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ScienceDirect
Behaviour Research and Therapy 45 (2007) 1461–1470
BEHAVIOUR RESEARCH AND THERAPY
www.elsevier.com/locate/brat

An open trial of cognitive-behavioral therapy for compulsive hoarding

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Received 3 November 2006; received in revised form 26 December 2006; accepted 4 January 2007

Abstract

The aim of the present study was to provide preliminary data on the efficacy of a new cognitive-behavioral treatment (CBT) for compulsive hoarding. Fourteen adults with compulsive hoarding (10 treatment completers) were seen in two specialty CBT clinics. Participants were included if they met research criteria for compulsive hoarding according to a semistructured interview, were age 18 or above, considered hoarding their main psychiatric problem, and were not receiving mental health treatment. Patients received 26 individual sessions of CBT, including frequent home visits, over a 7–12 month period between December 2003–February 2005. Primary outcome measures were the Saving Inventory-Revised (SI-R), Clutter Image Rating (CIR), and Clinician's Global Impression (CGI). Significant decreases from pre- to post-treatment were noted on the SI-R and CIR, but not the CGI-severity rating. CGI-Improvement ratings indicated that at mid-treatment, 40% ($n = 4$) of treatment completers were rated "much improved" or "very much improved;" at post-treatment, 50% ($n = 5$) received this rating. Adherence to homework assignments was strongly related to symptom improvement. CBT with specialized components to address problems with motivation, organizing, acquiring and removing clutter appears to be a promising intervention for compulsive hoarding, a condition traditionally thought to be resistant to treatment.

Keywords: Hoarding; Cognitive-behavioral therapy; Obsessive-compulsive disorder

Introduction

Compared to obsessive-compulsive disorder (OCD) and many of its purported subtypes, compulsive hoarding has received relatively little empirical study. Although not codified in the DSM-IV-TR (American Psychiatric Association, 2000), compulsive hoarding is generally thought to be marked by: (a) the acquisition of, and failure to discard, a large number of possessions; (b) clutter that precludes activities for which living

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doi:10.1016/j.brat.2007.01.001

spaces were designed; and (c) significant distress or impairment in functioning caused by the hoarding (Frost & Hartl, 1996). In cases where hoarding is clinically significant, clutter prevents the normal use of space for basic activities such as cooking, cleaning, moving through the house, and even sleeping. Interference with these functions can make hoarding a dangerous problem, putting people at risk for fire, falling, poor sanitation and health risks (Frost, Steketee, & Williams, 2000; Kim, Steketee, & Frost, 2001). Hoarding is associated with high levels of distress and social disruption, as well as significantly compromising the living environment of the sufferer and those with and near them. Individuals with compulsive hoarding typically report levels of depression and functional impairment that exceed those of patients with OCD and other anxiety disorders (Frost, Steketee, Williams, & Warren, 2000). Hoarding is associated with a number of indices of social maladjustment such as low marriage rates, social anxiety and withdrawal, and dependent personality traits (Frost, Steketee, Williams et al., 2000; Kim et al., 2001).

The question of whether compulsive hoarding is a subtype of OCD has not been resolved (Steketee, Frost, Tolin, & Brown, 2005). Many patients present to OCD clinics with complaints of hoarding (Samuels et al., 2002; Saxena et al., 2002), and OCD symptoms correlate with aspects of hoarding severity among individuals who hoard (Frost, Steketee, & Grisham, 2004; Frost, Steketee, Williams et al., 2000). Furthermore, hoarders' excessive doubting, checking, and reassurance seeking before discarding appear in many respects similar to compulsive rituals (Rasmussen & Eisen, 1992). Other research, however, suggests that compulsive hoarding might not be specifically associated with OCD, but rather may be associated with a range of psychiatric disorders. Hoarding behavior has been reported in the context of a wide variety of Axis I disorders including schizophrenia, social phobia, organic mental disorders, eating disorders, depression, and dementia (see Steketee & Frost, 2003, for a review). Furthermore, the fact that many patients with compulsive hoarding report little distress or recognition of the problem (Steketee & Frost, 2003) contrasts with the typical clinical presentation of OCD (therefore, hoarding diagnoses are frequently based on obvious impairment, rather than self-reported distress). Factor and cluster analyses indicate that hoarding consistently emerges as a distinct symptom type, although in two studies hoarding combined with symmetry/ordering to form a separate subgroup (see Calamari et al., 2004, for a review). Although various OCD symptoms appear closely related to one another, hoarding does not appear particularly closely associated with OCD and is just as closely associated with depression as it is with OCD (Wu & Watson, 2005). In addition, studies of treatment outcome by symptom subtype have consistently shown hoarding symptoms to predict poor outcome for standard OCD treatments using medication and cognitive behavior therapy (Abramowitz, Franklin, Schwartz, & Furr, 2003; Steketee & Frost, 2003), suggesting that compulsive hoarding and OCD may involve different biological, cognitive, or behavioral mechanisms. Neuroimaging studies (Maltby, Kiehl, Worhunsky, & Tolin, 2006; Mataix-Cols et al., 2004; Saxena et al., 2004) have also revealed patterns of hemodynamic activity that differ from those of OCD patients. In a large sample of people specifically seeking treatment for hoarding (rather than patients at an OCD clinic who report hoarding), the majority (53%) of hoarders denied any symptoms (even subclinical) of OCD (Frost, Steketee, Tolin, & Brown, 2006). Thus, the true association of hoarding and OCD is not fully clear at this time.

A cognitive-behavioral model of compulsive hoarding (Frost & Hartl, 1996; Steketee & Frost, 2003, 2007) suggests that the excessive acquisition, difficulty discarding, and clutter that make up the hoarding syndrome stem from several factors [for recent reviews see Steketee and Frost (2003) and Frost & Tolin (in press)] including:

1. *Information processing deficits*: Individuals with compulsive hoarding exhibit substantial problems focusing and sustaining attention (Hartl, Duffany, Allen, Steketee, & Frost, 2005), difficulty categorizing their possessions (Wincze, Steketee, & Frost, 2006), and markedly greater response latencies for decision-making about one's own possessions (Maltby et al., 2006).
2. *Maladaptive beliefs about, and emotional attachment to, possessions*: Research on beliefs about possessions suggests that these beliefs cluster into four basic subtypes: emotional attachment to possessions, poor memory confidence, exaggerated sense of responsibility for possessions, and desire for control over possessions (Frost, Hartl, Christian, & Williams, 1995; Hartl et al., 2004; Steketee, Frost, & Kyrios, 2003).
3. *Emotional distress and avoidance*: Maladaptive beliefs are thought to lead to intense emotional experiences (e.g., anxiety, grief, or guilt) about the prospect of losing (i.e., discarding or not acquiring) an object. The

intensity of these emotions leads to avoidance and escape in the form of saving (not discarding) and acquiring.

Effective treatments for OCD have shown little benefit for compulsive hoarding. Case reports describe patterns of poor insight, treatment refusal, lack of cooperation, and absence of resistance to the hoarding behavior (Christensen & Greist, 2001; Damecour & Charron, 1998; Fitzgerald, 1997; Greenberg, 1987; Greenberg, Witztum, & Levy, 1990). Even individuals who sought help and received behavior therapy have shown little benefit (Shafran & Tallis, 1996). Group studies of hoarding treatment have shown similar negative outcomes. Black et al. (1998) found that only 18% of hoarding patients responded to medication and cognitive behavior therapy, and Winsberg, Cassic, and Koran (1999) also reported disappointing outcomes with these treatments. In two studies, Mataix-Cols and colleagues reported that hoarding symptoms among patients with OCD predicted poor outcomes following SRI treatment (Mataix-Cols, Rauch, Manzo, Jenike, & Baer, 1999) and computer-based behavior therapy (Mataix-Cols, Marks, Greist, Kobak, & Baer, 2002). Abramowitz et al. (2003) reported that only 31% of hoarders exhibited a clinically significant response to exposure and response prevention, well below rates of 46–76% for patients with non-hoarding OCD symptoms. One possible exception is a study by Saxena, Brody, Maidment, and Baxter (2006) that found no difference in response to paroxetine among hoarding and non-hoarding OCD patients. However, no specific measure of hoarding severity was used in that study; furthermore, neither group showed a large improvement (23% reduction on the Yale-Brown Obsessive-Compulsive Scale for hoarders, 24% reduction for OCD); results for Saxena's OCD group were notably poorer than were those reported in previous research with paroxetine (Black et al., 1998). Thus, results of this study do not suggest a particularly good response to paroxetine in compulsive hoarding.

In contrast to these negative outcomes, treatments based on the hoarding model outlined above have shown good promise (Cermele, Melendez-Pallitto, & Pandina, 2001; Hartl & Frost, 1999; Saxena et al., 2002; Steketee, Frost, Wincze, Greene, & Douglass, 2000). Such interventions typically include both office and in-home visits emphasizing motivational interviewing, decision-making training, exposure, cognitive restructuring, and efforts to reduce acquisition. To date, most of the evidence for the efficacy of this form of specialized treatment derives from case reports or small group studies (Cermele et al., 2001; Hartl & Frost, 1999; Steketee et al., 2000), and is limited by the lack of adequate assessment instruments. The aim of the present open trial was to test the efficacy of a novel form of cognitive-behavioral treatment (CBT) in a small sample of adult outpatients with compulsive hoarding using measures validated for this population. We predicted that CBT would decrease the three major manifestations of hoarding: excessive clutter, difficulty discarding, and compulsive acquisition.

Method

Participants

Eligible patients were 18 years or older and reported a primary problem with excessive acquisition of items, a large amount of clutter in the home, and/or difficulty discarding possessions. Inclusion criteria were specified as a severity rating (0–8 scale) of 4 or higher on rating scales of clutter and/or difficulty discarding on a hoarding module for the *Anxiety Disorders Interview Schedule for DSM-IV* (ADIS-IV; Brown, DiNardo, & Barlow, 1994) developed by the authors for this study. Patients were excluded if they reported current psychotic symptoms, bipolar disorder, serious cognitive impairment, substance use disorder within the past 6 months, were receiving concurrent psychotherapy, or had received psychiatric medications within the past month.

Of 41 patients initially screened, 14 (34%) were enrolled in the study. The most common reason for exclusion was current use of psychiatric medications (41%). Of the 14 patients enrolled in the study, 4 (29%) discontinued prematurely, leaving 10 treatment completers. One patient discontinued after 8 sessions due to discontent with the therapist and the treatment. Three patients stopped or were removed from the trial after approximately 20 sessions; reasons included serious marital conflict and multiple cancelled sessions, a series of cancelled appointments that appeared to reflect fears of ending treatment, and failure to complete homework and eventual refusal to work on hoarding.

Measures

Diagnostic status was ascertained using the *ADIS-IV* (Brown et al., 1994). Severity of clutter was assessed using the recently-developed *Clutter Image Rating* (CIR; Frost, Steketee, Tolin, & Renaud, 2006), a series of 9 photographs each of a kitchen, living room, and bedroom with varying levels of clutter. Respondents select the photograph that most closely resembles each of the three rooms in the patient's home. Scores for each room are scaled from 1 to 9, and a mean composite score is calculated across the three rooms (range 1–9). In the original study, internal consistency ($\alpha = .84$), test–retest reliability ($r = .82$), and inter-rater reliability ($r = .94$) for the CIR were high, as were correlations with validated hoarding measures (Frost, Steketee, Tolin, & Renaud, 2006). For the present study only the therapists' CIR scores were used. Hoarding severity was also measured using the *Saving Inventory-Revised* (SI-R; Frost et al., 2004), a self-report measure of acquisition, clutter, and difficulty discarding. The *NIMH Clinician's Global Impression* (CGI; Guy, 1976) severity (CGI-S) and improvement (CGI-I) ratings were used to judge overall severity of illness and global response to treatment. At each session, therapists rated patients' degree of *homework adherence* from 1 to 6. Anchor points were: 1 (The patient did not attempt the assigned homework), 2 (The patient attempted the assigned homework but was unable to complete any of it), 3 (The patient did 10–25% of the homework or its equivalent), 4 (The patient did 26–50% of the homework or its equivalent), 5 (The patient did 51–75% of the homework or its equivalent), 6 (The patient did 76–100% of the homework or its equivalent).

Procedure

This study was approved by the Institutional Review Boards at Boston University, Smith College, and Hartford Hospital. Prior to treatment, patients met with a trained assessor to provide informed consent, review inclusion/exclusion criteria, and evaluate the severity of hoarding and other psychiatric conditions.

The uncertain relationship between hoarding and OCD (described above) raises a critical issue regarding participant recruitment and selection. In many of the larger studies of compulsive hoarding (LaSalle-Ricci et al., 2006; Mataix-Cols et al., 1999; Samuels et al., 2006; Saxena et al., 2002), participants were selected from OCD clinics or research programs. However, as noted above, when recruitment is specifically aimed at individuals who hoard, only a minority of participants meet criteria for OCD (Frost, Steketee, Tolin, & Brown, 2006). This would suggest, therefore, that hoarding samples drawn from OCD clinics might differ in meaningful ways from the larger population of hoarders. For the present study, patients were recruited via a series of local and national media appearances about compulsive hoarding, as well as Internet announcements. These strategies specifically targeted individuals with hoarding problems, rather than individuals with OCD.

Therapists included three Ph.D. psychologists, two advanced psychology graduate students, and one masters-level social worker. Therapists initially received two days of training in the treatment of compulsive hoarding by the second two authors. Training included reading the initial version of the treatment manual (Steketee & Frost, 2007), and watching several hours of training videotapes of motivational interviewing (Moyers, Miller, & Rollnick, 1998). They then received weekly supervision by one of the authors of this paper, who listened to audio recordings of sessions and provided ongoing feedback.

Treatment consisted of 26 individual sessions spaced over approximately 7–12 months. The aim was for the first 24 sessions to take place once per week, and the last 2 sessions to take place every other week; however, due to scheduling and motivational issues the inter-session interval was usually longer. Treatment was based on a cognitive-behavioral therapy manual for compulsive hoarding (Steketee & Frost, 2007). Office sessions typically lasted 1–1.5 h, and in-home sessions typically lasted 2 h. The first 3–5 sessions, held in the therapist's office, were devoted to evaluation and treatment planning, including multi-method assessment, motivational interviewing strategies (Miller & Rollnick, 2002) to enhance motivation to engage in treatment, and formulation of a cognitive behavioral model of each patient's condition. The assessment was conducted both in the clinic and in patients' homes.

Thereafter, therapists applied interventions targeting the three manifestations of hoarding: disorganization, compulsive acquisition, and difficulty discarding. These treatment techniques consisted of (1) skills training for organizing, decision-making, problem solving, and reinforcement, (2) imagined and direct exposure to avoided situations, and (3) cognitive restructuring of hoarding-related beliefs. Motivational interviewing strategies

were used when therapists judged that motivation lagged (e.g., poor homework compliance). About 75% of sessions were conducted at the therapist's office, and 25% (not less than once per month) were held in patients' homes or at sites of excessive acquisition (e.g., flea markets, discount stores). One patient received 1 "marathon" session lasting 3 h in which the therapist traveled to the patient's home to help with sorting, organizing, and discarding. A second patient received 2 "marathon" sessions, each lasting $2\frac{1}{2}$ h, in, which the therapist and 2 student assistants went to the home. Near daily homework tasks were assigned after each session, and the therapist rated the patient's degree of homework compliance from 1 to 6 at each session.

The final 2 sessions, spaced 2 weeks apart, included relapse prevention methods designed to help patients continue to make progress and to manage current and future stressors without reverting to hoarding behaviors.

At pre-treatment, mid-treatment, and post-treatment, the therapist conducted an in-home assessment of hoarding severity including the CIR, SI-R, and CGI.

Results

Data analysis

Treatment gains were assessed using repeated-measures analyses of variance (ANOVAs) at pre-treatment, mid-treatment (session 12), and post-treatment (session 26). Significant omnibus tests were followed up with pairwise comparisons using repeated-measures *t*-tests. Effect sizes for ANOVAs are reported as partial eta-squared (η_p^2) for which values of .01, .06, and .14 are considered to reflect small, medium, and large effects, respectively (Cohen, 1973). Global improvement ratings were categorized into response (CGI-I rating of "much improved" or "very much improved") or nonresponse (CGI-I ratings of "mildly improved" or lower). Because the SI-R has been used with both clinical and control groups (Frost et al., 2004), we were able to determine whether patients met criteria for clinically significant change using formulas developed by Jacobson and colleagues (Jacobson & Truax, 1991; McGlinchey, Atkins, & Jacobson, 2002). Participants were considered to meet criteria if their SI-R scores decreased by a reliable amount (14 or more points) based on the known test–retest reliability and were within 2 standard deviations of the normal range (a score of 50 or less).

Demographic and pre-treatment information

Demographic and pre-treatment information for the completer sample can be seen in Table 1. All patients were female; mean age was 49 years. Eight were Caucasian; 1 was African-American and 1 was Hispanic. All patients met criteria for at least one comorbid psychiatric disorder on the ADIS-IV; the most common conditions were major depressive disorder ($n = 10$) and anxiety disorders ($n = 8$), most commonly OCD other than hoarding symptoms ($n = 7$) and social phobia ($n = 5$). Clinicians rated patients on average as "markedly ill" on the CGI-S.

Table 1
Pre-treatment information for the completer sample ($N = 10$)

	M (SD)	*N* (%)
Age	49.20 (14.96)	
Female		10 (100)
Caucasian		8 (80)
Comorbid major depressive disorder		10 (100)
Comorbid anxiety disorder		8 (80)
Comorbid impulse control disorder		2 (20)
Comorbid bipolar disorder (in remission)		1 (10)
Clinician's global impression-severity	4.89 (.78)	

Saving inventory-revised

The three SI-R subscales (clutter, difficulty discarding, acquisition) were examined at pre-, mid-, and post-treatment. Results indicated a significant main effect of time [$F_{2,18} = 8.79$, $p = .002$, $\eta_p^2 = .494$], and a significant main effect of subscale [$F_{2,18} = 20.76$, $p < .001$, $\eta_p^2 = .698$]. There was no significant time × subscale interaction [$F_{4,36} = .39$, $p = .817$, $\eta_p^2 = .041$]. As can be seen in Table 2, SI-R total scores decreased significantly from pre- to mid-treatment; the decrease from mid- to post-treatment was not significantly different. At mid-treatment, none of the patients met criteria for clinically significant change (Jacobson & Truax, 1991) on the SI-R. At post-treatment, however, 6 (60%) patients met criteria for clinically significant change.

Although the time × subscale interaction was not significant, for exploratory purposes we examined change over time for each of the three subscales; these are depicted in Table 2. On all three subscales, the reduction was not statistically significant at mid-treatment, but was significant by post-treatment. Reductions on each of the SI-R subscale scores (Fig. 1) generally indicate a linear trend toward improvement over the course of treatment. Compulsive acquisition appears to have responded somewhat later than did the clutter and

Table 2
Outcome measures at pre-treatment, mid-treatment (12 sessions), and post-treatment (26 sessions)

	Pre-treatment	Mid-treatment	Post-treatment
SI-R total	67.00 (11.14)[a]	58.85 (8.18)[b]	48.40 (11.74)[b]
Clutter	29.00 (5.33)[a]	25.00 (7.33)	21.70 (7.02)[b]
Difficulty discarding	22.00 (3.50)[a]	20.05 (3.04)	16.60 (4.45)[b]
Acquiring	16.00 (5.64)[a]	13.80 (5.27)	10.10 (4.38)[b]
CIR	4.03 (1.57)[a]	3.20 (1.07)[b]	2.80 (1.40)[b]
CGI-S	4.80 (.79)	4.60 (.84)	4.10 (1.20)

Note: Within each row, means with different superscripts are significantly different from each other, $p < .05$.
SI-R = Saving Inventory-Revised. CIR = Clutter Image Rating. CGI-S: Clinician's Global Impression-Severity.

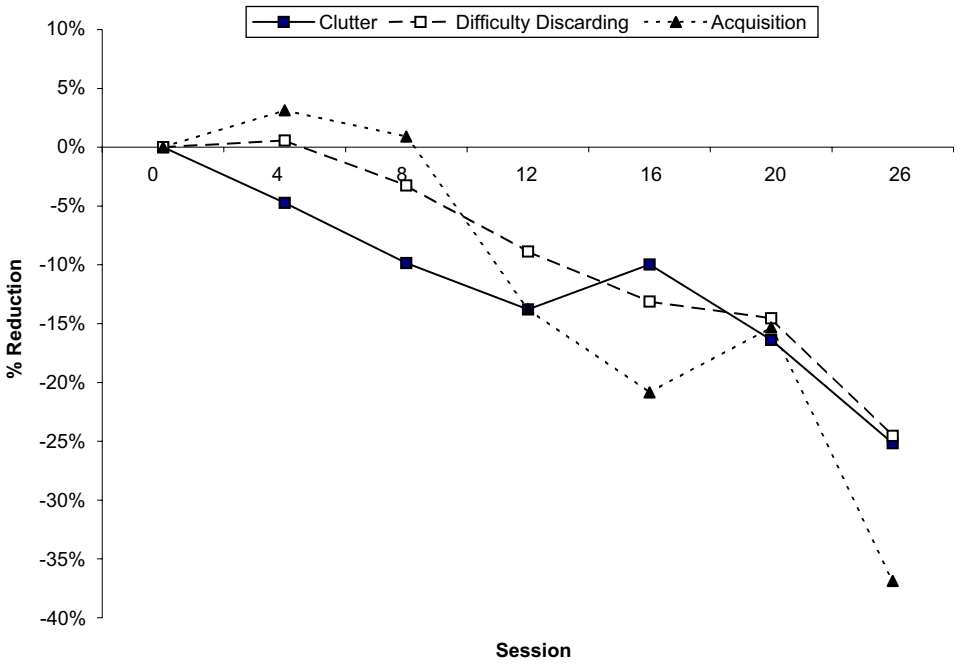

Fig. 1. Mean percent reduction on the clutter, difficulty discarding, and acquisition subscales of the Saving Inventory-Revised.

difficulty discarding, possibly due to the fact that for many patients, non-acquisition exercises were employed later in treatment than were sorting and discarding exercises. However, compulsive acquisition scores decreased by nearly 40% compared to clutter and difficulty discarding, each of which showed a 25% reduction.

Clutter image rating

Analysis of therapists' mean ratings of the three CIR photographs (living room, kitchen, bedroom) indicated a significant main effect of time [$F_{2,8} = 8.29$, $p = .011$, $\eta^2_p = .675$]. CIR scores decreased significantly from pre- to mid-treatment, and reductions from mid- to post-treatment were not significant, although post-treatment CIR scores remained substantially lower than those at pre-treatment.

Clinician's global impressions

Global severity scores on the CGI-S did not show a significant effect of time [$F_{2,18} = 1.46$, $p = .259$, $\eta^2_p = .139$]. At mid-treatment, 4 (40%) patients were rated "much improved" or "very much improved" on the CGI-I; at post-treatment, 5 (50%) were rated "much improved" or "very much improved."

Homework adherence

At each session, therapists rated patients' degree of homework adherence from 1 (did not attempt) to 6 (did all homework). From these ratings, we calculated for each patient a mean adherence rating (mean = 4.17, SD = .85, range 2.18–5.13). We then calculated Pearson correlation coefficients between mean homework rating and the percentage score reduction from baseline at mid-treatment and at post-treatment for the SI-R, CIR, and CGI-S. As shown in Table 3, at mid-treatment, there was no significant relationship between homework adherence and percent reduction on any of the outcome measures. However, at post-treatment, homework adherence showed a significant, positive, and strong correlation (.64 and above) with change on all outcome measures. Patients who completed more of their assigned homework tasks showed more hoarding symptom reduction. To examine this relationship further, we divided the sample into those below and above the median homework adherence score ("good adherence" and "poor adherence," respectively) and examined their outcomes on the CGI-I. At post-treatment, 4 of 5 patients (80%) showing good adherence were rated as "much improved" or "very much improved" on the CGI-I, whereas only 1 patient (20%) with poor adherence received this rating. This difference just missed statistical significance [χ^2 (1) = 3.60, $p = .058$], likely due to the small cell sizes.

Discussion

In contrast with earlier studies based on traditional OCD treatments, the findings from this study indicate that a treatment protocol developed from the cognitive behavioral model of compulsive hoarding can significantly reduce hoarding behaviors including clutter, excessive acquisition, and difficulty discarding.

Table 3
Pearson correlation coefficients between mean homework adherence ratings and outcome measures at pre-treatment, mid-treatment (12 sessions), and post-treatment (26 sessions)

	Correlation with mean homework adherence score	
	Mid-treatment	Post-treatment
SI-R total	.328	.790*
CIR	.132	.761*
CGI-S	.281	.637*

SI-R = Saving Inventory-Revised. CIR = Clutter Image Rating. CGI-S: Clinician's Global Impression-Severity.
*$p < .05$.

Effect sizes for specific hoarding measures were very large (η_p^2 of .49 and .67); even the effect for global improvement ratings ($\eta_p^2 = .14$) was considered large, although there was no significant effect of time for that variable (possibly due to the small sample size). The findings further suggest that poor outcomes observed in the treatment of hoarding are associated with problems completing homework.

In the present study, treatment differed from standard therapy for OCD in several ways. Exposure was de-emphasized, with greater focus given to motivational interviewing, skills training for organizing and problem solving, and cognitive modification of beliefs about possessions. Particularly unique to this treatment were the frequent off-site sessions, in which therapists guided patients through sorting, discarding, and resisting acquiring. Half of the patients appeared to be clear treatment responders on the CGI-I and 60% were clinically significantly improved on the SI-R. Although this represents an improvement over previous research, it is clear that outcomes in hoarding are attenuated compared to other conditions such as OCD. We note as well that the long-term outcomes of this treatment are still unknown; a larger waitlist controlled trial is currently underway that will provide more information on immediate and longer-term outcomes.

Perhaps more than conditions such as OCD, compulsive hoarding presents several clinical challenges that must be addressed in CBT. One such challenge is limited insight into the severity of hoarding behavior. Patients with compulsive hoarding are typically rated as showing poorer insight than are patients with OCD (Frost, Krause, & Steketee, 1996), and social service providers report that most elderly clients with serious hoarding show little insight into their problem (Steketee, Frost, & Kim, 2001). Related to insight is the low motivation and resistance to treatment exhibited by many hoarding patients (Christensen & Greist, 2001; Steketee et al., 2001). Patients with compulsive hoarding may be more likely than are OCD patients to refuse or drop out of treatment prematurely (Ball, Baer, & Otto, 1996; Mataix-Cols et al., 2002), and many individuals with hoarding problems refuse treatment unless pressured by family, social service workers, or health department officials (Frost, Steketee, & Williams, 2000). Even after treatment has been initiated, motivation appears to wax and wane (Hartl & Frost, 1999), with a notable lack of adherence to treatment (e.g., completion of homework assignments) (Christensen & Greist, 2001; Steketee et al., 2000). This was apparent in the present trial: the median homework adherence rating was 4, indicating that the patient "did 26–50% of the homework or its equivalent." Reports from therapists in this study indicated that nearly all of the patients had difficulty completing homework assignments, yet most had little difficulty working directly with the therapist on sorting and discarding tasks. Homework adherence was clearly associated with treatment outcome, with greater adherence predicting greater reductions in hoarding severity. Thus, it appears that maximizing adherence to homework assignments is a central challenge for clinicians treating hoarding patients. The principles and strategies of motivational interviewing (Miller & Rollnick, 2002), which have been used successfully for treatment-resistant OCD patients (Maltby & Tolin, 2005), may be particularly useful in treating patients who hoard, and are likely to be needed throughout treatment whenever motivation wanes.

The extent and effect of comorbidity is also clinically noteworthy. In the present sample, all of our hoarding patients met *DSM-IV-TR* criteria for at least one comorbid Axis I disorder; depression and anxiety disorders were particularly common. Axis II comorbidity has also been reported in the majority of hoarding cases in other samples (Seedat & Stein, 2002). Thus, many hoarding patients may require additional pharmacological and CBT strategies aimed at reducing comorbid symptoms, particularly when they exacerbate hoarding or interfere with its treatment (e.g., a depressed patient who is too fatigued to comply with homework assignments, a socially phobic patient who is too fearful to allow others into his/her home, contamination fears that affect ability to touch and sort possessions).

The duration of treatment also merits additional consideration. As seen in Fig. 1, SI-R scores appeared to decrease in a linear fashion over the course of treatment. Although the SI-R subscales decreased significantly by mid-treatment, the individual subscales did not decrease significantly until post-treatment, suggesting that a longer course of treatment might be helpful.

As an initial exploratory study, the present study is limited by its small sample size and open-trial design. A further limitation is the completion of clinical ratings by the therapist, a decision based in part on patients' reluctance to allow multiple observers into the home. This concern is particularly noteworthy in the homework adherence ratings, in which therapists' observations of progress could have influenced their subjective ratings of adherence. Because of the exploratory nature of the study, we allowed a great deal of flexibility in the treatment protocol (e.g., 7–12 month duration, "marathon" sessions for 2 patients). This is both a strength and a

limitation: on one hand, flexibility in manualized treatment delivery has been cited as critical (e.g., Kendall, Chu, Gifford, Hayes, & Nauta, 1998); on the other hand, such variability makes it difficult to ascertain necessary and sufficient parameters of the treatment, particularly with a small sample size. Such issues await clarification in a larger, controlled study. An additional limitation is the fact that all patients were women. The demographics of compulsive hoarding are unknown, although we note that in our larger, non-treatment study, women comprise approximately 75% of the sample (Frost, Steketee, Tolin, & Brown, 2006).

Additional research is needed to determine whether CBT yields results that are superior to no treatment, wait-list, or control treatments. Furthermore, the treatment used in the present study might not be feasible for many clinicians, whose ability to travel to patients' homes or acquisition sites is limited. Future dismantling studies should examine the necessity of out-of-office sessions in treating patients who hoard.

Acknowledgments

The authors thank study coordinators Robert Brady and Patrick Worhunsky, and research assistants Stefanie Renaud and Laura Fabricant. Robert Brady, Christiana Bratiotis, Ancy Cherian, Diane Cohen, Johanna Crocetto, Amanda Gibson, Dr. Scott Hannan, David Klemanski, Elaine Lewis, Dr. Nicholas Maltby, Dr. Suzanne Meunier, and Dr. Cristina Sorrentino served as intake clinicians, study therapists, and/or data managers. Dr. Tim Brown provided assistance with the development of study measures. This study was funded by NIMH Grant R21 MH068539-1 to Dr. Steketee.

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