## Title

Contemporary models of pediatric obsessive–compulsive disorder: An evaluation with a large clinical sample



## Journal

Psychiatry Research, 229(1-2)

## ISSN

0165-1781

## Authors

De Nadai, Alessandro
Nagpal, Prianka S
Piacentini, John
et al.

## Publication Date

2015-09-01

## DOI

10.1016/j.psychres.2015.03.034

Peer reviewed

HHS Public Access

Author manuscript

*Psychiatry Res*. Author manuscript; available in PMC 2016 September 30.

Published in final edited form as:

*Psychiatry Res*. 2015 September 30; 229(0): 620–622. doi:10.1016/j.psychres.2015.03.034.

# Contemporary Models of Pediatric Obsessive Compulsive Disorder: An Evaluation with a Large Clinical Sample

**Alessandro De Nadai**[a,b,*], **Prianka S. Nagpal**[b], **John Piacentini**[c], **Tara S. Peris**[c], **Gary R. Geffken**[d,e], **Daniel A. Geller**[f], **Tanya K. Murphy**[b], **Eric A. Storch**[a,b,g,h], and **Adam B. Lewin**[a,b]

[a]Department of Psychology, University of South Florida, 4202 East Fowler Ave, PCD 4118G Tampa, FL 33620.

[b]Departments of Pediatrics and Psychiatry and Behavioral Neurosciences, Rothman Center for Neuropsychiatry, University of South Florida College of Medicine, 880 6th Street South, Suite 460, Saint Petersburg, FL 33701.

[c]Department of Psychiatry and Biobehavioral Sciences, University of California Los Angeles, 760 Westwood Plaza, Los Angeles, CA 90095.

[d]Department of Psychiatry, University of Florida, 8491 NW 39th Ave., Gainesville, FL 32606.

[e]Department of Clinical and Health Psychology, University of Florida, 1225 Center Drive, Room 3151, Gainesville, FL 32611.

[f]Department of Psychiatry, Massachusetts General Hospital/Harvard Medical School, 55 Fruit Street, Boston, MA 02114.

[g]Rogers Behavioral Health - Tampa Bay, 2002 North Lois Ave., Suite 400, Tampa, FL 33629.

[h]All Children's Hospital - Johns Hopkins Medicine, 501 6th Ave. South, Saint Petersburg, FL 33701.

## Abstract

We evaluated the construct validity of the Child Yale-Brown Obsessive Compulsive Scale (CYBOCS) in a large clinical sample (N=730) using confirmatory factor analysis. Results found inadequate fit for a priori models, though a model accounting for overlapping item content displayed good fit. Parallel obsessions/compulsions items may provide largely redundant information on the CYBOCS. Findings suggest modifying the CYBOCS to reduce burden on researchers, patients, and clinicians, and to more accurately measure pediatric obsessive compulsive disorder.

Correspondence concerning this article should be addressed to Alessandro S. De Nadai, 880 6th Street South, Suite 460 Box 7523, Rothman Center for Neuropsychiatry, University of South Florida College of Medicine, Saint Petersburg, FL (USA) 33701. Phone: (727) 767-8230. denadai@mail.usf.edu.

**Keywords**

Obsessive compulsive disorder; pediatric; assessment

## 1. Introduction

A notable debate has focused on how to correctly classify pediatric obsessive compulsive disorder (OCD) in DSM-5, especially with regard to the uniqueness of obsessions and compulsions relative to psychopathology seen in other anxiety disorders (Storch et al., 2008). Improper modeling of obsessions and compulsions artificially increases heterogeneity in classification, which can complicate differential diagnosis and the communication of information to patients. A disorder model that is not correctly specified also creates error variance in measurement, which reduces power to detect relationships with other constructs of interest. Taken together, if pediatric OCD is not modeled properly, fewer research findings will emerge, and more error in clinical work will occur.

The gold standard measure used to characterize pediatric OCD is the Children's Yale-Brown Obsessive Compulsive Scale (CYBOCS; Scahill et al., 1997), which reflects a traditional separation of obsessions and compulsions. While it has shown reliability as well as convergent, divergent, and discriminant validity (Lewin et al., 2014), it has not demonstrated strong construct validity. Both Storch et al. (2005) and McKay et al. (2003) failed to confirm the separate modeling of obsessions and compulsions. Instead, each group found different 2-factor models that consisted of severity and disturbance factors as opposed to obsessions/compulsions factors. Given such discrepancies, we compared these models in a clinical sample that is nearly three times the size of the largest employed in prior factor analyses.

## 2. Methods

Participants were 730 treatment-seeking youth (56.4% male, 42.1% female, 1.5% gender not reported) ages 3–18 (Mean age=11.49, SD=3.06). They were recruited from four U.S. academic clinics specializing in childhood OCD and received primary diagnoses of OCD via semistructured interview. Participants were a subsample from a normative study of the CYBOCS; please see Lewin et al. (2014) for further detail on diagnostic methodology, which followed gold-standard practice. Participants were predominantly Caucasian (77.5%), with other ethnicities including Hispanic (6.6%), African American (2.2%), Asian American (1.9%), and other (3.6%); 5.1% of participants chose not to provide ethnicity data and 3.2% of participants did not have recorded ethnicity data.

All participants were administered the CYBOCS, a semistructured clinician-administered assessment consisting of a symptom checklist followed by a 10-item rating of obsessive and compulsive symptom severity over the past week. Each item is rated on a 0–4 point scale, yielding a CYBOCS Total Severity score. Three a priori models of the CYBOCS were tested via confirmatory factor analysis: the original CYBOCS factor structure, the severity-disturbance factor structure proposed by Storch et al. (2005), and the severity-disturbance factor structure proposed by McKay et al. (2003). A depiction of each model can be seen in

Figure 1. Model fit was assessed by the Comparative Fit Index (CFI), the Root Mean Square Error of Approximation (RMSEA), and the Standardized Root Mean Square Residual (SRMR). Adequate model fit is reflected by values of greater than .95 for the CFI, values of less than .06 for the RMSEA, and values of less than .06 for the SRMR (as indicated by Hu and Bentler, 1999). Modification indices for each model were evaluated via Lagrange multipliers; any improvements in model fit made based on these indices were considered by $\chi^2$ difference tests between models.

## 3. Results

Participants had CYBOCS scores consistent with those seen in other studies (Mean=24.9, SD=5.7). None of the a priori models evaluated displayed adequate model fit, including the original CYBOCS factor structure (CFI=.73, RMSEA=.17, SRMR=.10), the Storch et al. (2005) model (CFI=.78, RMSEA=.16, SRMR=.08), or the McKay et al. (2003) model (CFI=.71, RMSEA=.18, SRMR=.10). Given this lack of model fit, we reevaluated the original CYBOCS factor model, as item loadings for all indicators were in the good to excellent range (according to criteria specified by Comrey and Lee, 1992) with the exception of the resistance items (item loadings were <.3, and these items have previously received scrutiny in OCD research; Storch et al., 2010).

Two major trends emerged from an evaluation of modification indices. First, residuals were correlated among all CYBOCS items that had parallel formats for obsessions and compulsions (e.g., time spent on obsessions, time spent on compulsions). Secondly, the results indicated that residuals were correlated among the items focusing on resistance and control. Permitting for correlated residuals among parallel items for obsessions and compulsions found an improved model fit relative to the original CYBOCS model (difference in model fit: $\chi^2(5)=429.46$, $p$ <.01; overall model fit: CFI=.88, RMSEA=.12, SRMR=.07). Adding to this model correlated residuals for resistance and control items (i.e., items 4–5 and items 9–10 on the CYBOCS) resulted in the only acceptable model fit among all models evaluated (difference in model fit: $\chi^2(2)=249.31$, $p$ <.01; overall model fit: CFI=.97, RMSEA=.06, SRMR=.04). A pictorial depiction of this model can be seen in Figure 1.

## 4. Discussion

Support was not found for any a priori CYBOCS factor model. In particular, two sources of extraneous variance were identified that were not explained by obsessions/compulsions: systematic relationships between parallel item formats, and systematic relationships between the resistance and control items. Such correlated residual variance can arise from multiple sources, including the existence of a factor not measured in the model, participant response sets (e.g., different response approaches to positively/negatively worded items), and because items that assess similar content will have residuals that cluster together. It appears likely that the latter process is in effect in our data. This linkage between obsessions and compulsions is not unprecedented in OCD, as research in OCD self-report instruments (e.g., the Dimensional Obsessive-Compulsive Scale; Abramowitz et al., 2010) has found utility in measuring obsessions and compulsions simultaneously.

Given the strong factor loadings observed and the demonstrated reliability and validity of the CYBOCS, it is a useful measure of OCD. However, there may be a lack of parsimony among CYBOCS items, as asking about obsessions and compulsions separately may yield largely redundant information. If this is the case, assessors could possibly ask about both constructs simultaneously. In tandem with merging the resistance and control items (given conceptual and empirical redundancy), a 4-item CYBOCS would result. This CYBOCS could be administered by asking about both obsessions and compulsions simultaneously for items 1–4, and when administering item 4 also asking about resistance and control concurrently. A particular focus may be placed on compulsions, given that unwanted ego-dystonic obsessions are actually quite common (Rassin et al., 2007) and purely behavioral treatments have led to reductions in unwanted cognitions in anxiety disorders (e.g., Newman et al., 1994). Perhaps what makes OCD abnormal may not be the experience of obsessions, but rather patient response to these obsessions, and constructs such as anxiety sensitivity could differentiate clinical patients. While the CYBOCS is an effective measure of pediatric OCD, modifications may be required to increase parsimony, improve measurement precision, and reduce burden on patients and clinicians alike.

## Acknowledgment

This research was supported by the National Institutes of Health under National Institute of Mental Health grants F31 MH094095 (De Nadai), R01 MH058549 (Piacentini), K23 MH085058 (Peris), R01 MH093402 (Geller), R01 MH063914 (Murphy), R01 MH093381 (Storch), R03 MH076775 (Storch), as well as from the International OCD Foundation (Lewin and Murphy) and the University of South Florida Research Council (Lewin). The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Institutes of Health.

## References

Abramowitz JS, Deacon B, Olatunji B, Wheaton MG, Berman N, Losardo D, Timpano K, McGrath P, Riemann B, Adams T, Bjorgvinsson T, Storch EA, Hale L. Assessment of obsessive-compulsive symptom dimensions: Development and evaluation of the Dimensional Obsessive-Compulsive Scale. Psychological Assessment. 2010; 22:180–198. [PubMed: 20230164]

Comrey, AL.; Lee, HB. A first course in factor analysis. Hillsdale, NJ: Erlbaum; 1992.

Foa EB, Kozak MJ, Goodman WK, Hollander E, Jenike MA, Rasmussen SA. DSM-IV field trial: Obsessive-compulsive disorder. American Journal of Psychiatry. 1995; 152:90–96. [PubMed: 7802127]

Hu LT, Bentler PM. Cutoff criteria for fit indexes in covariance structure analysis: conventional criteria versus new alternatives. Structural Equation Modeling: A Multidisciplinary Journal. 1999; 6:1–55.

Lewin AB, Piacentini J, De Nadai AS, Jones AM, Peris TS, Geffken GR, Geller DA, Nadeau JM, Murphy TK, Storch EA. Defining Clinical Severity in Pediatric Obsessive-Compulsive Disorder. Psychological Assessment. 2014; 26:679–684. [PubMed: 24320764]

McKay D, Piacentini J, Greisberg S, Graae F, Jaffer M, Miller J, Neziroglu F, Yaryura-Tobias JA. The Children's Yale-Brown Obsessive-Compulsive Scale: Item structure in an outpatient setting. Psychological Assessment. 2003; 15:578–581. [PubMed: 14692851]

Newman MG, Hofmann SG, Trabert W, Roth WT, Taylor CB. Does behavioral treatment of social phobia lead to cognitive changes? Behavior Therapy. 1994; 25:503–517.

Rassin E, Cougle JR, Muris P. Content difference between normal and abnormal obsessions. Behaviour Research and Therapy. 2007; 45:2800–2803. [PubMed: 17709093]

Scahill L, Riddle MA, McSwiggin-Hardin M, Ort SI, King RA, Goodman WK, Cicchetti D, Leckman JF. Children's Yale-Brown Obsessive Compulsive Scale: reliability and validity. Journal of the American Academy of Child and Adolescent Psychiatry. 1997; 36:844–852. [PubMed: 9183141]

Storch EA, Abramowitz J, Goodman WK. Where does obsessive-compulsive disorder belong in DSM-V? Depression and Anxiety. 2008; 25:336–347. [PubMed: 18412060]

Storch EA, Murphy TK, Geffken GR, Bagner DM, Soto O, Sajid M, Allen P, Killiany EM, Goodman WK. Factor analytic study of the Children's Yale- Brown Obsessive-Compulsive Scale. Journal of Clinical Child and Adolescent Psychology. 2005; 34:312–319. [PubMed: 15901231]

Storch EA, Rasmussen SA, Price LH, Larson MJ, Murphy TK, Goodman WK. Development and psychometric evaluation of the Yale–Brown Obsessive-Compulsive Scale-Second Edition. Psychological Assessment. 2010; 22:223. [PubMed: 20528050]

## Highlights

- We examined contemporary models of pediatric obsessive compulsive disorder (OCD)
- Through confirmatory factor analysis, we found that prior models did not fit well
- We identified poor model fit likely to be a result of redundancy in item content
- Merging redundant item content could reduce OCD assessment burden by more than half

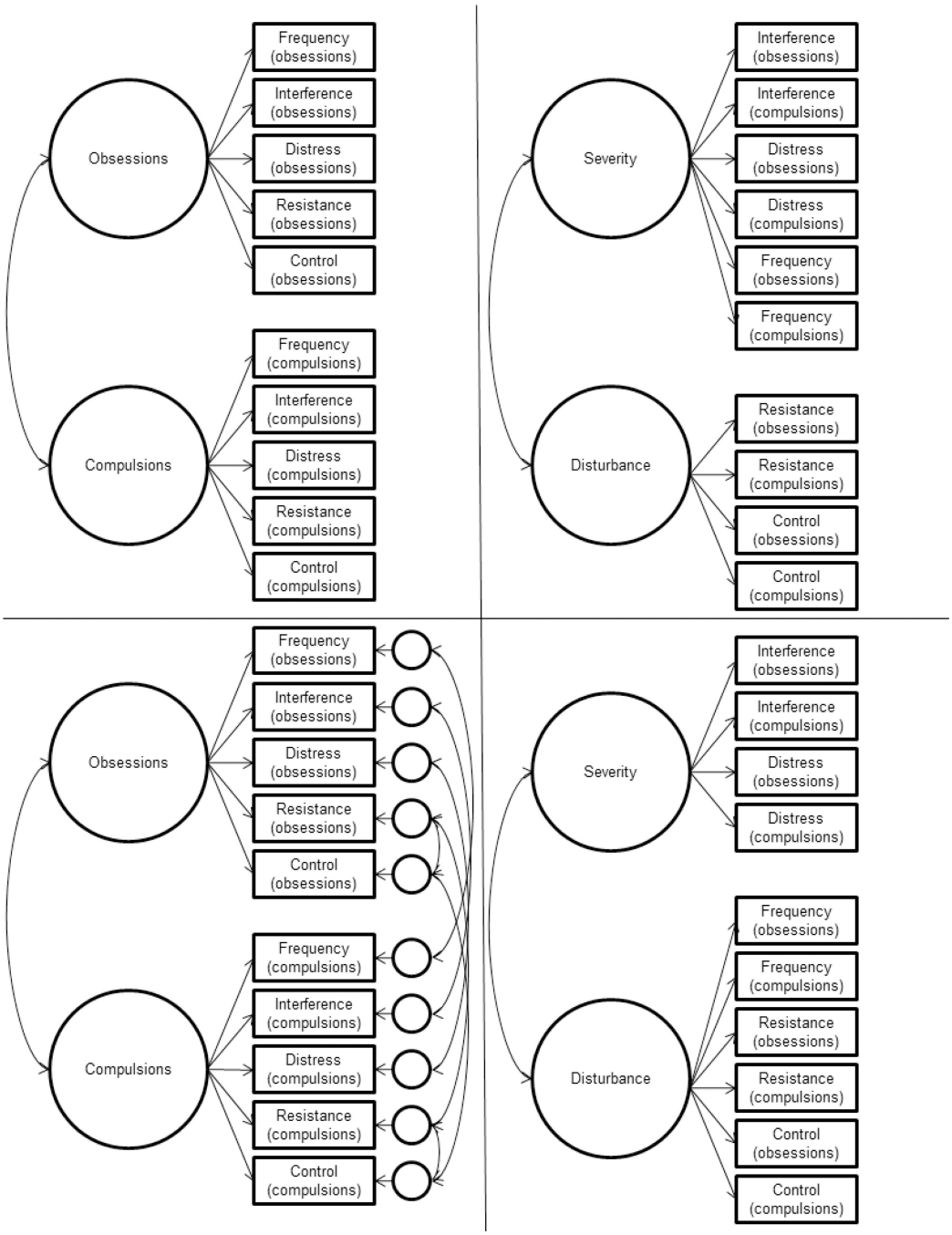


**Figure 1.**

CYBOCS models that were evaluated, clockwise from top derived CYBOCS factor structure, the Storch et al. (2005) CYBOCS model, the McKay et al. (2003) CYBOCS model, and our final top-left: The original rationally , CYBOCS model (incorporating correlated residuals)