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What is underneath all that stuff? A Q-methodological exploration of profiles of beliefs and vulnerabilities in hoarding disorder

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Abstract

Background: Hoarding disorder (HD) can be understood through the cognitive behavioural model in the context of vulnerability factors (for example, personality traits, co-morbidities, traumatic life events) and beliefs about possessions (for example, identity, emotional attachment, memory, utility). Less is known about the strength of these hypothesised beliefs, or how they interact within the hoarding population, with researchers suggesting that specifying beliefs would improve treatment outcomes.
Aim: The current study explored beliefs in HD, utilising Q-methodology to explore both categories of beliefs and the interactions between these. Moreover, Q-methodology allowed for comparison of the individuals endorsing specific categories of beliefs.
Method: A comprehensive list of beliefs about possessions was developed. Thirty-two adults with clinically significant levels of HD completed a Q-sort task, alongside measures of proposed vulnerabilities, including co-morbidity, trauma and attachment style.
Results: Q-factor analysis produced four profiles consisting of groups of participants who endorsed the same beliefs and had shared characteristics: (1) 'Expression of identity', (2) 'Responsibility and morality', (3) 'Stability and predictability', and (4) 'Objects as emotional and meaningful beings'.
Discussion: The profiles were distinguished by different categories of beliefs and co-morbid symptoms, suggesting that more targeted assessment tools and interventions would be beneficial to account for this heterogeneity within the clinical population. In particular, beliefs about identity and self-concept formed the largest profile, and beliefs about stability and predictability introduce a novel category of beliefs.

Keywords: beliefs; CBT; hoarding; Q-methodology

Introduction

Hoarding disorder (HD) is defined as a problem with discarding possessions such that living spaces become cluttered to the extent that they cannot be used for their intended purpose, causing distress and impairment (*DSM-5*; American Psychiatric Association, 2013). Clinically significant hoarding occurs in approximately 2.5% of the population (Postlethwaite *et al.*, 2019), and is associated with social isolation (Frost *et al.*, 2000; Kim et al., 2001), family conflict and employment difficulties (Tolin *et al.*, 2008).

The cognitive behavioural model of HD suggests that hoarding behaviour is driven by several vulnerability factors and associated beliefs about possessions (Frost and Hartl, 1996). Treatment

protocols for HD were developed based on this model and involve multiple techniques including motivational interviewing and exposure strategies. However, there is a high drop-out rate for treatment (Mataix-Cols *et al.*, 2002) and only moderate success rates post-treatment and at follow-up (Tolin *et al.*, 2015; Williams and Viscusi, 2016).

Vulnerability factors in hoarding disorder

Frost and Hartl (1996) include both external and internal experiences and co-morbid mental health conditions as vulnerabilities within their model. It is reported that individuals with HD experience higher levels of traumatic life events than those with obsessive compulsive disorder (OCD) and community controls (Hartl *et al.*, 2005; Landau *et al.*, 2011). More specifically, individuals with HD report greater incidences of traumatic events related to possessions: burglary or home invasion (Samuels *et al.*, 2008), fires or losing housing (Grisham *et al.*, 2006) and material deprivation (Landau *et al.*, 2011). It has been hypothesised that exposure to greater incidents of trauma or stressful life experiences contributes to individuals perceiving the world as unpredictable and unsafe, and consequently, to seek comfort in possessions (Hartl *et al.*, 2005).

There is less clear evidence regarding emotional deprivation; however, a link is indicated between insecure parent–child attachments in childhood and HD (Kellett *et al.*, 2010; Steketee *et al.*, 2003) with suggestion of a link between relational avoidance and hoarding in adulthood (Frost and Gross, 1993). Dependent and perfectionist personality traits, as well as paranoia, are included in the cognitive behavioural model (Frost and Hartl, 1996) with Samuels *et al.* (2008) finding that individuals with HD are more likely to meet criteria for paranoid, schizotypal, avoidant and obsessive-compulsive personality disorders. This suggests that individuals with HD may find forming and maintaining relationships more difficult than those without difficult early experiences. Moreover, Frost and Hartl (1996) include core beliefs about being 'unlovable' and 'unworthy' within their model, which poses a question about links between adult attachment styles and HD.

Regarding co-morbidity, research indicates that impulse control disorders, OCD, depression and anxiety (Pertusa *et al.*, 2008; Pertusa *et al.*, 2010) are commonly seen occurring alongside HD; however, little is known about causality and primacy of difficulties identified.

Beliefs about possessions in hoarding disorder

Beliefs about objects in HD are complex, and seem likely to be heterogeneous, with individuals endorsing multiple reasons to acquire, save and avoid discarding possessions (Yap and Grisham, 2019).

Emotional attachments to possessions are higher for people with HD as opposed to comparison control groups (Frost and Hartl, 1996; Kellett *et al.*, 2010), which includes beliefs about objects providing a sense of comfort (Steketee *et al.*, 2003) and anthropomorphic beliefs creating feelings of love and care due to the assignment of human-like traits to objects (Kellett *et al.*, 2010; Neave *et al.*, 2015). This extends to beliefs about caring for the wellbeing of objects and feeling a sense of responsibility for their safety (Frost *et al.*, 2015). Yap and Grisham (2019) found that insecure object attachment predicted the severity of acquisition behaviours, the degree of clutter and severity of discarding behaviours within a hoarding sample, and moreover, beliefs about anthropomorphism contributed to higher levels of acquisition.

Individuals with HD report beliefs about objects communicating aspects of their past, present and future identity (Steketee and Frost, 2010; Kellett *et al.*, 2010), as well as a fusion between themselves and their possessions (Steketee *et al.*, 2003). Furthermore, it has been suggested that objects can create connections to previous owners through an object's journey with others (Orr *et al.*, 2017).

It is also well documented within the literature that objects are seen to have exaggerated value by individuals with HD, extending to beliefs about the utility of possessions (Orr *et al*., 2017), aesthetic and monetary value (Frost *et al*., 2015) and sentimental value which describes meaning and memories associated with possessions (Kellett *et al*., 2010). More recently, beliefs about autobiographical memory have been shown to contribute to the severity of discarding behaviours within a hoarding sample (Yap and Grisham, 2019). Beliefs about objects facilitating general memory are commonly reported by those with HD as they provide prompts and reminders (Hartl *et al*., 2004), as well beliefs about possessions providing feelings of control and safety (Steketee *et al*., 2003).

Two psychometric measures have been developed to examine beliefs in HD. However, they include different categories of beliefs, meaning if used independently they potentially miss some of the diversity described in the updated literature. Firstly, the Saving Cognitions Inventory (SCI; Steketee *et al*., 2003) is a self-report measure assessing four categories of beliefs: (1) confidence in memory, (2) emotional attachment, (3) maintaining control and (4) responsibility for the care of objects. The SCI is commonly used within research as well as within clinical practice to support assessment of HD, although it does not include beliefs about instrumental value or communicating past identity. Secondly, the Beliefs about Hoarding measure (BAH; Gordon *et al*., 2013) consists of four subscales, three of which are categories of beliefs about possessions: (1) harm avoidance, (2) fear of material deprivation and (3) attachment disturbance, with the fourth category examining affect rather than beliefs. Interestingly, although beliefs about harm avoidance are endorsed less frequently by individuals with HD than their peers with co-morbid OCD (Gordon *et al*., 2013), this subscale was still included within the BAH even though it is specific to HD. The field has progressed since both the SCI and BAH were developed, so it seems likely that clinically relevant beliefs are missing from these measures, and therefore within clinical practice. The risk currently is that as HD research uses these two measures, there may be important belief categories that are continually missed. This highlights the need to collect the subjective experiences of those with HD to understand the full spectrum of important and relevant beliefs.

Aim

The diversity in beliefs, which is not yet comprehensively captured within one psychometric measure or model of HD, requires further examination. Therefore, due to the fragmented nature of the literature, suitability of the current validated measures, and need for a refined understanding of the importance and interactions of the beliefs, this study aims to: (1) assess all beliefs held by a sample of individuals with significant hoarding difficulties; (2) examine relationships between categories of beliefs; and (3) explore whether there are differences in participant characteristics between those endorsing different categories of beliefs. Q-methodology allows for the exploration of both vulnerability factors and beliefs about possessions simultaneously, to help understand the heterogeneity within HD.

Method

Q-methodology

Q-methodology analyses inter-relationships within groups of viewpoints (Amin, 2000; Stenner and Stainton-Rogers, 2004) and is now considered a well-established method within psychological research, having been used to explore viewpoints on mental health, treatments and more recently within HD service user research (Dudley *et al*., 2009; Holden *et al*., 2016; Morera *et al*., 2017; Postlethwaite *et al*., 2020). Q-methodology involves three stages: (1) the collection and development of a set of statements which include all subjective perspectives on

a particular phenomenon, known as a Q-set, (2) refining and condensing this Q-set, forming an appropriate and representative Q-set, and (3) statements in the Q-set are then judged and ranked within a forced choice grid to explore the degree to which participants agree or disagree with them (Simons, 2013; Watts and Stenner, 2012). The data are analysed using by-person factor analysis, which draws out common perspectives in the form of clusters of individuals who share a particular viewpoint, which is then conceptualised alongside participant characteristics (Watts and Stenner, 2012).

Q-set

The Q-set in the current study reflected beliefs held by individuals with HD. The beliefs about possessions were extracted from the results of a systematic search of relevant peer-reviewed and grey literature. Belief statements were also gathered through semi-structured interviews with clinicians (n=3), individuals with a self-reported diagnosis of HD (n=3), and prominent researchers in the field of HD, not involved in the current study (n=3).

A total of 188 belief statements were collected. These were reviewed by two researchers (R.M.T. and C.L.L.) with the aim of condensing the Q-set without compromising depth and breadth of the data. The beliefs were initially grouped into themes ensuring all possible groups of beliefs were included: at least one belief from each theme was retained in the final Q-set. Duplicates and statements describing feelings or vulnerabilities were removed. Finally, each belief was reviewed based on relevance and importance to the topic, with both researchers having to agree on the inclusion of each belief statement. This process reduced the concourse to a final Q-set of 46 possession belief statements. To check content validity of the final Q-set, an individual with HD and a researcher prominent in the field of HD reviewed the statements, commenting on any missing themes, appropriateness of language used, and clarity of each statement. Three statements were amended at this stage, with language being adapted to improve clarity. Furthermore, the reading age was assessed to ensure the Q-set was user-friendly (applying the Flesch-Kincaid formula). Between 40 and 80 statements is recommended for a final Q-set (Stainton-Rogers, 1995), with the preferred number for this study falling within the lower end of the range to keep the online interface user-friendly.

Participants

Participants (n=32) were recruited for the online study through gatekeepers in UK councils and fire services, third sector HD organisations and social media platforms, using a presumed interest criteria. To be included in the study all participants had to be over 18 years of age, English speaking and achieve a score of 14 or over on the Hoarding Rating Scale (HRS; Tolin *et al.*, 2010). Participants reported living in the USA, UK and Canada at the time of the study. The sample consisted of 29 females and three males, with an age range of 22–75 years (M=45.00, SD=14.55). The sample reported clinically significant hoarding symptoms (HRS score: M=30.00, SD=4.41), with mean average ages of onset for difficulty discarding as 22 years old (SD=12.19, R=4.50), of excessive acquiring as 23 years (SD=14.05, R=8.45), and that clutter became problematic slightly later at 31 years of age (SD=10.15, R=13–50).

Measures

Measures of HD were included. Additionally, measures capturing the aforementioned vulnerabilities and co-morbidities related to HD (traumatic life events, adult attachment style, depression, anxiety and OCD) were included to enable factor interpretation and identify shared group characteristics.

Hoarding Rating Scale (HRS; Tolin et al., 2010)

The HRS is a 5-item measure consisting of five Likert scales ranging from 0 (none) to 8 (extreme) of clutter, difficulty discarding, excessive acquisition, distress and impairment, and has a recommended clinical threshold score of 14.

The Savings Inventory Revised (SI-R; Frost et al., 2004). The SI-R is a 23-item self-report questionnaire which assesses difficulty discarding, acquisition, and clutter. Each item is rated on a scale of 0 to 4 (none to almost all), which is used to calculate an overall score, as well as scores for each subscale.

Obsessive Compulsive Inventory Revised (OCI-R; Foa et al., 2002). The OCI-R is an 18-item screening measure for OCD. In order to measure OCD symptoms independently from hoarding behaviour, the hoarding subscale (made up of questions 1, 7 and 13) was removed from the OCI-R for analysis.

Depression and Anxiety Stress Scale (DASS-21; Lovibond and Lovibond, 1995). The DASS-21 measures self-report symptoms of depression, anxiety and stress.

Relationship Questionnaire (RQ; Bartholomew and Horowitz, 1991). The RQ is a 4-item self-report questionnaire which identifies individuals' most prominent adult attachment style including secure, pre-occupied, fearful avoidant and dismissing avoidant (Bartholomew and Horowitz, 1991).

Brief Trauma Questionnaire (BTQ; Schnurr et al., 1999). The BTQ is a 10-item self-report questionnaire used to assess trauma exposure based on Criterion A from the PTSD diagnostic criteria.

Procedure

Online platforms [Qualtrics (http://www.qualtrics.com) and HTML-Q] hosted the study. Participants provided informed consent and if they met the HRS threshold, completed the psychometric measures and Q-sort task. The Q-sort task involved placing the belief statements on a forced choice grid based on the extent to which they agreed or disagreed with them. Participants were asked to enter reasons, within free-text boxes, explaining their decisions following the task.

Data analysis

In Q-sort factors refer to groups of individuals who share a perspective based on how they sorted the statements. Using PQMethod (version 2.35; Schmolck, 2014), pairwise intercorrelations were completed between the Q-sorts, prior to completing by-person factor analysis to reduce the viewpoints held by all participants. The factor matrix was rotated using varimax which is standard (Brown, 1980), and furthermore, Brown's (1980) equation was used to determine the significance level for participants loading on to each factor.

Results

Factor analysis

A four-factor solution was chosen based on four 'best-practice' decisions; (1) an eigenvalue of 1 or higher, (2) assessment of the scree plot, (3) the solution accounting for the highest total variance, and (4) the exclusion of factors with less than three individuals' sorts significantly loading (Watts and Stenner, 2012). Furthermore, two researchers assessed the four-factor solution for bipolar factors or reverse loadings before accepting it.

Table 1. Rotated factor matrix highlighting factor loadings

Participant	Factor 1	Factor 2	Factor 3	Factor 4
1	**0.5357***	−0.0514	0.2968	0.3432
2	0.1554	**−0.7375***	−0.0761	0.0099
3	0.1685	−0.1462	0.4031	**0.4985***
4	**0.5512***	0.4119	−0.0861	−0.0903
5	**0.5871***	0.5176	0.0378	0.0105
6	0.2300	0.1477	0.2565	**0.6499***
7	0.2716	−0.0617	−0.0700	**0.5523***
8	**0.5878***	0.2009	−0.0071	0.0244
9	**0.5003***	0.0909	0.3805	0.0469
10	0.3650	0.4196	0.4747	0.0257
11	0.2505	**0.4178***	0.2793	0.1516
12	**0.4896***	0.0595	0.3811	0.1637
13	**0.5124***	0.2479	0.1687	0.3201
14	0.0676	0.2901	**0.6677***	0.0541
15	0.1332	**0.7746***	0.2543	0.1362
16	0.3056	0.4433	**0.5585***	0.0765
17	0.3980	**0.5464***	0.2167	0.1034
18	−0.1176	**−0.6908***	0.2326	0.0425
19	**0.6328***	0.1808	0.1450	0.4354
20	0.0393	0.4913	0.5003	−0.1765
21	**0.6012***	−0.1418	0.3756	0.1597
22	0.1136	0.2747	0.0658	**0.4550***
23	**0.6100***	0.1142	0.3058	0.0189
24	0.1250	0.3009	**0.6869***	0.0666
25	−0.0318	**0.3354***	0.1199	0.2134
26	0.4922	0.3966	0.1353	0.2680
27	0.0465	0.0258	**0.4983***	0.1758
28	0.2826	0.0154	0.3224	−0.3306
29	0.0352	−0.1258	**0.4656***	0.0739
30	**0.5012***	−0.2470	−0.0180	0.1438
31	**0.6418***	0.1886	0.0950	0.2803
32	−0.2274	0.0877	0.1611	−0.0386
% Exp variance	15	13	11	7

*Significant factor loadings (loading of <0.37, on a single factor only) are in **bold.**

Within the four-factor solution, Q-sorts were retained by a factor if they significantly loaded on to one factor alone (loading of <0.37, $p=0.01$ according to Brown's (1980) equation). Table 1 highlights the significant sorts for each factor. Five participants did not load on to one factor alone due to co-loading ($n=3$) or low-loading ($n=2$), understood as unexplained variance.

The four-factor solution accounted for 46% of the total variance with small–medium correlations between factors (ranging between $r=0.22$ and $r=0.52$), suggesting they were indeed distinct factors.

Factor arrays demonstrated an average rating for each statement within each factor (Table 2) on the −5 to +5 scale used within the forced choice grid. For example, statement 13 was rated as −2 by factor 1, −1 by factor 2, +4 by factor 3 and neutral (0) by factor 4. Moreover, this statement was a 'distinguishing statement' for factor 3 as it was ranked significantly differently by participants in factor 3, compared with the other factors.

Factor comparisons

Differences in presentation, as assessed by the self-report psychometric measures, were observed between factors. These factor comparisons support the conceptualisation of the four distinct groups of participants, aiding the factor interpretation process (Watts and Stenner, 2012).

The psychometric measure data for each factor were compared statistically to aid the process of factor interpretation (Table 3). There were no significant differences between the mean OCI, SI-R

Table 2. Factor arrays for the four-factor model chosen

Statement no.	Statement	Factor 1	Factor 2	Factor 3	Factor 4
1	I don't trust people, but I can trust my items	−2	−1	0	−3
2	Things need looking after like people do	**−3***	−2	−2	0
3	I am physically attracted to objects, like I am to people	−2	−2	−3	−5
4	My items connect me to something else in the world, making my connections bigger	**0***	**−1***	**−3***	**1***
5	I need to look after items as other people don't care for them like I do	−1	0	**3***	−1
6	If I look close enough I can see beauty in everything	1	1	0	2
7	I attach meaning to things that others wouldn't	0	1	1	1
8	Objects won't reject me like people do	−4	−3	**2***	−2
9	My objects are predictable when nothing is else is	−1	**0***	**2***	−2
10	If I don't get items I will miss an opportunity	2	2	−2	−3
11	I want to have a lot of resources on hand in case of an emergency	3	2	3	3
12	I can rescue objects: if I left them they'd be taken for junk	**−1***	2	1	3
13	Items are stable, unchangeable and certain amongst the chaos	−2	−1	**4***	0
14	I am scared of forgetting things, so I need objects to remind me	3	1	3	0
15	Without my things I am just an empty shell with no personality	−4	−5	−4	−4
16	I keep objects because they belong with each other	**0***	1	2	2
17	I plan to use everything: fix, recycle, or find use	1	**3***	1	0
18	Once I see an object's soul and feel the connection, I can't hurt it	−3	−4	**−1***	**2***
19	I can't throw things out as it'd make me a bad person	−2	**3***	−3	−2
20	My things need to be cared for and loved as much, or more, than people do	−5	−3	−2	−2
21	Life is like a river of opportunity: if I don't grab everything, I'll miss out	**1***	−1	−1	**−4***
22	I love all the things I keep – I love them like I love people	−1	**−4***	−1	1
23	The things I have are part of who I am – they are extensions of my identity	**4***	**−3***	0	1
24	Other people do not understand or see how useful things are like I do	0	**4***	2	1
25	My things make me feel important and of value	0	0	−1	−1
26	What if I throw something away and need it later?	5	4	5	4
27	My items tell the story of my life – who I am and what I have done	2	**−2***	1	2
28	I build a fortress around myself and it keeps me safe	**−1***	1	0	0
29	I find things beautiful when other people do not	1	1	0	2
30	If I can keep things in order and keep these things safe, I am in control	−1	**3***	1	0
31	My attachments to objects are stronger than the attachments I can form to people	−3	−2	**0***	−3
32	I can see something and instantly know I want it because an immediate bond forms	0	1	−1	**−3***
33	Objects store emotions in them based on what they mean to me	**1***	−1	−2	**5***
34	I don't have a lot of control over my life, but I can have control over my belongings	1	2	2	**−1***
35	If I don't keep everything I will have failed as a person	−3	**0***	−4	**−2***
36	My objects keep me rooted in life which gives me a secure base	0	−1	−1	0
37	My things make me feel good about myself, which I don't usually feel	−1	0	−1	−1
38	Some of my things can bring vivid images to mind	2	0	−2	3
39	I feel secure in my 'cocoon' of things	0	0	0	1
40	It's comforting to know that I own things – they are there 'just in case'	3	2	**4***	**1***
41	Items remind me of people in my past and bring memories back for me	4	0	1	3
42	Objects could cause harm to others; I feel responsible	**−2***	**3***	**−5***	**−1***

(*Continued*)

Table 2. (*Continued*)

Statement no.	Statement	Factor 1	Factor 2	Factor 3	Factor 4
43	My collections will tell people who I am when I am no longer here	2*	−3	−3	−1
44	I keep things because they are worth money and I cannot waste money	2	5*	3	0*
45	My items are not just things – they have life stories and relationships attached to them	1	−1*	1	4*
46	My things represent who I dream of being; a better version of me	3*	−2*	0	1

*Distinguishing statements ($p<0.05$).

or HRS scores for each factor. Moreover, all four factors reported high levels of TLEs, with no distinguishable between-group patterns in participants' self-reported exposure to TLEs evident within the data. Although there was a significant overall effect of group on the DASS-anxiety subscale score; $H(3)=8.33$, $p<0.05$ (Kruskal–Wallis H-test; Kruskal and Wallis, 1952), *post-hoc* testing using the Dunn's method with Bonferroni correction indicated no significant difference between the groups. A one-way ANOVA identified a significant overall effect of group on the DASS-depression subscale score; $F(3)=5.83$, $p<0.05$, with *post-hoc* analysis showing significant differences on the subscale scores between participants comprising factors 1 and 2, and factors 2 and 3.

Factor 1: Expression of identity

Twelve participants loaded on to this factor with it accounting for the most variance (27%). This group was characterised with mild levels of depressive symptoms, no clinically significant levels of anxiety or stress and the lowest levels of OCD. All four adult attachment styles (secure, pre-occupied, fearful avoidant and dismissing avoidant) were endorsed within this group.

Individuals in factor 1 appear to use objects to communicate (to self and others) aspects of their identity. The following statements were 'distinguishing' statements for this factor, suggesting that this expression of identity can relate to past, present and potential future versions of oneself:

Statement 23: '*The things I have are a part of who I am – they are extensions of my identity*' (+4)

Statement 46: '*My things represent who I dream of being; a better version of me*' (+3)

Additionally, participants within this group felt that:

Statement 41: '*items remind me of people in my past and bring memories back for me*' (+4)

Statement 27: '*items tell the story of my life – who I am and what I have done*' (+2)

This suggests that the concept of identity can also extend to others' involvement and documenting life. Free text responses provided by participants in factor 1, following the Q-sort task, reinforced the idea that objects can signal identity, whether from the past ('*items from this time help me remember this part of my life*'), present ('*I need to remind myself who I am … a lot of these things show aspects of myself*'), or future ('*my books represent the career I never really had and I dream of writing a book*').

Individuals in this group did not endorse beliefs about safety or responsibility, with the following being significantly distinguishing statements:

Statement 2: '*My things need looked after like people do*' (−3)

Statement 42: '*Objects could harm others*' (−2)

Table 3. Factor comparisons

Factor	Gender (F:M ratio)	Age	HRS total	SI-R acqui-sition	SI-R clut-ter	SI-R dis-carding	SI-R total	DASS-21 Depression	DASS-21 Anxiety	DASS-21 Stress	OCI-R (without HD subscale)	R/S style	BTQ
1 $n=12$	12:0	$M=54.42$ $SD=13.45$	$M=29.25$ $SD=4.29$	$M=14.92$ $SD=5.66$	$M=19.50$ $SD=9.54$	$M=17.83$ $SD=4.06$	$M=52.25$ $SD=13.86$	$M=13.33$ $SD=7.50$	$M=6.67$ $SD=4.85$	$M=15.83$ $SD=9.12$	$M=11.08$ $SD=6.11$	Secure: $n=3$ Preoccupied: $n=3$ Fearful avoidant: $n=4$ Dismissing avoidant: $n=2$	Serious car accident: 42% Natural disaster: 33% Childhood physical punishment: 58% Physical assault: 0% Sexual assault: 75% Situation risk of injury/death: 42% Witnessed violent death of loved one: 25%
2 $n=6$	5:1	$M=41.00$ $SD=19.37$	$M=30.83$ $SD=2.04$	$M=15.00$ $SD=5.14$	$M=24.33$ $SD=3.44$	$M=18.83$ $SD=6.37$	$M=58.17$ $SD=7.88$	$M=27.66$ $SD=13.47$	$M=17.00$ $SD=13.72$	$M=19.67$ $SD=8.43$	$M=15.80$ $SD=5.07^{\ddagger}$	Preoccupied: $n=5$ Fearful avoidant: $n=1$	Serious car accident: 17% Natural disaster: 17% Childhood physical punishment: 50% Physical assault: 17% Sexual assault: 66% Situation risk of injury/death: 33% Witnessed violent death of loved one: 17%
3 $n=5$	4:1	$M=42.60$ $SD=12.13$	$M=31.80$ $SD=4.15$	$M=9.20$ $SD=5.97$	$M=18.60$ $SD=7.30$	$M=19.40$ $SD=6.80$	$M=47.20$ $SD=16.93$	$M=8.00$ $SD=4.90^{\ddagger}$	$M=4.90$ $SD=1.91^{\ddagger}$	$M=23.20$ $SD=11.88$	$M=19.80$ $SD=15.15$	Dismissing avoidant: $n=2$ Preoccupied: $n=3$	Serious car accident: 60% Natural disaster: 40% Childhood physical punishment: 80% Physical assault:40% Sexual assault: 60% Situation risk of injury/death: 80% Witnessed violent death of loved one: 40%

(*Continued*)

Table 3. (*Continued*)

Factor	Gender (F:M ratio)	Age	HRS total	SI-R acqui-sition	SI-R clut-ter	SI-R dis-carding	SI-R total	DASS-21 Depression	DASS-21 Anxiety	DASS-21 Stress	OCI-R (without HD subscale)	R/S style	BTQ
4 $n=4$	4:0	$M=42.25$ $SD=5.50$	$M=29.25$ $SD=2.75$	$M=10.75$ $SD=8.73$	$M=23.25$ $SD=5.74$	$M=19.75$ $SD=4.03$	$M=53.75$ $SD=12.37$	$M=22.50$ $SD=8.23$	$M=12.50$ $SD=7.37$	$M=32.50$ $SD=27.63$	$M=21.00$ $SD=13.23$	Fearful avoidant: $n=3$ Dismissing avoidant: $n=1$	Serious car accident: 25% Natural disaster: 25% Childhood physical punishment: 75% Physical assault: 0% Sexual assault: 75% Situation risk of injury/ death: 50% Witnessed violent death of loved one: 0%

‡Outlier removed from dataset (based on the interquartile range rule as 1.5; as determined by SPSS).

Factor 2: Morality and Responsibility

Six participants significantly loaded on to this factor, accounting for 9% of the total variance. This group is characterised as having severe levels of depression and anxiety, with moderate levels of stress and moderate levels of OCD symptoms. The most common (83%) adult attachment style endorsed by this group was 'pre-occupied', which according to the RQ manual (Bartholomew and Horowitz, 1991), suggests core beliefs of unworthiness and negative perceptions of others leading to difficulties with trust. Two participants reported that '*objects don't hurt people, people hurt people*' after completing the Q-sort, which supports the interpretation of group characteristics in this instance.

The beliefs with high ratings of agreement regarded morality, responsibility, and elements of control and safety. Morality, as understood within this study, includes beliefs about reducing waste and being mindful of the environment, culture or financial context, as well as participant's negative judgements about the self in relation to waste. One participant commented that '*all objects that have been utilised for its original purpose, can be repurposed into something completely different*'. The following significantly distinguishing statements capture the sense of morality felt by people in this group:

Statement 44: '*I keep things that are worth money and I cannot waste money*' (+5)

Statement 19: '*I can't throw things out or it'd make me a bad person*' (+3)

Statement 17: '*I plan to use everything: fix, recycle or use it*' (+3)

The endorsed statements in this factor suggest a sense of utility, unique ownership or value judgements of possessions, and a sense of care for the wellbeing of objects, as well as the way in which they are used.

Furthermore, individuals in this group appear to feel safe and comfortable when they have control over objects, with people agreeing with:

Statement 30: '*if I can keep things in order and keep things safe, I am in control*' (+3)

Statement 34: '*I don't have control in my life, but can over my belongings*' (+2)

Participants in this factor strongly disagreed with statements suggesting that objects represented identity, with these being rated negatively.

Factor 3: Stability and predictability

Five participants loaded on to factor 3, which accounted for 6% of the total variance. This group of individuals did not report clinical levels of depression or anxiety, falling in the 'normal' range of the DASS-21 for both. They reported moderate levels of stress and scored highly on the OCI-R, indicating moderate–severe OCD symptoms. Interestingly, this group all reported having either a dismissing avoidant or pre-occupied adult attachment style (RQ; Bartholomew and Horowitz, 1991). It could be hypothesised, therefore, that this group struggles with interpersonal relationships.

This group of individuals finds safety and comfort in the permanence and stability of objects, in contrast to the sense of transience that comes with life and human interaction. One participant commented that '*people are unreliable and often use other people to get what they want. Stuff doesn't just walk away with no explanation as to why*', after completing the sorting task. The following 'distinguishing statements' echo this sentiment:

Statement 13: '*Items are stable, unchangeable and certain amongst the chaos*' (+4)

Statement 9: '*My objects are predictable when nothing else is*' (+2)

Statement 8: '*Objects won't reject me like people do*' (+2)

Individuals in this group disagreed with statements about responsibility, morality and negative appraisals of waste.

Factor 4: Objects as emotional and meaningful beings

Four participants significantly loaded on to this factor, which accounted for 4% of the total variance. This group is characterised by severe levels of depression, moderate levels of anxiety and severe levels of stress, indicating a high degree of emotional distress. Most of the group reported having a fearful avoidant adult attachment style, indicating a desire for intimate and emotional relationships with others, but avoiding relationships due to a feeling of others not valuing them as much as they value others.

These participants appear to perceive objects as having emotional power and meaning. One participant commented that '*each thing, as well as the placement of things, has an emotional content*'. This conceptualisation is demonstrated by the following distinguishing statements:

Statement 33: '*Objects store emotion in them based on what they mean to me*' (+5)

Statement 45: '*My items are not just things – they have stories and meaning attached to them*' (+4)

There are also anthropomorphic beliefs displayed within this group, with the following statements being agreed with:

Statement 16: '*I keep objects as they belong together*' (+2)

Statement 18: '*Once I see an object's soul and feel the connection, I cannot hurt it*' (+2)

Consensus statements

Several statements were rated similarly by most participants, and therefore could not be explained within the context of one factor alone and did not distinguish a single group. In essence, these statements are beliefs about possessions which are of similar importance to all participants, regardless of the factor they loaded on to:

Statement 26: '*What if I throw something away and I need it later?*' (factor 1: +5; factor 2: +4; factor 3: +5; factor 4: +4)

Statement 7: '*I attach meaning to things that others wouldn't* ' (factor 1: 0; factor 2: +1; factor 3: +1; factor 4: +1)

Discussion

Whilst diverse beliefs have been documented within the HD literature, it remains unclear what belief categories are significant from the perspective of people with HD, and furthermore, whether some belief factors are more prominent than others. In the current study, four significantly distinguishable factors emerged: (1) expression of identity, (2) morality and responsibility, (3) stability and predictability, and (4) objects as emotional and meaningful beings; with evidence to indicate the relative importance of beliefs about the relationship between possessions and identity. Further, the findings present evidence for what we believe is a previously undefined category of beliefs, stability and predictability, which suggests the important role that objects can play in providing a sense of security and safety. The results
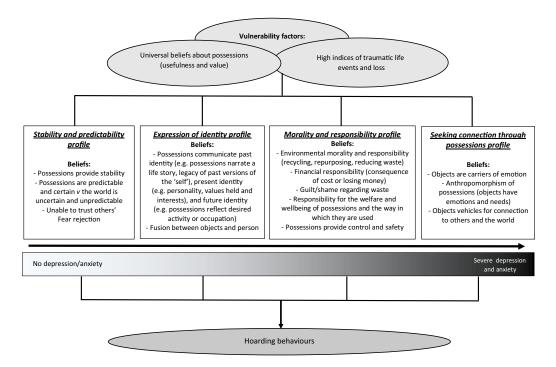
Figure 1.   Model of belief profiles in hoarding disorder.

also suggest that there are universal vulnerability characteristics; e.g. traumatic life events, universal beliefs about possessions; e.g. utility and value, and co-morbid symptoms such as anxiety and depression which vary across the four belief factors (see Fig. 1).

This proposed model of profiles in HD highlights the importance of beliefs about identity, as this was the group accounting for the most variance endorsing beliefs about possessions communicating identity. Moreover, this group did not present with clinical levels of depression, anxiety or OCD, suggesting that beliefs about identity may be a key feature in hoarding and distinct from OCD. Individuals in the 'expression of identity' profile appear to use objects as a way of expressing or communicating their individuality. This is consistent with evidence within the HD literature where the theme of self-object connectedness is emerging. For example, Kings *et al.* (2018) interviewed ten participants in relation to the possessions that they identified as relevant to themselves or others. As well as reporting that objects were reminders of important relationships and experiences, participants reported that objects were integral to their sense of self-identity. It is widely understood that identity plays a role in our relationships with ourselves and others. Previous research links 'identity confusion' with acquiring more possessions, suggesting that humans use objects as a proxy for identity, placing value on what possessions say about the 'self' (Claes *et al.*, 2016; Dittmar, 2004). It remains an area for future research to understand the extent to which this is particularly the case for people who experience hoarding difficulties.

The 'morality and responsibility' profile was characterised by beliefs about the wellbeing of possessions and the environment. These are well documented within the HD literature, with individuals reporting a need to protect the wellbeing of objects and treat them with love and respect (Tolin, Frost and Steketee, 2013; Gordon *et al.*, 2013). These beliefs are different to the harm avoidance beliefs reported within OCD (Pertusa *et al.*, 2010; Salkovskis *et al.*, 2000), which suggest that the motivation for acquisition is to protect others from harm. Moreover, participants in this group did not self-report severe OCD symptomatology. The majority of

individuals within this profile endorsed a pre-occupied attachment style, indicating a degree of approval-seeking from others (Hazan and Shaver, 1987). This could help to suggest why these individuals are concerned with protection and control; however, this is merely a hypothesis as there is little evidence regarding the relationship between adult attachment styles and hoarding.

The 'stability and predictability' profile proposes a novel category of beliefs which has not been documented within previous research. It has been reported that objects provide feelings of safety and control for some (Orr *et al.*, 2017; Steketee and Frost, 2010), therefore this profile may build on that concept of predictability, with the transient nature of life and interactions with others being associated with the risk of rejection or emotional pain. Despite this group not reporting clinical levels of anxiety or depression, they reported high indices of traumatic life events. Muller (2013) suggested that '*accumulating stuff fills the emotional hole left by trauma and allows individuals to avoid dealing with the pain*', therefore individuals in this profile could be avoiding experiencing emotional pain (or the risk of emotional pain from others) by seeking security through possessions.

The fourth profile included beliefs about the emotional content of objects and the stories and meanings that they can hold. This supports previous research indicating that individuals with HD have stronger emotional attachments to possessions than individuals without HD (Frost *et al.*, 2015; Kellett *et al.*, 2010; Steketee *et al.*, 2003), and individuals in this profile appear to seek connection, meaning and love from possessions. This group appear to anthropomorphise possessions, supporting previous findings by Kellett *et al.* (2010) and Neave *et al.* (2015). Interestingly, individuals within this profile tended to report having a fearful avoidant attachment style; implying a degree of mistrust in others and avoidance of close connection with others to prevent potential emotional pain caused by rejection. It can be hypothesised that objects are used for emotional connections to avoid relationships with others. Working clinically, it is not uncommon to observe individuals with HD avoiding and being fearful of intimate or close relationships, which fits with the description of this profile. Moreover, this profile experienced a high degree of distress, with clinically significant depression, anxiety and OCD symptoms.

Despite observing four distinct groups of individuals who present similarly and share profiles of beliefs about possessions, there are some beliefs that appear to be universal. Consensus statements highlighted that appreciating the utility of possessions is a universal belief with '*what if I throw something away and I need it later?*' being rated as highly important by all. This complements ideas about individuals with HD experiencing difficulties with decision making or prioritising (Frost and Hartl, 1996; Woody *et al.*, 2014), and that beliefs about utility and 'future need' are important (Dozier and Ayers, 2014). Moreover, attaching meaning to possessions that others would not, was a shared belief amongst all participants. These beliefs could be common amongst the population as a whole or the generation of included participants, rather than being unique to those with HD. A comparison of beliefs about possessions between a HD group and the general population would be helpful to explore consensus statements further, ascertaining whether these are in fact universal beliefs about the utility and value of possessions for those with HD, or whether they are common in the general population and their relationships with objects.

Also of interest, five individuals did not significantly load on to one factor alone, suggesting an additional profile of individuals who perhaps have a more complex belief system. These individuals all reported significant degrees of clutter and hoarding behaviours like the rest of the sample; however, they endorsed beliefs across multiple profiles: e.g. beliefs about identity, predictability, control, stability, connection and sentimentality were all rated highly important. This group was relatively young ($M=32.60$ years of age, $SD=5.43$) compared with the sample as a whole, suggesting further exploration of the relationship between age and belief profiles would be important following these exploratory findings. Regarding the clinical implications related to this fifth group of individuals, one possibility is that treatment may be more time-consuming because of the multiple, co-occurring belief categories underpinning the

meaningfulness of possessions. This highlights the requirement for thorough assessment measures which capture all beliefs about possessions.

The current findings build on previous research, and add further depth and meaning to the current cognitive behavioural conceptualisation of HD. The findings and subsequent proposed model of profiles in HD provide further evidence of traumatic life events, presence of co-morbid depression, anxiety and OCD symptoms as vulnerabilities, and presence of beliefs around utility, responsibility, safety, emotional attachment and control. However, the findings also highlight novel concepts which are missing from the cognitive behavioural model and related assessment tools. Frost and Hartl's (1996) model indicates that beliefs about emotional attachment and sentimental value are important, which loosely includes concepts around identity and connection to possessions. However, the BAH (Gordon *et al*., 2013) does not include beliefs about identity. The SCI (Steketee *et al*., 2003) includes two belief statements which are characterised within this identity profile, capturing the fusion between objects and people (e.g. '*objects are part of who I am*' and '*throwing away this possession is like throwing away a part of myself*'), but does not include beliefs about objects communicating elements of past, present or future identity. Moreover, the model and measures do not include beliefs about 'stability and predictability', or beliefs about utility and future use, meaning that these and other reasons for saving are potentially missed in clinical and research settings when guided by this model and subsequent measures.

The current treatment for HD is a manualised cognitive behavioural therapy (CBT) intervention including exposure to distress caused by discarding, challenging unhelpful beliefs and practising decision making/categorising (Steketee and Frost, 2013). Although this shows modest effects, the current data suggest adaptations or different approaches may be beneficial to account for the observed heterogeneity in presentation and beliefs. The proposed profiles of beliefs highlight the heterogeneity and complexity of belief systems and presentations within HD, which could inform clinical assessment and intervention. The authors understand that caution is required when grouping individuals in this way to ensure that an individual's identity and unique behaviours and beliefs are understood. However, exploring belief profiles with individuals during assessment could help direct or focus interventions in a helpful way, given the homogenous manualised approaches currently available for HD. For example, two participants self-reported severe hoarding symptoms and clutter, but they presented with different beliefs and co-morbid symptoms: one endorsed beliefs about objects providing stability and predictability and had no clinical levels of depression or anxiety, yet the other endorsed beliefs about responsibility and morality and had severe levels of anxiety and moderate levels of depressive symptoms. Currently, there is a risk that these two individuals would receive the same, largely exposure based, treatment protocol, which might go some way to understanding the variable response rate and disproportionately high drop-out rates that are reported in HD treatment trials (see Thompson *et al*., 2017). Instead, consideration of the most relevant belief profile/s might see quite different treatment strategies emerge, for example, a focus on relationships and uncertainty in the former example, and a focus on responsibility in the latter. It is hoped that by building upon the current findings and further understanding belief factors and, in particular, their relationship with the object categories that exist within a person's 'hoard' (e.g. childs clothing *vs* paperwork), clinicians will be able to collaboratively develop more specific possession belief based formulations and offer more targeted interventions.

With regard to study limitations, a significant gender bias was observed. Research suggests that there are no gender differences within prevalence data (Nordsletten *et al*., 2013; Timpano *et al*., 2011); however, the current study's sample was 85% female. This could be due to the gender biases of online recruitment (Kwak and Radler, 2002), suggesting greater effort is needed to address this in future. There is no evidence that gender influences how individuals experience HD or beliefs about possessions, but this study could be replicated with this limitation in mind exploring belief profiles in different genders, or by recruiting a more balanced sample.

Furthermore, all participants were from three countries (UK, USA and Australia). This is most likely due to the inclusion criteria requesting English as a first language and the online reach of the gatekeepers. It could be argued that having an entirely Western sample is a strength when exploring subjective meaning, although again, little is known about the cultural differences in HD. Future research should facilitate our learning regarding cultural differences in beliefs about possessions.

The current study is limited by the reliance on self-report screening tools to establish presence of HD. It is worth noting that the SI-R was also included as a measure of HD severity and scores on the HRS and SI-R were positively correlated, suggesting convergence. Furthermore, HRS scores in the current sample (severe range) are similar to HRS scores of samples used in previous research that also used clinician assessments of hoarding severity rather than solely self-report measures (e.g. Grisham *et al.*, 2018). The HRS was chosen for brevity and ease of use; however, additional measures of verification, not reliant on self-report, would have been helpful to include and should be used in subsequent research.

In conclusion, although the findings of the Q-sort are preliminary, they suggest helpful advances in our understanding of beliefs in adults with HD. They highlight a novel profile of beliefs about possessions, 'stability and predictability', and suggest that beliefs about identity are more important than documented in previous literature. Moreover, the analysis suggests that there are subtypes of presentations within HD – marked by different groups of beliefs, characteristics and co-morbidities. This provides exploratory data which can initiate thinking about the assessment and intervention of HD in a more meaningful way for service users.

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