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Psychometric Evaluation of the Saving Inventory-Revised in Older Adults

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Abstract

Objectives—Hoarding disorder (HD) is a chronic condition characterized by severe impairment in health and functioning for older adults. Researchers and clinicians commonly use the Saving Inventory-Revised (SI-R), a self-report measure validated for the assessment of HD, to establish symptom severity. This study represents the first evaluation of the psychometric properties of the SI-R in a sample of older adults with HD.

Methods—Participants were 156 older adults with HD and 23 older adults with no psychiatric diagnoses. Demographic and HD symptom severity measures were compared between the two samples. Convergent and discriminant validity was examined in the HD sample. A confirmatory factor analysis was used to test the replicability of the three-factor structure observed in the original sample.

Results—Participants in the HD sample scored significantly higher on the SI-R than did the non-psychiatric sample. The SI-R was significantly correlated with clutter level and symptoms of anxiety and depression. A three-factor model demonstrated poor fit in the HD sample.

Conclusions—The SI-R can be used to validly assess hoarding severity in geriatric populations.

Clinical Implications—Clinicians working with geriatric patients should consider refraining from use of the SI-R subscales as they may be less theoretically distinct in older adults.

Keywords

Hoarding disorder; older adult; psychological assessment

Introduction

Hoarding disorder (HD) is a chronic, debilitating psychiatric condition associated with difficulty discarding possessions, urges to save items, and excessive household clutter (American Psychiatric Association, 2013; Mataix-Cols et al., 2010). Clutter is defined as “the accumulation of possessions that congest and clutter active living areas and

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substantially compromises their intended use" (American Psychiatric Association, 2013). Clinically significant hoarding behaviors have been observed in up to 5% (Samuels et al., 2008) of community-dwelling individuals. Hoarding may be more prevalent in later life (Marx & Cohens-Mansfield, 2003; Samuels et al., 2008) and older adults with HD report that their hoarding symptoms increased steadily across their lifespans (Dozier, Porter, & Ayers, 2015). The consequences of hoarding may be magnified in older adults, including social dysfunction, increased medical problems, interference with activities of daily living, and functional impairment (Ayers & Dozier, 2015; Ayers, Scheisher, Liu, & Wetherell, 2012; Diefenbach, DiMauro, Frost, Steketee, & Tolin, 2013; Turner, Steketee, & Nauth, 2010).

A commonly used measure of HD severity is the Savings Inventory-Revised (SI-R; Frost, Steketee, & Grisham, 2004), a 23-item measure using a 5-point (0–4) Likert-type scale. Frost and colleagues (2004) utilized exploratory factor analysis to investigate the underlying factor structure of the scale in adults with self-reported hoarding symptoms. Three factors emerged: Clutter, Acquisition, and Difficulty Discarding. The SI-R was found to discriminate between middle-aged adults with and without hoarding symptoms (Frost et al., 2004). Frost and colleagues (2004) demonstrated the test-retest reliability and the convergent and discriminant validity of the use of the SI-R in samples of middle-aged individuals with high levels of clutter. The SI-R and all subscales were found to correlate significantly with both clinician and patient ratings of clutter levels in the patients' homes, suggesting initial convergent validity for the interpretation of the SI-R in geriatric hoarding samples (Frost et al., 2004).

There is a precedence of validation of the use of mental health measures within geriatric populations (La Rue & Markee, 1995). Specifically, the use of measures of anxiety (Beck, Stanley, Zebb, 1995; Kabacoff, Segal, Hersen, Van Hasselt, 1997; Wetherell & Gatz, 2005) and depression (Segal, Coolidge, Cahill, O'Riley, 2008) have been validated separately in samples of older adults. Validating the use of assessments in a new population, such as older adults, ensures that the same construct of interest is being evaluated across populations (e.g., content validity) and that the assessment can be reliably interpreted in the same manner (e.g., measurement invariance). There is some evidence that the presentation of HD in late life may be distinct from hoarding in middle age or young adulthood. Previous studies have demonstrated that older adults may endorse different reasons for saving and acquiring (Dozier & Ayers, 2014) and older adults report that while symptoms of difficulty discarding and excessive acquisition may stabilize in older adulthood, clutter levels continue to increase (Dozier et al., 2015). The use of the SI-R has not been validated in older adults, but it has been used to measure hoarding symptoms in geriatric samples (Ayers et al., 2014; Steketee, Schmalisch, Dierberger, DeNobel, & Frost, 2012).

In the original Frost and colleagues (2004) study the SI-R demonstrated high internal consistency in a small sample of older adults ($n = 12$) for the total score ($\alpha = .94$) and all subscales (Difficulty Discarding: $\alpha = .93$; Clutter: $\alpha = .88$, Acquisition: $\alpha = .80$). The SI-R scores in this geriatric HD sample ($n = 12$) were found to be significantly higher than the scores of older adults without evident hoarding symptoms ($n = 13$) (Frost et al., 2004). The SI-R has also shown evidence of distinguishing older adults with and without severe clutter problems (Steketee et al., 2012). Reid and colleagues (2011) investigated the properties of

the SI-R in a community sample of older adults (N = 269). The study reported a mean SI-R score of 15 (SD = 11.14, range 0–65) and reported a strong association between the SI-R and depression severity (Reid et al., 2011).

Convergent validity of the SI-R in geriatric populations has been demonstrated through significant associations between the SI-R and impairment in activities of daily living (Ayers et al., 2012) and impairment in executive functioning (Ayers, Wetherell, Schiehser, Almklov, & Saxena, 2013) in older adults with HD. The SI-R has demonstrated sensitivity to change in response to interventions for geriatric HD, including cognitive-behavioral therapy (Ayers, Wetherell, Golshan, & Saxena, 2011) and cognitive rehabilitation and exposure therapy (Ayers et al., 2014). The current study examines the reliability and validity of the use of the SI-R in assessing geriatric HD and represents the first investigation of the factor structure of the SI-R in older adults with HD.

Methods

Participants

The current study looked at baseline data from older adults (n = 156) participating in four separate studies of hoarding (HD Group) (mean age = 66, SD = 7.01; range, 55–87) and 23 older adults without psychiatric diagnoses (Non-Clinical Group) (mean age = 67, SD = 6.83; range, 56–86). The research for all studies was approved by the University of California, San Diego and by the VA San Diego Healthcare System. All assessments were conducted at the VA San Diego Healthcare System between July 2008 and September 2016. Demographics for both samples were comparable (Table 1).

Participants were recruited through flyers, Internet postings, and provider referrals from 2008–2016 in the San Diego County area. Participants in the HD group had to meet the DSM-5 criteria for HD to be eligible for the HD studies. Prior to May 2013, the proposed DSM-5 criteria for HD, which was identical to the adopted DSM-5 criteria, was used for inclusion. Participants were excluded if the hoarding symptoms were caused by a physical injury or another mental disorder. Participants identified as having comorbid obsessive-compulsive disorder (OCD; 30%) were required to have HD as the primary diagnosis and for their hoarding symptoms to not be related to their OCD. A licensed clinical psychologist reviewed all assessments and HD status was determined by a consensus diagnosis.

Measures

Individuals completed the SI-R, the Clutter Image Rating (CIR; Frost, Steketee, Tolin, & Renaud, 2008), the Hospital Anxiety and Depression Scale (HADS; Zigmond & Snaith, 1983), and a demographics questionnaire as dictated by the procedures of the studies in which they participated. Participants in the control group completed only hoarding specific measures in order to reduce burden.

The CIR is a three-item self-report measure in which participants are asked to rate the clutter severity of rooms in their house (bedroom, kitchen, and living room) on a scale of 1 to 9 based on three corresponding sets of photographs of increasingly cluttered rooms. Geriatric patient ratings of clutter level correlate highly with clinician ratings (Dozier & Ayers, 2015).

The CIR had high internal consistency in the HD sample (α = .86). The HADS, a 14-item self-report measure of anxiety and depression, was only completed by the HD sample. There was adequate internal consistency in both the anxiety (α = .79) and depression subscales (α = .83). In order to reduce participant burden, the HADS was utilized due to its brevity. Women tend to score higher on both HADS subscales and a modest effect of age has been observed (Crawford, Henry, Crombie, & Taylor, 2001). Previous studies suggest that the factor structure of the HADS is stable across age (Spinhoven et al., 1997) and gender (Lisspers, Nygren, & Söderman, 1997).

Data Analysis

Analyses were performed using Stata version 13.0 (StataCorp, 2013) and Mplus version 7.3 (Muthén & Muthén, 1998–2012). Convergent validity was assessed by examining the correlation between the SI-R and the CIR. Discriminant validity was assessed by examining the correlations between the SI-R and the HADS Anxiety and Depression scales, with the hypothesis that the SI-R would demonstrate a stronger association with a measure of clutter, the CIR, than with measures of anxiety and depression. Demographic and HD severity measures were compared between the HD and Non-Clinical Groups using t-tests adjusting for variance differences using Welch's degrees of freedom.

A confirmatory factor analysis (CFA) was used to test the replicability of the factor structure observed in Frost and colleagues (2004) in the current sample of older adults with HD. Overall model fit was determined using the recommendations of Bentler (2007) using the Comparative Fit Index (CFI; Bentler, 1990), with values greater than .95 indicating reasonable model fit and values greater than .90 indicating a plausible model; the root mean square error of approximation (RMSEA; Steiger, 1990), an absolute index of overall model fit with values less than .08 indicative acceptable model fit and values less than .05 indicative of good model fit; and the Standardized Root Mean Residual (SRMR; Hu & Bentler, 1999), an absolute index of overall model fit with values less than .08 indicative of acceptable model fit and values less than .05 indicative of good model fit. The likelihood ratio X^2 is reported for completeness.

Results

The demographics of both samples are displayed in Table 1. There were no significant differences between the two groups on age, gender, or years of education (all p values > .05). Significantly more participants in the HD group were non-Caucasian (18% vs. 0%; $X^2(1) = 4.63$, $p = .031$). Reliability of the SI-R in the overall sample was high for the total score (α = .96), as well as for all subscales (Clutter: α = .96, Difficulty Discarding: α = .92, and Acquisition: α = .88).

Within the HD sample, age was not significantly correlated with the SI-R total ($r = -.09$, p = .29), or with the Clutter ($r = .01$, $p = .91$) or Difficulty Discarding ($r = -.07$, $p = .36$) subscales; however, age was significantly correlated with the Acquisition subscale ($r = -.17$, $p < .05$) such that older participants reported lower levels of excessive acquisition. Additionally, within the HD sample women scored significantly higher than men on the SI-R

total ($t(114.61) = 3.80$, $p < .001$) and all subscales (Clutter: $t(107.04) = 3.79$, $p < .001$; Difficulty Discarding: $t(115.32) = 2.11$, $p = .02$; Acquisition: $t(136.11) = 2.61$, $p < .01$).

Relationships between the SI-R and other hoarding and psychiatric measures were explored in the HD sample to evaluate the convergent and discriminant validity of the use of the measure in older adults. The SI-R total and all subscales were significantly correlated with the CIR and the HADS anxiety and depression scales (all p values < .05; Table 2). Significant differences were found for all hoarding measures when comparing the HD and normal control groups (Table 1).

A three-factor model of Clutter, Difficulty Discarding, and Acquisition was tested using confirmatory factor analysis. The Clutter latent variable was indicated by 9 observed variables and the Difficulty Discarding and Acquisition latent variables were each indicated by 7 observed variables. Interfactor correlations were specified between the latent variables. This three-factor model did not fit well statistically ($X^2[227, N = 156] = 529.986$, $p < .0001$) or descriptively (CFI = .832, RMSEA = .092, SRMR = .095) in the current geriatric HD sample.

Discussion

Because of neurocognitive, physical, and social changes throughout the life course, it is necessary to evaluate measures in geriatric samples to ensure that clinicians and researchers are able to make accurate conclusions about symptom severity. The results of the present study suggest that use of the SI-R may be valid and reliable in the measurement of HD in older adults. The SI-R was able to distinguish between hoarding and non-psychiatric older adults and was significantly associated with clutter level.

The most notable difference observed between the current study and the original Frost and colleagues (2004) study was in the confirmatory factor analysis; the initial factor structure observed by Frost and colleagues (2004) was not successfully reproduced in the current geriatric HD sample. Although the Frost and colleagues (2004) sample did include older adults, the late life sample size was small ($n = 12$) and was not used in the factor analysis ($n = 136$ mid aged adults). The results of the current study suggest that the items on the subscales of the SI-R may not be as thematically distinct as originally theorized, especially for older HD patients. Use of the subscales on the SI-R with older adults may not be as clinically meaningful as their use with mid-life patients.

Frost and colleagues (2004) found that participant age was significantly correlated with the SI-R Difficulty Discarding and Clutter subscales. In contrast, the current study found a significant correlation between age and the SI-R Acquisition subscale only. This discrepancy may be due to the restriction in age range in the current study (aged 55 and older). Although the original Frost and colleagues (2004) study found a gender difference on the SI-R for only the Acquisition subscale, the current study observed significant gender differences on the SI-R total and all three subscales. This divergence from the results of the initial validation serves as a further indication of the need to continue research on the differential presentation of HD across the lifespan.

Convergent validity of the SI-R in late life was established by examining the correlations between reported clutter level on the CIR and the SI-R total and subscale scores within the HD sample. As expected, scores on the CIR correlated most strongly with the SI-R Clutter subscale, as is consistent with previous literature (Frost et al., 2008). Discriminant validity was explored by investigating the associations between the SI-R and anxiety and depression. The SI-R demonstrated moderate correlations with measures of anxiety and depression, which is congruent with the high rates of comorbidities of anxiety and depressive symptoms in geriatric hoarding patients (Ayers & Dozier, 2015).

The SI-R was successful in distinguishing between older adults with and without HD diagnoses in the current sample. Older adults with HD scored an average of five times higher on the SI-R total than older adults without HD. Although all three of the SI-R subscales were significantly different in hoarding and non-hoarding older adults, it is notable that the largest difference was in the Clutter subscale, where individuals with HD scored an average of 13 times higher than their non-hoarding counterparts.

There were several limitations in the current study. The non-psychiatric comparison group was relatively small and may not be entirely representative of non-hoarding older adults. Additional study of the hoarding symptoms in late-life individuals will strengthen the ability of future studies to make comparisons amongst groups of hoarding and non-hoarding older adults. The HD sample used was predominantly female (60%) and Caucasian (80%) and as such the findings of the current study may not be representative of the general HD population. The current study lacked a mid-life hoarding comparison group, which would have further elucidated the performance of the SI-R across the lifespan. Furthermore, the inclusion of additional assessments of hoarding related and other constructs in both a hoarding and non-hoarding sample would have provided increased evidence of the convergent and discriminant validity of the interpretation of the SI-R in older adults. Within the HD sample of the current study, the SI-R demonstrated strong associations with both clutter and depression. This suggests that although the SI-R was able to discriminate between hoarding and non hoarding patients, further analyses are needed in order to determine whether the SI-R is an adequate tool for assessing the strength of hoarding severity within a clinical sample. Finally, although the results of the current study suggest that the three-factor model of the SIR demonstrates poor fit in older adults, the HD sample used in the current investigation ($n = 156$) was too small to provide a definitive exploration of the factor structure of the SI-R in older adults. Overall, these results support the use of the SI-R as clinically valid in the investigation of hoarding symptoms in older adults.

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Clinical Implications

- The SI-R is a valid measure for differentiating older adults with and without compulsive hoarding symptoms.
- The subscales of the SI-R (clutter, difficulty discarding, acquisition) may lack clinical utility in late life HD.

Table 1

Descriptive statistics of all variables and differences between samples.

Characteristic	HD	Controls	*t*
Age, years	65.68 (7.01)	67.04 (6.83)	−.89
Gender	60% Female	48% Female	$X^2(1) = 1.17$
Ethnicity	82% Caucasian	100% Caucasian	$X^2(1) = 4.63$ ^
Education	15.13 (2.30)	15.65 (2.17)	.99
SI-R Total	57.82 (13.29)	10.87 (7.51)	24.80 *
SI-R Clutter	24.38 (7.27)	1.91 (2.41)	29.21 *
SI-R Difficulty Discarding	18.95 (4.42)	5.39 (4.82)	12.72 *
SI-R Acquisition	14.49 (5.05)	3.57 (2.00)	18.84 *
CIR	4.10 (1.82)	1.21 (.33)	16.71 *
HADS Anxiety	9.76 (4.23)	—	—
HADS Depression	7.93 (4.09)	—	—

^ $p < .05$;

* $p < .0001$.

SI-R = Savings Inventory-Revised.

CIR = Clutter Image Rating Scale.

HADS = Hospital Anxiety and Depression Scale.

Table 2

Correlations among all psychiatric variables in (n = 156) older adults with HD.

Variable	SI-R Total	SI-R Clutter	SI-R Difficulty Discarding	SI-R Acquisition
SI-R Clutter	.83***	–		
SI-R Difficulty Discarding	.76***	.42***	–	
SI-R Acquisition	.76***	.39***	.52***	–
CIR	.47***	.60***	.18*	.21*
HADS Anxiety	.38***	.28**	.35***	.27**
HADS Depression	.50***	.38***	.45***	.35***

* $p < .05$,

** $p < .01$,

*** $p < .001$.

SI-R - Savings Inventory-Revised.

CIR = Clutter Image Rating Scale.

HADS = Hospital Anxiety and Depression Scale.