Title

Parental bonding and hoarding in obsessive–compulsive disorder

Permalink

https://escholarship.org/uc/item/1s1171nk

Authors

Chen, David
Bienvenu, O Joseph
Krasnow, Janice
et al.

Publication Date

2017-02-01

DOI

10.1016/j.comppsych.2016.11.004

Peer reviewed

Parental bonding and hoarding in obsessive-compulsive disorder

David Chen[a], **O. Joseph Bienvenu**[b], **Janice Krasnow**[b], **Ying Wang**[b], **Marco A. Grados**[b], **Bernadette Cullen**[b], **Fernando S. Goes**[b], **Brion Maher**[c], **Benjamin D. Greenberg**[d], **Nicole C. McLaughlin**[d], **Steven A. Rasmussen**[d], **Abby J. Fyer**[e], **James A. Knowles**[f], **James T. McCracken**[g], **John Piacentini**[g], **Dan Geller**[h], **David L. Pauls**[i], **S. Evelyn Stewart**[j], **Dennis L. Murphy**[k], **Yin-Yao Shugart**[l], **Mark A. Riddle**[b], **Gerald Nestadt**[b], and **Jack Samuels**[b,*]

[a]Department of Psychology, Loyola University, Baltimore, Maryland [b]Department of Psychiatry and Behavioral Sciences, Johns Hopkins University School of Medicine, Baltimore, Maryland [c]Department of Mental Health, Bloomberg School of Public Health, Johns Hopkins University, Baltimore, Maryland [d]Department of Psychiatry and Human Behavior, Brown Medical School, Butler Hospital, Providence, Rhode Island [e]Department of Psychiatry, College of Physicians and Surgeons at Columbia University and the New York State Psychiatric Institute, New York City, New York [f]Department of Psychiatry, University of Southern California School of Medicine, Los Angeles, California [g]Department of Psychiatry and Biobehavioral Sciences, University of California, Los Angeles, School of Medicine, Los Angeles, California [h]Department of Psychiatry, Harvard Medical School, Boston, Massachusetts [i]Department of Psychiatry and Psychiatric and Neurodevelopmental Genetics Unit, Massachusetts General Hospital and Harvard Medical School, Boston, Massachusetts [j]Department of Psychiatry, Faculty of Medicine, University of British Columbia, Vancouver [k]Laboratory of Clinical Science, National Institute of Mental Health, National Institute of Health, Bethesda, Maryland [l]Unit of Statistical Genomics, Division of Intramural Research, National Institute of Mental Health, Bethesda, MD, USA

Abstract

Background—Hoarding behavior may indicate a clinically and possibly etiologically distinct subtype of obsessive compulsive disorder (OCD). Empirical evidence supports a relationship between hoarding and emotional over-attachment to objects. However, little is known about the relationship between hoarding and parental attachment in OCD.

Method—The study sample included 894 adults diagnosed with DSM-IV OCD who had participated in family and genetic studies of OCD. Participants were assessed for Axis I disorders, personality disorders, and general personality dimensions. The Parental Bonding Instrument (PBI)

*Corresponding author. Jack Samuels, PhD. Department of Psychiatry and Behavioral Sciences, Johns Hopkins University School of Medicine, 550 N. Broadway #902, Baltimore, Maryland 21205; Tel +1 410 614 4942; fax: +1 401 614 8137; jacks@jhmi.edu.

was used to assess dimensions of perceived parental rearing (care, overprotection, and control). We compared parental PBI scores in the 334 hoarding and 560 non-hoarding participants, separately in men and women. We used logistic regression to evaluate the relationship between parenting scores and hoarding in women, adjusting for other clinical features associated with hoarding.

Results—In men, there were no significant differences between hoarding and non-hoarding groups in maternal or paternal parenting scores. In women, the hoarding group had a lower mean score on maternal care (23.4 vs. 25.7, p<0.01); a higher mean score on maternal protection (9.4 vs. 7.7, p<0.001); and a higher mean score on maternal control (7.0 vs. 6.2, p<0.05), compared to the non-hoarding group. The magnitude of the relationships between maternal bonding dimensions and hoarding in women did not change after adjustment for other clinical features. Women who reported low maternal care/high maternal protection had significantly greater odds of hoarding compared to women with high maternal care/low maternal protection (OR=2.54, 95% CI=1.60-4.02, p<0.001).

Conclusions—Perceived poor maternal care, maternal overprotection, and maternal overcontrol are associated with hoarding in women with OCD. Parenting dimensions are not related to hoarding in men. These findings provide further support for a hoarding subtype of OCD and for sex-specific differences in etiologic pathways for hoarding in OCD.

Keywords

OCD; obsessive-compulsive disorder; hoarding; parental bonding; attachment

1. Introduction

Obsessive-compulsive disorder (OCD) is clinically heterogeneous, with considerable variation among affected individuals in the patterns of obsessions and compulsions they exhibit [1]. Much research has been devoted to elucidating clinical subtypes and dimensions in OCD; studying their associations with other clinical features such as course, prognosis, and treatment response; and investigating their relationships to cognitive functioning. It has been hypothesized that different OCD symptom subtypes and dimensions may result from different etiology and pathogenesis [2].

The most compelling evidence for a clinically and possibly etiologically distinct subtype or dimension of OCD is hoarding behavior, which presents in approximately 30% of OCD cases [3]. Compulsive hoarding is characterized by collecting, and difficulty discarding, large quantities of seemingly useless objects, such that living spaces are cluttered and considerable distress and/or impairment are experienced [4]. Among OCD cases, those with hoarding often have a more severe illness, poorer response to treatment, co-occurring mood, anxiety, and other Axis I disorders, and schizotypal, avoidant, dependent, and obsessive-compulsive personality traits [5-11]. In addition, neurocognitive and neuroimaging studies have found differences in executive functioning, and level of activation in specific brain regions, between OCD cases with and without hoarding [12-17]. A genetic contribution to hoarding in OCD is supported by evidence from OCD family studies, which have found

intra-familial aggregation of hoarding, heritability of hoarding among twins, and linkage of hoarding to specific chromosomal regions [18-21].

There also is evidence for an environmental contribution to hoarding in OCD. Several studies have found an association between stressful or traumatic life events and hoarding in individuals with OCD. Cromer et al. found that, in OCD cases, those with hoarding were significantly more likely to report having experienced at least one traumatic lifetime event; moreover, among those with hoarding, the severity of hoarding was greater in those who had experienced one or more traumatic events, even adjusting for age, age of OCD onset, depressive symptoms, general OCD symptomatology, or mood and anxiety comorbidity [22]. Landau et al. found that hoarding individuals, with or without comorbid OCD, reported greater exposure to a range of traumatic and stressful life events compared to those without hoarding, even after controlling for demographic characteristics, depression, and other obsessive-compulsive symptoms; moreover, the total number of reported traumatic events correlated significantly with the severity of hoarding [23].

However, another potentially important environmental domain, parental rearing style and attachment with parents during childhood, has received limited attention in OCD-hoarding research. According to attachment theory, healthy psychological development depends upon parental provision of an environment that provides emotional security and encourages the child to explore the world; in contrast, insecurely attached children are more vulnerable to the development of psychopathology [24]. In support of attachment theory, many studies using the Parental Bonding Instrument (PBI) [25] or other self-report questionnaires (e.g., Own Memories of Parental Rearing Experience in Childhood, or EMBU; Perris et al., 1980 [26]) have found that low parental care, and high parental overprotection and control, are related to a variety of psychopathology, including major depression, anxiety disorders, suicidality, alcohol and drug use disorders, antisocial personality, as well as to general personality characteristics [27-33].

Several studies also have found lower perceived parental care and higher control or protection in OCD cases compared to controls [34-37]. The parental bonding experience may have particular relevance for the development of hoarding in OCD, since empirical evidence supports a relationship between hoarding and emotional over-attachment to objects [38-42], as well as between hoarding and anthropomorphism, i.e., the tendency to apply human characteristics to non-human objects [43-45]. Moreover, there is evidence for a relationship between hoarding, adult attachment difficulties, and poor social support [46], and it has been hypothesized that attachment to objects is a compensation for insecure attachment to unreliable, close "others" [47].

We propose that hoarding may be an attempt to compensate for poor parental attachment in childhood. To our knowledge, there have been few reported studies of the relationship between parental bonding and hoarding in OCD. Using the EMBU, Alonso et al. (2004) did not find a difference between OCD outpatients (N=40) and matched healthy controls (N=40) in perceived parental rearing style. However, hoarding was the only OCD symptom dimension related to parental bonding, being significantly inversely related to parental warmth [48].

The purpose of the current study was to test the hypothesis that parental bonding is a potential risk factor for the development of hoarding behavior in OCD. The aims were: 1) to determine if specific dimensions of parental bonding are related to hoarding in OCD; 2) to determine if these relationships are different in men and women, and specific to maternal and paternal bonding; and 3) to determine if these relationships are independent of clinical features associated with hoarding in OCD.

2. Methods

2.1. Participants

The individuals included in the current analyses were adults, age 18 years and above, who participated in one of three family/genetic studies of OCD. The Johns Hopkins OCD Family Study (OFS) selected OCD index cases (probands) from five specialty OCD treatment centers in the Baltimore/Washington area and evaluated them and available first-degree relatives [49]. The OCD Collaborative Genetics Study (OCGS) targeted families with OCD-affected sibling pairs, extending these when possible through affected first- and second-degree relatives, and also collected other pedigrees with multiple-affected relatives when these were available [50]. The OCD Collaborative Genetic Association Study (OCGAS) targeted recruitment on trios (i.e., an OCD-affected and both parents), but also included pedigrees with a proband and affected sibling, as well as families with multiple-affected members [51]. Participants were recruited into the study from outpatient and inpatient clinics, referrals from clinicians in the community, web sites, media advertisements, self-help groups, and annual conventions of the International Obsessive Compulsive Foundation.

To be considered affected, a participant had to meet DSM-IV OCD diagnostic criteria at any time in his/her life (American Psychiatric Association, 1994) [52]. Probands were included if, in addition to meeting DSM-IV criteria, their first onset of obsessions and/or compulsions occurred before 18 years of age. Probands with schizophrenia, severe mental retardation, Tourette disorder, or OCD occurring exclusively in the context of depression were excluded. Written, informed consent was obtained prior to the clinical interview. The protocol was approved by the institutional review board at each study site.

2.2. Assessment

As described previously [50], diagnostic assessments were conducted by psychiatrists or PhD-level psychologists, who interviewed participants directly using a semi-structured format for the evaluation of psychopathology. The Structured Clinical Interview for DSM-IV (SCID-IV) [53] was used for assessing major Axis I diagnoses other than OCD. Pathological nail biting, pathological skin picking, and trichotillomania were operationalized as described previously [54, 55]. Relevant items from the Structured Instrument for the Diagnosis of DSM-IV Personality Disorders (SIDP-IV) [56] were used for the assessment of criteria for schizotypal, avoidant, dependent, and obsessive-compulsive personality disorders. Personality disorder dimensions were derived by counting the number of traits rated "present" or "strongly present".

The OCD section of the assessment package was adapted from the SADS-LA-R [57] and included detailed screening questions; the Yale Brown Obsessive Compulsive Scale (YBOCS) symptom checklist [58], refined to include the age of onset and level of severity (i.e., amount of time and level of distress during the worst period) of each symptom; and additional questions on onset, course, and history of treatment for these symptoms. A similar section was developed for assessing tics and tic disorders.

As for other obsessive-compulsive symptoms, hoarding obsessions and compulsions were assigned only if the clinician determined that the individual recognized that his/her symptoms were excessive or unreasonable, and the symptoms caused marked distress, were time consuming, or significantly interfered with normal routine, occupational functioning, or social activities and relationships (American Psychiatric Association, 1994) [52].

Participants self-completed the NEO-PI or NEO Five-Factor Inventory-3 (NEO-FFI-3) questionnaire, which were used to assess dimensions of the five-factor model of personality (neuroticism, extraversion, openness, agreeableness, and conscientious). T-scores were determined from the raw scores using norms which incorporate different reference means and standard deviations for men and women. Each T-score has a mean of 50 and standard deviation of 10 [59].

The Parental Bonding Instrument (PBI) [25] measures recollections of parental rearing practices and was developed to assess two dimensions of parental behaviors termed 'care' and 'overprotection'. The measure is 'retrospective', in that adults (over 16 years) complete the measure for how they remember their parents during their first 16 years. The measure was completed for both mothers and fathers separately. There are 25 questions, including 12 'care' items and 13 'overprotection' items, with each parent scored on a 4-point Likert scale. The PBI has been used extensively in community and clinical samples and has been found to be a reliable and valid measure of both perceived and actual parenting [60].

A principal components analysis in the study population identified three parental bonding factors for each parent; these were labeled "care", "overprotection", and "control" and are consistent with factors derived from a prior analysis in the OFS and OCGS samples [36] as well as in other study populations [61, 62]. Item distributions were nearly identical for mothers and fathers, except for one item, "I like me to make my own decisions", which loaded on the 'overprotection' factor for mothers and the 'control' factor for fathers. Thus, the maternal and paternal 'care' factors each include 12 items; maternal and paternal 'overprotection' factors include 8 and 7 items, respectively; and the maternal and paternal 'control' factors include 5 and 6 items, respectively. Three subscale scores, for each parent, were derived by summing the scores of the items comprising each factor. The "care" factor included such items as "was affectionate to me", "could make me feel better when I was upset", and "appeared to understand my problems and worries." The "overprotection" factor included items such as "tried to make me dependent on him/her", "did not want me to grow up", and "felt I could not look after myself unless he/she was around". The "control" factor included such items as "(didn't) give me as much freedom as I wanted" and "(didn't) let me decide things for myself."

2.3. Statistical analysis

Demographic characteristics and clinical features were compared in hoarding and non-hoarding groups, using the chi-square test for categorical variables, or Student's t-test for continuous variables. The t-test also was used to compare PBI scores in hoarding and non-hoarding groups. Cohen's d was used to estimate effect size [63]; confidence intervals for Cohen's d were estimated using the effect size calculator provided by the Centre for Evaluation & Monitoring (www.cem.org). Logistic regression was used to evaluate the relationship between hoarding, and PBI scores, adjusting for other variables associated with hoarding. In these models, we used the method of General Estimating Equations, which provides correct standard error estimates by accounting for correlation of measurements among individuals "clustered" in the same families [64]. In addition, we repeated the analyses, but restricted them to the probands, in order to minimize the potential impact of within-family correlation of PBI and other measures.

3. Results

3.1. Characteristics of the study sample

The current analyses included 894 adult participants, age 18 years or older, with OCD. The sample included 571 probands, 253 first-degree relatives, and 70 other relatives. 334 (37%) of the participants had a lifetime history of hoarding symptoms, while 560 (63%) did not. Women comprised 67% of the sample. The mean age of participants was 40 years (range, 18-89). The majority were college graduates (56%) and were currently employed (63%). The mean age at onset of OCD symptoms was 10 years, and mean age at OCD diagnosis was 14 years. The mean YBOCS severity score during the worst episode was 27, and most participants (82%) had received treatment for OCD (Table 1).

3.2. PBI scores in hoarding and non-hoarding groups

In the entire sample, the hoarding group had a significantly lower mean maternal care score (24.7 vs. 26.6, p<0.01), and significantly higher maternal overprotection score (9.6 vs. 8.2, p<0.001), than the non-hoarding group. The hoarding group also had a significantly higher mean score on paternal overprotection (5.9 vs. 5.2, p<0.05) (Table 2).

In men, there was little difference between hoarding and non-hoarding groups for any of the PBI dimensions, for either parent (Table 3).

In women, the hoarding group had a significantly lower mean score on the maternal care dimension (23.4 vs. 25.7, p=0.01); significantly higher score on the maternal overprotection dimension (9.4 vs. 7.7, p=0.001); and significantly higher score on the maternal control dimension (7.0 vs. 6.2, p=0.02), compared to the non-hoarding group. The effect sizes were -0.23, 0.29, and 0.20 for maternal care, overprotection and control, respectively. In contrast, paternal care, overprotection, and control scores were not significantly different between hoarding and non-hoarding groups (Table 4).

Following Parker [27], we subdivided the women into four groups, based on whether their scores on the maternal care and maternal overprotection dimensions were above or below

the mean values. We found that the high care/high protection group, and the low care/low protection group, had non-significantly increased odds of hoarding of about 30%, compared to the high care/low overprotection referent group. However, the low care/high overprotection group had a significantly greater odds of hoarding, relative to the high care/low overprotection referent group (odds ratio = 2.54, 95% CI=1.60-4.02, p<0.001) (Table 5).

3.3. Adjustment for other clinical variables related to hoarding

We found that hoarding was significantly related to several other clinical variables in women. Specifically, hoarding participants were older, on average, than non-hoarding participants. The hoarding women also had greater numbers of schizotypal, avoidant, and dependent personality traits; a higher neuroticism score; and lower extraversion, agreeableness, and conscientiousness personality scores. Moreover, the hoarding group had greater lifetime prevalences of social phobia, body dysmorphic disorder, and pathological skin picking. (Table 6).

In a series of logistic models, we investigated the relationship between maternal PBI scores and hoarding in women, adjusting one-by-one for these variables. We found that the magnitude of the relationships between hoarding and PBI scores did not appreciably change, when each of these variables was included in the models (Appendix Table A).

a. Analyses restricted to probands—In order to minimize the potential impact of clustering of cases within families, we repeated the analyses but restricted the sample to the 571 probands (200 men and 371 women). In men, none of the PBI scores was significantly different between hoarding and non-hoarding probands. In contrast, in women, hoarding probands had a lower mean score on maternal care (23.1 vs. 25.7, t_{355}=2.37; p=0.02), higher mean score on maternal protection (10.0 vs. 8.4; t_{358}=2.46, p=0.01), and higher mean score on maternal control (7.3 vs. 6.3, t_{363}=2.35, p=0.02) than did non-hoarding probands. In women, the low care/high overprotection group had a significantly greater odds of hoarding, relative to the high care/low overprotection referent group (odds ratio = 2.27, 95% CI=1.27-4.06, p<0.01).

In unadjusted logistic regression models in female probands, the odds of hoarding were inversely related to maternal care scores (OR=0.98, 95% CI=0.95-0.99, p=0.02), but increased with scores on maternal overprotection (OR=1.05, 95% CI=1.01-.08, p=0.02) and maternal control (OR=1.07, 95% CI=1.01-1.13). All of the clinical features that were significantly related to hoarding in all female relatives, except extraversion and agreeableness (Table 6), were significantly related to hoarding in female probands. However, the magnitude of the relationships between maternal PBI scores and hoarding in female probands did not appreciably change after adjusting one-by-one for these variables.

4. Discussion

We compared dimensions of perceived parental bonding in OCD-affected adults with and without hoarding. The mean PBI scores in the sample were generally comparable to what has been reported from several previous studies of patients with major depression and

anxiety disorders, as well as in comparison groups [27, 28, 65, 66], as summarized in Appendix Table B. We found that, in the entire sample, mean maternal care scores were lower, while maternal and paternal overprotection scores were higher, in the hoarding than non-hoarding group. However, the patterns were dissimilar in men and women. In men, none of the maternal or paternal bonding scores was significantly different in hoarding and non-hoarding groups. In contrast, in women, the maternal care score was significantly lower, and maternal overprotection and maternal control scores were significantly higher, in the hoarding group. These relationships were independent of other clinical differences between hoarding and non-hoarding women. Dichotomizing scores at their means, the combination of low maternal care and high maternal overprotection, which Parker termed the "affectionless control" style of parenting, was strongly associated with hoarding in women, with an odds of hoarding over 2.5 times greater compared to the high care/low overprotection group, which Parker termed "optimal bonding" [27].

Our finding of a relationship between perceived parenting styles (low care and high protection) and hoarding is consistent with numerous studies on parental bonding and various types of psychopathology [27-33]. However, it is striking that, in the current study, the relationship was found only for maternal, not paternal, bonding. Based on attachment theory, and supported by a wealth of empirical data, maternal bonding is crucial for healthy psychological development and may be more important than bonding with the father [67].

It also is noteworthy that the relationship between parenting and hoarding was found only in women. Interestingly, a previous study found that, among individuals with OCD, women had significantly higher levels of interpersonal attachment insecurity [40], and another study of a non-clinical sample found that women had significantly higher scores on hoarding severity, attachment difficulties, and anthropomorphism [44]. There also is other evidence that the etiology of hoarding may be different in women and men. Previous studies have found that the relationship of hoarding with specific personality and Axis I disorders is stronger in women than men with OCD [68, 69]. Furthermore, a recent family study found that compulsive hoarding disorder is more likely to be shared between mothers and daughters than between other parental-sibling dyads [68]; whether this is due to genetic, learning, or other environmental factors remains to be determined.

The mechanisms by which parental bonding and hoarding are related in women with OCD remain to be determined, although several have been proposed. There may be a direct, causal pathway, such that low maternal care and/or maternal overprotection and control increase the risk of developing hoarding, or psychopathology that leads to hoarding, in women with OCD. Alternatively, causality may be in the opposite direction, such that hoarding and other symptoms in their female child may elicit maternal rejection and overprotection [48]. Another possibility is that poor maternal bonding may be a reflection of maternal psychopathology and personality features that increases the vulnerability to hoarding in their female child. It also must be considered that mother and daughter may share genetic and/or environmental factors that predispose both to the development of hoarding and other psychopathology [70, 71].

The current study was subject to several limitations. First, assessment of parenting experienced in childhood was dependent on that perceived and reported by adults. We cannot rule out the possibility that past or current experience of psychopathology influences adult perception or attribution of parental behavior in childhood [72, 73]. However, in the current study, adjustment for several Axis I disorders, personality disorders, and personality did not affect the magnitude of the association between reported parenting and hoarding. Furthermore, some studies have found good correspondence between cases and unaffected siblings in assessment of parenting in OCD [35]. Second, since the individuals included in this study had participated in family/genetic studies of OCD, which targeted families with multiple relative affected with OCD, the findings may be less generalizable to non-familial cases. Nevertheless, the findings cannot be explained by intra-familial correlation of PBI or other measures, given the GEE analyses in all relatives, or in analyses restricted to probands. Third, although we adjusted for a variety of clinical correlates of hoarding in the analyses, additional factors, not evaluated in the current study, might impact the estimated magnitude of the relationship between parental bonding and hoarding. We recognize that even the largest effect sizes found, viz. for maternal bonding scores in women, were moderate, with considerable overlap in the distributions in hoarding and non-hoarding women, and that there is evidence that environmental factors in addition to parental bonding contribute to hoarding in OCD [22, 23].

The focus of the current study was on hoarding as a possible etiologic subtype of OCD. There are clinical and possibly etiologic distinctions between hoarding disorder and hoarding-related OCD [74]. The current version of the Diagnostic and Statistical Manual (DSM-5) now considers hoarding disorder as a condition that is related to, but distinct from, OCD, and further research is needed to determine if parental bonding dimensions are related to DSM-V hoarding disorder [75, 76].

The results of the current study suggest that clinicians should consider that the quality of parenting received, especially low maternal care and overprotection, may increase the risk of hoarding behavior, in women with OCD. However, prospective studies are needed to evaluate the relationship between parental bonding and hoarding, with longitudinal assessment of parenting and hoarding behavior in childhood and adolescence, and information collected by direct observation and from knowledgeable informants. These studies would help determine if parental bonding is an important risk factor for the development of hoarding behavior; how parenting interacts with other risk factors for hoarding; and if early intervention reduces the development of hoarding in individuals at higher risk. Moreover, given the disruptions in family functioning associated with hoarding [77, 78], and frustration with hoarding individuals experienced by their relatives, further clinical research on family-based interventions is needed [79, 80].

Acknowledgments

Appendix

Table A

Relationship between maternal bonding dimensions and hoarding in women, adjusting for other clinical features

Adjustment variable	Maternal care	Maternal overprotection	Maternal control
	Odds ratio (95% CI)		
-----	0.98 (0.96-0.99) [**]	1.05 (1.02-1.08) [**]	1.06 (1.01-1.10) [*]
Age at interview, years	0.98 (0.96-0.99) [*]	1.05 (1.02-1.08) [**]	1.05 (1.01-1.10) [*]
YBOCS score	0.98 (0.96-0.99) [*]	1.04 (1.01-1.08) [**]	1.05 (1.00-1.10) [*]
Schizotypal traits	0.98 (0.96-0.99) [*]	1.05 (1.02-1.08) [**]	1.05 (0.99-1.10) [&]
Avoidant traits	0.98 (0.96-0.99) [*]	1.04 (1.01-1.08) [**]	1.05 (1.00-1.10) [*]
Dependent traits	0.98 (0.96-0.99) [*]	1.04 (1.01-1.08) [**]	1.05 (1.00-1.10) [*]
Neuroticism score	0.98 (0.96-0.99) [*]	1.04 (1.01-1.07) [*]	1.05 (1.01-1.11) [*]
Extraversion score	0.98 (0.96-0.99) [*]	1.05 (1.01-1.08) [**]	1.06 (1.01-1.11) [*]
Agreeableness score	0.98 (0.96-0.99) [*]	1.05 (1.01-1.08) [**]	1.06 (1.01-1.11) [*]
Conscientiousness score	0.98 (0.96-0.99) [*]	1.04 (1.01-1.08) [*]	1.06 (1.01-1.11) [*]
Social phobia	0.98 (0.97-0.99) [*]	1.05 (1.02-1.08) [**]	1.05 (1.01-1.10) [*]
Body dysmorphic disorder	0.98 (0.96-0.99) [**]	1.05 (1.02-1.08) [**]	1.05 (1.01-1.10) [*]
Pathological skin picking	0.98 (0.96-0.99) [*]	1.06 (1.03-1.09) [***]	1.06 (1.01-1.10) [*]

[*] p<0.05;

[**] p<0.01;

[***] p<0.001;

[&] p=0.07

Table B

Mean PBI scores in patient and comparison groups, reported in previous studies of anxiety disorders

	Psychiatry outpatients				Comparison groups	
	OCD	"Anxiety neurosis"	Panic disorder	GAD	College and medical students, nurses, parents of school children	General practice outpatients
Reference	Current study	[65]	[28]	[28]	[66]	[66]
Number of participants	894	50	42	36	150	410
Age, mean (range)	40 (18- 89)	30 (16-56)	35 [(a)]	37 [(a)]	25 (17-40)	36 (12-74)
PBI Scores						
Mother care	25.9	21.2	26.1	22.7	26.8	26.9
Mother overprotection/control[b]	14.9	19.6	18.3	16.9	14.7	13.3
Father care	21.2	18.0	21.2	19.0	22.9	23.8
Father overprotection/control[c]	12.7	17.4	15.3	16.9	11.9	12.5

[a]Age range not provided.

[b]Sum of maternal overprotection and control means.

[c]Sum of paternal overprotection and control means.

References

1. Bloch MH, Landeros-Weisenberger A, Rosario MC, Pittenger C, Leckman JF. Meta-analysis of the symptom structure of obsessive-compulsive disorder. Am J Psychiatry. 2008; 165:1532–42. [PubMed: 18923068]

2. Mataix-Cols D, Rosario-Campos MC, Leckman JF. A multidimensional model of obsessive compulsive–disorder. Am J Psychiatry. 2005; 162:228–38. [PubMed: 15677583]

3. Samuels J, Bienvenu OJ 3rd, Riddle MA, Cullen BAM, Grados MA, Liang KY, et al. Hoarding in obsessive compulsive disorder: Results from a case-control study. Behav Res Ther. 2002; 40:517–28. [PubMed: 12043707]

4. Frost RO, Hartl TL. A cognitive-behavioral model of compulsive hoarding. Behav Res Ther. 1996; 34:341–50. [PubMed: 8871366]

5. Torres AR, Fontenelle LF, Shavitt RG, Ferrão YA, do Rosário MC, Storch EA, et al. Comorbidity variation in patients with obsessive-compulsive disorder according to symptom dimensions: Results from a large multicentre clinical sample. J Affect Disord. 2016; 190:508–16. [PubMed: 26561941]

6. Torres AR, Fontenelle LF, Ferrão YA, do Rosário MC, Torresan RC, Miguel EC. Clinical features of obsessive-compulsive disorder with hoarding symptoms: A multicenter study. J Psychiatr Res. 2012; 46:724–32. [PubMed: 22464941]

7. Samuels JF, Bienvenu OJ 3rd, Pinto A, Fyer AJ, McCracken JT, Rauch SL, et al. Hoarding in obsessive-compulsive disorder: Results from the OCD Collaborative Genetics Study. Behav Res Ther. 2007; 45:673–86. [PubMed: 16824483]

8. Frost RO, Steketee G, Williams LF, Warren R. Mood, personality disorder symptoms and disability in obsessive compulsive hoarders: A comparison with clinical and nonclinical controls. Behav Res Ther. 2000; 38:1071–81. [PubMed: 11060936]

9. Williams MT, Farris SG, Turkheimer EN, Franklin ME, Simpson HB, Liebowitz M, et al. The impact of symptom dimensions on outcome for exposure and ritual prevention therapy in obsessive-compulsive disorder. J Anxiety Disord. 2014; 28:553–58. [PubMed: 24983796]

10. Bloch MH, Bartley CA, Zipperer L, Jakubovski E, Landeros-Weisenberger A, Pittenger C, et al. Meta-analysis: Hoarding symptoms associated with poor treatment outcome in obsessive-compulsive disorder. Mol Psychiatry. 2014; 19:1025–30. [PubMed: 24912494]

11. Gentil AF, Lopes AC, Dougherty DD, Rück C, Mataix-Cols D, Lukacs TL, et al. Hoarding symptoms and prediction of poor response to limbic system surgery for treatment-refractory obsessive-compulsive disorder. J Neurosurg. 2014; 121:123–30.

12. Mathews CA, Perez VB, Roach BJ, Fekri S, Vigil O, Kupferman E, et al. Error-related brain activity dissociates hoarding disorder from obsessive-compulsive disorder. Psychol Med. 2016; 46:367–79. [PubMed: 26415671]

13. Lawrence NS, Wooderson S, Mataix-Cols D, David R, Speckens A, Phillips ML. Decision making and set shifting impairments are associated with distinct symptom dimensions in obsessive-compulsive disorder. Neuropsychology. 2006; 20:409–19. [PubMed: 16846259]

14. An SK, Mataix-Cols D, Lawrence NS, Wooderson S, Giampietro V, Speckens A, et al. To discard or not to discard: The neural basis of hoarding symptoms in obsessive-compulsive disorder. Mol Psychiatry. 2009; 14:318–31. [PubMed: 18180763]

15. Harrison BJ, Pujol J, Cardoner N, Deus J, Alonso P, López-Solà M, et al. Brain corticostriatal systems and the major clinical symptom dimensions of obsessive-compulsive disorder. Biol Psychiatry. 2013; 73:321–28. [PubMed: 23200527]

16. Alvarenga PG, do Rosário MC, Batistuzzo MC, Diniz JB, Shavitt RG, Duran FL, et al. Obsessive-compulsive symptom dimensions correlate to specific gray matter volumes in treatment-naïve patients. J Psychiatr Res. 2012; 46:1635–42. [PubMed: 23040160]

17. Mataix-Cols D, Wooderson S, Lawrence N, Brammer MJ, Speckens A, Phillips ML. Distinct neural correlates of washing, checking, and hoarding symptom dimensions in obsessive-compulsive disorder. Arch Gen Psychiatry. 2004; 61:564–76. [PubMed: 15184236]

18. Iervolino AC, Rijsdijk FV, Cherkas L, Fullana MA, Mataix-Cols D. A multivariate twin study of obsessive-compulsive symptom dimensions. Arch Gen Psychiatry. 2011; 68:637–44. [PubMed: 21646580]

19. Samuels J, Shugart YY, Grados MA, Willour VL, Bienvenu OJ, Greenberg BD, et al. Significant linkage to compulsive hoarding on chromosome 14 in families with obsessive-compulsive disorder: Results from the OCD Collaborative Genetics Study. Am J Psychiatry. 2007; 164:493–99. [PubMed: 17329475]

20. Mathews CA, Nievergelt CM, Azzam A, Garrido H, Chavira DA, Wessel J, et al. Heritability and clinical features of multigenerational families with obsessive-compulsive disorder and hoarding. Am J Med Genet B Neuropsychiatr Genet. 2007; 144:174–82.

21. Hasler G, Pinto A, Greenberg BD, Samuels J, Fyer AJ, Pauls D, et al. Familiality of factor analysis-derived YBOCS dimensions in OCD-affected sibling pairs from the OCD Collaborative Genetics Study. Biol Psychiatry. 2007; 61:617–25. [PubMed: 17027929]

22. Cromer KR, Schmidt NB, Murphy DL. Do traumatic events influence the clinical expression of compulsive hoarding? Behav Res Ther. 2007; 45:2581–92. [PubMed: 17673166]

23. Landau D, Iervolino AC, Pertusa A, Santo S, Singh S, Mataix-Cols D. Stressful life events and material deprivation in hoarding disorder. J Anxiety Disord. 2011; 25:192–202. [PubMed: 20934847]

24. Bowlby J. The making and breaking of affectional bonds. I Aetiology and psychopathology in the light of attachment theory. Brit J Psychiatry. 1977; 130:201–10. [PubMed: 843768]

25. Parker G, Tupling H, Brown LB. A parental bonding instrument. Brit J of Med Psychol. 1979; 52:1–10.

26. Perris C, Jacobsson L, Linndström H, von Knorring L, Perris H. Development of a new inventory for assessing memories of parental rearing behaviour. Acta Psychiatr Scand. 1980; 61:265–74. [PubMed: 7446184]

27. Parker G. Parental characteristics in relation to depressive disorders. Brit J Psychiatry. 1979; 134:138–47. [PubMed: 427329]

28. Silove D, Parker G, Hadzi-Pavlovic D, Manicavasagar V, Blaszczynski A. Parental representations of patients with panic disorder and generalized anxiety disorder. Brit J Psychiatry. 1991; 159:835–41. [PubMed: 1790454]

29. Heider D, Matschinger H, Bernert S, Alonso J, Brugha TS, Bruffaerts R, et al. Adverse parenting as a risk factor in the occurrence of anxiety disorders. Soc Psychiatry Psychiatr Epidemiol. 2008; 43:266–72. [PubMed: 18196186]

30. Goschin S, Briggs J, Blanco-Lutzen S, Cohen LJ, Galynker I. Parental affectionless control and suicidality. J Affect Disord. 2013; 151:1–6. [PubMed: 23820097]

31. Reti IM, Samuels JF, Eaton WW, Bienvenu OJ 3rd, Costa PT Jr, Nestadt G. Influences of parenting on normal personality traits. Psychiatry Res. 2002; 111:55–64. [PubMed: 12140120]

32. Reti IM, Samuels JF, Eaton WW, Bienvenu OJ 3rd, Costa PT Jr, Nestadt G. Adult antisocial personality traits are associated with experiences of low parental care and maternal overprotection. Acta Psychiatr Scand. 2002; 106:126–33. [PubMed: 12121210]

33. Kendler KS, Myers J, Prescott CA. Parenting and adult mood, anxiety and substance use disorders in female twins: An epidemiological, multi-informant, retrospective study. Psychol Med. 2000; 30:281–94. [PubMed: 10824649]

34. Merkel WT, Pollard CA, Wiener RL, Staebler CR. Perceived parental characteristics of patients with obsessive compulsive disorder, depression, and panic disorder. Child Psychiatry Hum Dev. 1993; 24:49–57. [PubMed: 8404245]

35. Lennertz L, Grabe HJ, Ruhrmann S, Rampacher F, Vogeley A, Schulze-Rauschenbach S, et al. Perceived parental rearing in subjects with obsessive-compulsive disorder and their siblings. Acta Psychiatr Scand. 2010; 121:280–88. [PubMed: 19694627]

36. Wilcox HC, Grados M, Samuels J, Riddle MA, Bienvenu OJ 3rd, Pinto A, et al. The association between parental bonding and obsessive compulsive disorder in offspring at high familial risk. J Affect Disord. 2008; 111:31–39. [PubMed: 18299151]

37. Myhr G, Sookman D, Pinard G. Attachment security and parental bonding in adults with obsessive-compulsive disorder: A comparison with depressed out-patients and healthy controls. Acta Psychiatr Scand. 2004; 109:447–56. [PubMed: 15117290]

38. Furby L. Possession in humans: An exploratory study of its meaning and motivation. Soc Behav Personal. 1978; 6:49–65.

39. Frost RO, Hartl TL, Christian R, Williams N. The value of possessions in compulsive hoarding: Patterns of use and attachment. Behav Res Ther. 1995; 33:897–902. [PubMed: 7487849]

40. Nedelisky A, Steele M. Attachment to people and to objects in obsessive-compulsive disorder: An exploratory comparison of hoarders and non-hoarders. Attachment Hum Dev. 2009; 11:365–83.

41. Kellett S, Greenhalgh R, Beail N, Ridgway N. Compulsive hoarding: An interpretative phenomenological analysis. Behav Cogn Psychother. 2010; 38:141–55. [PubMed: 20064282]

42. Seaman C, Oldfield VB, Gordon O, Forrester E, Salkovskis PM. The impact of symptomatic hoarding in OCD and its treatment. Behav Cogn Psychother. 2010; 38:157–71. [PubMed: 20152064]

43. Timpano KR, Shaw AM. Conferring humanness: The role of anthropomorphism in hoarding. Personal Indiv Diff. 2013; 54:383–88.

44. Neave N, Tyson H, McInnes L, Hamilton C. The role of attachment style and anthropomorphism in predicting hoarding behaviors in a non-clinical sample. Personal Indiv Diff. 2016; 99:33–37.

45. Neave N, Jackson R, Saxton T, Hönekopp J. The influence of anthropomorphic tendencies on human hoarding behaviors. Personal Indiv Diff. 2015; 72:214–19.

46. Medard E, Kellet S. The role of adult attachment and social support in hoarding disorder. Behav Cogn Psychother. 2014; 42:629–33. [PubMed: 24103104]

47. Keefer LA, Landau MJ, Rothschild ZK, Sullivan D. Attachment to objects as compensation for close others' perceived unreliability. J Exper Soc Psychol. 2012; 48:912–17.

48. Alonso P, Menchón JM, Mataix-Cols D, Pifarré J, Urretavizcaya M, Crespo JM, et al. Perceived parental rearing style in obsessive-compulsive disorder: Relation to symptom dimensions. Psychiatry Res. 2004; 127:267–78. [PubMed: 15296826]

49. Nestadt G, Samuels J, Riddle M, Bienvenu OJ 3rd, Liang KY, LaBuda M, et al. A family study of obsessive compulsive disorder. Arch Gen Psychiatry. 2000; 57:358–63. [PubMed: 10768697]

50. Samuels JF, Riddle MA, Greenberg BD, Fyer AJ, McCracken JT, Rauch SL, et al. The OCD Collaborative Genetics Study: Methods and sample description. Am J Med Genet Neuropsychiatr Genet. 2007; 141:201–07.

51. Mattheisen M, Samuels JF, Wang Y, Greenberg BD, Fyer AJ, McCracken JT, et al. Genome-wide association study in obsessive-compulsive disorder: Results from the OCGAS. Mol Psychiatry. 2015; 20:337–44. [PubMed: 24821223]

52. American Psychiatric Association. Diagnostic and Statistical Manual of Mental Disorders. 4. Washington, DC: American Psychiatric Press; 1994.

53. First, MB., Spitzer, RL., Gibbon, M., Williams, JB. Structured Clinical Interview for the DSM-IV Axis I Disorders. New York: New York State Psychiatric Institute; 1995.

54. Bienvenu OJ 3rd, Samuels JF, Riddle MA, Hoehn-Saric R, Liang KY, Cullen BA, et al. The relationship of obsessive-compulsive disorder to possible spectrum disorders: Results from a family study. Biol Psychiatry. 2000; 48:287–93. [PubMed: 10960159]

55. Cullen BA, Samuels JF, Bienvenu OJ 3rd, Grados M, Hoehn-Saric R, Hahn J, et al. The relationship of pathologic skin picking to obsessive-compulsive disorder. J Nerv Ment Dis. 2001; 189:193–95. [PubMed: 11277358]

56. Pfohl, B., Blum, N., Zimmerman, M. Structured Interview for DSM-IV Personality: SIDP-IV. Washington, DC: American Psychiatric Press; 1997.

57. Mannuzza S, Fyer AJ, Klein DF, Endicott J. Schedule for affective disorders and schizophrenia-lifetime version modified for the study of anxiety disorders (SADS-LA): Rationale and conceptual development. J Psychiatr Res. 1986; 20:317–25. [PubMed: 3806426]

58. Goodman WK, Price LH, Rasmussen SA, Mazure C, Fleischmann RL, Hill CL, et al. The Yale-Brown Obsessive Compulsive Scale: I. Development, use, and reliability. Arch Gen Psychiatry. 1989; 46:1006–11. [PubMed: 2684084]

59. Costa, PT., McCrae, RR. Revised NEO Personality Inventory (NEO-PI-R) and NEO Five-Factor Inventory (NEO-FFI): Professional manual. Odessa, FL: Psychological Assessment Resources; 1992.

60. Parker G. The Parental Bonding Instrument: Psychometric properties reviewed. Psychiatr Dev. 1989; 74:317–35.

61. Kendler KS, Sham PC, MacLean CJ. The determinants of parenting: An epidemiological, multi-informant, retrospective study. Psychol Med. 1997; 27:549–63. [PubMed: 9153676]

62. Cox BJ, Enns MW, Clara IP. The Parental Bonding Instrument: Confirmatory evidence for a three-factor model in a psychiatric clinical sample and in the National Comorbidity Survey. Soc Psychiatry Psychiatr Epidemiol. 2000; 35:353–57. [PubMed: 11037304]

63. Cohen, J. Statistical Power Analysis for the Behavioral Sciences. 2. Hillsdale, NJ: Lawrence Erlbaum Associates; 1988.

64. Hanley JA, Negassa A, Forrester JE. Statistical analysis of correlated data using generalized estimating equations: An orientation. Am J Epid. 2003; 157:364–75.

65. Parker G. Parental representations of patients with anxiety neurosis. Acta Psychiat Scand. 1981; 63:33–36. [PubMed: 7234462]

66. Parker G, Tupling H, Brown LB. A Parental Bonding Instrument. Br J Med Psychol. 1979; 52:1–10.

67. Parker G. Parental 'affectionless control' as an antecedent to adult depression. Arch Gen Psychiatry. 1983; 4:956–60.

68. Samuels JF, Bienvenu OJ, Pinto A, Murphy DL, Piacentini J, Rauch SL, et al. Sex-specific clinical correlates of hoarding in obsessive-compulsive disorder. Behav Res Ther. 2008; 46:1040–46. [PubMed: 18692168]

69. Wheaton M, Timpano KR, Lasalle-Ricci VH, Murphy D. Characterizing the hoarding phenotype in individuals with OCD: Associations with comorbidity, severity and gender. J Anx Disor. 2008; 22:243–52.

70. Steketee G, Kelley AA, Wernick JA, Muroff J, Frost RO, Tolin DF. Familial patterns of hoarding symptoms. Dep Anxiety. 2015; 32:728–36.

71. Kendler KS. Parenting: A genetic-epidemiologic perspective. Am J Psychiatry. 1996; 153:11–20.

72. Kendler KS, Sham PC, MacLean CJ. The determinants of parenting: An epidemiological, multi-informant, retrospective study. Psychol Med. 1997; 27:549–63. [PubMed: 9153676]

73. Halverson CF Jr. Remembering your parents: Reflections on the retrospective method. J Personality. 1988; 56:435–43. [PubMed: 3042946]

74. Pertusa A, Frost RO, Fullana MA, Samuels J, Steketee G, Tolin D, et al. Refining the diagnostic boundaries of compulsive hoarding: A critical review. Clin Psychol Rev. 2010; 30:371–86. [PubMed: 20189280]

75. American Psychiatric Association. Diagnostic and statistical manual of mental disorders: DSM-5. Washington, D.C: American Psychiatric Association; 2013.

76. Mataix-Cols D, Frost RO, Peretusa A, Clark LA, Leckman JF, Saxena S, et al. Hoarding disorder: A new diagnosis for DSM-V? Depr Anxiety. 2010; 27:556–572.

77. Tolin DF, Frost RO, Steketee G, Fitch KE. Family burden of compulsive hoarding: Results of an internet survey. Behav Res Ther. 2008; 46:334–44. [PubMed: 18275935]

78. Park JM, Lewin AB, Storch EA. Adult offspring perspectives on parental hoarding behaviors. Psychiatr Res. 2014; 220:328–44.

79. Thompkins MA. Working with families of people who hoard: A harm reduction approach. J Clin Psychol. 2011; 67:497–506. [PubMed: 21360706]

80. Chasson GS, Carpenter A, Ewing J, Gibby B, Lee N. Empowering families to help a loved one with hoarding disorder: Pilot study of Family-As-Motivators training. Behav Res Ther. 2014; 63:9–16. [PubMed: 25237830]

Highlights

- Low maternal care, and high maternal protection, and control, are associated with hoarding in women with OCD.

- Prevalence of hoarding is greatest in women with low maternal care/high maternal protection.

- Paternal parenting is not related to hoarding in women with OCD.

- Parenting dimensions are not related to hoarding in men with OCD.

Table 1

Characteristics of study participants

	Number (%)
Relative type	
Probands	571 (64)
Siblings	129 (14)
Parents	94 (11)
Offspring	30 (3)
Other	70 (8)
Sex	
Men	293 (33)
Women	601 (67)
Age	
18-29	244 (27)
30-39	199 (22)
40-49	228 (26)
50-89	223 (25)
Education	
High school only	144 (16)
Some college	245 (28)
College graduate	501 (56)
Currently employed	
No	325 (37)
Yes	560 (63)
Ever treated for OCD	
No	150 (18)
Yes	686 (82)
Hoarding	
No	560 (63)
Yes	334 (37)
	Mean (SD) <range>
Age at interview, years	40.3 (14.1) <18-89>
Age at onset of OCD symptoms, years	10.0 (6.8) <5-70>
Age at onset of OCD diagnosis, years	14.2 (8.8) <5-70>
YBOCS score, worst ever	26.9 (7.8) <3-40>

Table 2

PBI scores in hoarding and nonhoarding OCD groups, both sexes

	Hoarding (N=334)	Non-hoarding (N=560)	Test statistic	Cohen's d (95% CI)
	Mean (SD)	*Mean (SD)*		
Mother care	24.7 (9.8)	26.6 (8.9)	$t_{865} = -3.07$ **	-0.21 (-0.35 - -0.08)
Mother overprotection	9.6 (5.7)	8.2 (5.6)	$t_{861} = 3.57$ ***	0.25 (0.11 – 0.39)
Mother control	6.5 (3.8)	6.0 (3.4)	$t_{876} = 1.90$	0.13 (-0.01 – 0.27)
Father care	20.8 (9.9)	21.4 (10.0)	$t_{850} = -0.91$	-0.06 (-0.20 – 0.08)
Father overprotection	5.9 (4.7)	5.2 (4.6)	$t_{858} = 2.30$ *	0.16 (0.02 – 0.30)
Father control	7.3 (4.5)	7.1 (4.3)	$t_{855} = 0.62$	0.04 (-0.09 – 0.18)

*
p<0.05;

**
p<0.01;

***
p<0.001

Table 3

PBI scores in hoarding and nonhoarding OCD groups in men

	Hoarding (N=112)	Non-hoarding (N=181)	Test statistic	Cohen's d (95% CI)
	Mean (SD)	*Mean (SD)*		
Mother care	27.3 (7.7)	28.6 (7.0)	$t_{282} = -1.54$	-0.18 (-0.42 – 0.06)
Mother overprotection	10.0 (5.4)	9.1 (5.3)	$t_{281} = 1.36$	0.17 (-0.07 – 0.41)
Mother control	5.5 (3.5)	5.6 (3.1)	$t_{283} = -0.18$	0.02 (-0.26 – 0.22)
Father care	19.6 (9.3)	20.7 (9.5)	$t_{282} = -0.96$	-0.12 (-0.36 – 0.12)
Father overprotection	5.5 (3.8)	4.8 (4.4)	$t_{285} = 1.41$	0.17 (-0.07 – 0.41)
Father control	6.9 (3.7)	6.6 (3.8)	$t_{278} = 0.62$	0.08 (-0.16 – 0.32)

Table 4

PBI scores in hoarding and nonhoarding OCD groups in women

	Hoarding (N=222)	Non-hoarding (N=379)	Test statistic	Cohen's d (95% CI)
	Mean (SD)	*Mean (SD)*		
Mother care	23.4 (10.4)	25.7 (9.5)	$t_{581} = -2.79$ **	-0.23 (-0.40 - -0.07)
Mother overprotection	9.4 (5.9)	7.7 (5.7)	$t_{578} = 3.37$ ***	0.29 (0.12 – 0.46)
Mother control	7.0 (3.9)	6.2 (3.6)	$t_{591} = 2.40$ *	0.20 (0.04 – 0.37)
Father care	21.4 (10.2)	21.8 (10.3)	$t_{566} = -0.43$	-0.04 (-0.21 – 0.13)
Father overprotection	6.2 (5.1)	5.4 (4.6)	$t_{571} = 1.84$	0.16 (-0.01 – 0.33)
Father control	7.5 (4.9)	7.4 (4.4)	$t_{575} = 0.35$	0.03 (-0.14 – 0.20)

*
p<0.05;

**
p<0.01;

***
p<0.001

Table 5

Odds of hoarding, by quadrants of maternal care and maternal overprotection in women

Quadrant	Number	Hoarding Number (%)	Odds ratio (95% CI)
High care, Low overprotection	203	60 (30)	1.00
High care, High overprotection	130	47 (36)	1.35 (0.85-2.16)
Low care, Low overprotection	110	39 (36)	1.31 (0.80-2.14)
Low care, High overprotection	128	66 (52)	2.54 (1.60-4.02) ***

*p<0.05;

**p<0.01;

***
p<0.001

Table 6

Significant clinical differences between hoarding and non-hoarding groups in women

	Hoarding	Non-hoarding	Significance test
	Mean (SD)		t_{df}
Age at interview, years	42.8 (14.9)	39.9 (13.9)	$t_{599} = 2.40$ [*]
YBOCS score	27.5 (7.3)	26.0 (7.8)	$t_{572} = 2.31$ [*]
Schizotypal traits	0.9 (1.2)	0.5 (1.0)	$t_{587} = 4.15$ [***]
Avoidant traits	1.7 (2.0)	1.2 (1.7)	$t_{599} = 3.67$ [***]
Dependent traits	1.8 (2.0)	1.0 (1.5)	$t_{599} = 5.25$ [***]
Neuroticism score	63.3 (12.1)	60.6 (11.9)	$t_{559} = 2.57$ [*]
Extraversion score	42.8 (13.0)	45.9 (12.8)	$t_{559} = -2.77$ [**]
Agreeableness score	47.8 (13.7)	50.3 (13.1)	$t_{559} = -2.16$ [*]
Conscientiousness score	43.4 (13.7)	48.9 (12.4)	$t_{559} = -4.86$ [***]
	N (%)		χ^2_1
Social phobia	99 (46)	109 (30)	14.90 [***]
Body dysmorphic disorder	33 (15)	23 (6)	12.33 [***]
Pathological skin picking	62 (29)	71 (19)	6.87 [**]

[*] p<0.05;

[**] p<0.01;

[***] p<0.001