Rage Attacks in Pediatric Obsessive-Compulsive Disorder: Phenomenology and Clinical Correlates

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Objective: Rage attacks have been documented in youth with varied psychiatric disorders, but few data have been reported on the clinical characteristics and correlates of rage attacks among children with obsessive-compulsive disorder (OCD). **Method:** Participants were 86 children (ages 6–16 years) with a primary diagnosis of OCD. Patients and their primary caregiver were administered clinician-rated measures of obsessive-compulsive severity and rage severity. Children completed the Center for Epidemiologic Studies Depression Scale and the Child Sheehan Disability Scale-Child, whereas parents completed the Rage Attacks Questionnaire, Aberrant Behavior Checklist—Irritability Scale, Children's Affective Lability Scale, and Child Sheehan Disability Scale-Parent. **Results:** Rage was common among youth with OCD and was associated with varied clinical characteristics. Rage severity accounted for functional impairment beyond the influence of obsessive-compulsive symptom severity; however, these relations were explained by the impact of family accommodation. **Conclusions:** These data suggest that rage attacks are relatively common, have a negative impact on illness presentation, and contribute to functional impairment above and beyond obsessive-compulsive symptom severity. Rage may contribute to family accommodation of symptoms, which may further affect obsessive-compulsive symptom severity and impairment. J. Am. Acad. Child Adolesc. Psychiatry, 2012;51(6):582–592. **Key words:** obsessive-compulsive disorder, rage, anger attacks, treatment

The clinical presentation of obsessive-compulsive disorder (OCD) among children (and adults) is characterized by considerable heterogeneity. Affected children exhibit an array of obsessions (intrusive, distressing, and difficult to control thoughts, images, or impulses) and/or compulsions (repetitive overt or mental acts) that are disabling[1] and associated with reduced quality of life.[2]

Research highlights a variety of clinical features in the presentation of pediatric OCD (e.g., comorbidity, insight). However, the phenomenology of rage attacks, defined as recurrent episodes of explosive anger or aggression triggered by minor provocations,[3] in youth with OCD has received little empirical attention. The extant literature documents elevated frequency of rage attacks in disruptive behavior disorders (DBD; oppositional defiant disorder, conduct disorder),[4,5] which is frequently comorbid in youth with OCD.[6] The comorbid presentation of OCD and DBD is associated with increased obsessive-compulsive symptom severity and functional impairment relative to those without co-occurring DBD.[7,8] Although informative, these data do not directly speak to the presence or nature of rage in pediatric OCD. Conceptually, whereas rage attacks in youth with DBD may be more generalized across situations, rage attacks in OCD may be relatively context specific: to prevent exposure to feared triggers, secondary to exposure to anxiogenic triggers, or a result of being unable to complete rituals (e.g., being unable to engender a feeling of "just right").[9]

There exists one published study that has examined rage in children with OCD.[10] Twenty-

This article is discussed in an editorial by Dr. Evelyn Stewart on page 569.

two of 80 children (27.5%) studied had parent-reported rage episode(s) during the week before the assessment. Youth with OCD who exhibited rage episodes experienced greater obsessive-compulsive symptom severity, increased frequency of sexual, religious, and aggressive obsessions, as well as checking rituals relative to those without rage. Interestingly, youth who exhibited rage episodes had lower frequency of comorbid chronic tic disorder (CTD) compared with those without rage attacks. Anxiety, mood, attention-deficit symptoms, and patterns of comorbidity did not differentiate groups. Although this study provides a preliminary account of rage in pediatric OCD, limitations (discussed later) include the method of rage assessment (i.e., qualitative accounts by parents, use of nonstandardized measures) and the fact that potential mechanisms that may explain ways in which rage episodes and obsessive-compulsive symptoms may be related were not investigated.

The literature on rage in Tourette disorder/CTD may also inform understanding of this construct in pediatric OCD. Among those with CTD, rage is associated with psychosocial disability above and beyond the tic disorder alone and is considered by parents to be one of the most problematic features of their child's presentation.[11,12] Some evidence in CTD suggests that CTD and OCD comorbidity may be associated with increased incidence of rage attacks regardless of tic severity and that obsessive-compulsive symptom severity may be greater in youth with CTD and rage versus those with CTD alone.[13,14]

In this study, we report on the nature and psychosocial correlates of rage in youth with OCD. Four research questions were examined. First, what is the phenomenology of rage attacks in youth with OCD? Second, are the presence and severity of rage attacks associated with varied sociodemographic and clinical characteristics? Third, does rage severity predict functional impairment over and above obsessive-compulsive symptom severity? Finally, we wanted to test whether rage severity influences obsessive-compulsive symptom severity and functional impairment through a pathway of family accommodation. In this manner, rage severity is hypothesized to increase family accommodation, which in turn increases symptom severity and functional impairment. These models assume a bi-directional relationship between rage and obsessive-compulsive symptom severity and impairment, while testing our theory that family accommodation is used to avoid triggering rage in the child. Problematically, this behavior pattern would maintain obsessive-compulsive symptom severity and would contribute to functional impairment by negatively reinforcing rituals/avoidance and preventing the child from learning that feared outcomes would not actually result from exposure to the distress-evoking stimulus.[15,16]

TABLE 1 Characteristics of Study Participants

Age (y)	
Range	6–16
Mean, SD	11.12, 2.95
Gender, n (%)	
Male	48 (56%)
Female	38 (44%)
Ethnicity, n (%)	
White	66 (90%)
Hispanic	5 (6%)
Asian	2 (3%)
Psychiatric comorbidity, n (%)	
At least one DSM-IV-TR Axis 1 disorder	69 Subjects (80)
ADHD	18 (21)
Generalized anxiety disorder	26 (30)
Disruptive behavior disorder[a]	12 (14)
Chronic tic disorder	23 (27)
Depressive disorders	18 (21)
Social phobia	8 (9)
Separation anxiety	8 (9)
Enuresis	2 (2)
Specific phobia	5 (6)
Taking a psychotropic medication	39 (45)

Note: ADHD = attention-deficit/hyperactivity disorder.
[a]The behavior of children with comorbid disruptive behavior disorders must have been resent outside of obsessive-compulsive symptom triggers.

METHOD

Participants

Participants were 86 youth with a principal diagnosis of OCD and their parent(s) who presented consecutively for evaluation at an OCD specialty clinic. Table 1 details participant characteristics. Diagnoses were determined via best estimate procedures[17] in which consensus among three clinicians regarding the primary diagnosis and the presence of comorbid diagnoses was required for inclusion. In this procedure, all available information was incorporated into ascertain-

ing an accurate diagnostic profile. This involved having a psychiatrist or psychologist experienced in pediatric OCD conduct clinical interviews, reviewing participants' completed measures as part of this study, and examining past clinical records. Participants were excluded in the absence of 100% agreement for the primary or comorbid diagnoses or if diagnosed with psychosis or bipolar disorder.

Measures

Children's Yale-Brown Obsessive-Compulsive Scale (CY-BOCS). The clinician-administered CY-BOCS[18] is a semi-structured inventory that assesses the presence and severity of obsessive-compulsive symptoms. The CY-BOCS Symptom Checklist assesses the presence/absence of varied obsessions and compulsions over the past month. These symptoms have been factor analyzed to form five composite dimensions assessing contamination/cleaning, symmetry/ordering, hoarding, aggression/checking, religious/sexual. The CY-BOCS Severity Scale consists of two five-item subscales: Obsessions Severity and Compulsions Severity, which are combined to create a Total Score. The CY-BOCS Severity Scale has demonstrated high internal consistency and construct validity,[18,19].

Rage Attacks Questionnaire (RAQ). The RAQ[3] consists of 22 parent-rated items used to measure rage phenomenology, such as the frequency of rage episodes, severity, contextual cues, and associated emotional states.

Rage Outbursts and Anger Rating Scale (ROARS). The ROARS[20] consists of three clinician-rated items measuring frequency, intensity, and duration of rage in the past week (range = 0–9). Scores $\geq$7 were characterized as clinically significant rage, whereas score $\leq$6 were defined as non-significant rage.[20] Although no data have been published on the psychometric properties of the ROARS, findings from the present study speak to its construct validity.

Clinical Global Impression-Severity (CGI-Severity; CGI-Rage). The CGI-Severity[21] allows a clinician to rate a patient's illness severity on a seven-point scale anchored by 0 ("no illness") and 6 ("extremely severe"). For this study, the CGI-Severity was rated in terms of OCD and rage severity, respectively.

Global Assessment of Functioning (GAF). The GAF[22] is a numeric scale anchored by 0 and 100 that provides the clinician's assessment of current overall psychosocial functioning.

Family Accommodation (FA). Family accommodation was assessed using 13 clinician-rated items,[23] which measure the degree to which family members accommodate a child's obsessive-compulsive symptoms and the level of distress/impairment that the family members and patient experience as a result of accommodation. These family accommodation items have been used extensively in past research, and display adequate internal consistency[23,24] and construct validity.[15,16]

Child Sheehan Disability Scale–Child and Parent (CSDS-C/P). The CSDS-P[25] assesses the degree of impairment a child's obsessive-compulsive symptoms cause in social, academic, and family domains, as well as the effect that a child's obsessive-compulsive symptoms have on his or her parent's work, social, and family life. The CSDS-C assesses the child's perceptions of impairment related to his or her obsessive-compulsive symptoms across social, academic, and family domains. The CSDS-C/P possess strong reliability (i.e., internal consistency, test–retest reliability) and construct validity.[25]

Center for Epidemiologic Studies Depression Scale (CES-D). The CES-D[26] is a 20-item child-report measure of depressive symptoms with higher scores indicative of greater symptomology. The CES-D is widely used, displays adequate reliability, and has good convergent validity with other depression measures.[27]

Children's Affective Lability Scale (CALS). The CALS[28] contains 13 parent-report items that are rated on a five-point scale, with higher scores indicative of higher levels of affect dysregulation. The CALS displays good internal consistency and test–retest reliability in clinical and nonclinical samples of youth.[28]

Aberrant Behavior Checklist—Irritability Scale (ABC-I). The ABC-I[29] is a 15-item parent-based problem behavior rating scale that assesses irritability and agitation in youth. The ABC-I displays good reliability and convergent validity with measures of irritability, agitation, and mood dysregulation (M. Aman, unpublished data, 2002).

Procedures

Permission to conduct this research was granted by the local institutional review board, and written parental consent and child assent were obtained. All children and parents were interviewed by an experienced child and adolescent psychologist or psychiatrist. Thereafter, a trained clinician administered the CY-BOCS to parents and children jointly, followed by the ROARS and family accommodation items to parents alone. CY-BOCS ratings were based on an integration of parent and child responses using clinical judgment. Comprehensive rater training was directed by the first author and is detailed elsewhere.[30] Inter-rater consistency of the CY-BOCS in a subsample (n = 15) was high (intraclass correlation coefficient = 0.91). After the CY-BOCS was administered, children and parents completed respective child- and parent-report measures independently.

Data Analysis

Descriptive statistics were calculated to examine rage phenomenology. Independent samples t tests or χ^2 analyses were conducted to assess for clinical differ-

TABLE 2 Phenomenology of Rage Episodes in Youth With Rage and Obsessive-Compulsive Disorder

Rage attacks within the past week (m, SD)	1.85	1.90
Attacks related to OCD		62
Rage attack within past month		53
Verbal attack[a]		61
Physical rage attack[a]		60
Attack was redirectable[a]		26
Child yells/screams but can control anger somewhat[a]		46
Anger escalates to threatening and/or hitting[a]		40
Destructive/completely out-of-control attack[a]		9
Mental urge before attack[a]		13
Sensory (premonitory) urge prior to attack[a]		20

Note: Values are percentages (%) unless listed otherwise. OCD = obsessive-compulsive disorder.

[a]*Percentage corresponds to those who exhibited rage.*

ences between youth with and without clinically significant rage. Pearson correlation coefficients were calculated between metrics of rage and clinical constructs. Hierarchical linear regression was used to assess the extent to which rage severity predicted functional impairment over and above obsessive-compulsive symptom severity. The ROARS was used as the primary metric in most analyses because of multicollinearity between the ROARS and CGI-Rage scores and the ability of the ROARS to assess frequency, intensity, and duration of rage attacks.[23] To assess whether rage severity increased symptom severity and functional impairment through a pathway of family accommodation, we used bootstrapping techniques to test for indirect effects.[31] This procedure does not assume normal distributions for meditational relationships, which more accurately models indirect effects than do frameworks based on sequential regression tests. In addition, this procedure reduces Type II error rates while maintaining appropriate Type I error rates. Indirect effects were tested with 2,000 bootstrap samples and bias-corrected 95% confidence intervals (an effect was considered significant if the confidence interval did not include zero). To evaluate the effect size of mediation, the κ^2 statistic was used, which evaluates the magnitude of the observed indirect effect in proportion to the maximum indirect effect possible that could be calculated from the data.[32] This statistic can be interpreted in a similar fashion to R^2, with small, medium, and large effect sizes corresponding to values of 0.01, 0.09, and 0.25 respectively. All mediational procedures were completed using the program macro PROCESS in SPSS 20. Assumptions of normality, linearity, and equality of variances for variable distributions were tested and no significant violations were observed. Given the preliminary nature of this work, no statistical correction was used for Type I error.

RESULTS

Phenomenology of Rage in Youth With OCD

Tables 2 and 3 present descriptive statistics on rage in pediatric OCD. Rage attacks, defined as explosive anger outbursts that were grossly excessive or inappropriate to the situation and beyond the child's control, were present in 53% of youth during the past month. The majority of the sample (n = 47; 54.7%) exhibited clinically significant rage on the ROARS over the past week. Rage attacks occurred most often at home and frequently were directed at parents and siblings. Multiple triggers were related to rage, including parental limit setting, changes in routines, and OCD-related triggers (e.g., needing things to be perfect, being unable to engender a "just right" feeling, feeling contaminated and being unable to wash). The majority of rage attacks were verbal. However, a significant percentage of youth also engaged in threatening behaviors and physical attacks (e.g., striking or grabbing others). Although most youth did not experience mental and/or premonitory urges before rage attacks, rage was frequently associated with reduced irritability and increased calmness after the attack.

Associations Between Rage and Clinical Characteristics

Table 4 displays single-order correlations, internal consistency estimates, means, and standard deviations for study variables. Rage severity, as assessed by the ROARS and CGI-Rage, was strongly related to family accommodation and parent-rated child irritability and anger. Rage was moderately related to obsessive-compulsive symptom severity and OCD-related impairment. Weak associations were observed between rage and overall symptom severity on the CGI-Severity, global functioning on the GAF, resistance to obsessive-compulsive symptoms, interference related to obsessive-compulsive symptoms, and hoarding symptoms. Rage was not significantly associated with child insight, age, depressive symptoms, and contamination/cleaning, checking/aggression, symmetry/ordering, and religious/sexual obsessive-compulsive symptom dimensions.

TABLE 3 Additional Phenomenology of Rage Episodes in Youth With Rage and Obsessive-Compulsive Disorder

Children with rage attacks directed at	Never	Sometimes	Often	Always
Things or objects	37	39	17	7
Classmates	81	15	4	0
Friends	77	19	4	0
Mother	12	39	32	17
Father	24	41	28	7
Other family members	67	30	2	0
Children with rage attacks who exhibited them at	**Never**	**Sometimes**	**Often**	**Always**
School	78	17	5	0
Home	7	41	31	22
Other	57	21	21	0
Children with rage attacks related to	**Never**	**Sometimes**	**Often**	**Always**
Not getting one's way	23	33	26	18
Non–OCD-related frustration	40	49	7	4
Being told to stop an activity	28	35	26	12
Being teased/embarrassed	46	33	18	4
Things not being perfect	36	29	26	9
Having to compete with others for attention	54	24	17	5
Having something taken away	32	39	21	9
Being told one is wrong about something	29	46	16	9
A change in plans	29	34	32	5
No identifiable reason	66	31	2	2
Children's experiences after rage attacks	**Never**	**Sometimes**	**Often**	**Always**
Feeling guilty	10	37	19	34
Feeling tired/drained	18	45	18	20
	Calm	**Less Active**	**As Active**	
Activity level	27	52	21	
	Relaxed	**Less Tense**	**As Tense**	**More Tense**
Level of irritability	25	51	20	4

Note: Values are percentages (%) unless listed otherwise. OCD = obsessive-compulsive disorder.

Table 5 displays categorical differences between youth with and without clinically significant rage. Youth exhibiting clinically significant rage displayed elevated obsessive-compulsive symptom severity and OCD-related interference, and less symptom resistance relative to those without. These youth also scored higher on indicators of family accommodation, functional impairment, and overall illness severity and lower on insight into their obsessive-compulsive symptoms and overall functioning compared with youth without rage. Table 6 illustrates the relation between rage and comorbidity in youth with OCD. Youth exhibiting rage had a higher incidence of disruptive behavior disorders relative to those without rage. There were no differences in rates of anxiety disorders, depressive disorders, CTD, and ADHD for youth with and without rage.

Results of hierarchical regression analyses suggest that obsessive-compulsive symptom severity was significantly related to parent-rated [$b = 0.57$, $\beta = 1.40$, $t(77) = 6.03$, $p < .01$, $R^2 = .32$] and child-rated [$b = 0.38$, $\beta = 0.56$, $t(77) = 3.63$, $p < .01$, $R^2 = .15$] functional impairment. In step 2, rage severity was significantly and positively associated with parent-rated functional impairment [$b = 0.20$, $\beta = 0.91$, $t(76) = 2.03$, $p < .05$, $\Delta R^2 = 0.04$], but was significantly and negatively associated with child-rated functional impairment over and above obsessive-compulsive symptom severity [$b = -0.23$, $\beta = -0.63$, $t(76) = -2.08$, $p < .05$, $\Delta R^2 = 0.05$]. Each model accounted for approximately 36% and 19% of the variance in parent- or child-rated functional impairment, respectively.

Indirect Effects of Rage Severity on Obsessive-Compulsive Symptom Severity and Functional Impairment

Figure 1 illustrates the series of relationships among family accommodation, rage severity, and obsessive-compulsive symptom severity. When considering individual relationships through bivariate regressions, rage severity predicted obsessive-compulsive symptom severity [$b = 0.22$, $\beta = 0.06$, $t(85) = 2.02$, $p < .05$] and family accommodation scores [$b = 0.55$, $\beta = 2.09$, $t(82) = 5.89$, $p < .01$], whereas family accommodation also predicted obsessive-compulsive symptom severity [$b = 0.58$, $\beta = 0.04$, $t(82) = 6.44$, $p < .01$]. An indirect effect was detected, where rage severity affected obsessive-compulsive symptom severity by first increasing family accommodation ($\kappa^2 = .32$, 95% CI = 0.21-0.43). Figure 2 illustrates the series of

TABLE 4 Pearson Correlations, Internal Consistency, and Descriptive Statistics for Study Variables

Measure	ROARS	CGI-Rage	α	Mean	SD
ROARS	—	—	0.91	3.57	3.16
Frequency[a]	0.90**	0.95**	—	1.17	1.14
Intensity	0.94**	0.78**	—	1.09	1.02
Duration[b]	0.93**	0.73**	—	1.30	1.27
CGI-Rage	0.89**	—	—	3.20	1.93
CY-BOCS Total	0.34**	0.42**	0.85	24.19	5.70
Obsessions	0.25*	0.32**	0.81	11.57	3.40
Compulsions	0.38**	0.46**	0.72	12.62	2.90
Insight	0.17	0.16	—	1.26	1.22
Interference	0.29**	0.34**	0.84	14.28	3.77
Resistance	0.32**	0.41**	0.74	9.72	2.69
Contamination/Cleaning	0.08	0.19	0.68	2.70	2.61
Symmetry/Ordering	0.00	0.06	0.52	1.60	1.36
Hoarding	0.25*	0.21	0.68	0.86	0.87
Sexual/Religious	−0.15	−0.16	0.55	1.19	1.37
Aggressive/Checking	−0.11	−0.09	0.77	3.26	3.11
FA Total	0.55**	0.58**	0.89	22.89	12.10
Involvement	0.48**	0.53**	0.83	12.67	5.97
Avoidance	0.44**	0.45**	0.80	8.47	6.16
CSDS-Parent	0.38**	0.42**	0.86	26.14	14.00
CSDS-Child	−0.01	0.01	0.77	12.89	8.49
CGI-Severity	0.20	0.27*	—	4.21	0.89
CGAF	−0.27**	−0.22*	—	53.12	5.60
ABC Irritability	0.65**	0.66**	0.92	11.80	9.52
CALS Anger	0.56**	0.63**	0.92	18.00	11.65
CALS Disinhibited	0.17	0.28*	0.81	8.61	6.88
CES-D	−0.01	0.01	0.91	17.65	13.02
Age (y)	−0.13	−0.16	—	11.12	2.95

Note: ABC = Aberrant Behavior Checklist; CALS = Children's Affective Liability Scale; CES-D = Center for the Epidemiologic Studies—Depression Scale; CGAF = Children's Global Assessment of Functioning; CGI-Rage = Clinical Global Impression of Rage; CGI-Severity = Clinical Global Impression of Severity; CSDS-Child = Child Sheehan Disability Scale—Child Report; CSDS-Parent = Child Sheehan Disability Scale—Parent report; CY-BOCS = Children's Yale-Brown Obsessive-Compulsive Scale; FA = family accommodation; ROARS = Rage Outbursts and Anger Rating Scale.

[a]*Measured over the past 7 days.*

[b]*Duration (in minutes) of most severe episode during the past 7 days.*

*p < .05; **p < .01.

relationships among family accommodation, rage severity, and parent-rated functional impairment. Rage severity predicted parent-rated functional impairment [b = 0.37, β = 1.69, t(78) = 3.51, $p < .01$] and family accommodation scores [b = 0.55, β = 2.09, t(82) = 5.89, $p < .01$], whereas family accommodation also predicted functional impairment [b = 0.65, β = 0.77, t(75) = 7.26, $p < .01$]. An indirect effect was detected, where rage severity affected functional impairment by first increasing family accommodation (κ^2 = 0.30, 95% CI = 0.18-0.43).

Finally, because the cross-sectional design of this study precludes a definitive test of directionality among variables, relations between rage and obsessive-compulsive symptom severity on family accommodation were examined. Rage severity [b = 0.43, β = 1.63, t(82) = 5.26, $p < .01$] and obsessive-compulsive symptom severity both predicted family accommodation [b = 0.47, β = 6.28, t(82) = 5.84, $p < .01$]. However, there was no difference in strength between these associations [zpart = 0.39, N = 82, p = 0.35].

DISCUSSION

This report describes one of the first studies to examine characteristics of children with OCD who experience rage attacks. Notably, more than half of the sample children experienced rage attacks over the past week. Rage attacks were frequently associated with a disruption of OCD-related behaviors,

TABLE 5 Results of Independent Samples t Tests for Variables Associated With Obsessive-Compulsive Symptomology and Functional Impairment

	Clinically Significant Rage (n = 47)		Not Clinically Significant Rage (n = 39)			
Variable	**Mean**	**SD**	**Mean**	**SD**	**t (*df*)**	**d**
CY-BOCS Total	27.45	4.27	22.81	5.63	3.53** (84)	0.93
Obsessions	13.09	2.51	10.81	3.61	2.74** (84)	0.73
Compulsions	14.36	2.40	12.00	2.69	3.65** (84)	0.93
Insight	1.68	1.25	1.08	1.19	2.03* (84)	0.49
Interference	15.09	3.70	13.31	3.68	2.23* (84)	0.48
Resistance	10.36	2.53	8.95	2.71	2.49* (84)	0.54
Contamination/Cleaning	2.89	2.70	2.46	2.50	0.45 (82)	0.17
Symmetry/Ordering	1.60	1.31	1.59	1.44	0.00 (82)	0.00
Hoarding	1.00	0.91	0.67	0.78	1.72 (82)	0.39
Sexual/Religious	0.94	1.22	1.51	1.48	−1.96 (82)	0.42
Aggressive/Checking	2.83	2.57	3.81	3.64	−1.48 (82)	0.31
FA Total	28.04	11.12	16.17	9.88	5.06** (81)	1.13
Involvement	17.09	3.48	11.11	6.09	4.34** (81)	1.21
Avoidance	13.14	4.76	6.70	5.75	4.72** (84)	1.22
CSDS-Parent	34.23	9.39	21.69	14.78	3.68** (75)	1.00
CSDS-Child	12.00	9.86	13.20	8.00	−0.56 (77)	0.13
CGAF	50.00	4.97	54.44	5.39	−3.40** (84)	0.86
CGI-Severity	4.73	0.83	4.06	0.87	3.13** (84)	0.79

Note: CGAF = Children's Global Assessment of Functioning; CGI Severity = Clinical Global Impression of Severity; CSDS-Child = Sheehan Disability Scale—Child Report; CSDS-Parent = Sheehan Disability Scale—Parent report; CY-BOCS = Children's Yale-Brown Obsessive-Compulsive Scale; d = Cohen's d; FA = family accommodation.
*p < .05; **p < .01.

but were not precipitated by a specific urge or obsessional thought. However, children's report of increased calmness after a rage attack may suggest that rage attacks are negatively reinforced, possibly by escaping from OCD-related stimuli or a reduction in internal distress. Most rage episodes occurred at home and with siblings or parents. Although there is no evidence to suggest that children experience worse obsessive-compulsive symptoms at home than at school,[33] rage attacks appear to be context specific. This may be due to situational variations in antecedent triggers of rage (i.e., parental limit setting and changes in routines) and/or operant mechanisms (escape/avoidance maintained). Alternatively, peer and teacher influences in school may limit rage episodes (e.g., being teased, school discipline).

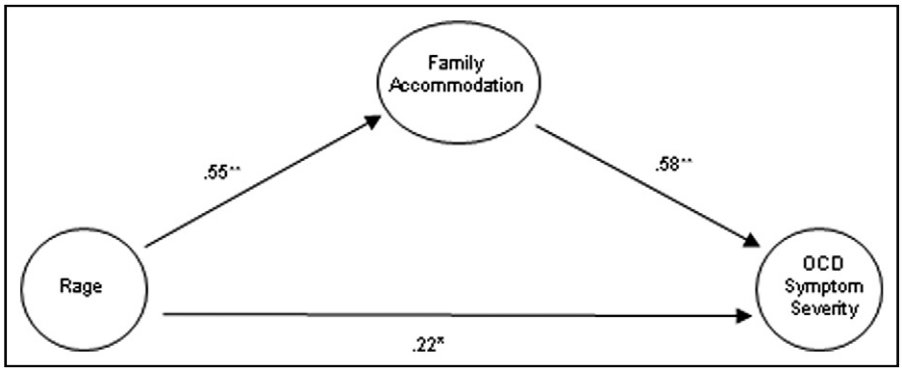
Previous work examining rage in the context

TABLE 6 Comorbidity in Youth With Obsessive-Compulsive Disorder With and Without Clinically Significant Rage

	Clinically Significant Rage n (%)	Not Clinically Significant Rage n (%)	χ^2(*df*)	V
Anxiety disorder	9 (24)	29 (76)	0.04 (1)	.02
ADHD	7 (39)	11 (61)	2.47 (1)	.17
Depressive disorders	6 (33)	12 (67)	0.91 (1)	.10
CTD	4 (17)	19 (83)	0.91 (1)	.10
Disruptive behavior disorder	8 (67)	4 (33)	13.23** (1)	.39

Note: ADHD = attention-deficit/hyperactivity disorder; CTD = Tourette disorder/chronic tic disorder; V = Cramer's V.
**p < .01.

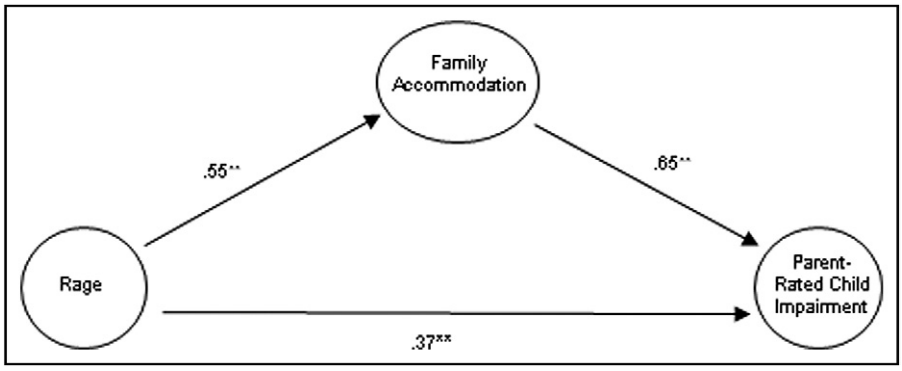
FIGURE 1 Conceptual model of the indirect effect of rage on obsessive-compulsive disorder (OCD) symptom severity though a pathway of family accommodation. Note: Standardized regression coefficients for all paths are presented. *$p < .05$, **$p < .01$.



of CTD found a high incidence of comorbid OCD (92%),[3] and children with OCD and CTD showed significantly more aggressive behaviors than children with only CTD.[14] Our findings in pediatric OCD indicate that youth with comorbid CTD were no more likely to have rage episodes than those without. These data suggest that OCD (rather than tic disorders) is the primary clinical characteristic driving rage episodes in children with comorbid CTD and OCD. This does not imply that youth with CTD do not exhibit rage; rather, the added presence of CTD does not seem to influence rage in youth with primary OCD. Thus, past findings of high rates of rage in CTD may reflect the influence of comorbid obsessive-compulsive symptoms rather than CTD. Related to comorbidity, children with OCD and rage attacks were significantly more likely to have comorbid DBD than were youth with OCD without rage. It is unclear whether behaviors that parents report as rage attacks in the context of OCD also are endorsed as disruptive behavior symptoms. For example, children who have disruptive behavior in other contexts may also display aggressive behavior when their obsessive-compulsive symptoms are interrupted. It is equally plausible that youth who display aggressive behavior in the context of OCD may act aggressively to avoid other situations or demands. Partial support for the latter is illustrated by strong relations with child irritability and anger, which may reflect emotional dysregulation in youth who exhibit rage.

In the current study, rage was positively associated with obsessive-compulsive symptom severity, parent-rated functional impairment, and family accommodation, but was not meaningfully related to specific obsessive-compulsive symptom dimensions. Rage directly

FIGURE 2 Conceptual model of the indirect effect of rage on parent-rated functional impairment though a pathway of family accommodation. Note: Standardized regression coefficients for all paths are presented. **$p < .01$.



predicted parent-rated functional impairment above and beyond obsessive-compulsive symptom severity. Rage may contribute to impairment by requiring family members to modify work and home lives to contend with potential behavioral triggers. For example, parents may accommodate symptoms, reduce child demands (e.g., homework, chores), or reduce limit setting behaviors to minimize the frequency of rage in the short-term. Problematically, this approach has long-term implications by reinforcing maladaptive behavior (i.e., rage), which may prospectively contribute to a worse illness course. Interestingly, rage severity predicted a reduction in child-reported functional impairment after accounting for obsessive-compulsive symptom severity. Children may have felt less impaired as rage episodes helped them to avoid distressing stimuli, contributing to the child's viewpoint of improved functioning. The differential impact of rage on parent- and child-reported impairment demonstrates the particular importance of multi-informant assessment of symptom severity among youth with OCD.

Results showed that rage attacks affected both obsessive-compulsive symptom severity and parent-rated OCD-related impairment through the mechanism of family accommodation. Rage episodes, with the resultant negative consequences, may motivate parents to limit the child's exposure to feared stimuli and/or to accommodate symptoms. This accommodating behavior by the parents, unfortunately, also reinforces children's rage episodes, in addition to contributing to more+ severe obsessive-compulsive symptoms and impairment over time. These putative bi-directional processes are similar to that seen in the "coercive process" between caregivers and youth displaying disruptive behavior[34] in which aggressive behavior is reinforced by parents acquiescing to disruptive behavior.

These data have important treatment implications in light of findings that children with OCD and disruptive behaviors have an attenuated response to behavioral and pharmacological interventions relative to children with OCD alone.[35,36] It has been suggested that this differential response may be due to treatment non-compliance or children's refusal to engage in exposure with response prevention.[37] Incorporating specific parent management and training interventions to address rage and family accommodation may aid in OCD treatment adherence and effectiveness.[37,38] Although many treatment packages advocate using rewards when children approach feared stimuli,[39,40] clinicians also may integrate use of a structured reward program and response costs (e.g., time out, loss of privileges) for aggressive or destructive behaviors associated with the rage episodes to avoid reinforcing rage and to maximize treatment effects. Exactly how clinicians instruct the parents will likely depend on the severity of rage episodes and co-occurrence of disruptive behavior. For example, clinicians may need to teach parents contingency management skills before exposure, with response prevention techniques for children who have global disruptive behaviors that are not confined to OCD-related incidents.[37] Conversely, if rage occurs specifically in the context of obsessive-compulsive symptoms or family accommodation, clinicians may benefit from implementing contingency management skills while conducting therapeutic tasks.[38,41]

Results of the current investigation should be interpreted in the context of several limitations. First, the study may be limited by a selection bias as parents of youth with rage attacks may have been more likely to seek treatment for OCD. Second, this was a predominantly Caucasian sample and results may not generalize to other ethnic or cultural groups. Studies suggest that culture has an important impact on parenting practices[42] and therefore may be a relevant variable in understanding the impact of rage attacks on families of children with OCD. The relatively equal male: female ratio also requires caution in making inferences about the phenomenology of rage in other pediatric psychiatric disorders that are more/less frequently diagnosed in males (e.g., CTD). Third, the cross-sectional study design cannot identify causality within our proposed model of indirect effects. Replication in a larger, independent sample could test competing models and for bidirectional effects. In addition, longitudinal designs are needed to understand the relationship of rage, family accommodation, and obsessive-compulsive severity and impairment causally and over time. Fourth, as the present study did not assess varied parent characteristics (e.g., parental anxiety and OCD), we highlight the inclusion of parental characteristics in future research examining rage in youth with OCD. Fifth, al-

though clinical diagnoses were established through best estimate procedures,[17] no structured diagnostic interviews were used. The use of structured interviews may have contributed information about lifetime psychiatric diagnoses that may be relevant to understanding rage, and would have allowed us to examine certain symptom domains as continuous versus categorical variables (e.g., ADHD or tic severity versus presence/absence of a diagnosis). Finally, we did not obtain observational data or child- and teacher-reports of rage. It would have been helpful to have multiple informants to elucidate a complete picture of rage attacks.

Within these limitations, these data offer important information about the occurrence of rage episodes in children with OCD. First, rage is a commonly occurring problem in children with OCD. Therefore, it should be assessed routinely, as rage contributes to impairment over and above obsessive-compulsive symptom severity and may be related to worse prognosis and treatment outcome. Second, rage may be a driving force in family accommodation, which maintains obsessive-compulsive symptoms and disrupts family functioning. Without directly addressing rage in treatment, treatment outcome is likely to be attenuated. Finally, these findings indicate a need for further treatment developments to address the complex functional relations among rage, parenting, and OCD. In this regard, we highlight the need for modular treatment approaches that are tailored to the unique clinical needs of youth with OCD. &

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REFERENCES

1. Piacentini J, Peris TS, Bergman RL, Chang S, Jaffer M. Functional impairment in childhood OCD: development and psychometrics properties of the Child Obsessive-Compulsive Impact Scale—Revised. J Clin Child Adolesc Psychol. 2007;36:645-653.
2. Lack CW, Storch EA, Keeley ML, *et al*. Quality of life in children and adolescents with obsessive-compulsive disorder: base rates, parent-child agreement, and clinical correlates. Soc Psychiatry Psychiatr Epidemiol. 2009;44:935-942.
3. Budman CL, Rockmore L, Stokes J, Sossin M. Clinical phenomenology of episodic rage in children with Tourette syndrome. J Psychosom Res. 2003;55:59-65.
4. King CA, Knox MS, Henninger N, *et al*. Major depressive disorder in adolescents: family psychiatric history predicts severe behavioral disinhibition. J Affect Disord. 2006;90:111-121.
5. Goodman G, Bass JN, Geenens DL, Popper CW. The MAVRIC-C and MAVRIC-P: a preliminary reliability and validity study. J Pers Assess. 2006;86:273-290.
6. Geller DA, Biederman J, Griffin S, Jones J, Lefkowitz TR. Comorbidity of juvenile obsessive-compulsive disorder with disruptive behavior disorders. J Am Acad Child Adolesc Psychiatry. 1996;35:1637-1646.
7. Langley AK, Lewin AB, Bergman RL, Lee JC, Piacentini J. Correlates of comorbid anxiety and externalizing disorders in childhood obsessive compulsive disorder. Eur Child Adolesc Psychiatry. 2010;19:637-645.
8. Storch EA, Lewin AB, Geffken GR, Morgan JR, Murphy TK. The role of comorbid disruptive behavior in the clinical expression of pediatric obsessive-compulsive disorder. Behav Res Ther. 2010;48:1204-1210.
9. Lebowitz ER, Omer H, Leckman JF. Coercive and disruptive behaviors in pediatric obsessive-compulsive disorder. Depress Anxiety. 2011;28:899-905.
10. Storch EA, Jones A, Lewin AB, Mutch PJ, Murphy TK. Clinical phenomenology of episodic rage in pediatric obsessive-compulsive disorder. Minerva Psichiatrica. 2011;52:89-95.
11. Dooley JM, Brna PM, Gordon KE. Parent perceptions of symptom severity in Tourette's syndrome. Arch Dis Child. 1999;81:440-441.
12. Storch EA, Lack CW, Simons LE, Goodman WK, Murphy TK, Geffken GR. A measure of functional impairment in youth with Tourette's syndrome. J Pediatr Psychol. 2007;32:950-959.
13. Budman CL, Bruun RD, Park KS, Lesser M, Olson M. Explosive outbursts in children with Tourette's disorder. J Am Acad Child Adoles. Psychiatry. 2000;39:1270-1276.
14. Stephens RJ, Sandor P. Aggressive behaviour in children with Tourette syndrome and comorbid attention-deficit hyperactivity disorder and obsessive-compulsive disorder. Can J Psychiatry. 1999;44:1036-1042.
15. Peris TS, Bergman RL, Langley A, Chang S, McCracken JT, Piacentini J. Correlates of accommodation of pediatric obsessive-compulsive disorder: parent, child, and family characteristics. J Am Acad Child Adolesc Psychiatry. 2008;47:1173-1181.

16. Storch EA, Geffken GR, Merlo LJ, *et al.* Family accommodation in pediatric obsessive-compulsive disorder. J Clin Child Adolesc Psychol. 2007;36:207-216.
17. Leckman JF, Sholomskas D, Thompson WD, Belanger A, Weissman MM. Best estimate of lifetime psychiatric diagnosis: a methodological study. Arch Gen Psychiatry. 1982;39:879-883.
18. Scahill L, Riddle MA, McSwiggin-Hardin M, *et al.* Children's Yale-Brown Obsessive Compulsive Scale: reliability and validity. J Am Acad Child Adolesc Psychiatry. 1997;36:844-852.
19. Storch EA, Murphy TK, Geffken GR, *et al.* Psychometric evaluation of the Children's Yale-Brown Obsessive-Compulsive Scale. Psychiatry Res. 2004;129:91-98.
20. Budman C, Coffey BJ, Shechter R, *et al.* Aripiprazole in children and adolescents with Tourette disorder with and without explosive outbursts. J Child Adolesc Psychopharmacol. 2008;18:509-515.
21. National Institute of Mental H. Clinical Global Impression Scale. Psychopharmacol Bull. 1985;21:839-844.
22. American Psychiatric Association. Diagnostic and statistical manual of mental disorders (DSM-IV-TR). Washington, DC: American Psychiatric Association; 2000.
23. Calvocoressi L, Lewis B, Harris M, *et al.* Family accommodation in obsessive-compulsive disorder. Am J Psychiatry. 1995;152:441-443.
24. Geffken GR, Storch EA, Duke DC, Monaco L, Lewin AB, Goodman WK. Hope and coping in family members of patients with obsessive-compulsive disorder. J Anxiety Disord. 2006;20:614-629.
25. Whiteside SP. Adapting the Sheehan disability scale to assess child and parent impairment related to childhood anxiety disorders. J Clin Child Adolesc Psychol. 2009;38:721-730.
26. Radloff LS. The CES-D Scale: a self-report depression scale for research in the general population. App Psychol Measure. 1977; 1:385-401.
27. Fountoulakis KN, Bech P, Panagiotidis P, *et al.* Comparison of depressive indices: reliability, validity, relationship to anxiety and personality and the role of age and life events. J Affect Disord. 2007;97:187-195.
28. Gerson AC, Gerring JP, Freund L, *et al.* The Children's Affective Lability Scale: a psychometric evaluation of reliability. Psychiatry Res. 1996;65:189-198.
29. Aman M, Singh NN, Stewart A, Field CJ. Psychometric characteristics of the Aberrant Behavior Checklist. Am J Ment Deficiency. 1985;89:492-502.
30. Storch EA, Geffken GR, Merlo LJ, *et al.* Family-based cognitive-behavioral therapy for pediatric obsessive-compulsive disorder: comparison of intensive and weekly approaches. J Am Acad Child Adolesc Psychiatry. 2007;46:469-478.
31. Preacher K, Hayes A. Asymptotic and resampling strategies for assessing and comparing indirect effects in simple and multiple mediator models. Behav Res Methods Instr Comp. 2008;40:879-891.
32. Preacher K, Kelley K. Effect size measures for mediation models: quantitative strategies for communicating indirect effects. Psychol Methods. 2011;16:93-115.
33. Piacentini J, Bergman RL, Keller M, McCracken J. Functional impairment in children and adolescents with obsessive-compulsive disorder. J Child Adolesc Psychopharmacol. 2003;13:S61-S69.
34. Patterson GR. Coercive family process. Eugene, OR: Castalia; 1982.
35. Geller DA, Biederman J, Stewart SE, *et al.* Impact of comorbidity on treatment response to paroxetine in pediatric obsessive-compulsive disorder: is the use of exclusion criteria empirically supported in randomized clinical trials? J Child Adolesc Psychopharmacol. 2003;13:S19-S29.
36. Storch EA, Merlo LJ, Larson MJ, *et al.* Impact of comorbidity on cognitive-behavioral therapy response in pediatric obsessive-compulsive disorder. J Am Acad Child Adolesc Psychiatry. 2008;47:583-592.
37. Lehmkuhl H, Storch EA, Rahman O, Freeman J, Geffken G, Murphy TK. Just say no: sequential parent management training and cognitive-behavioral therapy for a child with comorbid disruptive behavior and obsessive compulsive disorder. Clin Case Stud. 2009;8:48-58.
38. Ale CM, Krackow E. Concurrent treatment of early childhood OCD and ODD: a case illustration. Clin Case Stud. 2011;10:312-323.
39. March JS, Mulle K. OCD in children and adolescents: a cognitive-behavioral treatment manual. New York, NY: Guiford Press; 1998.
40. Freeman JB, Garcia AM, Coyne L, *et al.* Early childhood OCD: preliminary findings from a family-based cognitive-behavioral approach. J Am Acad Child Adolesc Psychiatry. 2008;47:593-602.
41. Owens EB, Piacentini J. Case study: behavioral treatment of obsessive-compulsive disorder in a boy with comorbid disruptive behavior problems. J Am Acad Child Adolesc Psychiatry. 1998; 37:443-446.
42. Kotchick BA, Forehand R. Putting parenting in perspective: a discussion of the contextual factors that shape parenting practices J Child Fam Stud. 2002;11:255-296.