Exposure and ritual prevention (EX/RP) is an effective treatment for obsessive compulsive-disorder (OCD), although it is neither universally nor completely helpful. Compliance with EX/RP treatment procedures has been linked theoretically to posttreatment outcome, yet empirical exploration of this relationship has been insufficient. In this study, therapists were asked to rate the treatment compliance of 28 consecutive patients who received EX/RP on a fee-for-service basis. Results indicated that understanding the treatment rationale and compliance with in-session and homework exposure instructions, but not with ritual prevention and self-monitoring of rituals, was significantly related to posttreatment OCD symptom severity. Clinical implications of these findings and future directions in treatment compliance research with OCD patients are discussed.

Treatment Compliance and Outcome in Obsessive-Compulsive Disorder

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Consistent research findings have established cognitive-behavioral therapy by exposure and response (ritual) prevention (EX/RP) as the psychosocial treatment of choice for obsessive-compulsive disorder

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(OCD) (e.g., Franklin, Abramowitz, Kozak, Levitt, & Foa, 2000). Foa and Kozak (1996) found that 83% of OCD patients who completed this form of treatment were classified as responders immediately following therapy, and 76% of patients were responders at follow-up (M = 29 months). However, even after successful treatment, most patients still have at least some residual symptoms (Abramowitz, 1998). In addition, as many as 25% to 30% of patients drop out of EX/RP prematurely (McDonald, Marks, & Blizard, 1988). Thus, although EX/RP is clearly helpful for many patients with OCD, there is room for improvement. It is therefore important to identify patient and treatment variables that are associated with successful outcome.

In EX/RP, emphasis is placed on learning new information and skills to modify OCD-related dysfunctional thoughts and behaviors. This treatment involves psychoeducation about OCD, followed by repeated and prolonged confrontation (exposure) with situations and stimuli that evoke obsessional distress. Patients are also taught that consistently refraining from compulsive rituals will yield long-term relief from frequent and distressing obsessions, even though this task can be difficult in the short run. Individuals with OCD who begin EX/RP do so because they are afraid of confronting feared stimuli without ritualizing; thus, there is a significant challenge inherent in the core features of this therapy. Moreover, clinical observations suggest that generalization of treatment effects to situations encountered in daily life is critical for short- and long-term OCD symptom reduction. Thus, success of EX/RP relies on helping patients overcome their trepidation to comply with treatment-related exercises both within and outside of therapy sessions.

Very little research attention has been paid to the relationship between compliance and outcome with EX/RP for OCD. Two studies (Lax, Basoglu, & Marks, 1992; O'Sullivan, Noshirvani, Marks, Montiero, & Lelliott, 1991) examined compliance among several other variables in analyses of predictors of treatment outcome, yet inconsistent results were found. O'Sullivan et al. (1991) reported that compliance with EX/RP predicted reductions in the severity of rituals at 6-year follow-up. However, Lax et al. (1992) found no relationship between compliance and treatment response. It is important that reduced variability in the data (patients were generally compliant)

may have hindered the detection of a significant relationship in the latter study. A more general problem with both studies was that compliance was rated on a single dimension that likely represented "general cooperation" with the therapist and was probably influenced by the patient-therapist relationship.

The aim of this study was to further elucidate the role of compliance with treatment instructions in EX/RP for OCD. Because EX/RP is a set of specific empirically validated treatment procedures, research on compliance with each procedure might yield more useful findings than would a global compliance rating. Therefore, we obtained ratings of compliance with the following components of EX/RP: (a) psychoeducation (understanding the EX/RP treatment rationale); (b) in-session exposure; (c) homework exposure; and (d) ritual prevention. We hypothesized that patients with more severe pretreatment symptoms would show less compliance with EX/RP. We also predicted that greater compliance with components of EX/RP would be associated with greater symptom reduction, and clinically significant improvement, following treatment.

METHOD

PARTICIPANTS

Twenty-eight adults (14 males and 14 females) who were consecutively enrolled in an outpatient OCD treatment program between 1998 and 2000 participated in this study. Twelve patients (50%) were using concomitant serotonergic medications for their OCD and remained on stable dosages throughout EX/RP treatment. Patients with secondary comorbid Axis I or Axis II diagnoses were included unless they reported current suicidal ideation, substance abuse, or active psychotic symptoms. Additional Axis I and II diagnoses, present in 15 patients (50%), included major depressive disorder ($n = 5$); generalized anxiety disorder ($n = 2$); bipolar disorder ($n = 2$); panic disorder ($n = 1$); social phobia ($n = 1$); and attention deficit disorder ($n = 1$). The only Axis II diagnosis was obsessive-compulsive personality disorder, which occurred in two patients.

The sample's mean age was 35.2 years (*SD* = 14.1, range = 18-65 years), and each participant had a primary *DSM-IV* (American Psychiatric Association, 1994) diagnosis of OCD as confirmed by two doctoral-level psychologists with ample training and experience in the use of the diagnostic interview. Mean duration of OCD symptoms was 19.5 years (*SD* = 11.2, range = 1-45 years). Three patients (12.5%) prematurely discontinued EX/RP: one following 3 treatment sessions, one after 8 sessions, and the other after 12 sessions. Data from these patients were included in the analyses with assessment results from the patients' last visit carried forward (i.e., intention-to-treat).

ASSESSMENT

Diagnosis of OCD according to *DSM-IV* criteria (American Psychiatric Association, 1994) was established in a two-stage intake process in which each patient was interviewed separately by two assessors. The first interview was guided by the Yale-Brown Obsessive Compulsive Scale (Y-BOCS) (Goodman, Price, Rasmussen, Mazure, Delgado, et al., 1989; Goodman, Price, Rasmussen, Mazure, Fleischmann, et al., 1989) symptom checklist and severity scale and included a semistructured assessment (based on *DSM-IV*) of comorbid conditions. Upon completion of this intake, treatment options were discussed, including the choice between daily and twice-weekly therapy sessions. All patients in this study were diagnosed as having primary OCD by both interviewers (100% interrater agreement). OCD symptom severity was assessed at pre- and posttreatment by evaluators not otherwise involved in the patient's therapy. The following symptom measures were used:

Yale-Brown Obsessive Compulsive Scale (Y-BOCS) (Goodman, Price, Rasmussen, Mazure, Delgado, et al., 1989; Goodman, Price, Rasmussen, Mazure, Fleischmann, et al., 1989). The diagnosis of OCD was established using the Y-BOCS, a semistructured interview that consists of a symptom checklist and severity scale. The severity scale, considered the "gold standard" measure of OCD symptoms, contains 10 items and assesses (a) time spent, (b) interference, (c) distress, (d) resistance, and (e) control for obsessions and compulsions

separately. Items (scored 0-4) are summed to yield a total score ranging from 0 (*no symptoms*) to 40 (*very severe*).

Beck Depression Inventory (BDI) (Beck, Ward, Mendelsohn, Mock, & Erlbaugh, 1961). The BDI is a 21-item self-report scale that assesses the severity of affective, cognitive, motivational, vegetative, and psychomotor components of depression. Scores of 10 or less are considered normal; scores of 20 or greater suggest the presence of clinical depression. The BDI has excellent reliability and validity (Beck, Steer, & Garbin, 1988) and is widely used in treatment outcome research. The BDI was completed at pretreatment only.

TREATMENT

All patients received EX/RP for OCD based on the manual developed by Kozak and Foa (1997). This treatment involved three psychoeducational/information-gathering sessions followed by 15 treatment sessions. Sessions lasted for 2 hours each and were conducted either on an intensive (daily sessions over 3 weeks; $n = 11$) or twice-weekly (over 8 weeks; $n = 17$) basis. The first three sessions were spent educating the patient about OCD and the rationale for EX/RP and developing a treatment plan (a hierarchy of exposure situations). Briefly, patients were taught that obsessions give rise to anxiety, and compulsive rituals serve to reduce this distress. Exposure is performed to weaken the association between obsessional thoughts and anxiety, and ritual prevention helps to further weaken these fears by removing the negatively reinforcing effects of compulsions.

The 15 treatment sessions consisted of repeated and prolonged exposure to anxiety-evoking situations in real life (in vivo) and/or in imagination. Patients were also assigned situations to practice for homework and provided with forms on which to record time, anxiety levels, and difficulties that emerged during homework exposures. In addition, patients were instructed to refrain from all ritualizing, but to record the occurrence of any violations of ritual prevention on self-monitoring forms. The therapist collected all forms at the subsequent session. Violations of ritual prevention were discussed with the therapist to assist the patient in resisting compulsive urges more completely.

THERAPISTS

Therapists were doctoral-level psychologists with at least 2 years of experience providing EX/RP for OCD. All cases were discussed in weekly supervision meetings.

ASSESSMENT OF TREATMENT COMPLIANCE

As in previous research (e.g., Leung & Heimberg, 1996), we used therapists' ratings of patient compliance on Likert-type scales ranging from 0 (*poor*) to 6 (*outstanding*). A coding manual included instructions for assessing compliance in each area. Ratings were made following the final treatment session, but before the therapist was made aware of the patient's posttreatment Y-BOCS score. Compliance with four components of EX/RP were operationalized as follows:

Patients' understanding of the treatment rationale. This was conceptualized as compliance with the psychoeducational component of EX/RP. During the first few treatment sessions, therapists provided patients with reading material and gave informal quizzes to assess patients' mastery of these concepts. In rating patients on this variable, therapists were instructed to evaluate the patient's comprehension of the material covered in these sessions.

Compliance with in-session exposure instructions. Therapists were instructed to rate compliance with instructions to perform exposure exercises that had been planned for each treatment session. Notes from each exposure session were recorded on coding forms and examined prior to rating compliance. Refusal to enter or remain in exposure situations, and subtle or overt avoidance during exposure, were considered in this rating.

Compliance with homework exposure instructions. At each session, the therapist and patient agreed on the patient's exposure homework assignment; the instructions for this assignment were written on forms given to the patient to complete while performing the exposure. These forms were collected at the next session and kept in a folder. In

rating homework compliance, therapists were instructed to consider data from the patient's homework forms, as well as verbal accounts of homework performance.

Compliance with self-monitoring of rituals. Patients were instructed that their goal was to refrain from all rituals during treatment but to record rituals they might perform on self-monitoring forms provided by the therapist. Self-monitoring forms were collected at each session. In rating compliance in this area, therapists were instructed to consider both the patients' effort in abstaining from compulsive rituals as well as their accuracy in recording violations of ritual prevention.

RESULTS

PATIENT CHARACTERISTICS

Differences between treatment schedules. Whether a patient received daily or twice-weekly treatment sessions was determined by a combination of patient choice, practical factors such as distance between patients' homes and the clinic, and recommendations from the intake evaluators. Comparisons of demographic characteristics between groups (with *t* or chi-square tests as necessary) revealed no differences in pretreatment Y-BOCS or BDI scores, duration of OCD symptoms, sex, medication use, or comorbidity. We did find that patients who received twice-weekly EX/RP were significantly older than those who received daily treatment (*M* difference = 14 years), $t(26) = 2.63$, $p < .05$. Because only the treatment schedule and mean age differed between these groups, we combined these groups for the analyses reported below.

Symptom severity. Mean scores on measures of psychopathology are presented in Table 1. At baseline, patients evidenced moderate to severe OCD symptoms and clinical levels of depression. The pre- to posttreatment reduction in Y-BOCS scores was significant, paired $t(23) = 7.54$, $p < .01$.

TABLE 1
Descriptive Statistics for Symptom Severity Measures and Ratings of Treatment Compliance

Characteristic	M	SD	*Range*
Symptom measures			
Y-BOCS (pretreatment)	26.93	4.34	18-35
Y-BOCS (posttreatment)	15.11	3.50	4-28
BDI (pretreatment only)	21.95	10.00	0-48
Treatment compliance ratings			
Understand EX/RP rationale (0-6)	4.44	1.12	2-6
In-session exposure (0-6)	4.33	1.75	0-6
Homework exposure (0-6)	3.56	1.93	0-6
Self-monitoring of rituals (0-6)	3.30	1.73	0-6

NOTE: OCD = obsessive-compulsive disorder; EX/RP = exposure and ritual prevention; Y-BOCS = Yale-Brown Obsessive Compulsive Scale; BDI = Beck Depression Inventory.

Treatment compliance. Table 1 also displays mean ratings for each of the four compliance variables. As can be seen, patients were moderately compliant with treatment instructions, however there was a moderate degree of variability.

We examined the interrelationships among the four measures of compliance to determine whether they made up a single factor or were more accurately viewed as separate components of compliance. As seen in Table 2, moderately strong significant correlations (maximum $R^2 = .40$) were found between compliance with in-session exposure and both homework exposure and understanding the treatment rationale. No other significant relationships among the dependent variables were detected. Based on these results, the compliance ratings were analyzed separately rather than as a single factor. To reduce the chances of committing Type 1 errors, we applied a Bonferroni corrected alpha level of $p < .01$ (.05/4) to all subsequent analyses of the four compliance variables.

EFFECTS OF PRETREATMENT PSYCHOPATHOLOGY ON COMPLIANCE

To determine whether treatment compliance was related to baseline symptom severity, we calculated correlation coefficients between the four compliance indices and pretreatment scores on the psycho-

TABLE 2
Correlations Between Treatment Compliance Variables

Variable	*In-Session Exposure*	*Understand EX/RP Rationale*	*Homework Exposure*	*Self-Monitoring of Rituals*
In-session exposure	—	.57*	.66*	–.17
Understand EX/RP rationale		—	.34	–.01
Homework exposure			—	.19
Self-monitoring of rituals				—

NOTE: EX/RP = exposure and ritual prevention.
* $p < .01$.

pathology measures. No significant correlations were found (all *p*s > .01), indicating that severity of OCD and depressive symptoms were not related to degree of compliance with EX/RP procedures.

Next, compliance ratings for patients with and without comorbid Axis I and II disorders were compared using *t* tests. These analyses also indicated no between-group differences on any compliance measure (all *p*s > .01). Adherence with EX/RP instructions was not affected by psychiatric comorbidity.

EFFECTS OF TREATMENT VARIABLES ON COMPLIANCE

We examined whether the use of concomitant medication affected compliance with EX/RP procedures. A series of *t* tests comparing compliance ratings for medicated and nonmedicated patients was performed, yet no between-group differences on any measure of compliance were found (all *p*s > .01). Thus, medicated patients were no more or less compliant than those not using medication. A similar comparison between patients receiving twice weekly versus daily treatment sessions also revealed no differences (all *p*s > .01).

RELATIONSHIP BETWEEN COMPLIANCE AND TREATMENT OUTCOME

A stepwise multiple regression approach was used to examine the association between treatment compliance and posttreatment OCD symptom severity. To control for initial OCD severity, the pretreat-

TABLE 3
Summary of Stepwise Regression Analysis for Compliance Variables Predicting Posttreatment Y-BOCS Scores

Variable	R^2	*Increment*	B	SE B	*ß*
	Posttreatment				
Step 1	.16	—			
Pretreatment Y-BOCS			.67	.81	.40*
Step 2	.70	.64			
Pretreatment Y-BOCS			.50	.20	.30*
Understand EX/RP rationale			–2.04	.93	–.31*
In-session exposure			–1.54	.81	–.36
Homework exposure			–.85	.65	–.22
Self-monitoring			.15	.56	.04

NOTE: Y-BOCS = Yale-Brown Obsessive Compulsive Scale total score; EX/RP = exposure and ritual prevention.

ment Y-BOCS score was entered as the independent variable in step 1, and the four compliance measures were entered as independent variables in step 2. Posttreatment Y-BOCS score was the dependent variable. The results of this analysis, presented in Table 3, indicated that once pretreatment severity was accounted for, compliance explained an additional 64% of the variance in posttreatment OCD severity, with only understanding the treatment rationale significantly contributing to the final model, $R = .85$, $F(5, 26) = 10.68$, $p < .01$.

We also computed partial correlations between the measures of compliance and posttreatment Y-BOCS scores, controlling for pretreatment Y-BOCS severity. These correlation coefficients indicate that understanding the rationale for EX/RP ($r = –.65$; $p < .01$), compliance with in-session exposure ($r = –.75$; $p < .01$), and compliance with homework exposure ($r = –.61$; $p < .01$) were strongly associated with less severe posttreatment OCD symptoms.

Clinical significance. As suggested by Jacobson and Truax (1991), we used two criteria for determining whether a patient achieved clinically significant improvement: (a) progression from the clinical to the nonclinical population on the Y-BOCS, and (b) reliable change. Normative Y-BOCS data reported by Steketee, Frost, and Bogert (1996) were used to calculate *c*, the cutoff point beyond which a patient's posttreatment score is closer to the mean of the nonclinical than the

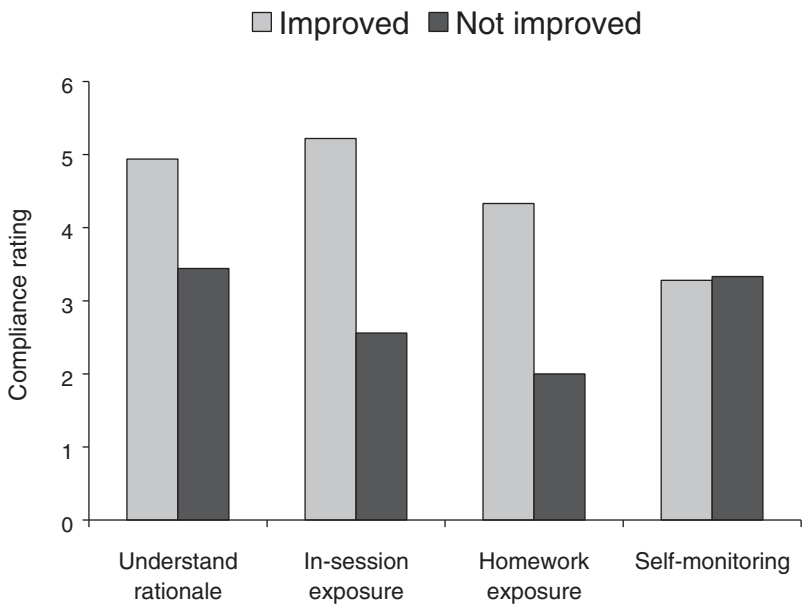

Figure 1. Mean ratings of compliance by clinically significant improvement status.

clinical population. *c* was determined to be 16.9; thus patients with posttreatment Y-BOCS scores less than 16 were considered to be in the nonclinical range. Test-retest reliability data reported by Steketee et al. (1996) were also used in calculating the reliable change index (RC) for each patient. RC values greater than 1.96 indicate that the likelihood of pre- to posttreatment differences resulting from chance were less than .05.

Eighteen patients (64.3% of the sample) met both criteria for clinically significant improvement. To examine differences in compliance between patients who did and did not achieve this status, we computed mean compliance scores for both groups of patients. These are displayed in Figure 1. Between group *t* tests indicated that patients who achieved clinically significant improvement had a better understanding of the treatment rationale and were more compliant with both in-session and homework exposure instructions, compared to patients who did not show clinically significant improvement (all *p*s < .01).

DISCUSSION

Our aims in this study were to examine whether (a) more severe pretreatment OCD and depressive symptoms were related to poorer compliance with specific cognitive-behavioral therapy procedures (i.e., EX/RP) and (b) whether greater treatment compliance was associated with better clinical outcomes. This study affords advances over previous research in this area because it included a patient sample with heterogeneous pretreatment clinical status, compliance, and treatment response. Two thirds of the sample achieved clinically significant improvement in OCD symptoms. Thus, we were able to avoid the problem of range restrictions that may have obscured these relationships in prior investigations.

We examined interrelationships between compliance with four distinct facets of EX/RP. Patients who evidenced greater compliance with in-session exposure were also more compliant with homework exposure instructions. Also, patients who better understood the rationale for EX/RP were more compliant with in-session exposure instructions. This suggests that a strong emphasis on psychoeducation in EX/RP may lay the groundwork for subsequent success in performing challenging and anxiety-evoking exposures. Alternatively, as the psychoeducational process is ongoing throughout EX/RP, it may be that patients who complied with in-session exposures came to better understand the treatment rationale by the benefit of their own experience with these procedures. Nevertheless, our findings suggest that these two components of EX/RP may be related, and this may have important treatment implications. For instance, checks on knowledge of the treatment rationale (e.g., quizzes) could be used to help therapists avert potential problems that may arise if a patient does not adequately grasp core concepts prior to engaging in the most difficult exposure exercises.

We hypothesized that patients with more severe pretreatment symptoms would have greater difficulty complying with EX/RP instructions. However, baseline clinical severity was not significantly related with any measure of compliance. The flexibility of EX/RP may explain this initially counterintuitive finding. That is, EX/RP treatment plans are individually tailored to each patient's specific

OCD symptoms, and therapists generally attempt to encourage compliance in severely avoidant patients by designing early exposures that are less difficult. Thus, patients with severe symptoms may have initially been given less difficult treatment instructions with which to comply. Nevertheless, our finding is consistent with earlier studies that also failed to find relationships between pretreatment severity and compliance with cognitive-behavioral treatments for other anxiety disorders (Edelman & Chambless, 1995; Leung & Heimberg, 1996).

Our findings are generally consistent with the hypothesis that greater treatment compliance is associated with less severe OCD symptoms following EX/RP. Patients who achieved clinically significant improvement better understood the treatment rationale and were more compliant with in-session and homework exposure instructions compared to patients who did not improve to this extent. Compliance with the psychoeducational aspects of EX/RP was most strongly associated with reductions in posttreatment OCD severity. We suspect that patients who understood the rationale for EX/RP were better able to apply these principles than were patients who did not understand the core concepts of EX/RP.

One way in which understanding the rationale for EX/RP might lead to better treatment results is that patients with a clearer grasp of how these procedures weaken OCD symptoms may perform higher quality exposures. That is, they may be better able to recognize subtle elements of their own OCD symptoms (e.g., avoidance, reassurance-seeking) and attend to these aspects when confronting feared stimuli. It may also be that patients with a clear understanding readily anticipate the cognitive changes that occur via EX/RP (i.e., disconfirmation of feared consequences). This highlights the importance of clearly articulating a conceptualization of OCD that the patient can understand in terms of how EX/RP procedures reduce these symptoms. A related question concerns factors influencing the patient's ability to understand the treatment rationale. Perhaps previous experience, general intelligence, insight into the senselessness of OCD symptoms, and the therapist's skill level play significant roles in this important aspect of therapy.

Compliance with self-monitoring of rituals was not significantly related to posttreatment OCD severity. We expected that patients who

diligently attempted to refrain from rituals, yet recorded instances when they did not refrain, would benefit from maintaining such a record. Indeed, inclusion of ritual prevention has been found to add to the efficacy of exposure-based treatment of OCD (Foa, Steketee, Grayson, Turner, & Lattimer, 1984; Foa, Steketee, & Milby, 1980). In our study, however, it is possible that patients' self-monitoring forms, which were used to rate success with ritual prevention, did not accurately reflect the degree to which patients abstained from rituals. One shortcoming of present monitoring forms is that they do not measure the percentage of successfully resisted compulsive urges, which may be more important conceptually than the raw number of compulsive rituals performed. Perhaps inclusion of this information will provide a more fine-tuned estimate of ritual prevention compliance in future studies of this kind.

This study has several noteworthy shortcomings. First, for EX/RP (as well as for other cognitive-behavioral treatments), it is conceptually difficult to disentangle treatment compliance from treatment outcome. Two components of compliance, compliance with in-session and homework exposure assignments, could also be considered measures of treatment outcome. Indeed, systematic confrontation with anxiety-evoking stimuli is a therapeutic procedure; yet it can also be viewed as a behavioral avoidance test. Thus, adherence to exposure instructions is at once compliance and progress (outcome). This overlap may account for the strong correlations we found between these components of compliance and treatment outcome.

Our results may also have been influenced by the timing and methods used for assessing treatment compliance. First, it is uncertain whether a single item rated once at the end of treatment accurately captures the intricacies of graduated exposure tasks over a 15-session treatment program. Indeed, use of weekly ratings (with an aggregated total) might prove to be a more valid approach. Second, although therapists were blind to posttreatment Y-BOCS scores when making ratings of treatment compliance, compliance ratings may still have been affected by the therapists' perceptions of the patients' progress. Where possible, we attempted to reduce this bias by having therapists base compliance ratings on data collected during treatment (e.g., home-

work forms) and by providing manuals describing how compliance was to be coded.

A third problem is that rather than measuring compliance with specific EX/RP procedures, as we had intended, our measures may have tapped a global assessment of the therapist-patient alliance. Although intercorrelations between compliance dimensions were low to moderate (suggesting nonredundancy), this could reflect difficulty with reliability, rather than evidence of uniqueness. Data on interrater reliability assessed during or prior to the study, which would be helpful in ruling out this possibility, were not collected.

Although our procedures extend previous research on treatment compliance in OCD, more reliable methodology for assessing adherence with EX/RP is clearly needed. For example, standardized quizzes might be used to assess patients' understanding of the treatment rationale. Likewise, compliance with in-session exposure could be rated by independent observers watching session videotapes. Also, future studies should disentangle the quality versus quantity of treatment compliance. That is, some patients may complete an adequate number of exposure practices, yet perform them improperly or incompletely. Recently, Schmidt and Woolaway-Bickel (2000) found that the quality of homework predicted outcome of cognitive-behavior therapy for panic disorder better than the quantity of work performed. Finally, although therapists in this study received supervision, we did not formally assess therapist compliance with the EX/RP protocol. Future research should incorporate formal assessment of therapist adherence to the protocol, as this would seem to be a prerequisite for meaningful measurement of patient compliance (Primakoff, Epstein, & Covi, 1986).

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