechtbauer, 2010). Restricted maximum likelihood estimation was used for overall effect testing, as this method is appropriate for meta-analysis of continuous outcomes (Veroniki et al., 2016). We included scale type as a covariate in the meta-regression model to estimate Cronbach's α coefficients for each scale.

3.1 Literature Inclusion

This meta-analysis included 26 studies, yielding 33 effect sizes. Among these, 8 were Chinese-language articles and 18 were English-language articles, spanning 1997-2021. Included studies are listed in the Appendix.

3.2 Main Effects Test

The current meta-analysis employed a three-level random-effects model to estimate main effects across 33 effect sizes. Results showed that the overall estimated average internal consistency coefficient for OCD scales in children and adolescents was $\alpha = 0.854$, 95% CI [0.824, 0.884]. Heterogeneity analysis of this result indicated significant heterogeneity in the main effect, $Q(df = 32) = 5201.338$, $p < .001$.

3.4 Moderator Effects Test

[Figure 1: see original paper] shows the funnel plot of α coefficients. Meta-regression analysis was used to test whether internal consistency differed across OCD scales, with results presented in Table 1 . The moderator effect of OCD scale type was significant, $Q(df = 9) = 19.9643$, $p = 0.018$.

Table 1. α Reliability Estimates for Each OCD Scale

Scale	Intercept/mean α (95% CI)	β (95% CI)
CFOCI	0.735 (0.631, 0.839)***	—
CYBOCS	0.760 (0.607, 0.913)***	0.025 (-0.160, 0.210)
SCL90	0.796 (0.737, 0.855)***	0.061 (-0.059, 0.180)
LOLCV	0.810 (0.660, 0.960)***	0.075 (-0.108, 0.258)
YBCOS	0.830 (0.745, 0.915)***	0.095 (-0.039, 0.229)
OCICV	0.875 (0.813, 0.937)***	0.140 (0.019, 0.261)*
OSCQA	0.875 (0.810, 0.941)***	0.140 (0.017, 0.263)*
OBQCV	0.920 (0.773, 1.066)***	0.185 (0.005, 0.365)*
PI	0.930 (0.870, 0.990)***	0.195 (0.075, 0.315)**

Note: k = number of effect sizes; β = meta-regression coefficient.

CFOCI = Children's Florida Obsessive Compulsive Inventory; CYBOCS = Children's Yale-Brown Obsessive Compulsive Scale; SCL90 = Symptom Checklist–90; LOLCV = Leyton Obsessional Inventory-Child Version; YBCOS = Yale-Brown Obsessive Compulsive Scale; OCICV = Obsessive Compulsive Inventory-Child Version; OSCQA = Obsessive-Compulsive Symptoms Questionnaire of Adolescent; OBQCV = Obsessive Belief Questionnaire-Child Version; PI = Padua Inventory.

$p < 0.05$; ***$p < 0.01$;*** $p < 0.001$.*

4 Discussion

This meta-analysis integrated internal consistency coefficients from OCD assessment scales used in child and adolescent populations both domestically and internationally. The average Cronbach's α across all scales was 0.854, indicating good overall reliability of current OCD assessment instruments for children and adolescents. We further employed OCD scale type as a covariate in meta-regression models to estimate internal consistency coefficients for each scale and examine significant differences between them. Moderator analysis revealed that among all OCD scales for children and adolescents, the Children's Florida Obsessive Compulsive Inventory (CFOCI) demonstrated the lowest internal consistency coefficient, while the Padua Inventory (PI) showed the highest. Notably, PI was used in only one study, potentially overestimating its actual reliability. Therefore, based on current meta-analytic results, the Obsessive Belief Questionnaire-Child Version (OBQCV) appears to be the most suitable tool for assessing OCD in children and adolescents. However, OCD encompasses both obsessive thoughts and compulsive behaviors, while OBQCV specifically assesses only obsessive thoughts. For assessing compulsive behaviors, in addition to the PI scale, the Obsessive-Compulsive Symptoms Questionnaire of Adolescent (OCSQA), developed by Chinese scholar Chen Li (2007), also demonstrates

excellent internal consistency. Moreover, OCSQA was developed based on a Chinese adolescent sample, potentially offering greater applicability for mental health practitioners in Chinese primary and secondary schools.

This meta-analysis has several limitations. First, our evaluation of OCD scales for children and adolescents relied solely on internal consistency coefficients, while reliability also encompasses test-retest reliability, structural reliability, and other indicators. Future research should incorporate additional reliability metrics to comprehensively reflect scale quality. Second, studies with favorable reliability results are more likely to be published, suggesting potential publication bias risk in this meta-analysis. We lacked quantitative assessment and correction for this risk. Future meta-analyses of α coefficients should consider incorporating methods such as Egger's regression to quantify publication bias.

5 Conclusion

Current OCD assessment instruments for children and adolescents demonstrate good overall reliability. Among all scales for this population, the Children's Florida Obsessive Compulsive Inventory exhibits the lowest internal consistency coefficient, while the Padua Inventory shows the highest. We recommend that mental health practitioners in Chinese primary and secondary schools use the Obsessive Belief Questionnaire-Child Version to assess obsessive thoughts and either the Padua Inventory or the Obsessive-Compulsive Symptoms Questionnaire of Adolescent to assess obsessive-compulsive behaviors.

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Appendix: Studies Included in the Meta-Analysis

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Note: Figure translations are in progress. See original paper for figures.