BRIEF REPORT

Experiential Avoidance and Saving Cognitions in the Prediction of Hoarding Symptoms

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Published online: 16 October 2010 © Springer Science+Business Media, LLC 2010

Abstract The cognitive-behavioral approach to hoarding implicates dysfunctional beliefs about possessions (i.e., "saving cognitions"). Acquiring and saving possessions can be conceptualized as avoidance behaviors that prevent feeling the distress provoked by such beliefs in certain situations (e.g., discarding). Experiential avoidance (EA) involves an unwillingness to endure upsetting emotions, thoughts, memories, and other private experiences, and deliberate efforts to control or escape from them. EA has been investigated in several clinical disorders, but to date little investigation of the role of EA in hoarding has been made. The present study examined EA in the prediction of hoarding symptoms. A large sample of unscreened undergraduates completed measures of EA, saving cognitions, and hoarding symptoms. EA predicted the acquisition and clutter components of hoarding even after controlling for saving cognitions and general distress. However, EA was not uniquely associated with the difficulty discarding component of hoarding. Implications for future research are discussed.

Keywords Hoarding · Saving cognitions · Experiential avoidance

Hoarding involves the acquisition and retention of a large number of possessions of apparently limited value (Frost and Gross 1993). These possessions accumulate and cause substantial clutter that can interfere with the functionality

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of an individual's living space and even become a health hazard (e.g., fires, unsanitary conditions). Individuals with hoarding problems have difficulty discarding their saved possessions, leading to distress and interpersonal problems such as conflicts with family members and embarrassment about having visitors to the home. For some individuals hoarding can become a debilitating condition, causing substantial functional impairment as well as economic and family burden (Tolin et al. 2008). Recent epidemiological investigations suggest that hoarding problems may be surprisingly common in the population (lifetime prevalence estimates 2–14%; Pertusa et al. 2010). Although research on hoarding has increased in recent years (Mataix-Cols et al. 2010), the psychological processes involved in this often debilitating problem have not been fully elucidated.

The best-articulated theoretical approach to understanding hoarding is the cognitive-behavioral model (e.g., Frost and Hartl 1996; Steketee and Frost 2003). The cognitive component of this model proposes that different types of dysfunctional beliefs about possessions underlie hoarding symptoms. For example, individuals who hoard have exaggerated beliefs about the meaning and importance of their saved possessions (hypersentimentality; e.g., "losing this possession is like losing a friend"). Some also show inflated responsibility and the need to control their possessions (e.g., "no one has the right to touch my possessions"). Additionally, some individuals have reduced confidence in their memory and thus rely upon hoarded possessions as memory aids. These beliefs and cognitive phenomena (collectively termed "saving cognitions") are thought to give rise to distress and difficulty making decisions regarding whether to save or discard items, leading to the accumulation of unneeded possessions (Steketee et al. 2003). Several empirical investigations have linked saving cognitions to hoarding symptoms in

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both clinical (Frost et al. 2004; Steketee et al. 2003) and non-clinical populations (Coles et al. 2003; Luchian et al. 2007).

Avoidance, which serves to minimize distress, is the most prominent behavioral element of the cognitivebehavioral model of hoarding (Steketee and Frost 2003). For example, saving is conceptualized as a form of avoidance that functions to minimize the intense distress and feelings of loss that are provoked by having to discard items. Because saving engenders a reduction in this distress, it is negatively reinforced and therefore becomes habitual. Similarly, because sorting and categorizing items can be overwhelming for individuals who hoard, this behavior is also avoided, leading to clutter and disorganization. Some individuals who hoard also experience distress when they do not obtain items that they desire (e.g., when walking past yard a sale). Thus, the "high" or positive emotional boost that is reported when acquiring items helps to avoid the distress that is associated with not acquiring desired items. Acquiring behavior may be both positively and negatively reinforced.

Although the cognitive-behavioral model as described above explains hoarding symptoms to some degree (Steketee et al. 2003), it does not entirely account for these symptoms; nor are interventions based on this model uniformly effective (Steketee and Frost 2003). Thus, it is worth considering ways to increase the scope of the model. To this end, authors in the field of Acceptance and Commitment Therapy (ACT; Hayes et al. 2006) have drawn attention to ways in which problem behaviors (e.g., substance abuse, non-suicidal self-injury) serve as strategies for avoiding intense negative affect (Kingston et al. 2010). The concept of experiential avoidance (EA; e.g., Hayes et al. 1996) refers to a process characterized by (a) excessive negative evaluations of unwanted emotions, thoughts, and sensations, (b) an unwillingness to experience these private events, and (c) deliberate efforts to control or escape from them. Although EA has been investigated in a number of psychological disorders, including depression, obsessive-compulsive disorder, PTSD and trichotillomania (e.g., Chawla and Ostafin 2007; Hayes et al. 2004; Orsillo and Roemer 2005), there are few published studies of the relationship between EA and hoarding. One investigation found that EA was associated with a measure of obsessive-compulsive symptoms that included some hoarding items (Briggs and Price 2009). In another investigation, Abramowitz et al. (2009) reported that EA was not associated with the hoarding subscale of the OCI-R. However, this instrument contains only three hoarding items and is not specifically designed to assess hoarding. Thus, the field is lacking direct investigations of the relationship between EA and hoarding. This is surprising given that acquiring and saving behaviors are conceptualized as strategies that function to minimize internal distress. In other words, the cognitive-behavioral model provides good reasons to expect an association between EA and hoarding.

Indirect empirical evidence also hints at an association between EA and hoarding. For example, two studies (Coles et al. 2003; Timpano et al. 2009) found that hoarding severity was related to anxiety sensitivity (the tendency to fear bodily sensations associated with anxious arousal), which is related to EA (e.g., avoidance of internal body sensations; Berman et al. 2010). Distress tolerance, which is similar to EA in that it refers to the capacity to withstand negative emotional events (e.g., Boulanger et al. 2010), has also been implicated as a vulnerability factor for hoarding symptoms (Timpano et al. 2009).

Given the lack of research focusing directly on hoarding and EA, we investigated the relationship between these phenomena in the present study. Specifically, we administered measures of hoarding symptoms, saving cognitions, EA, and general distress to a large unscreened student sample and used correlation and regression analysis to determine how well the latter three variables predict hoarding. On the basis of the theoretical models discussed above, we predicted that saving cognitions and EA would be associated with hoarding symptoms. We also predicted that the association between EA and hoarding would remain even after controlling for general distress and saving cognitions. Given that savings cognitions are an established predictor of hoarding symptoms, demonstrating that EA predicts hoarding symptoms above and beyond saving cognitions would provide evidence for incremental utility. As in a number of previous studies of hoarding (e.g., Coles et al. 2003; Timpano et al. 2009), we elected to test our hypothesis using an unscreened sample given that hoarding symptoms, and the cognitive and behavioral factors proposed to underlie these symptoms, occur along a continuum in the population at large (Damecour and Charron 1998).

Method

Participants

Three hundred and eighty-five self-selected undergraduates enrolled in Introductory Psychology courses at the University of North Carolina at Chapel Hill completed a series of computer-administered online questionnaires. Participants were approximately 72.2% female and had a mean age of 19.9 (SD = 1.21, range 18–28). The ethnic composition of the sample was as follows: 74% Caucasian, 11.2% African American, 4.7% Hispanic/Latino, 7.5% Asian/Pacific Islander, and 2.6% "Other."

Procedure

Participation in this study was available to all undergraduate students enrolled in Introductory Psychology classes at the study site. These classes include a research participation requirement, and all participants received course credit for participating in the study, which was reviewed and approved by the University IRB. After signing up for the experiment via an internet-based software program, participants provided informed consent and were directed to a secure project website where they completed the study measures. All data were collected using Qualtrics, an online web survey development tool. Internet-based measures are increasingly being utilized in mental health research, including studies of hoarding (e.g., Tolin et al. 2008). Results from a number of studies indicate that the administration of anxiety-related measures using Internet-based and paper-and-pencil formats yield highly comparable results, with Internet-administered measures demonstrating similar psychometric properties to paper-and-pencil administrations (e.g., Coles et al. 2007).

Measures

Saving Inventory-Revised (SI-R; Frost et al. 2004). The SI-R is a 23-item questionnaire designed to measure hoarding symptoms, including Difficulty Discarding, Acquisition, and Clutter. It has been found to be a valid measure of hoarding behaviors in both clinical and non-clinical populations (Coles et al. 2003; Frost et al. 2004). The SI-R has been found to have good test–retest reliability and strong internal consistency (Frost et al. 2004). The reliability of the SI-R in the present study was good ($\alpha = .93$).

Acceptance and Action Questionnaire-II (AAQ-II; Bond et al. 2008). The AAQ-II is a 10-item revision of the original 9-item AAQ (Hayes et al. 2004), a widely-used measure of the construct of EA. Whereas the original AAQ was scored so that higher scores indicate higher EA, items on the AAQ-II are scored such that lower scores indicate experiential avoidance while higher scores reflect psychological flexibility (e.g., "It's OK if I remember something unpleasant"). Psychological flexibility refers to the ability to observe one's own internal experiences (e.g., thoughts, feelings, images, physiological sensations) on a momentto-moment basis, in an open and non-judgmental manner, even when they are unpleasant or upsetting, and is thus considered to be the inverse of experiential avoidance (Hayes et al. 2006). Items assessing avoidance are reverse scored (e.g., "I'm afraid of my feelings"). Scores on the AAQ-II are highly correlated with those on the original AAQ and have good test-retest reliability and internal consistency (Bond et al. 2008). The AAQ-II has previously been used in several research studies, and has demonstrated adequate psychometric properties and construct validity (e.g., Abramowitz et al. 2009; Berman et al. 2010). The reliability of the AAQ-II in the present study was acceptable ($\alpha = .86$).

Saving Cognitions Inventory (SCI; Steketee et al. 2003). The SCI is a 24-item self-report measure that assesses beliefs related to possessions. Respondents are asked to rate the presence of specific cognitions when deciding whether to discard a possession on a seven-point likert-type scale (e.g. "Throwing away this possession is like throwing away a part of me"). Items were generated based on the theoretical model of Frost and Hartl (1996). Steketee et al. (2003) found support for the use of an SCI total score and four subscale scores (Emotional attachment, Memory, Control, and Responsibility toward possessions). However, only the total score was used in the present study. The SCI total has been found to be a valid measure of hoarding beliefs with good internal consistency in both clinical (Steketee, et al. 2003) and non-clinical samples (Coles et al. 2003). The reliability of the SCI in the present study was excellent ($\alpha = .94$).

Center for Epidemiological Studies–Depression Scale (CES-D; Radloff 1977). The CES-D consists of 20 items developed as a global measure to assess psychological distress in general community samples. Participants are asked to rate how often they have felt (or behaved) in certain ways (e.g., "I felt sad"; "My sleep was restless") over the past week, from 0 (rarely) to 3 (most of the time). Items are summed (4 are reverse scored) to obtain a total score ranging from 0 to 60. The CES-D is a widely used, reliable, and valid measure of psychological distress (e.g., Radloff 1977). The reliability of the CES-D in the present study was acceptable ($\alpha = .88$).

Results

Sample Characteristics

Mean scores (standard deviations) on the four study measures are presented in Table 1. The present group's scores on all measures fell within the range reported in other undergraduate samples (e.g., Bond et al. 2008; Coles et al. 2003; Steketee et al. 2003). SI-R scores were not correlated with age, r = -.08, P > .05 and did not differ according to ethnicity F (4, 384) = 0.71, P > .05. However, an independent samples *t*-test revealed that SI-R scores were related to gender, t (383) = 2.74, P < .01, with female participants (M = 25.27, SD = 13.23) having higher scores on average compared to males (M = 21.22, SD = 12.22). Analysis of the SI-R subscales revealed that female participants had higher scores on the Difficulty Discarding subscale, t (372) = 2.35, P < .05, and also the

Table 1 Means, standard deviations, and zero-order correlations

	SI-R	SCI	AAQ-II	CES-D	Mean	SD	Range
SI-R total	_	.64	47	.40	24.14	13.08	1–64
Difficulty Discarding	.87	.70	41	.34	8.18	4.82	0–21
Acquisition	.81	.44	40	.35	7.74	4.06	0–24
Clutter	.86	.46	38	.32	5.67	4.43	0–22
SCI		-	44	.31	61.16	24.10	24-134
AAQ-II			_	64	49.84	9.79	19–70
CES-D				-	13.28	8.40	0–50

All correlations significant at P < .001

SI-R saving inventory-revised, *SCI* saving cognitions inventory, *AAQ-II* acceptance and action questionnaire-II, *CES-D* center for epidemiologic studies–depression scale

Acquisition subscale, t (371) = 4.36, P < .01. There was no gender difference on the SI-R Clutter subscale, t (368) = 0.31, P > .05. Accordingly, we included gender as a predictor variable in our regression analyses reported further below.

Zero-Order Correlations

Table 1 also presents the zero-order correlation coefficients among the study variables. Consistent with our hypotheses, scores on the SI-R were significantly associated with those on the SCI and the AAQ-II as well as the CES-D. In addition, the AAQ-II and SCI were moderately correlated. The inverse correlations involving the AAQ-II are due to the fact that higher scores on this instrument correspond to *less* psychopathology (i.e., EA), whereas higher scores on other measures indicate greater psychopathology.

Regression Analyses

We examined our hypothesis that EA predicts hoarding symptoms above and beyond saving cognitions through multiple regression analyses. For each analysis, the tolerance diagnostics among predictor variables were all within acceptable limits, indicating that multicollinearity was not a problem. The first model used the SI-R total as the dependent variable. The CES-D and participant gender were entered in first step, which accounted for 17% of the variance $(R^2 = .17, P < .001)$. The SCI was then entered in the second step and it accounted for an additional 29% of the variance ($\Delta R^2 = .29$, P < .01). In the third and final step the AAQ-II was then entered and it accounted for an additional 1% of the variance ($\Delta R^2 = .01, P < .01$). As is shown in Table 2, the final model accounted for 47% of the variance in SI-R scores (P < .001), and all four predictor variables emerged as significant individual predictors of hoarding symptoms. Subsequent analyses were conducted

 Table 2
 Summary statistics for the final step of regression equations predicting SI-R total and subscale scores

Variable	R^2	Beta	t	Р
Predicting SI-R 7	Total			
Final model	.47			<.001
Gender		.10	2.69	<.01
CES-D		.12	2.44	<.05
SCI		.53	12.67	<.001
AAQ-II		15	-2.98	<.01
Predicting SI-R I	Difficulty Di	scarding		
Final model	.51			<.001
Gender		.09	2.46	<.05
CES-D		.10	2.03	<.05
SCI		.64	15.78	<.001
AAQ-II		05	-0.99	n.s.
Predicting SI-R A	Acquisition			
Final model	.29			<.001
Gender		.19	4.19	<.001
CES-D		.12	2.15	<.05
SCI		.32	6.55	<.001
AAQ-II		16	-2.68	<.01
Predicting SI-R C	Clutter			
Final model	.26			<.001
Gender		02	-0.40	n.s.
CES-D		.12	1.98	<.05
SCI		.36	7.20	<.001
AAQ-II		15	-2.46	=.02

SI-R saving inventory-revised, *SCI* saving cognitions inventory, *AAQ-II* acceptance and action questionnaire-II, *CES-D* center for epidemiologic studies–depression scale

on the SI-R subscales to investigate the possibility that EA might differently relate to the three components of hoarding. In each analysis the regression model was identical to that described above.

In predicting the SI-R Difficulty Discarding subscale, gender and the CES-D accounted for 12% of the variance $(R^2 = .12, P < .001)$ in the first step of the model. In the second step the SCI accounted for an additional 39% of the variance ($\Delta R^2 = .39, P < .001$). In third step the AAQ-II did not contribute additional variance ($\Delta R^2 = .001$, P > .05). The final model accounted for 51% of the variance (P < .001) and the SCI, CES-D and participant gender emerged as significant individual predictors.

In predicting the SI-R Acquisition subscale, in the first step of the model gender and the CES-D accounted for 16% of the variance ($R^2 = .16$, P < .001). In the second step the SCI accounted for an additional 12% of the variance ($\Delta R^2 = .12$, P < .001). In third step the AAQ-II predicted significant additional variance ($\Delta R^2 = .01$, P < .01). The final model accounted for 29% of the variance (P < .001) and all four predictor variables emerged as significant individual predictors of SI-R Acquisition scores.

In predicting the SI-R Clutter subscale, in the first step of the model gender and the CES-D accounted for 10% of the variance ($R^2 = .10$, P < .001). In the second step the SCI accounted for an additional 15% of the variance ($\Delta R^2 = .15$, P < .001). In third step the AAQ-II predicted significant additional variance ($\Delta R^2 = .01$, P = .02). The final model accounted for 26% of the variance (P < .001) and the SCI, AAQ-II and CES-D emerged as significant individual predictors of SI-R Clutter scores.

Discussion

The present study examined the relationship between saving cognitions, EA, and self-reported hoarding behavior. While collecting and saving behaviors function to help the individual avoid distress, few investigations of EA in relation to these symptoms have previously been made. As hypothesized, both EA and saving cognitions were significantly correlated with hoarding symptoms. The magnitude of these relationships was generally moderate for both saving cognitions and EA. An exception was the relationship between saving cognitions and the Difficulty Discarding subscale of the SI-R, which was quite strong. Saving cognitions and EA were also significantly correlated with one another. The moderate magnitude of this relationship indicated that these constructs can be considered distinct. EA was also strongly correlated with symptoms of distress and depression in the sample. Interestingly, hoarding symptoms varied by gender in our sample. Frost et al. (2004) previously reported that female participants scored higher on the SI-R Acquisition subscale. Our results are consistent with this finding but also revealed a gender difference on the Difficulty Discarding subscale.

In our regression analyses, saving cognitions were highly predictive of hoarding symptoms. This is consistent with our hypothesis and with previous findings (Coles et al. 2003; Steketee et al. 2003), and provides support for the cognitive-behavioral conceptualization of compulsive hoarding which implicates specific cognitive distortions about possessions. Symptoms of general distress and depression were also predictive of hoarding symptoms. Although EA predicted SI-R total scores above and beyond all of these other variables, which supported our hypothesis, the amount of variance uniquely explained by EA was very small (1%). Analysis of the SI-R subscales revealed that EA was a significant individual predictor of the clutter and acquisition components of hoarding, but was not uniquely predictive of difficulty discarding. This latter result suggests that the significant zero order association between EA and difficulty discarding may be better accounted for by the other predictor variables; most likely saving cognitions, which were particularly strongly associated with difficulty discarding. One explanation for this is that items on the SCI assess the degree to which certain thoughts occur *when deciding whether to discard something*. Thus, the SCI is especially sensitive to the context of discarding, leaving little additional variance to be explained by other constructs such as EA.

The cognitive-behavioral model of hoarding involves overt behavioral avoidance (Frost and Hartl 1996; Steketee and Frost 2003), but the present results suggest that hoarding behaviors are also associated with attempts to avoid internal states. However, this relationship was only true for the clutter and acquisition components of hoarding, as EA did not predict difficulty discarding above and beyond disorder-specific beliefs (saving cognitions). It should be noted however, that in both cases where EA was a significant unique predictor the amount of variance it accounted for was relatively small (1%). In addition, substantial additional variance remained unaccounted for in SI-R scores, particularly on the Clutter and Acquisition subscales, highlighting the importance of identifying other vulnerability factors for hoarding.

Owing to a number of limitations, the present study is best considered preliminary—an opportunity to initially test hypotheses and generate questions for future research. Most notably, we employed an unscreened student sample rather than a clinical sample. Although the general psychological processes involved in hoarding symptoms appear to be similar across the continuum of hoarding severity (e.g., Frost and Gross 1993), future research is needed to replicate our results in samples with clinically significant levels of hoarding. Indeed, it is possible that the present results would differ in a clinical sample. It could be that EA would be uniquely related to difficulty discarding in patients with clinically significant hoarding problems.

Our results highlight the need for future research to elucidate the relationship between EA and hoarding. Authors have noted the need for new directions in hoarding treatments (e.g., Muroff in press) given that hoarding problems are notoriously difficult to treat (Steketee and Frost 2003). Thus future research should investigate the relationship between EA and clinically significant hoarding problems and consider the possibility that interventions that target EA, such as acceptance and mindfulness-based approaches (e.g., Orsillo and Roemer 2005) could be beneficial for hoarding. Research is also needed to investigate the possibility that ACT and mindfulness-based strategies could augment exposure and response prevention techniques, which have limited effectiveness as a monotherapy for hoarding (e.g., Abramowitz et al. 2003). Other limitations to the present study should also be mentioned; for example, the exclusive use of self-report measures may have systematically inflated relationships among variables due to a lack of method variance. Novel methods are now available for measuring hoarding behavior, such as the Clutter Image Rating Scale (Frost et al. 2008), which would introduce method variance. Finally, the cross-sectional and correlational nature of our study precludes drawing causal inferences. For example, it cannot be determined from this investigation whether the psychological factors under study represent etiological factors in hoarding symptoms, or merely epiphenomena. Future studies should include multiple assessment points in order to properly examine the direction of causality.

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