

Hoarding Rating Scale-Interview: Reliability and Construct Validity in a Nonclinical Sample

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ABSTRACT

The Hoarding Rating Scale-Interview (HRS-I) is a brief semi-structured interview that assesses five aspects of hoarding disorder: difficulty discarding, clutter, excessive acquisition, distress, and impairment. The aim of this study was to develop an Italian version of the HRS-I and examine its psychometric properties, in terms of reliability and construct validity. The HRS-I was administered to a sample of non-clinical adults ($N= 491$) along with a battery of selected self-report measures. The reliability was evaluated in terms of internal consistency. Cronbach's alpha and corrected item-total correlations indicated satisfactory scale homogeneity. The construct validity was addressed by providing evidence of both criterion and construct validity. In this direction, the relationships between HRS-I and other measures of the same or related constructs were investigated. In line with the findings of the original study, the general pattern of results was of a stronger association for like subscales than for unlike subscales. On the whole, empirical results indicated promising psychometric properties of the HRS Italian version in a nonclinical sample. Limitations of the study and the utility of the HRS-I in clinical and research settings are discussed.

Key words: hoarding disorder; HRS-I; clutter; acquisition; distress.

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Novelty and Significance

What is already known about the topic?

- Hoarding disorder has been included as a new diagnostic category in DSM 5, what it requires to have valid and reliable instruments for assessment.
- One of the most widely used tool is the Hoarding Rating Scale, in its self-report or interview version (HRS-I).

What this paper adds?

- Further empirical data about the psychometric properties of the HRS-I, contributing to the debate about the cross-cultural validation of the instrument.
- The first adaptation of this high utility scale in the Italian-translated version.

Hoarding is defined as “the acquisition of and failure to discard possessions which appear to be useless or of limited value” (Frost & Gross, 1993, p. 367). According to the first systematic definition of compulsive hoarding by Frost and Hartl (1996), the syndrome “is characterized by: (a) acquisition of and failure to discard a large number of items; (b) clutter that precludes activities for which living spaces were designed; and (c) significant distress or impairment in functioning caused by the hoarding or clutter” (Tolin, Frost, & Steketee, 2010, p. 147).

The recent inclusion of hoarding disorder as a new diagnostic category in DSM 5 (American Psychiatric Association, 2013) as well as the lifetime prevalence of over

5% (Samuels *et alii*, 2008; Iervolino *et alii*, 2009; Timpano *et alii*, 2011; Nordsletten *et alii*, 2013) has pointed up the need for valid and reliable diagnostic instruments.

As emerged from a recent review focused on the diagnosis and assessment of hoarding disorder (Frost, Steketee, & Tolin, 2012), a number of clinical and self-administered measures exist to assess hoarding features, in particular the severity of aspects such as difficulties discarding, clutter, and distress. One of the most widely used tool is the Hoarding Rating Scale, in its self-report or interview version (HRS-I; Tolin, Frost, Steketee, Gray, & Fitch, 2008; Tolin *et alii* 2010).

The HRS-I is a five items scale that assesses clutter, difficulty discarding, excessive acquisition, and the intensity of distress and impairment caused by hoarding. Each of the questions is scored from 0 (“not at all”) to 8 (“extreme”).

In the English version, the HRS-I seems as a psychometrically sound diagnostic instrument for determining the presence and severity of hoarding disorder. Indeed, it showed an excellent internal consistency reliability, as well as an high test-retest and cross-context reliability. Both convergent and discriminant validity has been established by the reported correlations between the HRS-I and each of the other administered hoarding and non-hoarding measures (Tolin *et alii*, 2010; Frost *et alii*, 2012; Frost & Steketee, 2014).

Thus, in line with much earlier research suggesting the relevance of presenting test adaptations for use in multiple languages and cultures (Perdighe *et alii*, 2015; Faraci & Tirrito, 2013; Hambleton & Patsula, 1998; Triscari, Faraci, D’Angelo, & Urso, 2011), we consider valuable to report further empirical data in order to evaluate the psychometric properties of the Italian version of the HRS-I, contributing to the debate about the cross-cultural validation of the instrument.

The present study aimed to examine the psychometric properties of the Hoarding Rating Scale-Interview (HRS-I) in an Italian non clinical sample. The reliability was evaluated in terms of internal consistency. The construct validity was addressed by providing evidence of both criterion and construct validity. In this direction, the relationships between HRS-I (items and total score) and other measures of the same or related constructs were investigated. In particular, concurrent validity was verified calculating correlations with other hoarding measures; convergent validity was gathered: (i) exploring relations with depression and anxiety, which on the basis of several literature models are supposed to be positively linked with hoarding disorder (Tolin *et alii*, 2010; Frost & Steketee, 2013); (ii) examining associations with obsessive compulsive disorder, on the basis of the most widespread literature findings according to which obsessive compulsive disorder is expected to be related with hoarding disorder (Tolin *et alii*, 2008; Tolin *et alii*, 2010). Therefore, it was hypothesized that hoarding indicators would be positively associated with levels of both depression and anxiety. It was also hypothesized that hoarding scores would be positively related to reported obsessive compulsive symptoms.

METHOD

Participants

Participants were recruited by advertisements requesting volunteers for psychological studies in various regions of Italy. Participants had to be 18 years of age or older, possess at least a primary school education, and not been treated for any psychiatric disorder. Participants were 491 adults (63.3% female), with a mean age of 28.72 years ($SD=12.02$, range= 18-79), from northern Italy (8%), central Italy (51.9%), and southern Italy

(47.3%). They were students (65.3%), full-time employees (17.3%), part-time employees (8.2%), housewives (1%), unemployed (2.7%), retired people (2%), other (3.5%). The most frequent marital status was single (78.8%), followed by married (19.4%), separated (1.6%), and widow/widower (0.2%). Their educational level ranged from compulsory school (6%) to university degree (34.6%), with 59.4% of respondents having a high school degree. Participants completed a battery of self-report instruments as well as demographic questions. Participants were informed about the aim of the study and a strong emphasis was put on data confidentiality.

Instruments

Hoarding Rating Scale-Interview (HRS-I, Tolin *et alii*, 2010). The HRS-I is a 5-item self-report measure of the following dimensions of hoarding: Clutter, which measures difficulty using living spaces due to chaos; Difficulty Discarding, which measures difficulty discarding (or recycling, selling, giving away) ordinary things that other people would get rid of; Acquisition, which measures excessive acquisition of objects; Distress, which measures emotional discomfort due to hoarding behaviours; Impairment, which measures functional disturbance due to hoarding behaviours. Each item is rated on a 9-point Likert scale from 0 (“None”) to 8 (“Extreme”). A total score was derived by calculating the sum of all 5 items. Cut-off score for item 1 “Clutter”, item 4 “Distress” and item 5 “Impairment” was 3, cut-off score for item 3 “Acquisition” was 2, cut-off score for item 2 “Difficulty Discarding” was 4, and cut-off score for the HRS-I total score (as the sum of all 5 items) was 14. The HRS-I has shown high internal consistency and inter-rater reliability, correlated strongly with other measures of hoarding, and effectively discriminated hoarding from non-hoarding individuals.

In order to gather construct validity, in addition to HRS-I, seven self-report measures were administered:

- Clutter Image Rating* (CIR, Frost, Steketee, Tolin, & Renaud, 2008). The CIR is a pictorial measure of clutter severity. This scale contains three cards, each containing 9 equidistant, standardized pictures of severity of clutter, with one card for each of the three people’s homes’ main rooms: living room, kitchen, and bedroom. Respondents are asked to select the picture that most closely resembles the level of clutter in each room of their home. It showed good internal consistency, test-retest reliability, and inter-rater reliability, and convergent validity, supported by stronger associations with measures of clutter than with other hoarding and psychopathology scale.
- Saving Inventory-Revised* (SI-R, Frost, Steketee, & Grisham, 2004). The SI-R is a 23-item questionnaire consisting of three subscales designed to measure Clutter, Difficulty Discarding, and Acquisition. Participants are asked to rate the extent to which each statement describes them on a 5-point Likert scale ranging from 0 (strongly disagree) to 4 (strongly agree). It showed good internal consistency and adequate test-retest reliability for the total score and subscales. Convergent and discriminant validity were supported by correlations with hoarding and non-hoarding indices. SI-R distinguishes individuals with hoarding from OCD participants without hoarding as well as from nonclinical samples.
- Saving Cognitions Inventory*. (SCI, Steketee, Frost, & Kyrios, 2003). The SCI is a 24-item questionnaire aimed to assess the cognitive aspects of compulsive hoarding. Participants are asked to rate the extent of each thought they had when they were deciding to throw something away during the past week using a 7-point Likert scale ranging from 1 (not at all) to 7 (very much). A total SCI score is derived by calculating the sum of all items. The inventory is structured in four subscales: Emotional Attachment, Control, Responsibility, Memory. The SCI showed internal consistency for known groups, convergent and discriminant validity differentiating between individuals with compulsive hoarding, obsessive compulsive disorder without hoarding, and community controls.
- Compulsive Acquisition Scale* (CAS, Frost, Steketee, & Williams, 2002). The CAS is an 18-item self-report scale measuring the extent to which individuals feel compelled to acquire possessions. It contains two subscales: Buy, which assesses compulsive buying behaviour, and Free, which assesses the excessive acquisition of free objects. Each item is rated on a 7-point Likert scale ranging from 1 (not at all or rarely) to 7 (very much or very often). The CAS has shown satisfactory

internal consistency reliability and convergent validity, supported by correlations with buying-related cognitions, OCD symptoms, perfectionism, and indecisiveness. Besides, CAS distinguishes compulsive buyers from controls. A cut-off score of 47.8 was found to maximize sensitivity and specificity for clinically significant compulsive buying.

Beck Depression Inventory II (BDI-II, Beck, Steer, & Brown, 1996). The BDI-II is a 21-item self-report inventory, that measures affective, cognitive, motivational, psychomotor, and vegetative components of depression. Each item consists of four statements, which are scored from 0 to 3. Sum score consisting of the individual scores to the 21 items is used to estimate the overall severity of depression. Raw scores ranging from 0 to 13 indicate minimal depression, 14-19 indicates mild depression, 20-28 indicates moderate depression, 29-63 indicates severe depression. It has been widely used in psychological research, which has demonstrated the scale's good reliability and validity.

Beck Anxiety Inventory (BAI, Beck, Epstein, Brown, & Steer, 1988). The BAI is a 21-item questionnaire assessing the severity of self-reported anxiety. Items refer to common symptoms of anxiety. Participants are asked to indicate how much they have been bothered by that symptom during the past month on a 4-point Likert scale ranging from 0 (not at all) to 4 (Severely -"it bothered me a lot"). The total score is achieved by the sum of the 21 item scores. A grand sum between 0-21 indicates very low anxiety; a grand sum between 22-35 indicates moderate anxiety; a grand sum that exceeds 36 is a potential cause for concern. The BAI showed high internal consistency and good one-week test-retest reliability.

Obsessive Compulsive Inventory-Revised (OCI-R, Foa *et alii*, 2002). The OCI-R is a 18-item self-report questionnaire of Obsessive Compulsive Disorder (OCD) symptoms containing 6 subscales: Hoarding, Checking, Neutralizing, Obsessing, Ordering, and Washing. Each statement refers to experiences that many people have in their everyday lives. People are asked to circle the number that best describes the extent to which that experience has distressed or bothered them during the past month. Items are rated on a 5-point Likert scale ranging from 0 (not at all) to 4 (extremely). Scores are calculated by adding the item scores. The possible range of scores is 0-72. Mean score for persons with OCD is 28.0 ($SD= 13.53$). The recommended cut-off score is 21, with scores at or above this level indicating the likely presence of OCD. The OCI-R showed excellent psychometric properties, in terms of internal consistency, test-retest reliability, and convergent and discriminant validity with other measures of OCD symptoms. The OCI-R and its subscales effectively differentiate between patients with OCD and other groups, further supporting the clinical utility of the scale.

Procedure

The Italian version of the HRS-I was developed through a mixed forward-and back translation procedure (Behling & Law, 2000). One bilingual Italian-English person and two of the authors independently translated the English version of the scale into Italian. After a shared translation among the authors, the bilingual translator, blind to the original version, back-translated this version into English. After, the translators discussed the discrepancies in the versions until they reached an agreement on a common translation. The HRS-I in Italian language was administered to eight people to check the understandability of the items.

RESULTS

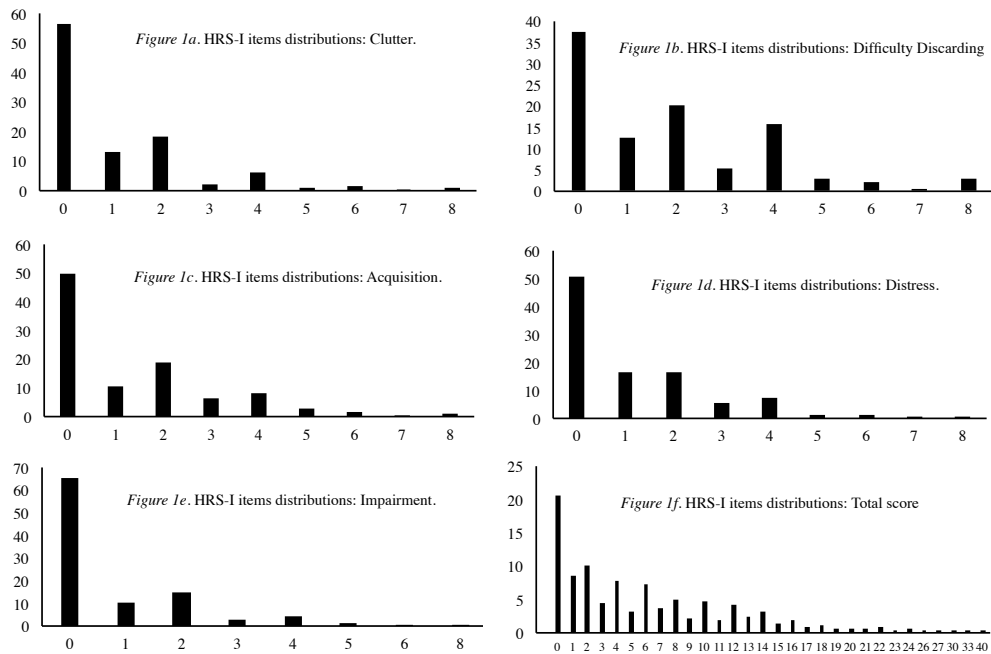
Psychometric evaluation of the HRS-I started with an examination of the items' distributional properties and responses frequencies. Table 1 gives item characteristics. Included are mean, standard deviation, skewness and kurtosis, and response frequency of all the 5 item. The mean values of the HRS-I items ranged from .79 to 1.87. The distributional properties of each item were examined by inspecting the skewness and kurtosis and the pattern of response frequency. The univariate skewness values ranged from 1.10 to 2.13, and the univariate kurtosis values ranged from .78 to 5.38, thus

Table 1. HRS-I item analysis and response frequency.

	Item 1	Item 2	Item 3	Item 4	Item 5
<i>M</i>	1.05	1.87	1.36	1.13	0.79
<i>SD</i>	1.57	2.03	1.77	1.51	1.36
<i>S</i>	1.86	1.10	1.40	1.49	2.13
<i>K</i>	3.71	0.78	1.69	2.14	5.38
0	56.3%	37.5%	49.9%	51%	65.5%
1	13.1%	12.8%	10.6%	16.3%	10.2%
2	18.4%	20.2%	18.9%	16.7%	14.9%
3	2.2%	5.3%	6.5%	5.5%	2.7%
4	6.3%	15.7%	7.9%	7.6%	4.5%
5	1%	3.1%	2.9%	1.2%	1.4%
6	1.6%	2%	1.8%	1%	0.2%
7	0.2%	0.4%	0.2%	0.2%	0
8	0.8%	3.1%	1.2%	0.4%	0.6%

Notes: *M*= Mean; *SD*= Standard Deviation; *S*= Skewness; *K*= Kurtosis; 0= None; 2%= Mild; 4%= Moderate; 6%= Severe; 8%= Extreme.

suggesting that items deviated from a normal distribution. Specifically, items distributions were positively skewed with most of the values tending to cluster toward the left side of the x-axis (i.e. the smaller values) with increasingly fewer values at the right side of the x-axis (i.e. the larger values) (see Figures 1a to 1f).



The internal consistency of the HRS-I, as a measure of the reliability of the scale, was satisfactory ($\alpha = .83$). Corrected item-total correlations ranged from .52 to .73, indicating good scale homogeneity.

Correlations between the five item scores were computed. As expected, items correlated significantly ($p < .01$, two-tailed tests) but moderately with each other ($.39 \leq r \leq .66$, $p < .01$), indicating that the questionnaire's indicators measured several aspects of the hoarding that are relatively distinct from one another. To assess the association between the items and the test total score, we then computed correlations between the

overall scale score and each of the five items scores. Results showed that the total score and each indicator were strongly related ($.69 \leq r \leq .83$, $p < .01$), indicating that the items are from the same universe of content. Pearson's correlations are presented in Table 2.

Table 2. HRS-I items intercorrelations.

Measures	Clutter	Difficulty Discarding	Acquisition	Distress	Impairment
HRS-I -Clutter	–				
HRS-I -Difficulty Discarding	.430*	–			
HRS-I -Acquisition	.429*	.542*	–		
HRS-I -Distress	.409*	.570*	.608*	–	
HRS-I -Impairment	.430*	.387*	.521*	.660*	–
HRS-I -Total score	.689*	.791*	.810*	.829*	.743*

Note: * = Correlation is significant at the .01 level (2-tailed tests).

Support for concurrent validity was provided by significantly positive correlations between HRS-I scores and the other measures of hoarding severity (Clutter Image Rating, CIR; Saving Inventory-Revised, SI-R; Saving Cognitions Inventory, SCI; Compulsive Acquisition Scale, CAS) (see Table 3). Each HRS-I item, as well as the total score, correlated significantly and positively with each of the other administered hoarding measures: from $r = .14$ to $r = .36$ ($p < .01$) with the CIR; from $r = .30$ to $r = .65$ ($p < .01$) with the SI-R; from $r = .13$ to $r = .49$ ($p < .01$) with the SCI; from $r = .20$ to $r = .45$ ($p < .01$) with the CAS.

Table 3. Correlations between HRS-I and other measures of hoarding.

Measures	HRS-I Clutter	HRS-I Difficulty Discarding	HRS-I Acquisition	HRS-I Distress	HRS-I Impairment	HRS-I Total score
CIR	.341*	.136*	.285*	.327*	.338*	.358*
SI-R -Clutter	.515*	.318*	.360*	.441*	.486*	.536*
SI-R -Difficulty Discarding	.369*	.545*	.520*	.520*	.420*	.623*
SI-R -Acquisition	.312*	.293*	.486*	.435*	.409*	.497*
SI-R -Total score	.473*	.454*	.526*	.543*	.509*	.647*
SCI -Affective Attachment	.355*	.380*	.315*	.416*	.353*	.470*
SCI -Control	.130*	.242*	.261*	.252*	.197*	.284*
SCI -Responsibility	.362*	.352*	.383*	.393*	.406*	.486*
SCI -Memory	.380*	.275*	.316*	.315*	.296*	.406*
SCI -Total score	.367*	.374*	.366*	.421*	.381*	.492*
CAS -Buy	.275*	.281*	.411*	.367*	.312*	.426*
CAS -Free	.279*	.292*	.297*	.282*	.197*	.353*
CAS -Total score	.311*	.317*	.421*	.378*	.302*	.449*

Note: * = Correlation is significant at the .01 level (2-tailed tests).

Convergent validity was gathered examining correlations between HRS-I and: (1) depression, as measured by Beck Depression Inventory-II, BDI-II, (2) anxiety, as measured by Beck Anxiety Inventory, BAI, and (3) obsessive compulsive disorder, as measured by Obsessive Compulsive Inventory-Revised, OCI-R. As depicted in Table 4, HRS-I scores did correlate significantly with all of the OCI-R subscales (from $r = .13$ to $r = .60$, $p < .01$) and total scores (from $r = .32$ to $r = .52$, $p < .01$). The HRS-I items and total score correlated positively with depression and anxiety too, although the strength of these correlations was generally lower than were the correlations between the HRS-I and OCI-R scores. The relationships, even if moderate, were significant and in the expected direction: from $r = .13$ to $r = .29$ ($p < .01$) and from $r = .16$ to $r = .30$ ($p < .01$), respectively.

Table 4. Correlations between HRS-I and BDI-II, BAI, and OCI-II.

Measures	HRS-I Clutter	HRS-I Difficulty Discarding	HRS-I Acquisition	HRS-I Distress	HRS-I Impairment	HRS-I Total score
BDI-II	.133*	.188*	.217*	.287*	.172*	.258*
BAI	.213*	.160*	.298*	.284*	.215*	.298*
OCI-R -Hoarding	.433*	.471*	.486*	.521*	.391*	.597*
OCI-R -Checking	.311*	.213*	.342*	.351*	.316*	.390*
OCI-R -Neutralizing	.356*	.228*	.285*	.286*	.340*	.380*
OCI-R -Obsessing	.288*	.241*	.291*	.382*	.258*	.374*
OCI-R -Ordering	.208*	.133*	.282*	.304*	.219*	.291*
OCI-R -Washing	.319*	.216*	.324*	.321*	.352*	.389*
OCI-R -Total score	.415*	.317*	.433*	.474*	.397*	.521*

Note: * = Correlation is significant at the .01 level (2-tailed tests).

DISCUSSION

The purpose of the study was to evaluate the adaptation of the Italian version of the HRS-I in a nonclinical sample. Our results suggested adequate psychometric properties, in terms of both reliability and validity of the scale. In particular, good internal consistency was found with no items that would have increased the scale reliability if they had been deleted. Results from items' intercorrelations revealed that all the indicators measured several aspects of the hoarding that are relatively distinct from one another, but derived from the same universe of content, as confirmed by strong correlations between each item and the total scale score.

Evidence for both concurrent and convergent validity was provided by significant correlations between the HRS-I and the other measures of the hoarding severity and selected measures of anxiety, depression, and obsessive compulsive disorder symptoms. In line with the findings of the original study (Tolin *et alii* 2008; Tolin *et alii*, 2010), the general pattern of results was of a stronger association for like subscales than for unlike subscales.

An important limitation of the current research concerns the use of a nonclinical sample, which may limit the generalizations that could be drawn from the reported outcomes. Nevertheless, the initial HRS-I psychometric investigation in non-English-speaking cultures offers a number of advantages for clinicians, since at our knowledge this is the first adaptation study of an high utility scale in the Italian-translated version.

The HRS-I offers an intuitive, fast, easy to use and, according to the results of prior studies (Mataix Cols, Billotti, Fernandez de la Cruz, & Nordsetten, 2013), valid and reliable means to assess the symptoms of hoarding disorder. It is a semi-structured interview of five items, that allows for thorough assessment in keeping with current diagnostic criteria of DSM-5 and also to determine the severity of the symptoms. Moreover, its short administration time (generally maximum 5-10 minutes) makes it particularly useful in both the clinical and the research settings.

In conclusion, although additional research is unquestionably needed, this investigation provided evidence that the Italian version of the HRS-I may be promisingly administered for determining the severity of compulsive hoarding. A replication study using clinical samples and providing Italian norms would be valuable.

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