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Distinguishing fear versus distress symptomatology in pediatric OCD

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Abstract

Prior research has identified OCD subtypes or “clusters” of symptoms that differentially relate to clinical features of the disorder. Given the high comorbidity between OCD and anxiety, OCD symptom clusters may more broadly associate with fear and/or distress internalizing constructs. This study examines fear and distress dimensions, including physical concerns (fear), separation anxiety (fear), perfectionism (distress), and anxious coping (distress), as predictors of previously empirically-derived OCD symptom clusters in a sample of 215 youth diagnosed with primary OCD (ages 7 to 17, mean age = 12.25). Self-reported separation fears predicted membership in Cluster 1 (aggressive, sexual, religious, somatic obsessions, and checking compulsions) while somatic/autonomic fears predicted membership in Cluster 2 (symmetry obsessions and ordering, counting, repeating compulsions). Results highlight the diversity of pediatric OCD symptoms and their differential association with fear, suggesting the need to carefully assess both OCD and global fear constructs that might be directly targeted in treatment.

Keywords

OCD; fear; distress; child; adolescent

Pediatric obsessive-compulsive disorder (OCD) is a distressing and debilitating condition that predicts a variety of long-term negative mental health outcomes.^{1,2} The course of OCD tends to be chronic, and while some have found strong treatment response rates in children and adolescents³, others report poor-to-moderate treatment response⁴ and high rates of relapse over the course of follow-up.^{5,6} Challenges to understanding the phenomenology and treatment of OCD are complicated by its heterogeneous symptom presentation.⁷ In attempts to better understand the diversity of obsessions and compulsions that comprise OCD and that may lead to difficulties with treatment efficacy⁸ researchers have begun to study and identify “clusters”, or groupings of OCD symptoms, that tend to present together across individuals.

Use of factor and cluster analytic techniques by several research groups has resulted in proposals for four distinct, empirically-supported OCD symptom clusters^{9–12}, which have been further supported with meta-analysis.¹³ Although individual studies have found slight differences in the exact symptoms included in each cluster, the broad categories identified in adult samples and subsequently replicated with children consist of: 1) aggressive, sexual, religious, somatic, checking; 2) symmetry, ordering, counting, repeating; 3) contamination, cleaning; and 4) hoarding. These empirically-derived symptom clusters predict differential response to exposure-based treatment in adults: while contamination symptoms predict better treatment response¹⁴, hoarding^{15–17} and sexual/religious^{18,19} obsessions are associated with fewer clinical gains. Subsequently, experts have called for further examination of these OCD subtypes in order to clarify the phenotypic diversity of OCD and, hopefully, improve conceptualization and treatment of this condition.²⁰

Despite these strides in understanding, several questions remain. OCD and anxiety commonly co-occur²¹, but little work has been done to examine whether OCD symptom clusters are related to ratings of fear and/or distress. This is particularly important considering current efforts to understand the phenomenology and nosology of both OCD and anxiety-spectrum disorders. OCD and anxiety have been recently separated in DSM-5, with some preliminary support provided for distinct neurobiological underpinnings.^{22–24} However, there are arguments against this reclassification and support provided that OCD should be retained with the anxiety disorders.²⁵ Indeed, OCD and anxiety appear to co-occur at high rates, both respond to evidence-based pharmacologic and psychosocial intervention approaches, and share fear/worry symptoms. For example, OCD obsessions of symmetry, harm, and unacceptable thoughts, along with arranging, checking, and neutralizing compulsions have been associated with comorbid anxiety.⁹ Moreover, some associated characteristics of OCD, including inflated sense of responsibility, thought-action fusion, and reassurance-seeking are also related to anxiety disorder symptoms in both adults^{26–28} and children^{29–31}, suggesting constructs related to self and safety that may underlie both conditions.

One alternate conceptualization of the link between OCD and anxiety stems from a movement towards dimensional categorization of mental health problems within their underlying nosological domains^{32,33} and empirical studies of the structure of psychopathology. Large-scale investigations provide support for the distinction between internalizing symptoms that can be categorized as “distress”- or “fear-based”, with generalized anxiety disorders, depressive disorders, and post-traumatic stress loading on the distress factor, and specific phobias, social phobia, separation anxiety, and panic disorder loading on the fear factor.^{34–37} As such, several groups of experts have recommended that a more appropriate diagnostic approach may be to reclassify internalizing disorders into fear versus distress categories^{34,38}, which would have potentially important implications for guiding the study of etiology, maintenance, and treatment of these mental health concerns.

While some investigations within this alternate conceptual approach have found OCD to broadly cluster with both fear and distress within internalizing problems^{39,40}, others have found it to associate more significantly with fear.³⁶ However, it is yet unclear whether all subtypes of this heterogeneous condition are broadly related to both fear and distress, or

whether certain OCD symptom clusters differentially associate with one or the other. Indeed, some OCD symptoms have salient sensory components and strong overlap with tic disorder (prompting the current DSM-V tic-specifier), suggesting that different domains of OCD symptomatology may be due to distinct neurocognitive and biological underpinnings. Raines and colleagues examined relationships between OCD symptoms and fear/distress symptoms in a community sample of adults, and found that aggressive obsessions/checking compulsions and symmetry obsessions/arranging compulsions were related to both fear and distress, while contamination obsessions/washing compulsions were related to fear.⁴¹ These findings provide preliminary support for OCD symptom clusters as belonging to fear and/or distress dimensions. Moreover, a recent shift in cognitive-behavioral treatment approaches focuses on distress tolerance, rather than immediate habituation of fear, as a means to learn new, non-fearful/threatening cognitive associations.^{42,43} This shift for conceptualization of treatment for OCD may support the notion of OCD symptoms being distress-based.

There is a particular dearth of research in this area with pediatric samples, despite indisputable evidence that: (a) OCD is a childhood-onset disorder⁴⁴, (b) anxiety and OCD co-occur at high rates throughout the lifespan, beginning during childhood and adolescence^{45–47}, and (c) until recently and as described above, OCD was conceptualized as an anxiety-disorder in the DSM, and its reclassification into its own disorder-grouping has led to a debate in the field and calls to better understand the interplay between pediatric OCD and anxiety.^{24,25} Thus, the study of whether and how fear and distress³⁴ relate to OCD subtypes in youth is warranted. Such work may lead to identification of such dimensions as more global treatment targets in exposure-based interventions, which in turn may result in greater treatment generalization and symptom reduction.

To address these gaps in the literature, we sought to examine whether child self-reported fear and/or distress ratings, including physical concerns (fear), separation anxiety (fear), and anxious harm avoidance (distress) would differentially predict the presence of previously-derived OCD symptom clusters in a sample of treatment-seeking youth with primary OCD diagnosis. Specifically, we hypothesized that membership in OCD Cluster 1 (aggressive, sexual, religious, somatic obsessions, and checking compulsions) would be associated with higher ratings on fear-related symptoms of physical complaints and separation anxiety, as the experience of somatic symptoms may lead a child to focus on physical danger to self, and concerns of separation from family might lead to intrusive thoughts about harm to self and others. Indeed, when youth rate environmental ambiguity as threatening and dangerous after being provided with information about their own⁴⁸ and others'⁴⁹ physical sensations, and also self-report⁵⁰ and objectively exhibit⁵¹ arousal when provided with information about environmental danger. We predicted that membership in Cluster 2 (symmetry obsessions and ordering, counting, repeating compulsions) would be associated with higher ratings on distress-related symptoms of harm avoidance*, which tap at anxious, perfectionistic coping and might overlap with the desire for perfectionism, as well as higher

*It should be noted that the MASC harm avoidance subscale and use of the phrase “harm avoidance” in this paper refers to perfectionism and anxious coping. This is distinct from use of the term “harm avoidance” to describe intrusive aggressive/harm thoughts in OCD. In this paper, we use “harm avoidance” to describe the MASC subscale, and the term “aggression” to describe OCD symptoms related to harm to self or others.

ratings on fear-related symptoms of physical concerns, due to empirical evidence for a relationship between harm avoidance and “incompleteness” related to Cluster 2 symptoms.⁵² Additionally, our clinical experiences are that youth with symptoms in this cluster report engaging in compulsions to relieve feelings of discomfort and internal physical states in order to feel “just right.” Finally, we predicted that membership in OCD Cluster 3 (washing, cleaning) would be associated with distress-related symptoms of harm avoidance, given empirical evidence for the central role of disgust^{53,54} on contamination symptoms above and beyond fear-based anxiety symptoms^{55,56}. Anecdotally, our clinical experience with youth experiencing contamination symptoms is that these patients often report no consequences of contamination other than how it feels. Exploratory analyses examined whether fear or distress predicted OCD Cluster 4 (hoarding), although we did not anticipate that this Cluster would necessarily be linked to fear or distress symptoms given that hoarding has been found to be distinct from both OCD and anxiety.⁵⁷ Finally, we also explored whether fear symptoms relevant to social anxiety would predict membership in any OCD cluster, though we did not have specific hypotheses about fear-related symptoms of social anxiety.

Method

Participants

Participating youth included 215 children and adolescents with a primary DSM-IV diagnosis of OCD seeking services at a university-based research clinic specializing in the treatment of OCD and anxiety-related disorders. Youth ranged in age from 7 to 17 years (Mean age = 12.25, SD = 2.75), were 57% male, and self-identified as 74% Caucasian, 11% Hispanic, 4% Asian, 1% African American, 1% American Indian, and 9% mixed. The mean Children’s Yale-Brown Obsessive Compulsive Scale (CYBOCS⁵⁸) total severity score was 24.89 (SD = 4.33, range 15–36), which is comparable to other pediatric outpatient treatment-seeking samples with primary OCD.^{59–61} Sixty-two percent of the sample also met for at least one other diagnosis, with 50% of the sample meeting for a concurrent anxiety diagnosis: 14% Separation Anxiety Disorder, 16% Social Phobia, 32% Generalized Anxiety Disorder. Fourteen percent of the sample was on psychotropic medications at time of evaluation. Additional demographic and clinical information are presented in Table 1.

Measures

Anxiety Disorders Interview Schedule for Children, Version IV (ADIS-IV⁶²). The ADIS is a semi-structured diagnostic interview that assesses the major DSM-IV internalizing and externalizing disorders, including anxiety and OCD. It has demonstrated strong reliability and validity.^{63,64} The ADIS was used in this study to confirm primary OCD diagnosis and to assess for other comorbidity in order to characterize the sample.

Children’s Yale-Brown Obsessive Compulsive Scale (CYBOCS⁵⁸) is a clinician-rated dimensional measure of OCD, including a symptom checklist and total severity score. The CYBOCS has good psychometric properties⁶⁵ and has been used across many studies of obsessive-compulsive symptoms and diagnoses. The CYBOCS total severity score sums ratings for time spent on symptoms, interference, distress, resistance, and control over symptoms. Total severity scores range from 0 to 40. We used symptom clusters that were

previously empirically-derived^{11,12} to code presence or absence of clusters in our sample as described in the *Statistical Analyses* section. We also examined CYBOCS severity as a covariate in analyses. In this sample, Cronbach's alpha for the CYBOCS was .87.

Children's Obsessive Compulsive Impact Scale-Revised (COIS-R⁶⁶) is a psychometrically-sound 27-item self- and parent-report that assesses OCD-specific functional impairment across multiple domains of functioning. The COIS-R yields a total score of OCD-related impairment across school, family, and social domains. The COIS-R was included as a potential covariate in analyses in order to account for variance in statistical models that might be due to OCD-related impairment. Cronbach's alpha for COIS-R was .75 for parent-report and .80 for child report.

Multidimensional Anxiety Scale for Children (MASC⁶⁷) is a 39-item child self-report measure of anxiety symptoms. The MASC has excellent psychometric properties⁶⁸⁻⁷⁰ and has been used to assess anxiety symptoms in community samples⁷¹, as well as children diagnosed with anxiety⁷² and OCD.⁷³ The MASC provides normed t-scores (based on gender and age) for total score and four subscales that we conceptualized as fear or distress based on the prior literature^{9,34,41}: separation anxiety (fear), physical symptoms (fear), harm avoidance (distress) and social anxiety (fear). The physical symptoms subscale can be further broken down into tense/restlessness and somatic/autonomic scales, and the harm avoidance subscale can be further broken down into perfectionism and anxious coping subscales. We used t-scores as MASC total and subscale scores in order to control for effects of gender and age. Cronbach's alpha for the MASC total score was .89. For subscale scores, Cronbach's alphas were: physical symptoms .87, harm avoidance .79, social anxiety .82, separation fears .74. Per *a priori* hypotheses, in the event that either the physical symptoms or harm avoidance subscales would be statistically significant predictors in our models, we sought to examine the individual components of these MASC subscales. For the physical symptoms subscale, Cronbach's alphas were .89 for tense/restlessness and .86 for somatic autonomic. For the harm avoidance subscale, Cronbach's alphas were .76 for perfectionism and .80 for anxious coping.

Procedure

Youth seeking services for OCD completed an intake evaluation and assessment battery, from which the measures in this study were drawn. The university Institutional Review Board provided approval, and informed consent was obtained from parents and assent obtained from children prior to the evaluation. Both youth and parent participated in the diagnostic interview; the ADIS and CYBOCS were administered by doctoral-level psychologists or doctoral students in clinical psychology. Doctoral students participated in in-depth training procedures on administration of each clinician-rated measure based on guidelines developed by the interview developers, which involved co-rating both videotaped and live interviews, and ongoing weekly supervision. Youth completed the MASC self-report and parents completed a demographic information form.

Statistical Analyses

CYBOCS symptom clusters in this study were those previously derived by Stewart and colleagues.¹² Cluster assignment was dichotomous (yes/no), such that if clinician rated any symptom within a particular domain on the CYBOCS symptom checklist as currently present at the time of evaluation, the youth was assigned to meet for that cluster. Clusters included: 1) aggressive, sexual, religious, somatic obsessions, and checking compulsions; 2) symmetry obsessions, ordering, counting, and repeating compulsions; 3) contamination obsessions and washing, cleaning compulsions; and 4) hoarding.

To characterize the sample, descriptive statistics, including frequencies and chi-square, were conducted to examine the percentage of youth endorsing each of the four OCD Clusters, examine overlap between clusters, and examine anxiety disorder in the sample. For our primary aims, we implemented a two-step approach to data analysis for prediction of OCD symptom clusters from fear and distress. First, four binomial stepwise logistic regression models were used to predict membership (yes/no) in each of the four CYBOCS symptom clusters from our *a priori* hypothesized fear and distress symptom dimensions as measured by MASC subscale t-scores. As noted earlier, the CYBOCS symptom clusters were those derived in previous empirical investigations of the factor structure and symptom cluster composition of the CYBOCS.¹² CYBOCS severity, OCD-related impairment as rated by each child and parent, comorbid anxiety diagnosis were entered as potential covariates in Step 1, while the fear and distress predictors were entered in Step 2. Any fear and distress dimensions and CYBOCS symptom clusters that were not specifically under examination based on *a priori* hypotheses were also examined as potential covariates in Step 1. We did not include gender or age as potential covariates in regression models because MASC t-scores are normed based on these two variables. We retained significant predictors and covariates from full models for follow-up tests in parsimonious posthoc prediction models. Second, for significant models including fear dimensions of physical symptoms and harm avoidance, we further examined the predictive value of the individual components of these dimensions (i.e., physical symptoms: autonomic/somatic and tense/restless; harm avoidance: perfectionism/anxious coping) to further specify fear constructs that might account for greater variance in OCD cluster membership, per our *a priori* analytic plan and hypotheses. We set a critical alpha at 0.05 for all comparisons, given the small extant literature examining fear and distress within OCD.

Results

Sample characteristics and OCD symptom clusters

As shown in Table 1, 88% of youth endorsed symptoms of Cluster 1, 80% endorsed Cluster 2, 77% endorsed Cluster 3, and 43% endorsed Cluster 4. As would be anticipated given that youth with OCD often experience symptoms from more than one content area, there was significant overlap between OCD symptom clusters for youth, with 8% of the sample only endorsing symptoms from one cluster, 25% endorsing symptoms from two clusters, 35% endorsing symptoms from 3 clusters, and 32% endorsing symptoms from all four clusters. Chi-square and one-way ANOVA revealed no significant differences on cluster membership for youth with/without comorbid anxiety diagnoses and MASC total t-scores, respectively.

Fear dimensions predict OCD symptom cluster membership

Binomial stepwise logistic regressions were used to predict membership in the four OCD symptom clusters (Table 2). As hypothesized, the fear dimension of separation anxiety significantly predicted membership in Cluster 1 (aggressive, sexual, religious, somatic obsessions, and checking compulsions), even when controlling for the significant effects of child-rated OCD-related impairment and OCD Cluster 4 (hoarding), $\chi^2(2) = 21.822$, $p < .001$, (see Table 2). The model explained 20% (Nagelkerke R^2) of the variance in Cluster 1 and correctly classified 88% of cases. Likelihood of Cluster 1 membership increased by 1.041 (95% CI: 1.002, 1.081, $p = .039$), or nearly 5%, for every one-point increase in separation anxiety. Contrary to hypotheses, the physical symptoms fear dimension did not significantly predict Cluster 1 membership. Of note, OCD severity and anxiety disorder status was not a significant covariate in this model.

In addition, as hypothesized, the physical symptoms fear dimension significantly predicted membership in Cluster 2 (symmetry obsessions and ordering, counting, repeating compulsions), even after controlling for the significant effects of anxiety disorder, $\chi^2(2) = 17.482$, $p < .001$ (Table 2). The model explained 12% (Nagelkerke R^2) of the variance in Cluster 2 and correctly classified 81% of cases. Likelihood of Cluster 2 membership increased by 1.044 (95% CI: 1.006, 1.084, $p = 0.025$), or 5% for every one-point increase in physical symptoms. Contrary to hypotheses, anxiety-related harm avoidance did not significantly predict Cluster 2 membership. Of note, OCD severity and related impairment were not significant covariates in this model.

To further unpack the relationship between the physical symptoms fear dimension and Cluster 2, we conducted an additional logistic regression with the same covariates and specifically examining the two subcomponents of physical symptoms – tense/restless and somatic/autonomic – as predictors. Again, controlling for the significant effects of anxiety disorder ($\chi^2(1) = 12.007$, $p = .001$), only somatic/autonomic complaints, and not tension/restlessness, significantly predicted membership in Cluster 2, $\chi^2(2) = 17.833$, $p < .001$ (Table 2). This model explained 13% (Nagelkerke R^2) of the variance in Cluster 2 and correctly classified 81% of cases. Likelihood of Cluster 2 membership increased by 1.048 (95% CI: 1.007, 1.091, $p = .022$), or 5% for every one-point increase in somatic/autonomic symptoms. This model was comparable to the original Cluster 2 binomial logistic regression examining the full physical symptoms subscale, suggesting that somatic/autonomic symptoms fully account for the effects of physical complaints on Cluster 2 membership. Including tension/restlessness in Step 1 of the regression model did not improve model fit or reduce the effects of somatic/autonomic symptoms on Cluster 2 membership.

Contrary to hypotheses, distress symptoms related to harm avoidance did not predict membership in Cluster 3 (contamination obsessions and washing/cleaning compulsions). Finally, as hypothesized, no fear or distress symptoms significantly predicted membership in Cluster 4 (hoarding).

Discussion

In an effort to further our understanding of domains of impairment underlying OCD symptoms in youth, this study examined the extent to which fear and distress dimensions derived from a child anxiety symptom measure were associated with empirically-derived OCD symptom clusters. A pattern of results emerged that supports statistically significant differential associations between fear, but not distress, and OCD symptom Clusters 1 (aggressive, sexual, religious, somatic, and checking) and 2 (symmetry, ordering, counting, and repeating). First, endorsement of OCD Cluster 1 symptoms were statistically predicted by fears related to separation concerns about harm coming to self and parents, which is consistent with the clinical presentation of obsessions related to aggression, harm, checking, and religiosity. As OCD Cluster 1 has been associated with poorer treatment response in adults¹⁸, treatment targets for youth with these symptoms might include exposures that more broadly address separation and safety (even if these are not part of the child's primary concerns) in order to address the fears that may underlie Cluster 1 symptoms and thus improve treatment response. An alternate conceptualization of this finding, which should be explored in future investigations, may be that OCD Cluster 1 symptoms may be associated with distress from obsessive thoughts of possibly behaving in inappropriate ways (e.g., harming someone, touching someone improperly), leading youth to seek, receive, and come to rely on comfort and/or accommodation from their caregivers and then go to great lengths to avoid disruption in their access to such comfort.

Also consistent with expectations, OCD Cluster 2 symptoms (symmetry, ordering, counting, repeating) were statistically predicted by fear-based symptoms of autonomic arousal and somatic complaints. Contrary to our hypotheses, Cluster 2 symptoms were not predicted by distress. Given that Cluster 2 symptoms are often associated with a salient sensory component and desire to feel "just right"^{52,74}, youth with these symptoms may be hyper-focused on their physiological experience, which might be captured by questions from symptoms that tap physical components of fear. Clinically, this would suggest that, in addition to exposure, treatment targets may include behavioral strategies to manage somatic complaints. Such evidence-based models⁷⁵⁻⁷⁷ teach youth primary coping methods such as behavioral approach regardless of level of physiological arousal or somatic/pain experiences. These strategies are also consistent with new exposure-based treatment models that do not focus on cognitive restructuring to manage OCD symptoms, but rather on improving tolerance for physical and emotional discomfort by increasing exposure length and difficulty in order to maintain arousal for prolonged periods of time.^{42,43}

Prior investigations with community and epidemiological samples of adults^{40,41} and adolescents³⁹ found symmetry, arranging, aggression, and checking to relate to both fear and distress disorder symptoms, while other studies in community samples have found these OCD symptoms to associate more significantly with fear.³⁶ The current study extends these findings to a clinical sample of youth with primary OCD diagnoses, and provides preliminary evidence that aggressive/sexual/religious/checking and symmetry/ordering/repeating OCD symptoms may be more closely linked with fear- but not distress-based symptoms, although the specific fear symptom relationships differ for these two OCD clusters. Findings in this study may diverge from the prior literature due to developmental

features of youth as compared to adults, sample selection (specialty clinic versus community samples), and measurement (anxiety symptoms versus other questionnaires tapping worry, global internalizing symptoms, etc.). Future work in this area should consider the potential impact of development and symptom severity on findings, as well as use multiple measures of fear and distress.

This study has several limitations that might be addressed with future investigations in this area. First, although this study and prior investigations used a single self-reported measure of anxiety as the basis for fear and distress ratings, neurobiological (e.g., fMRI; EEG) and behavioral (e.g., performance-based or behavioral assessments) procedures and tasks may more accurately assess the fear and distress constructs under study. Second, all youth in this sample met for a primary diagnosis of OCD, limiting the generalization of results to youth with this clinical profile. Next, as a consequence of the procedures for completing diagnostic assessments at our specialty research treatment center, the current study categorized youth as endorsing a symptom cluster if they reported any symptom within that cluster. Related to this limitation, due to the overlap between OCD symptom clusters, which is likely a reflection of the composition and heterogeneity of OCD symptoms even within a single individual, we were not sufficiently powered to compare youth who only met criteria for one OCD symptom cluster and did not endorse symptoms of the other clusters. It should also be noted that the proportion of explained variance by our regression models was rather small, ranging from 12% to 20%, which also suggests that OCD Cluster endorsement is also determined by other factors than those studied in this investigation. It may be possible that identification of “primary” OCD cluster or other relevant variables (e.g., controlling for specific anxiety disorder symptoms, inclusion of behavioral measures of fear and distress) would explain a larger percentage of variance in OCD cluster endorsement.

Despite these limitations, the current investigation is the first to examine fear and distress constructs in pediatric OCD, and provides preliminary support for OCD symptom clusters of aggression/religious/somatic/checking and symmetry/ordering/counting/repeating in youth as related to fear symptoms. It marks a step forward in efforts to understand the high rates of overlap between OCD and anxiety and points to underlying domains of impairment that may cut across disorders. As the field moves toward a dimensional understanding of youth psychopathology, more work is needed to understand these - and other - drivers of symptomatology.

Summary

This study examined whether OCD symptom clusters demonstrated differential relationships with fear- and/or distress-based dimensions in a sample of youth with primary OCD. Findings suggest that youth meeting for OCD Cluster 1 (aggress, sexual, religious, somatic obsessions, and checking compulsions) are associated with fear-based separation concerns, while OCD Cluster 2 (symmetry obsessions and ordering, counting, repeating compulsions) are associated with fear-based somatic/autonomic, but not tension/restlessness, physical symptoms. These results highlight the heterogeneity of pediatric OCD symptoms, and provide initial evidence for relationships between OCD and internalizing fear, but not

distress, domains. Implications include carefully assessing both OCD and global fear constructs that might be directly targeted in treatment.

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Table 1

Demographic and Clinical Variables for Full Sample and By OCD Symptom Cluster

	Full Sample		OCD Cluster 1		OCD Cluster 2		OCD Cluster 3		OCD Cluster 4	
	Endorsed	Not Endorsed	Endorsed	Not Endorsed	Endorsed	Not Endorsed	Endorsed	Not Endorsed	Endorsed	Not Endorsed
Age	12.25 (2.75)	11.68 (2.41)	12.32 (2.79)	11.68 (2.41)	12.29 (2.83)	12.09 (2.43)	12.46 (2.73)	11.52 (2.71)	12.15 (2.80)	12.33 (2.72)
Gender (% male)	57%	60%	57%	60%	59%	50%	57%	58%	49%*	63%*
Minority status (%)	26%	24%	26%	24%	27%	21%	28%	21%	26%	26%
Psychotropic Medication (%)	14%	16%	13%	16%	13%	14%	13%	17%	11%	15%
CYBOCS Total	24.89(4.33)	24.85(4.31)	24.85(4.31)	25.20(4.52)	25.05 (4.31)	24.24 (4.37)	25.31 (4.28)	23.44 (4.21)	25.43 (3.93)	24.49 (4.58)
COIS-C	25.12(26.28)	26.61(27.41)*	26.61(27.41)*	13.40(7.87)*	27.22 (12.03)*	16.19 (13.88)*	26.80 (28.03)	19.49 (18.42)	27.08 (27.09)	23.63 (25.55)
COIS-P	28.46(24.72)	28.58(25.66)	28.58(25.66)	27.50(15.35)	29.74 (16.66)	23.08 (12.78)	29.71 (26.38)	24.20 (17.50)	28.91 (25.84)	28.11 (23.93)
Comorbid anxiety dx	50%	36%	52%	36%	55%*	26%*	50%	48%	70%*	35%*
MASC Total T-Score	56.19 (11.73)	57.05 (11.62)*	57.05 (11.62)*	49.68 (10.70)*	57.46 (11.87)*	50.95 (9.64)*	56.61 (11.68)	54.73 (11.91)	58.75 (12.13)*	54.28 (11.10)*
Separation anxiety (fear)	60.22 (13.45)	61.18 (13.25)*	61.18 (13.25)*	52.92 (12.95)*	61.12 (13.40)*	56.52 (13.13)*	60.43 (13.18)	59.50 (14.47)	62.39 (13.40)*	58.59 (13.31)*
Physical symptoms (fear)	52.60 (11.28)	53.19 (11.31)*	53.19 (11.31)*	48.16 (10.18)*	53.80 (11.28)*	47.67 (9.98)*	52.63 (11.39)	52.52 (11.03)	54.09 (10.77)	51.50 (11.57)
Social anxiety (fear)	54.70 (10.68)	55.15 (10.67)	55.15 (10.67)	51.20 (10.32)	55.42 (11.08)*	51.76 (8.30)*	55.36 (10.69)	52.42 (10.44)	57.24 (52.80)*	52.80 (10.41)*
Harm avoidance (distress)	51.87 (10.23)	52.42 (9.95)*	52.42 (9.95)*	47.68 (11.53)*	52.67 (10.94)*	48.57 (10.22)*	52.23 (10.39)	50.38 (9.61)	52.97 (10.42)	51.05 (10.04)

* Indicates significant group differences between youth who endorse vs. do not endorse symptoms of each cluster at $p < .05$

Table 2

Reduced binomial stepwise logistic regressions predicting OCD Cluster membership

	β	p-value	R ²	R ²
Cluster 1				
CYBOCS Hoarding Cluster endorsement	3.334	.040	.081	---
COIS-C	1.046	.031	.160	.065
MASC -C separation t-score (fear)	1.041	.039	.200	.040
Cluster 2				
Anxiety disorder comorbidity	2.670	.014	.087	---
MASC-C physical t-score (fear)	1.044	.025	.124	.037
Cluster 2 (physical fear subtypes)				
Anxiety disorder comorbidity	2.697	.013	.087	---
MASC-C somatic/autonomic t-score (fear)	1.048	.022	.127	.040

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