The status of hoarding as a symptom of obsessive–compulsive disorder

Jonathan S. Abramowitz [a,*], Michael G. Wheaton [a], Eric A. Storch [b]

[a] Department of Psychology, University of North Carolina at Chapel Hill, Chapel Hill, NC 27599, USA
[b] Departments of Psychiatry and Pediatrics, University of South Florida, St. Petersburg, FL 33701, USA

ARTICLE INFO

ABSTRACT

Hoarding is considered by many to be a symptom of obsessive–compulsive disorder (OCD). Yet although it is observed in people with OCD, hoarding symptoms also appear in a number of other psychological and psychiatric conditions. The present studies were conducted using samples of OCD patients, patients with other anxiety disorders, and a non-clinical sample to further elucidate the relationship between hoarding and OCD. Across two investigations, we found that (a) whereas OCD patients had higher scores than the other groups on non-hoarding symptoms, this was not the case for hoarding symptoms; (b) hoarding tended to correlate more weakly with other OCD symptoms (e.g., washing, checking) than these other symptoms intercorrelated; (c) items measuring hoarding had the weakest factor loadings when a measure of OCD symptoms was submitted to factor analysis; (d) hoarding symptoms were not correlated with global OCD or anxiety severity, whereas other OCD symptoms were; and (e) hoarding did not show consistent relationships with OCD-related cognitive variables. These results do not support a specific relationship between hoarding and OCD; and they call into question hoarding's status as a specific symptom of OCD. Results are also discussed in terms of the importance of functional assessment of hoarding and OCD symptoms.

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Obsessive–compulsive disorder (OCD) is a heterogeneous condition involving (a) intrusive, anxiety-evoking thoughts, images, and impulses (obsessions) and (b) urges to perform behavioral or mental acts (compulsive rituals) to reduce obsessional distress. The specific manifestation of obsessions and compulsions varies widely among patients, and often within them over time. Commonly, obsessions concern contamination, the fear of illness, responsibility for harm or mistakes, religion and morality, exactness, sex, and violence (Rachman & Hodgson, 1980). In response to these obsessions, patients may perform a variety of compulsions or neutralizing responses such as washing, checking, arranging, or mental rituals, as well as avoidance of situations that provoke the obsessions. Research on the dimensional structure of OCD has consistently found that obsessions and compulsions load into four or five thematically based factors related to (a) contamination and decontamination; (b) symmetry/ordering; (c) responsibility for harm and checking; (d) religion, sex, and morality; and (e) hoarding (e.g., Mataix-Cols, Rosario-Campos, & Leckman, 2005).

Despite this heterogeneity, OCD is regarded as a unitary diagnostic entity in the Diagnostic and Statistical Manual of Mental Disorders Fourth Edition (DSM-IV; American Psychiatric Association, 2000). As planning for DSM-V is under way, however, it is important to carefully examine the relationships among these symptom dimensions to discern the core phenomenology of OCD and determine whether the OCD phenotype can be further homogenized. This is vital because it has been argued that the current phenotypic heterogeneity within OCD compromises the power and clarity of results from studies of experimental psychopathology, biological and genetic factors, and treatment outcome (Mataix-Cols et al., 2005). Recently, researchers have questioned whether the hoarding symptom dimension is actually a distinct (yet perhaps overlapping) clinical syndrome from OCD (e.g., Saxena, 2007). The present research was designed to address this issue empirically.

Hoarding is defined as the acquisition of, and failure to discard items that appear (at least to others) to have little or no value (Frost & Gross, 1993). This behavior is observed in a number of psychiatric conditions, including depression, anorexia, schizophrenia, and dementia (e.g., Frankenburg, 1984; Luchins, Goldman, Lieb, & Hanrahan, 1992; Shafran & Tallis, 1996), but it is most commonly associated with OCD. Phenomenological studies indicate between 18% and 42% of OCD patients report hoarding symptoms (Hanna, 1995; Rasmussen & Eisen, 1992; Samuels et al., 2002) resulting in some authors concluding that hoarding is best conceptualized as an OCD symptom (Coles, Frost, Heimberg, & Steketee, 2003).

* Corresponding author. Department of Psychology, Campus Box # 3270 (Davie Hall), University of North Carolina at Chapel Hill, Chapel Hill, NC 27599, USA. Tel.: +1 919 843 8170; fax: +1 919 962 2537.
E-mail address: jabramowitz@unc.edu (J.S. Abramowitz).

Accordingly, most of the recently developed OCD symptom inventories include questions related to hoarding (e.g., the Obsessive–Compulsive Inventory; Foa, Kozak, Salkovskis, Coles, & Amir, 1998; Foa et al., 2002).

A growing body of evidence, however, suggests OCD patients who report hoarding symptoms have a distinct clinical profile compared to those who do not hoard. In the largest study of hoarding behaviors among OCD patients to date, Samuels, Bienvenu, et al. (2007) found that individuals with compulsive hoarding were more likely than individuals without compulsive hoarding to have symmetry obsessions and counting, ordering, and repeating compulsions; as well as greater illness severity, difficulty completing tasks, and problems with indecision. Other studies have suggested that relative to OCD patients without hoarding, those with hoarding have a younger age of OCD onset (Samuels et al., 2002), greater levels of global impairment (Lochner et al., 2005), higher comorbidity rates with other axis I (Wheaton, Timpano, LaSalle-Ricci, & Murphy, 2008) and axis II disorders (Frost, Steketee, Williams, & Warren, 2000), and less insight into the senselessness of their symptoms (Steketee & Frost, 2003; Storch et al., 2007). Neuroimaging studies have suggested that OCD patients who hoard have distinct patterns of neural activity (Mataix-Cols et al., 2004; Saxena et al., 2004), and genetic studies point to possible differences in susceptibility loci (Samuels, Shugart, et al., 2007). Relative to other OCD symptom dimensions, patients with primarily hoarding symptoms also show a poorer response to cognitive-behavioral treatment (Abramowitz, Franklin, Schwartz, & Furr, 2003), and in some studies, to pharmacotherapy by serotonin reuptake inhibitors (Saxena et al., 2002).

The studies reviewed above largely have examined hoarding in samples of patients diagnosed with OCD. Researchers, however, have observed that these samples contain two types of hoarding patients: those with hoarding symptoms only, and those with hoarding along with other symptoms of OCD (e.g., obsessions concerning mistakes, checking compulsions; Grisham, Brown, Liverant, & Campbell-Sills, 2005; Wu & Watson, 2005). Grisham et al. (2005) compared OCD patients reporting only hoarding symptoms to (a) those with mixed presentations (hoarding and other OCD symptoms) and (b) those without any hoarding symptoms. They found that the pure hoarding group evinced lower levels of negative affect, depression, anxiety, and stress relative to the other groups, and suggested hoarding be conceptualized as an OCD symptom when it occurs in the context of other sorts of obsessions and compulsions (e.g., failure to discard items because of the fear of contamination from garbage cans), but not when it occurs in isolation. In concert with this conclusion, Wu and Watson (2005) found that OCD patients did not report more hoarding than did a mixed psychiatric outpatient sample, and that hoarding symptoms correlated more weakly with other OCD symptoms (e.g., washing, checking) than these other symptoms correlated among themselves.

In sum, the existing literature begins to raise doubts that hoarding is best considered an OCD symptom. The heterogeneity of OCD, however, produces a number of dilemmas for researchers, including the need to demonstrate consistency in findings across settings and patient samples (e.g., to account for slight method variance) in order to bolster confidence in conclusions about OCD phenomenology. Accordingly, we report two studies designed to replicate and extend the findings from earlier research and further elucidate the relationship between hoarding and OCD symptoms. Specifically, we aimed to shed additional light on whether hoarding is best conceptualized as an OCD symptom by examining the following issues:

a. Whether individuals with OCD report more hoarding symptoms relative to those with other anxiety disorders.
b. What are the associations among OCD symptom dimensions, including hoarding?
c. What are the contributions of hoarding versus other OCD symptoms in explaining global OCD severity?
d. What are the relationships of hoarding and other OCD symptoms to associated psychopathology?
e. What are the relationships among cognitive factors, hoarding, and other OCD symptoms?

Study 1

Study 1 had three aims. First, we sought to replicate and extend Wu and Watson's (2005) findings regarding comparisons of hoarding severity across large groups of OCD patients, patients with other psychological disorders, and non-patient controls. Wu and Watson (2005) used a control group consisting of primarily mood disorder patients and suggested that future research address this issue with a control group of individuals with anxiety disorders other than OCD. We included such a control group in the present study, which permitted us to focus on the relationship between hoarding and anxiety related syndromes. Specifically, it allowed us to examine whether hoarding is related to OCD in particular, or anxiety symptoms in general. We predicted that patients with OCD would evidence higher levels of hoarding symptoms relative to those with other anxiety disorders.

Second, we investigated the associations among OCD symptoms, including hoarding, to determine if hoarding correlates as strongly with other symptoms as those symptoms correlate with one another. In accord with previous work, we hypothesized that hoarding symptoms would correlate more weakly with other OCD symptoms than these other symptoms would correlate among themselves.

Third, we investigated the factor structure of OCD symptoms using the Obsessive–Compulsive Inventory—Revised (OCI-R; Foa et al., 2002) to assess the relationship between hoarding and other OCD symptoms. Factor and cluster analyses of many OCD symptom inventories have consistently detected a distinct hoarding factor, which has sometimes been described as evidence that hoarding is indeed a symptom of OCD. As Wu and Watson (2005) point out, however, finding a separate hoarding factor merely suggests hoarding symptoms are *distinguishable* from the other symptoms assessed by the particular measure. The presence of a separate hoarding factor does not address whether such symptoms are related or unrelated. To more clearly elucidate the relationship between the hoarding symptoms and the other OCI-R symptoms via factor analysis, we subjected all 18 OCI-R items to a principal components analysis in which we specified a single factor solution using a method similar to Joiner, Vohs, and Heatherton (2000). This single factor solution would therefore be an artificial unidimensional measure of the OCI-R which would allow us to investigate the contribution of each symptom. If hoarding is a bonafide symptom of OCD, the hoarding items should load on this single factor to the same degree that the other OCI-R items load.

Method

Participants

The present study included three groups of participants: (a) OCD patients, (b) patients with other anxiety disorders (OADs), and (c) a group of unscreened undergraduate students.

The OCD group consisted of 225 patients (117 women [52%] and 108 men [48%]) who had been evaluated and given a primary OCD diagnosis at one of two university medical center based outpatient anxiety clinics. Diagnoses were established by either the Anxiety Disorders Interview Schedule (ADIS; Brown, DiNardo, & Barlow, 1994) or the Mini International Neuropsychiatric Interview (MINI; Sheehan et al., 1998). The mean age of this group was 32.2

(SD = 11.3). The OAD group included 178 patients (109 women [61.2%] and 69 men [38.8%]) diagnosed with an anxiety disorder other than OCD or with hypochondriasis (which we consider an anxiety-related disorder; i.e., health anxiety) at the same clinics. The frequency of each principal anxiety disorder diagnosis for this group was as follows: panic disorder with or without agoraphobia = 60 (33.7%), social phobia = 36 (20.2%), hypochondriasis = 25 (14.0%), generalized anxiety disorder = 25 (14.0%), specific phobia = 19 (10.7%), posttraumatic stress disorder (PTSD) = 5 (2.8%), agoraphobia without panic disorder = 2 (1.1%) and anxiety disorder not otherwise specified (NOS) = 6 (3.4%). None of the patients with other anxiety disorders had a secondary comorbid diagnosis of OCD. The mean age of the OAD group was 36.6 (SD = 13.8). The student group consisted of 1005 undergraduates (744 women [74%] and 261 men [26%]) at a large university in the southeastern United States who received course credit for their participation. The students had a mean age of 19.0 (SD = 2.0).

Measures

We used the OCI-R (Foa et al., 2002) to measure levels of obsessive–compulsive symptoms. The OCI-R is an 18-item questionnaire widely used in OCD research and based on the earlier 84-item OCI (Foa et al., 1998). Participants rate the degree to which they are bothered or distressed by OCD symptoms in the past month on a five-point scale from 0 (not at all) to 4 (extremely). This instrument assesses OCD symptoms across six symptom-based subscales, each consisting of three items: (a) washing, (b) checking, (c) obsessions, (d) mental neutralizing, (e) ordering, and (f) hoarding. The OCI-R possesses a stable factor structure and sound reliability and validity, and its factor structure is similar among OCD patients, those with other anxiety disorders, and unscreened college students (e.g., Abramowitz & Deacon, 2006; Hajcak, Huppert, Simons, & Foa, 2004; Foa et al., 2002).

There is consistent evidence across clinical and non-clinical samples that the OCI-R hoarding scale has good construct (convergent and discriminant) validity as a measure of hoarding symptoms. Two studies using clinical samples (Abramowitz & Deacon, 2006; Huppert et al., 2007) found that OCD patients with primary hoarding symptoms scored significantly higher on the OCI-R hoarding subscale relative to OCD patients with other symptoms. Moreover, the patients with primary hoarding symptoms had higher scores on the OCI-R hoarding subscale than on any other subscale. In a non-clinical sample (Fullana et al., 2005) the OCI-R hoarding subscale and the Saving Inventory-Revised were strongly correlated.

Results

Between groups comparison

Table 1 presents the OCI-R subscale means across the OCD, OAD, and student groups, as well as the results of a one-way ANOVA comparing these scores. As can be seen, OCD patients scored significantly higher than both other groups on all symptom categories except hoarding, on which the student group scored slightly, yet significantly, higher than both the OCD and OAD groups.[1]

Correlations among OC symptom dimensions

Intercorrelations among the OCI-R subscales for the combined sample revealed that hoarding was significantly related with all five

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[1] We also computed analyses of covariance to examine whether group differences on the OCI-R hoarding subscale could be accounted for by group differences in age. These computations revealed that age did not account for group differences in reported hoarding symptoms.

Table 1
Means (standard deviations) on OCI-R subscales by group

OCI-R subscale	OCD	OAD	Students	F-value
Checking	5.21[a] (4.07)	2.21[b] (2.60)	1.96[b] (2.22)	132.65*
Washing	4.92[a] (4.49)	1.34[b] (2.34)	1.40[b] (2.17)	153.85*
Obsessing	6.55[a] (3.76)	3.03[b] (3.11)	1.77[c] (2.14)	296.32*
Neutralizing	2.70[a] (3.44)	0.88[b] (1.83)	1.25[b] (2.01)	40.77*
Ordering	4.57[a] (3.85)	2.80[b] (3.12)	3.22[b] (2.92)	19.49*
Hoarding	2.62[b] (3.08)	2.19[b] (2.69)	3.29[a] (2.46)	16.63*

Student–Newman–Keuls post hoc testing was conducted to examine the nature of significant omnibus main effects.
Means with different superscripts (a–c) differ significantly in magnitude ($P < 0.05$).
OCI-R = Obsessive–Compulsive Inventory—Revised; OCD = obsessive–compulsive disorder; OAD = other anxiety disorders.
Degrees of freedom for F-tests ranged from (2, 1377) to (2, 1381) due to missing data.
*$P < 0.001$.

other symptom groups (see Table 2). However, the magnitude of the intercorrelations among the other subscales appeared much greater, suggesting that hoarding is less strongly correlated with the other symptoms than these other symptoms are with one another. To test this observation we used Steiger's equation for comparing correlation coefficients (Cohen & Cohen, 1983). The magnitude of the correlation between the hoarding subscale and the checking subscale was significantly weaker than that between checking and any other subscale ($P < 0.01$). A similar pattern emerged for the washing, obsessing, and neutralizing subscales (i.e., correlations with hoarding were significantly weaker than were correlations with the other subscales; $P < 0.01$). The correlation between ordering and obsessing was of a slightly lower magnitude than that between hoarding and ordering, but this difference was not significant.

Factor analysis

To further assess the relationship of hoarding to the other OCD symptoms we subjected the entire sample's scores on the 18 OCI-R items to a principal component factor analysis in which we specified a single factor solution. We included the entire sample in this analysis because of the similarity in factor structure of the OCI-R across groups and to increase our sample size and maximize the variability in responses to all OCI-R items. As shown in Table 3, items pertaining to washing, checking, ordering, obsessing, and neutralizing all had strong loadings on this unitary factor. The three hoarding items (i.e., items 1, 7, and 13) loaded on this factor, but were the weakest loadings of all the OCI-R items.

Discussion

The first aim of this study was to compare the severity of hoarding symptoms across OCD patients, patients with other anxiety (and related) disorders, and a non-clinical sample. If hoarding is indeed best regarded as an OCD symptom, patients with OCD should evidence higher levels of hoarding symptoms relative to those with other anxiety disorders. Our results, however, indicated no differences in hoarding scores between OCD patients and those with other anxiety disorders, whereas non-clinical controls

Table 2
Correlations among OCI-R subscales in the total sample

OCI-R subscale	Checking	Washing	Obsessing	Neutralizing	Ordering
Checking	–				
Washing	0.50	–			
Obsessing	0.46	0.39	–		
Neutralizing	0.47	0.41	0.38	–	
Ordering	0.49	0.41	0.26	0.44	–
Hoarding	0.30	0.20	0.17	0.28	0.30

All correlations significant at $P < 0.01$.

Table 3
Rotated factor loadings from one-factor principal component analysis of the OCI-R items

OCI-R item	Factor loading
1. I have saved up so many things that they get in the way.	0.310
2. I check things more often than necessary.	0.693
3. I get upset if objects are not arranged properly.	0.637
4. I feel compelled to count while I am doing things.	0.611
5. I find it difficult to touch an object when I know it has been touched by strangers or certain people.	0.654
6. I find it difficult to control my own thoughts.	0.591
7. I collect things I don't need.	0.385
8. I repeatedly check doors, windows, drawers, etc.	0.730
9. I get upset if others change the way I have arranged things.	0.670
10. I feel I have to repeat certain numbers.	0.626
11. I sometimes have to wash or clean myself simply because I feel contaminated.	0.678
12. I am upset by unpleasant thoughts that come into my mind against my will.	0.589
13. I avoid throwing things away because I am afraid I might need them later.	0.428
14. I repeatedly check gas and water taps and light switches after turning them off.	0.673
15. I need things to be arranged in a particular order.	0.627
16. I feel that there are good and bad numbers.	0.506
17. I wash my hands more often and longer than necessary.	0.658
18. I frequently get nasty thoughts and have difficulty in getting rid of them.	0.535

evidenced slightly *more* hoarding symptoms than both of the patient groups. In contrast, checking, washing, obsessing, neutralizing and ordering symptoms were markedly increased in OCD patients as compared to the other groups. Thus, whereas these symptom presentations show a somewhat specific association with the diagnosis of OCD, hoarding does not.

The second aim of this study was to examine associations among OCD symptoms, including hoarding. Our findings are consistent with previous studies (e.g., Wu & Watson, 2005) suggesting that hoarding is not as strongly related to the other OCD symptoms as these other symptoms are related with one another. The third aim was to investigate the relationship between hoarding and the other OCD symptoms by examining the factor loadings of individual OCI-R items when OCD is considered as a unidimensional phenomenon. Our principal components analysis revealed that OCI-R hoarding items contributed the least to this artificially contrived single OCD symptom factor.

Study 2

Study 2 was specifically conducted to examine the extent to which hoarding is associated with global OCD severity, levels of general psychopathology, and various cognitive factors associated with OCD and anxiety. Cognitive models (e.g., Rachman, 1997, 1998; Salkovskis, 1996) propose that OCD results from dysfunctional beliefs about the presence and importance of negative thoughts (e.g., "Thinking about something bad is the same as doing something bad"), overestimates of threat and responsibility, and the need for perfection and certainty. These sorts of beliefs are thought to lead to the misinterpretation of otherwise normally occurring negative intrusive thoughts found in up to 90% of the population (Rachman & de Silva, 1978). When such intrusions are misinterpreted, the result is anxiety and distress, as well as efforts to reduce this distress using behaviors such as avoidance, neutralizing, and compulsive rituals. These behaviors reduce anxiety in the short-term, but cue additional intrusive thoughts and reinforce the dysfunctional beliefs in the long-term (e.g., Rachman, 1997; Salkovskis, 1996).

Previous research has reported theoretically consistent associations between OCD-related cognitive variables and specific symptom dimensions (e.g., Abramowitz & Deacon, 2006; Tolin, Brady, & Hannan, in press). For example, Abramowitz and Deacon (2006) found that washing, checking, ordering, and obsessing, but not neutralizing and hoarding, were associated with intolerance of uncertainty; and that checking and obsessing symptoms were associated with the misinterpretation of intrusive thoughts as important and needing to be controlled. Whereas these authors did

not report associations between hoarding and OCD-related cognitive variables, others have found such relationships (e.g., Tolin et al., in press).

The analyses in this study were conducted using only data from the 225 OCD patients described in Study 1. Considering our findings in Study 1, we expected that washing, checking, ordering, obsessing, and neutralizing, but not hoarding symptoms, would be associated with the severity of global OCD and related symptoms (i.e., anxiety and depression). Such a pattern of results would provide evidence against hoarding as an OCD symptom. We also predicted that all of the OCI-R subscales except hoarding would show theoretically consistent associations with the OCD-related cognitive variables included in the present study (described below).

Method

Participants

These analyses were conducted using data from the 225 OCD patients described in Study 1.

Measures

In addition to the OCI-R, the following assessment instruments were used in this study.

a. The Beck Depression Inventory (BDI; Beck & Steer, 1987) 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 and is widely used in clinical research (Beck, Steer, & Garbin, 1988).

b. The Interpretation of Intrusions Inventory (III; Obsessive–Compulsive Cognitions Working Group [OCCWG], 2003) is a semi-idiographic questionnaire composed of 31 items that measures immediate appraisals or interpretations of unwanted, distressing intrusive thoughts, images or impulses. Respondents are first given a definition of unwanted ego-dystonic mental intrusions, as well as examples of obsessive themes and content, and are asked to write in the space provided two intrusive thoughts, images or impulses they had recently experienced. They then complete ratings of recency, frequency, and distress of these intrusions. Respondents then rate their level of belief (from 0 = "I did not believe this idea at all" to 100 = "completely convinced this idea was true") within the past 2 weeks for each of the 31 statements as they related to the two intrusive thoughts they recorded on the

questionnaire. Although three subscales were initially described (OCCWG, 2003), factor analysis yielded a single factor, suggesting that the total score be used in lieu of subscale scores (OCCWG, 2005). To facilitate interpretation, the 100-point scale was transformed into a 10-point scale. The psychometric properties of the III are described by the OCCWG (2005).

c. The Intolerance of Uncertainty Scale (IUS; Freeston, Rheaume, Letarte, Dugas, & Ladouceur, 1994) is a 27-item self-report measure of beliefs about the unacceptability of uncertainty and doubt (sample items: "uncertainty makes life intolerable"; "I always want to know what the future has in store for me"; "when I am uncertain I can't go forward"). Each item is rated on a five-point scale from 1 ("Not at all characteristic of me") to 5 ("Entirely characteristic of me"). Scores on the IUS range from 27 to 135 and the scale has good psychometric properties (Freeston et al., 1994).

d. The Obsessive Beliefs Questionnaire (OBQ; OCCWG, 2005) is a 44-item self-report instrument, measures dysfunctional beliefs thought to contribute to the escalation of normal intrusive thoughts into clinical obsessions. It contains three subscales: (1) threat overestimation and responsibility (OBQ-T/R), (2) importance and control of intrusive thoughts (OBQ-I/CT), and (3) perfectionism and need for certainty (OBQ-P/C). The instrument's good validity, internal consistency, and test–retest reliability are described in OCCWG (2005).

e. The Responsibility Attitudes Scale (RAS; Salkovskis et al., 2000) is a 26-item self-report measure designed to assess beliefs about responsibility that are characteristic of people with OCD. Sample items include "If I don't act when I can foresee danger, then I am to blame for any consequences if it happens" and "I should never cause even the lightest harm to others." Items are rated on a scale from 1 (totally agree) to 7 (totally disagree) and the participant's mean response across all 26 items is reported as the RAS score. The psychometric properties of the scale are described in Salkovskis et al. (2000).

f. The Self-Rated Anxiety Scale (SAS; Zung, 1971) is a 20-item measure developed to assess the frequency of anxiety symptoms. The scale consists primarily of somatic symptoms and has demonstrated adequate internal consistency and test–retest reliability (Jegede, 1977; Michelson & Mavissakalian, 1983).

g. The State-Trait Anxiety Inventory-Trait version (STAI-T; Spielberger et al., 1983) is a 20-item scale that measures the stable propensity to experience anxiety and the tendency to perceive stressful situations as threatening. The STAI-T has demonstrated high test–retest reliability, internal consistency, and concurrent validity with other anxiety questionnaires (Spielberger et al., 1983).

h. The Thought–Action Fusion Scale (TAF; Shafran, Thordarson, & Rachman, 1996) is a 19-item self-report measure of the tendency to believe that thoughts are equivalent to actions. Twelve items assess *moral* TAF (e.g., "Having a blasphemous thought is almost as sinful to me as a blasphemous action"), three assess *likelihood-self* TAF (e.g., "If I think of myself being in a car accident this increases the risk that I will have a car accident"), and four items assess *likelihood-other* TAF (e.g., "If I think of a relative/friend losing their job, this increases the risk that they will lose their job). Agreement with each item (statement) is rated on a scale from 0 (disagree strongly) to 4 (agree strongly). The psychometric properties have been described by Shafran et al. (1996).

i. The Yale-Brown Obsessive Compulsive Scale (Y-BOCS; Goodman et al., 1989a, 1989b) is a semi-structured interview that consists of a symptom checklist and severity scale. The first part of the symptom checklist provides definitions and examples of obsessions and compulsions that the clinician reads to the patient. Next, the clinician reviews a list of over 50 specific obsessions (e.g., violent images) and compulsions (e.g., checking appliances) and asks the patient whether each symptom is currently present or has occurred in the past. These items are categorized into 15 more general categories of types of obsessions (e.g., contamination) and compulsions (e.g., checking). Finally, the most prominent obsessions and compulsions identified from the checklist are rated on the severity scale, which contains 10 items that assess the following parameters of obsessions (Items 1–5) and compulsions (Items 6–10): (1) time, (2) interference, (3) distress, (4) resistance, and (5) control. Items (scored 0–4) are summed to yield a total score ranging from 0 (no symptoms) to 40 (very severe), and two subscales (obsessions and compulsions) each ranging from 0 to 20.

Results

Characteristics of the sample

The group's mean Y-BOCS total and subscale scores were in the moderate to severe range: total score = 25.8 (SD = 5.9); obsessions subscale = 12.8 (SD = 3.3); compulsions subscale = 13.0 (SD = 3.4). The mean BDI score was 17.1 (SD = 10.5), also falling within the moderate range of depressive symptoms, although with substantial variability. Mean scores for the two measures of general anxiety were SAS = 40.9 (SD = 9.6), STAI-T = 52.5 (SD = 8.8), indicating clinically severe levels of anxiety.

Correlations with measures of psychopathology

Table 4 shows correlations between the OCI-R subscales and measures of OCD severity and general psychopathology (anxiety and depression). As can be seen, each of the OCI-R subscales, except the hoarding subscale, was significantly correlated with either the Y-BOCS obsessions or compulsions subscales. Hoarding was significantly, yet weakly, associated with the BDI, and was not significantly associated any other psychopathology measures. In contrast, each of the other OCI-R subscales, except neutralizing, demonstrated at least a moderate association with anxiety.

Correlations with measures of OCD-related cognitive variables

Correlations between OCI-R subscales and measures of cognitive biases present among individuals with OCD appear in Table 5. As can be seen, hoarding was weakly correlated with the TAF, and not significantly associated with any of the other measures of cognitive variables. The other OCI-R subscales, in contrast, showed significant weak to moderate associations with the cognitive variables.

Discussion

This study aimed to more thoroughly investigate the nature of hoarding symptoms within a sample of patients diagnosed with

Table 4
Correlations between OCI-R subscales and measures of OCD severity and general psychopathology

OCI-R subscale	Measure					
	Y-BOCS					
	Total score	Obsessions	Compulsions	BDI	SAS	STAI-T
Checking	0.16*	0.12	0.17*	0.09	0.27*	0.17*
Washing	0.24**	0.23**	0.20**	0.16*	0.27*	0.23**
Obsessing	0.14	0.20**	0.05	0.27**	0.38**	0.25**
Neutralizing	0.17*	0.13	0.17*	0.08	0.10	0.18*
Ordering	0.16*	0.09	0.20**	0.19**	0.34**	0.23**
Hoarding	0.05	0.02	0.11	0.17*	0.15	0.04

OCI-R = Obsessive–Compulsive Inventory—Revised; Y-BOCS = Yale-Brown Obsessive Compulsive Scale; BDI = Beck Depression Inventory; SAS = Self-Rated Anxiety Scale; STAI-T = State-Trait Anxiety Inventory-Trait version.
*P < 0.05; **P < 0.01.

Table 5
Correlations between OCI-R subscales and cognitive variables associated with OCD

OCI-R subscale	Cognitive variable						
	TAF	IUS	RAS	III	OBQ-T/R	OBQ-P/C	OBQ-I/CT
Checking	0.10	0.44**	0.29**	0.06	0.24	0.03	−0.15
Washing	0.11	0.27**	0.15	0.07	0.32*	0.36*	0.08
Obsessing	0.28**	0.08	0.27*	0.44**	0.24	−0.13	0.45**
Neutralizing	0.24**	0.17	0.01	0.20*	0.27	0.17	0.18
Ordering	0.19*	0.46**	0.04	0.09	0.16	0.33*	−0.03
Hoarding	0.18*	0.03	0.05	0.08	0.18	0.15	0.14

OCI-R = Obsessive–Compulsive Inventory—Revised; TAF = Thought–Action Fusion; IUS = Intolerance for Uncertainty Scale; RAS = Responsibility Attitudes Scale; III = Interpretation of Intrusions Inventory; OBQ = Obsessional Beliefs Questionnaire; OBQ-T/R = Responsibility/Threat estimation subscale; OBQ-P/C = Perfectionism/Certainty subscale; OBQ-I/CT = Importance/Control of Thoughts subscale.
*$P < 0.05$; **$P < 0.01$.

OCD. Hoarding was unique among OCD symptom dimensions in that it was not significantly related to the overall severity of obsessions or compulsions as assessed by the "gold standard" Y-BOCS. Consistent with previous findings (e.g., Abramowitz & Deacon, 2006), hoarding was only weakly associated with depressive symptoms, and unrelated to general anxiety, which were at least mildly associated with many of the other OCD symptoms. In our exploratory analysis of the relationship between hoarding and the cognitive variables thought to underlie OCD, the non-hoarding OCD symptoms demonstrated theoretically consistent relationships with these cognitive biases. In contrast, the magnitude of correlations between hoarding and cognitive measures was less than 0.2 in all cases. An important caveat of the present study, however, is the failure to include measures of the cognitions thought to be important in hoarding, such as urges to save, indecisiveness, and desire to acquire. Thus, an interesting topic for future research would be to investigate how these cognitive factors relate to the cognitions thought to underlie the other OCD symptoms. Overall, although the results of Study 2 do not provide unequivocal evidence *against* considering hoarding as an OCD symptom, they do not support the notion of hoarding as a cardinal feature of OCD.

General discussion

The two studies we report address the relationship between hoarding and other OCD symptoms to better elucidate the status of hoarding as a symptom of OCD. Although OCD is a highly heterogeneous condition, our findings with an independent sample, are generally consistent with those reported by other investigators (e.g., Saxena, 2007; Wu & Watson, 2005). The accumulating evidence suggests it is best not to consider hoarding among the varied symptoms of OCD. This is not to say that some individuals with OCD don't show hoarding behavior (e.g., Grisham et al., 2005); rather, that such hoarding is not a specific *sign* of OCD. Analogously, many individuals with posttraumatic stress disorder (PTSD) evidence substance abuse, yet substance abuse is not a sign or symptom of PTSD.

One of the limitations of the current DSM's symptom-based checklist approach to diagnosis is that disorders are defined merely by lists of signs and symptoms. Because the DSM is devoid of theory, these signs and symptoms are identified merely on the basis of their *form* or *topography*, as opposed to their *function*. For example, compulsive rituals are often described as repetitive and excessive (topography) as opposed to being aimed at reducing anxiety or preventing dreaded catastrophes (function). As a result, the psychological processes (e.g., cognition, behavior) that motivate and control such behaviors are often overlooked. The inclusion of hoarding as an OCD symptom appears to have been on the basis of its topography: hoarding can be repetitive and excessive. However,

research on the psychological basis of hoarding indicates not all hoarding behavior is performed to reduce anxiety or the probability of feared consequences (Frost & Steketee, 2008).

Consider two individuals with hoarding symptoms. Ms. X hoards anything to do with cats—pictures, news articles, figurines, drawings, etc. (and seven live cats as well). She says that she loves cats and feels a sentimental connection toward the items she hoards. These items, however, are strewn about her home in no apparent organized way. Head-high piles of materials line several walls, the staircase, and a closet. Her bedroom is also strewn with cat-related items so that only a pathway to her bed remains. Ms. X rarely, if ever, looks through or enjoys the items she has saved; but cannot discard them. The second individual, Mr. Y, saves trash and just about anything else that comes into his apartment. His kitchen is filled with empty containers, bags, old mail, and other refuse that is months—if not years—old. When asked to explain his problem, Mr. Y says he is afraid to throw anything away without carefully checking it over because otherwise he might lose something important. For example, "what if I throw a bag away, but it has an important receipt or money in it that I didn't see?" and "what if there is a blank check in the pages of a magazine I discard?" Mr. Y had planned to carefully check all of items he was saving before throwing them out. His piles represent what he has not yet checked thoroughly enough to discard.

These two cases demonstrate the importance of understanding hoarding at the functional level. Although both Ms. X and Mr. Y display excessive saving behavior, the psychological variables controlling this behavior are different. Ms. X's hoarding is motivated by dysfunctional beliefs about the meaning of possessions particularly reflecting an exaggerated sense of sentimentality and aesthetic value. Her behavior is not fear-motivated and there are no obsessional (i.e., fear-provoking) phenomena. On the other hand, Mr. Y's hoarding is motivated by fears of disastrous consequences ("I will discard something important"). He reports obsessions about losing or mistakenly discarding "important" items, and compulsive checking rituals (e.g., his wallet, the floor of his car). His hoarding could be viewed as an avoidance strategy (or even as part of a checking ritual) that allowed him to not have to worry about losing something important. This conceptualization falls in line with the conclusions of Grisham et al. (2005), who proposed that hoarding which occurs in the context of other OCD symptoms is likely to be a symptom of OCD, whereas that which occurs in the absence of other OCD symptoms is likely not. We suggest, however, that aside from observing the presence or absence of OCD, it is important to functionally assess the cognitive and behavioral controlling variables of the hoarding symptom. It is indeed possible that hoarding and the more classic OCD symptoms (e.g., checking and washing) might fulfill different functions within the same individual.

A number of limitations of our two studies deserve comment. Most importantly, because of the heterogeneity of OCD, it is possible that hoarding was underrepresented in the present sample. That is, there might be more hoarding in the general OCD population than was observed in our particular sample. This would provide an alternative explanation for the pattern of results we observed, especially the group differences found in Study 1. Second, because most of the assessment instruments we used were self-report measures, there is the possibility of response biases. This is particularly relevant when one considers the often "ego-syntonic" nature and tendency toward poor insight observed with hoarding symptoms (Steketee & Frost, 2003; Storch et al., 2007). The reduced method variance might also systematically inflate relationships among variables. Third, although the present patient sample sizes were large, the majority was Caucasian and presenting for treatment at specialty clinics; thus, the external validity of our findings may be limited. Fourth, data on a number of other relevant

variables (e.g., age of onset, functional impairment, family history) were not systematically collected that may further distinguish hoarding symptoms from other OCD symptoms. Fifth, the OCI-R contains only three items assessing hoarding symptoms. Therefore, future research should use specific measures of hoarding that have recently been developed (e.g., the Saving Inventory-Revised; Frost, Steketee, & Grisham, 2004).

Within these limitations, the current study has provided additional evidence that hoarding symptoms are relatively unique from other symptoms of OCD. The DSM-V taskforce is currently taking up the issue of OCD's diagnostic status. Two topics are at the heart of this issue: (a) the heterogeneity of OCD and (b) the putative overlap between OCD and a number of so called "OCD spectrum disorders." The second matter, which relates less to the present research, concerns whether OCD is or is not an anxiety disorder, and whether it belongs in its own category of OCD spectrum disorders (for a critical discussion see Storch, Abramowitz, & Goodman, 2008). The present findings are, however, directly relevant to the first matter: where lie the boundaries of OCD? Which of the symptoms currently regarded as obsessions and compulsions belong as OCD symptoms and which do not? Our findings suggest hoarding may be best conceptualized as a discrete set of behaviors resulting from cognitions regarding the acquisition and discarding of possessions that is often seen in conjunction with several disorders (including OCD), rather than as a particular sign, symptom, dimension, or subtype of OCD. Recognition of this in forthcoming DSMs might assist with the diagnosis, classification, research, and treatment of OCD.

References

Abramowitz, J. S., & Deacon, B. J. (2006). Psychometric properties and construct validity of the Obsessive–Compulsive Inventory—Revised: replication and extension with a clinical sample. Journal of Anxiety Disorders, 20, 1016–1035.

Abramowitz, J. S., Franklin, M. E., Schwartz, S. A., & Furr, J. M. (2003). Symptom presentation and outcome of cognitive-behavioral therapy for obsessive–compulsive disorder. Journal of Consulting and Clinical Psychology, 71, 1049–1057.

American Psychiatric Association. (2000). Diagnostic and statistical manual of mental disorders (4th ed., text revision).. Washington, DC: Author.

Beck, A. T., & Steer, R. A. (1987). Beck Depression Inventory manual. San Antonio, TX: Psychological Corporation.

Beck, A. T., Steer, R. A., & Garbin, M. G. (1988). Psychometric properties of the Beck Depression Inventory: twenty-five years of evaluation. Clinical Psychology Review, 8, 77–100.

Brown, T. A., DiNardo, P., & Barlow, D. H. (1994). Anxiety Disorders Interview Schedule for DSM-IV. Oxford, UK/San Antonio, TX: Psychological Corporation.

Cohen, J., & Cohen, P. (1983). Applied multiple regression and correlational analysis for the behavioral sciences. Hillsdale, NJ: Lawrence Erlbaum Associates.

Coles, M. E., Frost, R. O., Heimberg, R. G., & Steketee, G. (2003). Hoarding behaviors in a large college sample. Behaviour Research and Therapy, 41, 179–194.

Foa, E. B., Huppert, J. D., Leiberg, S., Langner, R., Kichic, R., Hajcak, G., et al. (2002). The Obsessive–Compulsive Inventory: development and validation of a short version. Psychological Assessment, 14, 485–496.

Foa, E. B., Kozak, M. J., Salkovskis, P. M., Coles, M. E., & Amir, N. (1998). The validation of a new obsessive–compulsive disorder scale: the obsessive–compulsive inventory. Psychological Assessment, 10, 206–214.

Frankenburg, F. (1984). Hoarding in anorexia nervosa. British Journal of Medical Psychology, 57, 57–60.

Freeston, M., Rheaume, J., Letarte, H., Dugas, M. J., & Ladouceur, R. (1994). Why do people worry? Personality and Individual Differences, 17, 791–802.

Frost, R. O., & Gross, R. C. (1993). The hoarding of possessions. Behaviour Research and Therapy, 31, 367–381.

Frost, R. O., & Steketee, G. (2008). Compulsive hoarding. In J. Abramowitz, D. McKay, & S. Taylor (Eds.), Obsessive–compulsive disorder: Subtypes and spectrum conditions (pp. 76–93). Amsterdam: Elsevier.

Frost, R. O., Steketee, G., & Grisham, J. (2004). Measurement of compulsive hoarding: saving Inventory-Revised. Behaviour Research and Therapy, 42, 1163–1182.

Frost, R. O., Steketee, G., Williams, L. F., & Warren, R. (2000). Mood, personality disorder symptoms and disability in obsessive compulsive hoarders: a comparison with clinical and nonclinical controls. Behaviour Research and Therapy, 38, 1071–1081.

Fullana, M. A., Tortella-Feliu, M., Caseras, X., Andion, O., Torrubia, R., & Mataix-Cols, D. (2005). Psychometric properties of the spanish version of the Obsessive-Compulsive Inventory—revised in a non-clinical sample. Journal of Anxiety Disorders, 19, 893–903.

Goodman, W. K., Price, L. H., Rasmussen, S. A., Mazure, C., Delgado, P., Heninger, G. R., et al. (1989a). The Yale-Brown Obsessive Compulsive Scale: validity. Archives of General Psychiatry, 46, 1012–1016.

Goodman, W. K., Price, L. H., Rasmussen, S. A., Mazure, C., Fleischmann, R. L., Hill, C. L., et al. (1989b). The Yale-Brown Obsessive Compulsive Scale: development, use, and reliability. Archives of General Psychiatry, 46, 1006–1011.

Grisham, J., Brown, T., Liverant, G., & Campbell-Sills, L. (2005). The distinctiveness of compulsive hoarding from obsessive–compulsive disorder. Journal of Anxiety Disorders, 19, 767–779.

Hajcak, G., Huppert, J. D., Simons, R. F., & Foa, E. B. (2004). Psychometric properties of the OCI-R in a college sample. Behavior Research and Therapy, 42, 115–123.

Hanna, G. L. (1995). Demographic and clinical features of obsessive–compulsive disorder in children and adolescents. Journal of the American Academy of Child and Adolescent Psychiatry, 34, 19–27.

Huppert, J., Walther, M., Hajcak, G., Yadin, E., Foa, E., Simpson, H., et al. (2007). The OCI-R: validation of the subscales in a clinical sample. Journal of anxiety disorders, 3, 394–406.

Jegede, R. O. (1977). Psychometric attributes of the self-rating anxiety scale. Psychological Reports, 40(303), 306.

Joiner, T. E., Vohs, K. D., & Heatherton, T. F. (2000). Three studies on the factorial distinctiveness of binge eating and bulimic symptoms among nonclinical men and women. International Journal of Eating Disorders, 27, 198–205.

Lochner, C., Kinnear, C. J., Hemmings, S. M., Seller, C., Niehaus, D. J., Knowles, J. A., et al. (2005). Hoarding in obsessive–compulsive disorder: clinical and genetic correlates. Journal of Clinical Psychiatry, 66, 1155–1160.

Luchins, D. J., Goldman, M. B., Lieb, M., & Hanrahan, P. (1992). Repetitive behaviors in chronically institutionalized schizophrenic patients. Schizophrenia Research, 8, 119–123.

Mataix-Cols, D., Rosario-Campos, M. C., & Leckman, J. F. (2005). A multidimensional model of obsessive–compulsive disorder. American Journal of Psychiatry, 162, 228–238.

Mataix-Cols, D., Wooderson, S., Lawrence, N., Brammer, M. J., Speckens, A., & Phillips, M. L. (2004). Distinct neural correlates of washing, checking, and hoarding symptom dimensions in obsessive–compulsive disorder. Archives of General Psychiatry, 61, 564–576.

Michelson, L., & Mavissakalian, M. (1983). Temporal stability of self-report measures in agoraphobia research. Behaviour Research and Therapy, 21, 695–698.

Obsessive Compulsive Cognitions Working Group. (2003). Psychometric validation of the Obsessive Beliefs questionnaire and the interpretations of intrusions inventory: Part 1. Behaviour Research and Therapy, 41, 863–878.

Obsessive Compulsive Cognitions Working Group. (2005). Psychometric validation of the Obsessive Beliefs questionnaire and the interpretations of intrusions inventory–part 2: factor analyses and testing of a brief version. Behaviour Research and Therapy, 43, 1527–1542.

Rachman, S. (1997). A cognitive theory of obsessions. Behaviour Research and Therapy, 35, 793–802.

Rachman, S. (1998). A cognitive theory of obsessions: elaborations. Behaviour Research and Therapy, 36, 385–401.

Rachman, S. J., & Hodgson, R. J. (1980). Obsessions and compulsions. Englewood Cliffs, NJ: Prentice-Hall, Inc.

Rachman, S., & de Silva, P. (1978). Abnormal and normal obsessions. Behaviour Research and Therapy, 16, 233–248.

Rasmussen, S. A., & Eisen, J. L. (1992). The epidemiology and clinical features of obsessive compulsive disorder. Psychiatric Clinics of North America, 15, 743–758.

Salkovskis, P. (1996). Cognitive-behavioral approaches to the understanding of obsessional problems. In R. Rapee (Ed.), Current controversies in the anxiety disorders (pp. 103–133). New York: Guilford.

Salkovskis, P. M., Wroe, A. L., Gledhill, A., Morrison, N., Forrester, E., Richards, C., et al. (2000). Responsibility attitudes and interpretations are characteristic of obsessive compulsive disorder. Behaviour Research and Therapy, 38, 347–372.

Samuels, J. F., Bienvenu, O. J., Pinto, A., Fyer, A. J., McCracken, J. T., Rauch, S. L., et al. (2007). Hoarding in obsessive–compulsive disorder: results from the OCD Collaborative Genetics Study. Behaviour Research and Therapy, 45, 673–686.

Samuels, J., Bienvenu, O. J., Riddle, M. A., Cullen, B. A. M., Grados, M. A., Liang, K.-Y., et al. (2002). Hoarding in obsessive compulsive disorder: results from a case–control study. Behaviour Research and Therapy, 40, 517–528.

Samuels, J. F., Shugart, Y. Y., Grados, M. A., Willour, V. L., Bienvenu, O. J., Greenberg, B. D., et al. (2007). Significant linkage to compulsive hoarding on chromosome 14 in families with obsessive compulsive disorder: results from the OCD collaborative Genetics study. American Journal of Psychiatry, 164, 493–499.

Saxena, S. (2007). Is compulsive hoarding a genetically and neurobiologically discrete syndrome? Implications for diagnostic classification. American Journal of Psychiatry, 164, 380–384.

Saxena, S., Brody, A. L., Maidment, K. M., Smith, E. C., Zohrabi, N., Katz, E., et al. (2004). Cerebral glucose metabolism in obsessive–compulsive hoarding. American Journal of Psychiatry, 161, 1038–1048.

Saxena, S., Maidment, K. M., Vapnik, T., Golden, G., Rishwain, T., Rosen, R. M., et al. (2002). Obsessive–compulsive hoarding: symptom severity and response to multimodal treatment. Journal of Clinical Psychiatry, 63, 21–27.

Shafran, R., & Tallis, F. (1996). Obsessive–compulsive hoarding: a cognitive-behavioural approach. Behavioural and Cognitive Psychotherapy, 24, 209–221.

Shafran, R., Thordarson, D. S., & Rachman, S. (1996). Thought-action fusion in obsessive compulsive disorder. Journal of Anxiety Disorders, 10, 379–391.

Sheehan, D., Lecrubier, Y., Harnett-Sheehan, K., Amoriam, P., Janavs, J., Weiller, E., et al. (1998). The Mini International Neuropsychiatric Interview (M.I.N.I.): the development and validation of a structured diagnostic psychiatric interview. *Journal of Clinical Psychiatry, 59*(Suppl. 20), 22–23.

Spielberger, C. D., Gorsuch, R. L, Lushene, R., Vagg, P. R., & Jacobs, G. A. (1983). *Manual for the State-Trait Anxiety Inventory*. Palo Alto, CA: Consulting Psychologists Press.

Steketee, G., & Frost, R. O. (2003). Compulsive hoarding: current status of the research. *Clinical Psychology Review, 23*, 905–927.

Storch, E. A., Abramowitz, J. S., & Goodman, W. K. (2008). Does obsessive-compulsive disorder belong among the anxiety disorders in DSM-V? *Depression and Anxiety, 25*, 226–247.

Storch, E. A., Lack, C. W., Merlo, L. J., Geffken, G. R., Jacob, M. J., Murphy, T. K., et al. (2007). Clinical features of children and adolescents with obsessive–compulsive disorder and hoarding symptoms. *Comprehensive Psychiatry, 48*, 313–318.

Tolin, D. F., Brady, R. E., & Hannan, S. E. (in press). Obsessional beliefs and symptoms of obsessive–compulsive disorder in a clinical sample. *Journal of Psychopathology and Behavioral Assessment*.

Wheaton, M. G., Timpano, K. R., LaSalle-Ricci, V. H., & Murphy, D. L. (2008). Characterizing the hoarding phenotype in individuals with OCD: associations with comorbidity, severity and gender. *Journal of Anxiety Disorders, 22*, 243–252.

Wu, K., & Watson, D. (2005). Hoarding and its relation to obsessive–compulsive disorder. *Behaviour Research and Therapy, 43*, 897–921.

Zung, W. W. K. (1971). A rating instrument for anxiety disorders. *Psychosomatics, 12*, 371–379.