Changes in saving cognitions mediate hoarding symptom change in cognitive-behavioral therapy for hoarding disorder

Hannah C. Levy[a,*], Blaise L. Worden[a], Christina M. Gilliam[a], Christine D'Urso[a], Gail Steketee[b], Randy O. Frost[c], David F. Tolin[a,d]

[a] Anxiety Disorders Center, Institute of Living, Hartford Hospital, 200 Retreat Avenue, Hartford, CT 06106, USA
[b] Boston University School of Social Work, 264 Bay State Road, Boston, MA 02215, USA
[c] Department of Psychology, Smith College, 10 Elm Street, Northampton, MA 01063, USA
[d] Department of Psychiatry, Yale University School of Medicine, 333 Cedar Street, New Haven, CT 06510, USA

ARTICLE INFO

ABSTRACT

Cognitive-behavioral therapy (CBT) is an empirically-supported treatment for hoarding disorder (HD). However, meta-analytic studies suggest that CBT is only modestly effective, and a significant number of individuals with HD remain symptomatic following treatment. To inform the development of more effective and targeted treatments, it will be important to clarify the mechanisms of treatment response in CBT for HD. To this end, the current study examined whether change in maladaptive saving beliefs mediated symptom change in CBT for HD. Sixty-two patients with primary HD completed measures of maladaptive saving cognitions and hoarding severity at pre-, mid-, and post-CBT. Results showed that change in saving cognitions mediated change in all three domains of HD symptoms (i.e., acquiring, difficulty discarding, and excessive clutter), suggesting that cognitive change may be a mechanism of treatment response in CBT. The findings indicate that cognitive change may have an impact on treatment outcomes, and are discussed in terms of cognitive-behavioral theory of HD and potential ways in which to enhance belief change in treatment.

1. . Introduction

Cognitive-behavioral therapy (CBT) is an empirically supported treatment for hoarding disorder (HD; Tolin, Frost, Steketee, & Muroff, 2015; Williams & Viscusi, 2016). However, rates of clinically significant change in HD symptoms are modest: A recent meta-analysis of CBT for HD found that only 35% of treatment-seeking patients achieve clinically significant change following treatment, leaving 65% in the pathological range (Tolin et al., 2015). Unfortunately, efforts to enhance the efficacy of CBT for HD (e.g., by including home visits) have been largely unsuccessful. Group CBT without home visits was comparably effective to individual CBT with home visits (Gilliam et al., 2011), and increasing the number of home visits from four to eight did not significantly enhance group CBT outcomes (Muroff, Steketee, Bratiotis, & Ross, 2012). Furthermore, treatment of hoarding can be lengthy (typically around 20–26 sessions) and labor-intensive, and compliance with treatment procedures is often low (Ayers, Bratiotis, Saxena, & Wetherell, 2012). Therefore, identifying both effective mechanisms of change and ineffective elements of existing protocols can inform more efficient and targeted HD treatments.

One candidate mechanism in CBT for HD is belief change, or the disconfirmation of erroneous or unhelpful beliefs that serve to maintain clinical symptoms. Prior research suggests that HD is associated with multiple overvalued beliefs about the importance of possessions. These beliefs include exaggerated sentimental attachment to or anthropomorphizing of objects; aversion to wastefulness; and fears of losing, missing or not remembering important information (Dozier & Ayers, 2014; Steketee, Frost, & Kyrios, 2003). These maladaptive beliefs are characterized by overestimation of the likelihood and severity of feared consequences, particularly fears of what may result from not saving or not acquiring objects. Such hoarding-related beliefs, as measured by the Saving Cognitions Inventory (SCI; Steketee et al., 2003), are moderately to highly correlated with severity of hoarding on self-report measures such as the Saving Inventory-Revised (SI-R; Frost, Steketee, & Grisham, 2004) and reliably differentiate hoarding from other disorders (Steketee et al., 2003; Wheaton, Fabricant, Berman, & Abramowitz, 2013). Wheaton et al. (2013) found that hoarding-related beliefs as measured by the SCI explained additional variance (26%) in SI-R scores over and above experiential avoidance and general distress (symptoms of depression and anxiety). When individual SI-R subscales were examined,

* Corresponding author.
  E-mail address: hannah.levy@hhchealth.org (H.C. Levy).

the SCI explained significant variance in the acquiring and difficulty discarding subscales (reflecting the key behavioral elements of HD), but not in the clutter subscale (which may be attributable to additional error variance in this environmental consequence of hoarding behaviors). Similarly, in a laboratory study, compared to healthy control participants, those with HD reported stronger beliefs related to emotional attachment, responsibility, memory, utility, and aesthetic appeal when considering both a personal possession and a magazine given to them by the experimenter (Frost, Ong, Steketee, & Tolin, 2016). Taken together, the extant literature supports the notion that maladaptive beliefs are relevant to HD symptomatology.

The next step for this research is to determine whether change in these maladaptive hoarding-related beliefs mediates treatment outcome in CBT for HD. To our knowledge, no prior studies have examined this important clinical question. Previous studies suggest that cognitive change explains unique variance in CBT outcome and mediates change for a variety of related disorders, including depression, anxiety disorders, and obsessive-compulsive disorder (OCD; e.g., DeRubeis et al., 1990; Hofmann et al., 2007; Olatunji et al., 2013; Quilty, McBride, & Bagby, 2008; Vogele et al., 2010; Webb, Kertz, Bigda-Peyton, & Bjorgvinsson, 2013). However, in a laboratory-based discarding task, the number of items saved were equivalent for HD participants who did and did not report a reduction in maladaptive beliefs (Frost et al., 2016). Thus, from prior clinical research it seems reasonable to expect that change in maladaptive saving beliefs may mediate symptom change in CBT for HD, although laboratory findings potentially contradict this hypothesis.

To help clarify the role of maladaptive beliefs within the context of HD treatment, the aim of the current study was to examine whether pre- to post-treatment change in hoarding-related beliefs mediates symptom change in CBT for HD. As mentioned previously, to our knowledge no prior studies have examined cognitive mediation in CBT for hoarding. Given the recent study by Frost et al. (2016), we felt it was important to assess whether cognitive change is even important to successful outcomes in CBT for HD, prior to conducting additional research to find out how best to target maladaptive beliefs in this population. In line with Wheaton et al. (2013), it was hypothesized that cognitive change as assessed by the SCI would mediate HD symptom change for the acquiring and difficulty discarding subscales of the SI-R, but not for the clutter subscale.

2. Method

2.1. Participants

Participants were 62 patients with a primary diagnosis of HD who came from two sources, including a waitlist-controlled trial of individual CBT for HD (n = 35; Steketee, Frost, Tolin, Rasmussen, & Brown, 2010), and patients who completed group CBT for HD in an outpatient specialty clinic (n = 27). All participants were adults 18 years of age or older whose most severe problem was non animal-related HD; patients were excluded from treatment if they presented with current psychosis or active bipolar disorder, or were judged by the intake clinician to have cognitive impairment (e.g., dementia, brain injury) severe enough to interfere with comprehension of treatment content. The waitlist-controlled trial had additional inclusion criteria that were not present in the outpatient group, including having at least moderate HD severity as assessed by the Hoarding Rating Scale-Interview (HRS-I; Tolin, Frost, & Steketee, 2010), no substance use disorder in the past six months, no concurrent psychotherapy, and no psychiatric medication in the past month. For the purposes of the current study, only individuals who completed CBT and at least the pre-treatment self-report measures were included in the analyses that follow. As reported by Steketee et al. (2010), nine of 46 total participants in the individual treatment trial dropped out before completing treatment. An additional two participants were excluded from the

current study due to incomplete data, leaving a final sample of 35 participants from the parent trial. Of the 57 patients who began outpatient group treatment, 12 dropped out and an additional 18 had missing pre-treatment self-report data, leaving a final sample of 27 patients from the outpatient clinic.

2.2. Measures

The *Anxiety Disorders Interview Schedule for DSM-IV* (ADIS-IV; Brown, Di Nardo, Brown, & Barlow, 1994), the *Mini-International Neuropsychiatric Interview Plus* (MINI Plus; Sheehan et al., 1998), or the *Diagnostic Interview for Anxiety, Mood, and Obsessive-Compulsive and Related Neuropsychiatric Disorders* (DIAMOND; Tolin et al., 2016) was used to determine diagnoses. All 35 participants from the parent trial (Steketee et al., 2010) completed the ADIS-IV. In the outpatient clinic group, 20 patients completed the DIAMOND and seven completed the MINI Plus. The ADIS-IV and MINI Plus are both widely used structured diagnostic interviews based on the DSM-IV criteria, and therefore did not include a specific module on HD. To verify HD diagnosis, participants who completed the ADIS-IV also completed the HRS-I. Similarly, those who completed the MINI Plus answered additional questions to confirm HD diagnosis, including the severity of clutter in the home, presence of excessive acquisition, difficulty discarding, and the distress and impairment associated with these symptoms. The DIAMOND is a newly developed structured diagnostic interview based on the DSM-5 with good reliability and validity estimates for anxiety, mood, and depressive disorders. The DIAMOND has a specific module for assessing HD, so no additional measures to determine HD diagnosis were needed.

Interviewers were advanced level psychology graduate students, psychology postdoctoral fellows, or licensed psychologists who were trained in diagnostic interviewing, including how to diagnose HD. Prior to conducting these interviews, interviewers attended didactic training on the administration of the structured interview they would be utilizing (i.e., ADIS- IV, DIAMOND, or MINI Plus). In addition, the interviewers both observed and were observed by experienced clinicians with expertise in administering the interviews. Interviewers received ongoing supervision of the diagnostic interviews from licensed psychologists with significant experience in diagnostic interviewing.

The *Saving Inventory-Revised* (SI-R; Frost et al., 2004) was administered to assess hoarding symptom severity. The SI-R is a self-report questionnaire that contains 23 items and three subscales: compulsive acquisition, difficulty discarding, and cluttered living spaces. Each item ranges from 0 to 4, with a total score ranging from 0 to 92 and higher scores indicating greater hoarding severity. Mean scores among those with clinically significant hoarding generally fall above 50, whereas mean scores among non-hoarding samples fall between 22 and 24. The SI-R has demonstrated adequate internal and retest reliability, as well as strong convergent and discriminant validity (Frost et al., 2004). Internal consistency estimates were acceptable for the current sample at all time points (pre-treatment, SI-R total score, α = 0.89, SI-R subscales, all αs ≥ 0.79; mid-treatment, SI-R total score, α = 0.92, SI-R subscales, all αs ≥ 0.82; post-treatment, SI-R total score, α = 0.94, SI-R subscales, all αs ≥ 0.86).

The *Saving Cognitions Inventory* (SCI; Steketee et al., 2003) was used to assess participants' beliefs about saving. The SCI is a self-report measure containing 24 items and four subscales: emotional attachment (e.g., "Losing this possession is like losing a friend"), concerns about memory (e.g., "Saving this means I don't have to rely on my memory"), control over possessions (e.g., "I like to maintain sole control over my things"), and responsibility towards possessions (e.g., "I am responsible for the well-being of this possession"). Respondents rate on a Likert-type scale from 1 to 7 the extent to which they experienced each thought when attempting to discard an object within the past week, with total scores ranging from 24 to 168. The SCI has demonstrated good internal consistency and convergent and discriminant validity. Internal consistency estimates were acceptable for the current sample at