

# Symptoms of Obsessive-Compulsive Disorder

James F. Leckman, M.D., Dorothy E. Grice, M.D., James Boardman, M.D.,  
Heping Zhang, Ph.D., Amy Vitale, B.A., Colin Bondi, M.A., John Alsobrook, Ph.D.,  
Bradley S. Peterson, M.D., Donald J. Cohen, M.D., Steven A. Rasmussen, M.D.,  
Wayne K. Goodman, M.D., Christopher J. McDougle, M.D., and David L. Pauls, Ph.D.

---

**Objective:** Obsessive-compulsive disorder encompasses a broad range of symptoms that represent multiple psychological domains, including perception, cognition, emotion, social relatedness, and diverse motor behaviors. The purpose of these analyses was to evaluate the correlational relationships of the symptoms of obsessive-compulsive disorder. **Method:** This study examined the 13 a priori categories used to group types of obsessions and compulsions in the Yale-Brown Obsessive Compulsive Scale symptom checklist in two independent groups of patients with obsessive-compulsive disorder (N=208 and N=98). A principal-components factor analysis with a varimax rotation was performed, followed by a series of other exploratory analyses. **Results:** The two data sets yielded nearly identical results. Four factors—obsessions and checking, symmetry and ordering, cleanliness and washing, and hoarding—emerged in each data set, in total accounting for more than 60% of the variance. **Conclusions:** Obsessive-compulsive disorder is a multidimensional and etiologically heterogeneous condition. The four symptom dimensions identified in this study are largely congruent with those identified in earlier reports. These factors may be of value in future genetic, neurobiological, and treatment response studies. (Am J Psychiatry 1997; 154:911-917)

---

Standard nomenclatures regard obsessive-compulsive disorder as a unitary nosological entity. While this parsimony has a certain esthetic appeal, it may be misleading. The symptoms used to define obsessive-compulsive disorder are diverse and include various intrusive thoughts and preoccupations, rituals, and compulsions. Two individuals with obsessive-compulsive disorder may have totally different and nonoverlapping symptom patterns (1). Studies of psychopathology, genetics, neurobiology, and treatment outcomes have frequently simplified this complex array in several ways, one of which is the use of global severity rating scales such as the Yale-Brown Obsessive Compulsive Scale (2, 3).

Historically, attempts to classify patients with obsessive-compulsive disorder on the basis of their clinical phenotype have met with limited success (4-14). Early

descriptive efforts yielded a rough topology that lacked a sound empirical basis (4, 5). Other difficulties have included the use of symptom inventories that are biased toward specific symptoms, such as checking or cleaning, or that omit key symptoms, such as hoarding, obsessions concerning symmetry or exactness, ordering and arranging obsessions and compulsions, and religious obsessions (6-8). As pointed out by Baer and colleagues (9, 10), such biases inherently limit the value of these reports. More problematic is the use of composite severity ratings based on all of the patient's obsessions and compulsions (11-13). The use of such ratings assumes the unity of the obsessive-compulsive disorder construct and loses the rich diversity of symptoms. Still other studies have relied solely on inventories of current symptoms (9, 10). This approach fails to take into account the changing constellation of symptoms that can be observed over time (14). Finally, many of these studies have relied on data from a relatively small number of subjects (6, 9, 10, 13) that could yield unstable estimates from factor analyses.

With these various limitations, previous studies have consistently paired washing and cleaning compulsions with contamination obsessions (6-10). Similarly, aggressive, sexual, and religious obsessions tend to co-occur (9, 10). Obsessions of symmetry and exactness have been found to accompany repeating rituals, counting compulsions, and ordering/arranging compulsions (9,

---

Received Sept. 16, 1996; revision received Feb. 11, 1997; accepted March 27, 1997. From the Child Study Center, Yale University School of Medicine. Address reprint requests to Dr. Leckman, I-269 SHM, Child Study Center, Yale University School of Medicine, P.O. Box 207900, New Haven, CT 06520-7900.

Supported by NIMH grants MH-49351, MH-44843, and MH-30929, National Institute of Child Health and Human Development grants HD-03008 and HD-30712, and National Center for Research Resources grant RR-06022.

The authors thank Dr. Robert A. King, Dr. Mary M. Robertson, Mr. Lawrence D. Scahill, Ms. Sharon I. Ort, and Ms. Kimberly Lynch for their assistance and comments on an earlier draft of this report.

TABLE 1. Demographic and Clinical Data on 292 Subjects With Obsessive-Compulsive Disorder

Variable	Phenomenological Study Group (N=208)		Family/Genetic Study Group (N=98)		Total for Both Study Groups (N=292) <sup>a</sup>	
	Mean	SD	Mean	SD	Mean	SD
Current age (years)	37.8	11.9	34.0	11.8	36.5	11.9
Age at onset of obsessive-compulsive disorder (years)	14.2	9.5	12.1	9.8	13.4	9.7
	N	%	N	%	N	%
Female sex	103	49.5	59	60.2	153	52.4
Chronic tic disorder <sup>b</sup>	85	40.9	16	16.3	93	31.8
Brown University site	110	52.9	43	43.9	141	48.3

<sup>a</sup>Fourteen subjects participated in both studies.<sup>b</sup>Significant difference between studies ( $\chi^2=16.6$ ,  $df=1$ ,  $p<0.0001$ ).

10). Hoarding and collecting compulsions often co-occur with hoarding obsessions (9, 10).

We and other investigators have sought to identify clinical phenotypes of obsessive-compulsive disorder based on the presence of comorbid disorders. The best example of this approach has focused on comorbid tic disorders. A strong case can be made that tic-related obsessive-compulsive disorder constitutes a separate obsessive-compulsive disorder phenotype, on the basis of symptom profiles, sex ratio, age at onset, family/genetic data, neurochemical and neuroendocrine findings, and patterns of response to treatment (15–31).

The present study was undertaken in an effort to replicate and extend the findings of Baer and colleagues (9, 10) and to guide possible revisions in severity rating scales. We report on two largely independent study groups of patients with obsessive-compulsive disorder (17, 19, 27) of sufficient size to address some of the shortcomings of earlier studies. Similar to the study by Baer and colleagues, we made use of the Yale-Brown Obsessive Compulsive Scale symptom checklist. Our analytic approach to these data was modeled after the strategies used by Andreasen et al. (32). We conducted a factor analysis, using an initial principal-components analysis to provide a firm structural definition of the symptom dimensions in each of the two sets of data, and the results were compared across the two data sets. Next, the test-retest reliability of four symptom dimensions was assessed in a small subset of 14 patients common to both studies. We then evaluated each of the miscellaneous obsessions and compulsions included in the Yale-Brown Obsessive Compulsive Scale checklist in relation to the four symptom dimensions. Finally, the relationship between these factor scores and the presence of a comorbid chronic tic disorder was evaluated.

## METHOD

The subjects in this study consisted of 292 patients with obsessive-compulsive disorder who had been diagnosed and evaluated at one of three clinics (the Yale Child Study Center—Tic Disorders and OCD Clinic, New Haven, Conn.; the Yale OCD Clinic at the Connecticut

Mental Health Center, New Haven; and the OCD Clinic at Brown University, Providence, R.I.). All patients were diagnosed according to the DSM-III-R criteria for obsessive-compulsive disorder with previously described methods (17, 19, 27). Subjects were selected on the basis of their participation in one or more of three studies (17, 19, 27) in which the Yale-Brown Obsessive Compulsive Scale symptom checklist had been completed. Two of the three studies (17, 19) used identical methods and were designed to evaluate “just right” perceptions associated with obsessive-compulsive disorder and Gilles de la Tourette’s syndrome, among other clinical features. A total of 312 individuals participated in these two phenomenological studies, 208 of whom had a definite diagnosis of obsessive-compulsive disorder (N=98 from the Yale clinics and N=110 from the clinic at Brown). The remainder had a primary diagnosis of Tourette’s disorder without obsessive-compulsive disorder (N=104) and were not included in the analyses described below. The third study (27) was a family/genetic study of 100 patients with obsessive-compulsive disorder drawn from the clinics at Yale (N=57) and Brown (N=43). Complete data from the Yale-Brown Obsessive Compulsive Scale symptom checklist were available for 98 of the 100 probands with obsessive-compulsive disorder who participated in the family/genetic study. On the basis of a comparison of names, birth dates, gender, and site, it was determined that 14 subjects participated in both the family study and the later studies of phenomenology. The clinical and demographic characteristics of all participating patients with obsessive-compulsive disorder are summarized by study in table 1. The only difference between the two study groups was the expected difference in the proportion of patients with a comorbid chronic tic disorder.

## Measures and Procedures

The ratings of symptoms were taken from the Yale-Brown Obsessive Compulsive Scale (2, 3). Despite a few shortcomings (33), this scale is considered by many investigators to be the gold standard for measuring symptom severity (34). It is divided into three major sections: a symptom inventory organized by category, a target symptom list, and a 10-item severity rating scale. The severity ratings are composite ratings designed to reflect all available information concerning the time spent, distress, resistance, interference, and degree of control for all obsessions (considered together) and all compulsions (considered together) occurring during the previous week. The reliability of each of the 10 severity ratings has been shown to be excellent by interrater measures of agreement (2). Self-report versions of the Yale-Brown Obsessive Compulsive Scale that have excellent agreement with clinicians’ severity ratings have also been developed (35).

The Yale-Brown Obsessive Compulsive Scale symptom checklist includes more than 60 symptoms organized according to 15 separate categories of obsessions and compulsions. These categories were selected for analysis because they were considered to provide the purest and most sensible divisions of symptoms currently available.

The patients with obsessive-compulsive disorder participating in

the phenomenological studies (17, 19) completed the self-report version of the Yale-Brown Obsessive Compulsive Scale initially developed by Rosenfeld and colleagues (35). In contrast, these same data were collected in the family/genetic study by interviewers (blind to the status of the person interviewed) trained to reliability (31). This difference in data source—self-report versus interview-generated—permits a further evaluation of the stability and robustness of the dimensional structure. Similarly, the test-retest correlations from the 14 subjects who were part of both studies also permit a test of the cross-validation of these two methods of data collection. Factor analyses offer a technique for data reduction. If the dimensional structure of obsessive-compulsive symptoms is stable within and across individuals, the same factor structure should emerge across both data sets, and at least reasonable test-retest agreement should exist between the two methods of data collection at two points in time.

### Data Analysis

Data analysis was conducted in several stages. An initial principal-components analysis applying a varimax rotation was used in each of the two data sets, as well as in the total data set, to determine the number and structural definition of specific dimensions. Following the lead of Baer and colleagues (9, 10), we selected seven of the eight obsession categories and six of the seven compulsion categories for the factor analysis. Data from the two remaining categories, miscellaneous obsessions and miscellaneous compulsions, were withheld from the initial factor analysis. In contrast to the approach used by Baer and colleagues, we summed the number of positive lifetime symptoms for each category in order to take maximum advantage of the variance within each of the data sets. In this context "lifetime" refers to the total number of symptoms, currently present or present at some point in the past, endorsed in each category. In the principal-components analysis, the criterion used to select the number of factors was an eigenvalue greater than unity. The initial factor solutions then were rotated to simple structure with the varimax procedure.

To evaluate the structural integrity of these solutions, the results from each data set were compared. Pearson correlations were used to compare the factor scores generated from both data sets for the 14 individuals who participated in both studies.

To study the relationship of individual miscellaneous obsessions and compulsions, we considered each miscellaneous symptom separately. First, we divided each study group according to whether or not a particular miscellaneous symptom was present or absent. On the basis of earlier work by ourselves and others (9, 10, 15–19), we predicted that the miscellaneous compulsive "need to touch, tap, or rub" would be associated with higher scores on the symmetry and ordering symptom dimension. The other multivariate analyses were exploratory in nature.

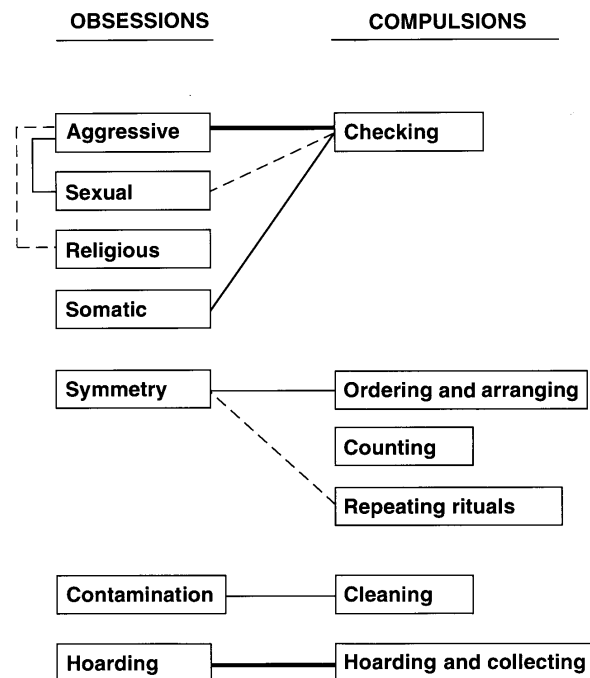
A multivariate analysis was performed to evaluate possible sex effects on the symptom dimension scores. To assess the symptom picture associated with comorbid tic disorders, a multivariate analysis of variance was performed with the four factor scores as dependent measures and tic disorder status as an independent class variable.

Finally, on the basis of work by ourselves and others (9, 10, 15–22), we predicted that the obsessions and checking and the symmetry and ordering symptom dimensions would be positively associated with the presence of comorbid Tourette's disorder and that the cleanliness and washing symptom dimension would be negatively associated with Tourette's disorder and other chronic tic disorders.

### RESULTS

Pearson correlations among the Yale-Brown Obsessive Compulsive Scale symptom checklist categories are schematically shown in figure 1. The principal-components factor analysis of the 13 symptom checklist categories yielded an identical four-factor solution in each of the data sets examined. The four factors accounted for 63.5%, 63.4%, and 62.6% of the total variance in

FIGURE 1. Pearson Correlations Between Lifetime Scores on the Yale-Brown Obsessive Compulsive Scale Symptom Checklist Categories in Two Data Sets<sup>a</sup>



<sup>a</sup>Bold lines indicate correlations greater than or equal to 0.60 in both data sets. Solid lines indicate correlations greater than or equal to 0.40 in both data sets. Dashed lines indicate a correlation greater than or equal to 0.40 in one data set.

the phenomenological study data, the family/genetic study data, and the total data set, respectively.

Table 2 shows the principal-components factor structure after the factors were rotated to simple structure with a varimax rotation procedure. The first factor reflects an obsessions and checking symptom dimension and accounted for 31.5%, 25.3%, and 30.1% of the variance within the phenomenological study, family study, and total data sets, respectively. The aggressive, sexual, religious, and somatic obsessions and checking compulsions symptom categories all loaded highly (>0.50) on this first factor. The second factor, accounting for 13.7%, 11.1%, and 13.8% of the variance within the phenomenological study, family study, and total data sets, respectively, reflects a symmetry and ordering symptom dimension. Obsessions with a need for symmetry or exactness, repeating rituals, counting compulsions, and ordering/arranging compulsions had strong loadings (>0.50) on this factor. The third factor, which reflects a cleanliness and washing symptom dimension, included just contamination obsessions and cleaning/washing compulsions. Both of these symptom categories had a loading greater than 0.80 on this factor. The third factor accounted for between 9.1% and 10.2% of the total variance, depending on the data set. The fourth factor reflects a hoarding symptom dimension that included just hoarding obsessions and hoard-

TABLE 2. Varimax Rotated Factor Structure for Yale-Brown Obsessive Compulsive Scale Symptom Checklist Category Scores

Item	Factor Loading <sup>a</sup>											
	Obsessions and Checking <sup>b</sup>			Symmetry and Ordering <sup>b</sup>			Cleanliness and Washing <sup>b</sup>			Hoarding <sup>b</sup>		
	1	2	3	1	2	3	1	2	3	1	2	3
Symptom category												
Aggressive obsessions	<b>0.86</b>	<b>0.75</b>	<b>0.82</b>	0.05	0.00	0.03	0.08	0.17	0.10	0.11	0.11	0.07
Contamination obsessions	0.31	0.27	0.32	-0.03	0.11	0.01	<b>0.85</b>	<b>0.85</b>	<b>0.83</b>	0.08	0.01	0.07
Sexual obsessions	<b>0.74</b>	<b>0.68</b>	<b>0.73</b>	0.03	0.16	0.07	-0.14	0.02	-0.11	0.21	-0.06	0.12
Hoarding obsessions	0.04	0.00	0.10	0.25	0.14	0.22	0.09	0.03	0.06	<b>0.81</b>	<b>0.91</b>	<b>0.84</b>
Religious obsessions	<b>0.66</b>	0.48	<b>0.67</b>	0.28	-0.29	0.22	0.12	0.31	0.07	-0.03	0.32	0.03
Obsessions of symmetry	0.02	0.01	0.02	<b>0.79</b>	<b>0.73</b>	<b>0.79</b>	-0.02	-0.03	-0.03	0.23	0.27	0.23
Somatic obsessions	<b>0.54</b>	<b>0.69</b>	<b>0.62</b>	0.13	0.03	0.13	0.30	-0.07	0.18	0.08	-0.11	0.06
Cleaning compulsions	0.02	-0.03	0.02	0.21	0.09	0.17	<b>0.85</b>	<b>0.90</b>	<b>0.88</b>	0.17	-0.03	0.11
Checking compulsions	<b>0.74</b>	<b>0.81</b>	<b>0.72</b>	0.17	0.04	0.10	0.25	0.16	0.24	0.02	0.08	0.04
Repeating rituals	0.15	0.46	0.30	<b>0.66</b>	<b>0.53</b>	<b>0.62</b>	0.13	0.12	0.12	0.21	-0.02	0.11
Counting compulsions	0.16	0.13	0.10	<b>0.67</b>	<b>0.58</b>	<b>0.64</b>	0.07	0.28	0.16	-0.01	-0.05	-0.05
Ordering and arranging	0.14	-0.08	0.10	<b>0.74</b>	<b>0.68</b>	<b>0.73</b>	0.06	-0.03	-0.02	0.05	0.36	0.18
Hoarding and collecting	0.21	0.03	0.12	0.09	0.26	0.12	0.16	-0.05	0.11	<b>0.80</b>	<b>0.88</b>	<b>0.85</b>
Statistic												
Eigenvalue	3.93	3.29	3.91	1.78	1.44	1.80	1.39	1.19	1.32	1.08	2.33	1.10
Percentage of variance explained	31.5	25.3	30.1	13.7	11.1	13.8	10.2	9.1	10.2	8.1	18.0	8.5

<sup>a</sup>Robust loadings (greater than 0.50) are printed in bold underline.

<sup>b</sup>1=based on data from the phenomenological study subjects (N=208); 2=based on data from the family/genetic study subjects (N=98); 3=based on data from the total study group (N=292 [14 subjects were in both studies]).

ing and collecting compulsions. Both of these symptom categories had a loading greater than 0.80 on this factor. The fourth factor accounted for between 8.1% and 18.0% of the total variance, depending on the data set. The inclusion or exclusion of the data from the 14 individuals who participated in both the phenomenological studies and the family study did not have a major impact on these findings (data not shown).

#### Test-Retest Agreement

For the 14 subjects who participated in both the family/genetic study and the phenomenological studies, the mean test-retest interval was 51.2 months (SD=11.7, range=17–61). In each case, the family/genetic study data (interview-based) were collected before the data from the phenomenological studies (self-report). Pearson correlations for the four factors were in the good to excellent range: for obsessions and checking,  $r=0.67$ ,  $p<0.01$ ; for symmetry and ordering,  $r=0.75$ ,  $p<0.005$ ; for cleanliness and washing,  $r=0.58$ ,  $p<0.05$ ; and for hoarding,  $r=0.51$ ,  $p=0.06$ ;  $N=14$  for all correlations.

#### Analysis of Miscellaneous Obsessions and Compulsions

Consistent with our prediction, lifetime ratings of the presence or absence of the compulsive need to touch, tap, or rub was robustly associated with higher scores on the symmetry and ordering symptom dimension in both sets of data as well as in the total data set (data not shown).

In the exploratory analyses, 22 multivariate tests of significance were used. Using a Bonferroni (alpha-splitting) correction, we set a  $p$  value of 0.002 as the thresh-

old level for significance. Four other miscellaneous symptoms—the fear of saying certain things, the fear of not saying just the right thing, the compulsive need to tell, ask, or confess, and compulsions (not involving checking) to prevent harm or terrible consequences— independently reached this threshold in both data sets (data not shown). Specifically, the fear of saying certain things was robustly associated with higher scores on the obsessions and checking symptom dimension in both data sets. The fear of not saying just the right thing was strongly associated with higher scores on the symmetry and ordering symptom dimension in both data sets. The compulsive need to tell, ask, or confess and compulsions (not involving checking) to prevent harm or terrible consequences were both associated with higher scores on the obsessions and checking symptom dimension in each data set.

#### Effect of Sex

A modest overall effect of sex was observed in a multivariate analysis of the four symptom dimensions in the total data set ( $F=2.43$ ,  $df=4$ , 283,  $p<0.05$ ). Considered separately, only the symmetry and ordering factor showed this effect (greater in men than in women).

#### Comorbid Chronic Tic Disorders

Consistent with our predictions, individuals with chronic tic disorders scored significantly higher on both the obsessions and checking and the symmetry and ordering factors in the total study group (table 3). The initial multivariate test showed a significant difference ( $F=7.58$ ,  $df=8$ , 570,  $p<0.0001$ ). The subsequent uni-

variate analyses confirmed that this result was due in large measure to both the obsessions and checking factor and the symmetry and ordering factor. The mean score on the cleanliness and washing factor was lower in the chronic tic groups, but this effect was not significant. Unexpectedly, the hoarding factor also made a significant contribution.

## DISCUSSION

Although the distinction between obsessions and compulsions is comfortably established in clinical usage and has been a crucial conceptual starting point for many theoretical discussions and empirical studies (5, 13, 36–40), there is mounting evidence to support a more multidimensional view of obsessive-compulsive disorder (9, 10). In this study, an identical set of four symptom dimensions emerged in two separate sets of data. Each of these four symptom dimensions cuts across the conceptual boundary between obsessions and compulsions, with one or more categories of obsessions being highly correlated with one or more categories of compulsions. Many of these results are congruent with those of previous studies (6–10). Aggressive, sexual, and religious obsessions co-occurred in this study and in one previous study that used similar methods (9, 10). This symptom dimension (aggression and checking) accounted for more than one-fourth of the variance in each of the data sets examined as part of the present study. However, the strongest correlations within this first symptom dimension were between aggressive obsessions and checking compulsions—a relationship not seen in the earlier study by Baer and colleagues (9, 10). A second symptom dimension, symmetry and ordering, combined compulsions of ordering and arranging, counting compulsions, and repeating rituals with obsessions of symmetry. A similar symptom constellation was also found in the earlier study by Baer and colleagues. Not surprisingly, a third symptom dimension (cleanliness and washing) consistently paired washing and cleaning compulsions with contamination obsessions.

Finally, hoarding obsessions were highly correlated with hoarding behaviors and other collecting compulsions. Although this pairing of hoarding obsessions and compulsions was seen in the study by Baer and colleagues (9, 10), these symptoms did not emerge as a separate dimension in their analysis. It is also of interest that the hoarding symptom dimension accounted for twice as much variance in the family/genetic study subjects as in the phenomenological study subjects. This may reflect a real difference in the composition of the two study groups. Such differences between the groups make it that much more remarkable that identical di-

TABLE 3. Lifetime Scores on Factors From the Yale-Brown Obsessive Compulsive Scale Symptom Checklist of Subjects With Obsessive-Compulsive Disorder Grouped by Comorbid Tic Disorder Status

Factor	Score					
	Subjects With No Chronic Tic Disorder (N=198)		Subjects With a Chronic Tic Disorder (N=20)		Subjects With Tourette's Disorder (N=73)	
	Mean	SD	Mean	SD	Mean	SD
Obsessions and checking <sup>a</sup>	-0.228	0.879	0.399	0.702	0.484	1.150
Symmetry and ordering <sup>b</sup>	-0.110	0.990	-0.158	1.030	0.327	0.957
Cleanliness and washing	0.049	0.972	-0.011	1.090	-0.157	1.030
Hoarding <sup>c</sup>	-0.092	0.945	-0.238	0.922	0.318	1.110

<sup>a</sup>Significant difference between the groups with tic disorders and the group without ( $F=17.10$ ,  $df=2, 288$ ,  $p<0.001$ ).

<sup>b</sup>Significant difference between the groups with tic disorders and the group without ( $F=5.51$ ,  $df=2, 288$ ,  $p=0.004$ ).

<sup>c</sup>Significant difference between the groups with tic disorders and the group without ( $F=5.12$ ,  $df=2, 288$ ,  $p=0.006$ ).

mensional structures of symptom categories emerged from the two types of studies. Taken together, these differences contribute to the impression that this four-dimension solution is robust.

This study used data from nearly 300 patients and represents one of the largest systematic studies of the correlational relationships among the symptoms of obsessive-compulsive disorder that has been completed to date. Discrepancies between the results of this study and those of prior investigations are likely to be due to in part to the number of subjects participating and methodological differences that may have biased the results of earlier studies. Several studies (11–13) simply used composite severity ratings of obsessions and compulsions, making it impossible to examine the potential correlational relationships between symptom categories. Other studies were biased by not including the full range of obsessive-compulsive symptoms (6–8) or by limiting the sampling frame to current rather than lifetime symptoms (9, 10). Given sufficient statistical power, an inclusive approach to content may be preferable. For investigators interested in defining trait variables for genetic and neurobiological studies, the use of lifetime symptom inventories may provide a more complete and accurate picture of an individual patient's clinical phenotype. While this approach is vulnerable to recall bias, we are encouraged by the good to excellent preliminary test-retest reliability of the four symptom dimensions identified in this study.

The shortcomings of this study include its reliance on the a priori symptom categories used in the construction of the Yale-Brown Obsessive Compulsive Scale. While the Yale-Brown symptom checklist is the best available inventory (34), arguments can be made for expanding or reframing some of the categories. For example, it may be heuristically valuable to consider to what degree some of the common aggressive, violent, and sexual obsessions contain elements of separation anxiety (41).

In conclusion, obsessive-compulsive disorder is a

multidimensional and heterogeneous disorder when assessed with use of the correlational methods of factor analysis. Data from other groups and larger samples are needed before the dimensional structure of obsessive-compulsive disorder symptoms determined in this study can be accepted with greater confidence. Indeed, some of our exploratory analyses suggest that with a larger study group, the symmetry and ordering symptom dimension may fragment further and a separate counting dimension may emerge. In any case, it is likely that the distinction between obsessions and compulsions that is so comfortably embedded in clinical usage may need to be reconsidered. The difference between thought and action is crucial in current conceptualizations of obsessive-compulsive disorder. However, it may be more fruitful for clinical studies to disaggregate obsessions and compulsions in order to assess clinical severity and change for each symptom dimension. Composite severity ratings can be misleading and might obscure selective changes that may have occurred in just one dimension. This conclusion may call for the development of new severity rating scales that focus on one or more symptom dimensions. Further, it is important to recall that factor analysis is essentially a method of data reduction. It identifies which symptoms in a group are highly intercorrelated, indicating that they frequently co-occur in the same individual. This demonstration of co-occurrence is simply descriptive until other methods are used to demonstrate that any given relationship has conceptual, diagnostic, clinical, or biological meaning. We have taken a few steps in this direction (29–31, 41–43). If any of these leads are confirmed or if other investigators independently replicate this four-factor solution, a program of research to explore the genetic, neural, neuropsychological, and treatment correlates of these four symptom dimensions would be warranted. This approach has proven to be of value in identifying the genetic factors associated with particular phenotypic features in other clinically heterogeneous disorders such as dyslexia (44). Similar approaches could be undertaken with in vivo neuroimaging studies, experimental neuropsychological studies, and clinical trials.

## REFERENCES

- Rasmussen SA, Eisen JL: Clinical and epidemiological findings of significance to neuropharmacological trials. *Psychopharmacol Bull* 1988; 24:466–470
- Goodman WK, Price LH, Rasmussen SA, Mazure C, Fleischmann RL, Hill CL, Heninger GR, Charney DS: The Yale-Brown Obsessive Compulsive Scale, I: development, use, and reliability. *Arch Gen Psychiatry* 1989; 46:1006–1011
- Goodman WK, Price LH, Rasmussen SA, Mazure C, Delgado P, Heninger GR, Charney DS: The Yale-Brown Obsessive Compulsive Scale, II: validity. *Arch Gen Psychiatry* 1989; 46:1012–1016
- Janet P, Raymond F: *Les Obsessions et la Psychasthénie* (1903). New York, Arno, 1976
- Lewis AJ: Problems of obsessional illness. *Proc R Soc Med* 1936; 29:325–336
- Hodgson RJ, Rachman S: Obsessional-compulsive complaints. *Behav Res Ther* 1977; 15:389–395
- Minichiello WE, Baer L, Jenike MA, Holland A: Age of onset of major subtypes of obsessive-compulsive disorder. *J Anxiety Disorders* 1990; 4:147–150
- Khanna S, Kalaperumal VG, Channabasavanna SM: Clusters of obsessive-compulsive phenomena in obsessive-compulsive disorder. *Br J Psychiatry* 1990; 156:98–102
- Baer L: Factor analysis of symptom subtypes of obsessive compulsive disorder and their relation to personality and tic disorders. *J Clin Psychiatry* 1994; 55(March suppl):18–23
- Baer L, Breiter HC, Goodman WK, Rasmussen SA, Eisen JL, Barr L, Shera D, Jenike MA: Identifying subtypes in obsessive-compulsive disorder and their relationship to Tourette and tic disorder: a factor analytic study. *J Abnorm Psychol* (in press)
- Fals-Stewart W: A dimensional analysis of the Yale-Brown Obsessive Compulsive Scale. *Psychol Rep* 1992; 70:238–240
- Kim SW, Dysken MW, Pheley AM, Hoover KM: The Yale-Brown Obsessive-Compulsive Scale: measures of internal consistency. *Psychiatry Res* 1994; 51:203–211
- McKay D, Danyko S, Neziroglu F, Yaryura-Tobias JA: Factor structure of the Yale-Brown Obsessive-Compulsive Scale: a two dimensional measure. *Behav Res Ther* 1995; 33:865–869
- Rettew DC, Swedo SE, Leonard HL, Lenane MC, Rapoport JL: Obsessions and compulsions across time in 79 children and adolescents with obsessive-compulsive disorder. *J Am Acad Child Adolesc Psychiatry* 1992; 31:1050–1056
- Leckman JF, McDougle CJ, Pauls DL, Peterson BS, Grice DE, King RA, Scahill L, Price LH, Goodman WK, Rasmussen SA: Tic-related vs non-tic-related obsessive-compulsive disorder, in *Treatment Resistant Obsessive-Compulsive Disorder*. Edited by Goodman WK, Maser JD. Rockville, Md, US Public Health Service (in press)
- George MS, Trimble MR, Ring HA, Sallee FR, Robertson MM: Obsessions in obsessive-compulsive disorder with and without Gilles de la Tourette's disorder. *Am J Psychiatry* 1993; 150:93–97
- Leckman JF, Walker DE, Goodman WK, Pauls DL, Cohen DJ: "Just right" perceptions associated with compulsive behavior in Tourette's syndrome. *Am J Psychiatry* 1994; 151:675–680
- Holzer JC, Goodman WK, McDougle CJ, Baer L, Boyarsky BK, Leckman JF, Price LH: Obsessive-compulsive disorder with and without a chronic tic disorder: a comparison of symptoms in 70 patients. *Br J Psychiatry* 1994; 164:469–473
- Leckman JF, Grice DE, Barr LC, deVries ALC, Martin C, Cohen DJ, Goodman WK, Rasmussen SA: Tic-related vs non-tic-related obsessive-compulsive disorder. *Anxiety* 1995; 1:208–215
- Miguel EC, Coffey BJ, Baer L, Savage CR, Rauch SL, Jenike MA: Phenomenology of intentional repetitive behaviors in obsessive-compulsive disorder and Tourette's disorder. *J Clin Psychiatry* 1995; 56:246–255
- de Groot CM, Bornstein RA, Janus M-D, Mavissakalian MR: Patterns of obsessive compulsive symptoms in Tourette subjects are independent of severity. *Anxiety* 1995; 1:268–274
- Zohar AD, Pauls DL, Ratzoni G, Apter A, Dycian A, Binder M, King R, Leckman JF, Kron S, Cohen DJ: Obsessive-compulsive disorder with and without tics in an epidemiological sample of adolescents. *Am J Psychiatry* 1997; 154:274–276
- Pauls DL, Leckman JF: The inheritance of Gilles de la Tourette's syndrome and associated behaviors: evidence for autosomal dominant transmission. *N Engl J Med* 1986; 315:993–997
- Pauls DL, Raymond CL, Leckman JF, Stevenson JM: A family study of Tourette's syndrome. *Am J Hum Genet* 1991; 48:154–163
- Lenane MC, Swedo SE, Leonard H, Pauls DL, Sceery W, Rapoport J: Psychiatric disorders in first degree relatives of children and adolescents with obsessive compulsive disorder. *J Am Acad Child Adolesc Psychiatry* 1990; 29:407–412
- Leonard HL, Lenane MC, Swedo SE, Rettew DC, Gershon ES, Rapoport JL: Tics and Tourette's disorder: a 2- to 7-year follow-up of 54 obsessive-compulsive children. *Am J Psychiatry* 1992; 149:1244–1251
- Pauls DL, Alsobrook JP II, Goodman W, Rasmussen S, Leckman JF: A family study of obsessive-compulsive disorder. *Am J Psychiatry* 1995; 152:76–84
- Hanna GL, McCracken JT, Cantwell DP: Prolactin in childhood

- obsessive-compulsive disorder: clinical correlates and response to clomipramine. *J Am Acad Child Adolesc Psychiatry* 1991; 30: 173-178
29. Leckman JF, Goodman WK, North WG, Chappell PB, Price LH, Pauls DL, Anderson GM, Riddle MA, McSwiggan-Hardin M, McDougle CJ, Barr LC, Cohen DJ: Elevated cerebrospinal fluid levels of oxytocin in obsessive-compulsive disorder: comparison with Tourette's syndrome and healthy controls. *Arch Gen Psychiatry* 1994; 51:782-792
  30. McDougle CJ, Goodman WK, Leckman JF, Barr LC, Heninger GR, Price LH: The efficacy of fluvoxamine in obsessive-compulsive disorder: effects of comorbid chronic tic disorder. *J Clin Psychopharmacol* 1993; 13:354-358
  31. McDougle CJ, Goodman WK, Leckman JF, Lee NC, Heninger GR, Price LH: Haloperidol addition in fluvoxamine-refractory obsessive-compulsive disorder: a double-blind, placebo-controlled study in patients with and without tics. *Arch Gen Psychiatry* 1994; 51:302-308
  32. Andreasen NC, Arndt S, Alliger R, Miller D, Flaum M: Symptoms of schizophrenia: methods, meanings, and mechanisms. *Arch Gen Psychiatry* 1995; 52:341-351
  33. Woody SR, Steketee G, Chambless DL: Reliability and validity of the Yale-Brown Obsessive-Compulsive Scale. *Behav Res Ther* 1995; 33:597-605
  34. Pato MT, Eisen J, Pato CN: Rating scales for obsessive compulsive disorder, in *Current Insights in Obsessive Compulsive Disorder*. Edited by Hollander E, Zohar J, Marazzati D, Olivier B. New York, John Wiley & Sons, 1994, pp 77-91
  35. Rosenfeld R, Dar R, Anderson D, Kobak KA, Greist JH: A computer-administered version of the Yale-Brown Obsessive Compulsive Scale. *Psychol Assessment* 1992; 4:329-332
  36. Akhtar S, Wig NN, Varma VK, Pershad D, Verma SK: A phenomenological analysis of symptoms in obsessive-compulsive neurosis. *Br J Psychiatry* 1975; 127:342-348
  37. Dowson JM: The phenomenology of severe obsessive-compulsive neurosis. *Br J Psychiatry* 1977; 131:75-78
  38. Stern RS, Cobb JP: Phenomenology of obsessive compulsive neurosis. *Br J Psychiatry* 1978; 132:233-239
  39. Khanna S, Channabasavanna SM: Towards a classification of compulsions in obsessive compulsive neurosis. *Psychopathology* 1987; 20:23-28
  40. Khanna S, Channabasavanna SM: Phenomenology of obsessions in obsessive-compulsive neurosis. *Psychopathology* 1988; 21: 12-18
  41. Leckman JF, Insel TR, Mayes LC: Maladies of love—an evolutionary perspective on some forms of obsessive-compulsive disorder, in *Advancing Research on Developmental Plasticity*. Edited by Hann DM, Huffman LC, Lederhendler I, Meinecke D. Rockville, Md, National Institute of Mental Health (in press)
  42. Carter AS, Pauls DL, Leckman JF: The development of obsessional: continuities and discontinuities, in *Manual of Developmental Psychopathology*. Edited by Cicchetti D, Cohen DJ. New York, John Wiley & Sons, 1995, pp 609-632
  43. Evans DW, Leckman JF, Carter A, Reznick JS, Henshaw D, Pauls DL: Ritual, habit, and perfectionism: the prevalence and development of compulsive-like behavior in normal young children. *Child Dev* 1997; 68:58-68
  44. Grigorenko EL, Wood FB, Meyer MS, Hart LA, Speed WC, Schuster A, Pauls DL: Susceptibility loci for distinct components of dyslexia on chromosomes 6 and 15. *Am J Hum Genet* 1997; 60:27-39