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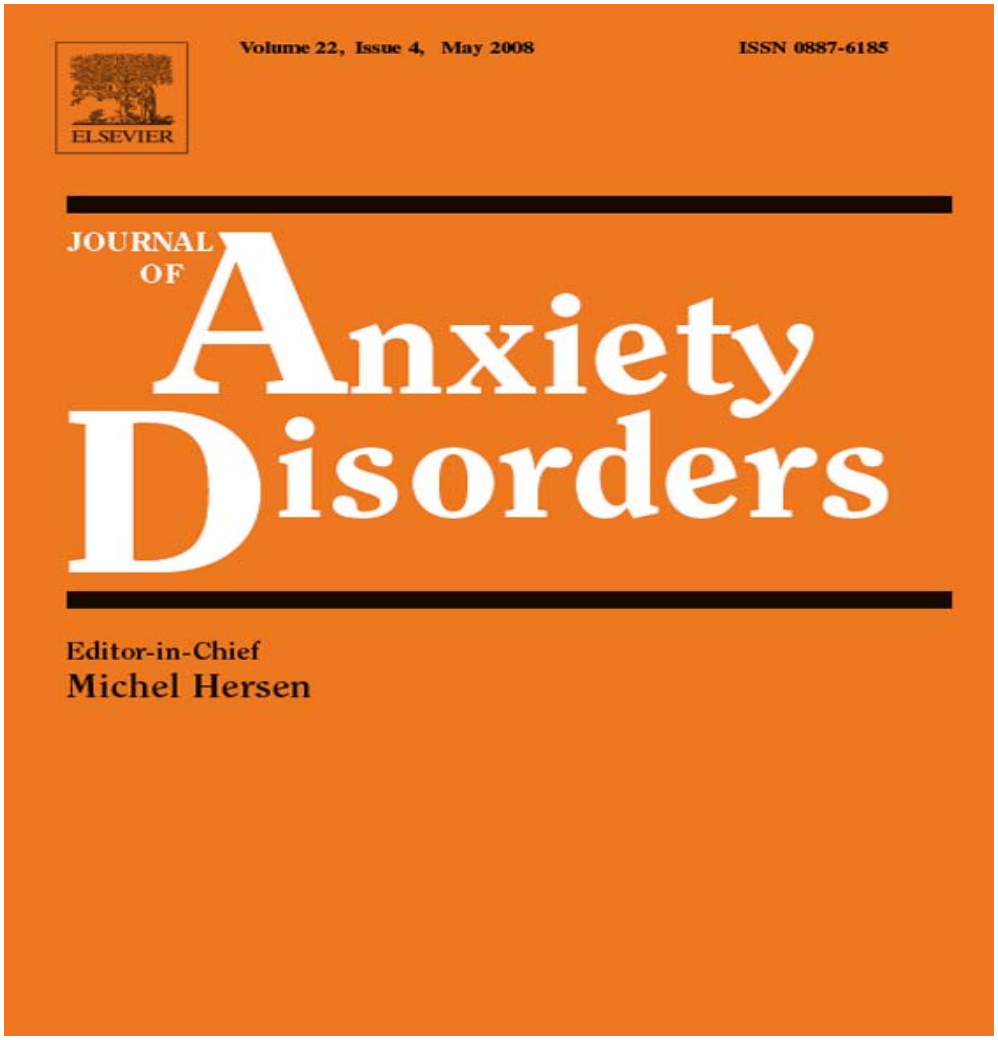

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The Obsessive–Compulsive Inventory-Revised (OCI-R): Validation of the German version in a sample of patients with OCD, anxiety disorders, and depressive disorders

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Abstract

The OCI-R is a psychometrically sound and valid self-report scale measuring the major symptoms of OCD on six dimensions: Checking, Washing, Ordering, Hoarding, Obsessing, and Neutralizing. Information is needed on its ability to discriminate OCD from depression. In this study, reliability and convergent, divergent, and known-groups validity of an authorized German version were examined in 381 patients with OCD, other anxiety and depressive disorders. Confirmatory factor analyses replicated the original six-factor structure in each sample. Moreover, results indicated good convergent, divergent, and known-groups validity for the full scale and the subscales in each sample, only a slight construct overlap between OCD and depression, anxiety, pathological worry, and perfectionism, and the relationships of the subscales with obsessive–compulsive personality features supported its construct validity. Previous findings for the original scale were replicated and extended in a different cultural context. However, the domains Neutralizing and Obsessions need further development.

Keywords: Obsessive–compulsive disorder; Anxiety disorders; Depressive disorders; Assessment; Obsessive–Compulsive inventory-revised (OCI-R); Confirmatory factor analysis

Compared with other anxiety disorders, OCD is a less homogeneous diagnostic category (Clark, 2004). Although OCD is regarded as a unitary nosological entity in current diagnostic classifications of mental disorders (DSM-IV-TR, American Psychiatric Association, 2000; ICD-10-GM, Deutsches Institut für Medizinische Dokumentation und Information, 2007), individuals with OCD show a considerable amount of heterogeneity and diversity of symptom contents. In addition, diagnostic differentiation from other disorders (e.g., other anxiety disorders, especially generalized anxiety disorder) is often difficult and diagnostic comorbidity with other mental disorders is high (for a review, see Clark, 2004), in particular with major depression and other anxiety disorders (e.g., Antony, Downie, & Swinson, 1998; Brown, Campbell, Lehman, Grisham, & Mancill, 2001).

There is still no general consensus how OCD symptom contents should be partitioned into subtypes or symptom dimensions. In the last decade, several self-report instruments aiming at a comprehensive

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measurement of the heterogeneous clinical picture have been developed, e.g., the Padua Inventory (Sanavio, 1988) and its revisions (Burns, Keortge, Formea, & Sternberger, 1996; van Oppen, Hoekstra, & Emmelkamp, 1995), the Vancouver Obsessional Compulsive Inventory (Thordarson et al., 2004), the Schedule of Compulsions, Obsessions, and Pathological Impulses (Watson & Wu, 2005), and the OCI-R (Foa et al., 2002). Most of these instruments have been translated into various languages and validated in other cultural contexts. This transfer is important, because replication of research across different cultures requires the use of measures that have been standardized and validated in these cultures (e.g., Fullana et al., 2005). The German-speaking language area has hardly been influenced by these international developments. Although several self-report instruments have been translated into German, their psychometric properties have not been examined in German samples.

The OCI-R (Foa et al., 2002) is a short self-report scale assessing a broad range of obsessive and compulsive symptoms. Eighteen items form six subscales: Washing, Checking, Ordering, Obsessing, Hoarding, and Neutralizing. The OCI-R has a solid factor structure, good internal consistency, test–retest–reliability, and convergent validity in samples of patients with OCD, other anxiety disorders, and non-clinical controls (Abramowitz & Deacon, 2006; Foa et al., 2002; Hajcak, Huppert, Simons, & Foa, 2004; Huppert et al., 2007), and is sensitive to treatment effects (Abramowitz, Tolin, & Diefenbach, 2005). In addition, a Spanish translation of the measure has shown good psychometric properties in a student sample (Fullana et al., 2005). An examination of the relationships between OCI-R subscales and diverse measures of cognitive features thought to underlie OCD provided evidence of the construct validity of the OCI-R subscales, except for the Neutralizing subscale (Abramowitz & Deacon, 2006). Previous results concerning the discriminant validity of the OCI-R and its subscales are very satisfying. The total scale and the subscales effectively discriminated (a) OCD patients from anxious and non-clinical controls (except for the Hoarding and Ordering subscales; Foa et al., 2002) and (b) OCD patients with a specific subtype from OCD patients without that symptom subtype and patients with other anxiety disorders on the corresponding subscales (Abramowitz & Deacon, 2006; Huppert et al., 2007). The ability of the OCI-R subscales to discriminate OCD patients from patients with depressive disorders has not been examined yet. This is an important issue in the validation process of an OCD scale with regard to potential symptom overlap and high comorbity between OCD and depression. Diagnostic differentiation of obsessions from depressive ruminations is difficult. Thus, in order to support the discriminant validity of the OCI-R, information is needed on the ability of the OCI-R total scale and subscales to discriminate OCD patients from patients with depressive disorders.

The divergent validity of the OCI-R with measures of other kinds of psychopathology also needs further exploration, particularly in clinical samples. A poor divergent validity with measures of depression, anxiety, and worry has been a substantial shortcoming of OCD measures (for a review, see Taylor, 1998), and is commonly attributed to a true symptom overlap between the symptoms of OCD, other anxiety disorders, and major depression. The relationship between the OCI-R and measures of pathological worry has not yet been examined in samples of patients with OCD and anxiety despite the well-known potential symptom overlap between obsessions and pathological worry (Abramowitz & Foa, 1998; Holaway, Heimberg, & Coles, 2006). Furthermore, Foa et al. (2002) found a high correlation ($r = .70$) between the OCI-R and the Beck Depression Inventory (BDI; Beck & Steer, 1987), a measure for assessing symptoms of depression, in a mixed sample of patients with OCD and non-clinical controls. This finding raises questions regarding the divergent validity of the OCI-R, although this is not a problem unique to the OCI-R. Foa et al. assumed that the high correlations found between measures of OCD and depression may reflect the high levels of depression observed in OCD patients, and proposed to examine the divergent validity of the OCI-R with depressive symptoms separately in samples of patients diagnosed with depressive disorder with and without OCD. Woody, Steketee, & Chambless (1995) have shown for another instrument, the Y-BOCS interview (Goodman et al., 1989), that an exclusion of OCD patients with comorbid depression does not improve the low divergent validity. To our knowledge, the OCI-R has not yet been used in a sample of patients with depressive disorders, despite the high comorbidity between OCD and depression.

The relationship between the OCI-R and obsessive–compulsive personality features has also not been examined yet. Based on the results of several studies it can be hypothesized that only some OCD symptom subtypes (e.g., Ordering, Checking, and Hoarding) are associated with obsessive–compulsive personality features and others (e.g., Obsessional Thoughts and

Washing) not (Baer, 1994; Ecker & Gönner, 2007; Gibbs & Oltmanns, 1995; Rosen & Tallis, 1995; Tallis, Rosen, & Shafran, 1996). Gönner et al. (2007) examined the psychometric properties of the German OCI-R version in a sample of OCD patients, and first results support its reliability and construct validity in this group.

The specific goals of the present study were:

(1) To examine the psychometric properties and factor structure of the German version of the OCI-R[1] and its subscales separately in samples of patients with OCD, other anxiety disorders, and depressive disorders.
(2) To examine the convergent and divergent validity of the OCI-R with several self-report measures of obsessive–compulsive symptoms, anxiety, pathological worry, depression, and perfectionism, with the aim of replicating previous findings and addressing limitations of previous research. The divergent validity of the OCI-R has not yet been examined with perfectionism, with pathological worry in an anxious sample, and also not with depression in a depressive sample. In previous studies, correlations between the Y-BOCS interview and the OCI-R total score were low (Abramowitz & Deacon, 2006; Foa et al., 2002), possibly due to method variance (self-rating measure versus interview). By using the Y-BOCS self-rating scale (Y-BOCS-SRS; Baer, 1991), it was possible to examine the convergent validity with the Y-BOCS independently from method variance.
(3) To explore the construct validity of the OCI-R subscales by examining their relationships with obsessive–compulsive personality features. We expect low to moderate correlations of obsessive–compulsive personality traits with Ordering, Checking, and Hoarding, and no correlation with Washing and Obsessing.
(4) To further examine the known-groups validity of the OCI-R total scale and subscales in a sample of patients with OCD, anxiety disorders, and/or depressive disorders. It was hypothesized that patients with OCD will show higher scores on the OCI-R total scale and its subscales compared to patients with other anxiety disorders and/or depressive disorders.
(5) To examine the extent to which the measure can accurately classify patients as having a diagnosis of OCD or a different disorder.

1. Method

1.1. Participants

Exclusion criteria for all samples included presence of a neurological disorder, psychotic disorder, bipolar disorder, or alcohol/substance dependence. Patients with pension application were also excluded. Four samples were taken into consideration:

(1) OCD patients (OCs): One hundred and sixty-seven individuals with a diagnosis of OCD (ICD-10 F42) comprised the sample from the Gönner et al. (2007) study (without those with pension application). Twenty-one patients had a comorbid anxiety disorder (F40/41), 67 patients a comorbid depressive disorder (F32–34) and 36 patients a comorbid personality disorder (F60/61). Mean age was 36.0 (S.D. = 11.0), 56% were female. OCD patients' data were derived from two sources. One hundred and forty-five OCD patients were referred for inpatient treatment to the Psychosomatic Clinic of Bad Dürkheim. Twenty-two OCD patients sought treatment at two outpatient practices specializing in OCD treatment.
(2) Anxiety disorder controls (ACs): The sample consisted of 62 patients with other anxiety disorders (F40/41) without OCD or depressive disorder. Sixty-six percent had a diagnosis of panic disorder with or without agoraphobia (F40.0/F41.0), 18% suffered from social phobias (F40.1), 5% from specific (isolated) phobias (F40.2), 7% from generalized anxiety disorder (F41.1), and 8% from mixed, other specified or unspecified anxiety disorders (F41.2-9). (Total % sum > 100 due to comorbidity.) Seven percent had a comorbid personality disorder (F60/61). Mean age was 40.8 (S.D. = 12.0), 48% were female.
(3) Depressive disorder controls (DCs): The sample consisted of 83 patients with depressive disorder (F32–34) without anxiety disorder. Forty-eight percent had a diagnosis of depressive episode (F32), 51% recurrent depressive disorder (F33), and 7% dysthymia (F34). (Total % sum > 100 due to comorbity.) Twelve percent had a comorbid personality disorder (F60/61).

[1] Copies of the German version of the OCI-R are available from the author Sascha Gönner.

Mean age was 46.3 (S.D. = 11.6), 70% were female.

(4) Anxiety and depressive disorder controls (ADCs): The sample consisted of 69 patients with depressive disorder (F32–34) and anxiety disorder (F40/41) without OCD, 61% had a diagnosis of depressive episode (F32), 36% recurrent depressive disorder (F33), 4% dysthymia (F34), 65% panic disorder with or without agoraphobia (F40.0/F41.0), 23% social phobias (F40.1), 3% specific (isolated) phobias (F40.2), 10% generalized anxiety disorder (F41.1), and 7% mixed, other specified or unspecified anxiety disorders (F41.2-9). (Total % sum > 100 due to comorbity.) Mean age was 44.0 (S.D. = 11.0), 59% were female.

1.2. Measures

1.2.1. International Diagnostic Checklists (IDCL; Hiller, Zaudig, & Mombour, 1995)

The IDCL provide a systematic assessment of psychiatric diagnoses according to the ICD-10. They consist of 30 lists, each assigned to a specific disorder and allowing immediate and operationalized diagnostic decisions. Studies have indicated good clinical practicability and satisfactory to excellent diagnostic reliability. Compared to different structured interviews it has shown at least equal interrater reliability.

1.2.2. OCI-R (Foa et al., 2002)

The OCI-R is an 18-item self-report questionnaire that assesses obsessive–compulsive symptoms, with a total score ranging from 0 to 72 and subscale scores ranging from 0 to 12. The original version was translated to German by two of the authors (S.G. and W.E.) and back-translated by a bilingual psychotherapist. The back-translation was verified by the authors of the original version. The German version demonstrated good psychometric properties in a sample of OCD patients (Gönner et al., 2007).

1.2.3. Yale-Brown Obsessive–Compulsive Scale self-rating severity scale (Y-BOCS-SRS; Baer, 1991)

The German version of the Y-BOCS-SRS (Baer, 1993) is an adaption of the Yale-Brown Obsessive–Compulsive Scale (Goodman et al., 1989) for administration as a self-report scale. The items and definitions of obsessions and compulsions from the original Y-BOCS are rewritten in a self-report format. The 10-item severity scale measures the severity of obsessions and compulsions independently from symptom domain. The total score ranges from 0 to 40, the Obsessions and Compulsions subscales score from 0 to 20. The German version demonstrated good interrater reliability with the Y-BOCS interview and represents an adequate alternative for utilization in clinical studies (Schaible, Armbrust, & Nutzinger, 2001). In our OCD sample, the Y-BOCS-SRS mean was 23.5 (S.D. = 6.6).

1.2.4. Padua Inventory—Washington State University revision (PI-WSUR; Burns et al., 1996)

The 39-item revision of the original PI (Sanavio, 1988) is a widely used self-report questionnaire to assess obsessive–compulsive symptoms across five content domains: Contamination Obsessions and Washing Compulsions, Checking Compulsions, Dressing/Grooming Compulsions, Obsessional Thoughts of Harm to Self/Others, and Obsessional Impulses to Harm Self/Others. The total score ranges from 0 to 156. The German translation of the PI (Gönner & Ecker, 2005) was authorized by Enzio Sanavio. In previous analyses of our research group, it demonstrated good internal consistency (α-range = .75–.96).

1.2.5. Symmetry, Ordering and Arranging Questionnaire (SOAQ; Radomsky & Rachman, 2004)

The SOAQ is a 20-item self-report scale to assess symmetry obsessions, ordering, and arranging compulsions, with a score ranging from 0 to 80. The original version demonstrated excellent internal consistency and good convergent and divergent validity in a non-clinical sample. In this study, an authorized German translation showing excellent internal consistency (α = .98) was used (Ecker & Gönner, 2005).

1.2.6. Beck Depression Inventory (BDI; Beck & Steer, 1987)

The BDI is a widely used 21-item self-report scale used to measure the symptoms of depression, with a total score ranging from 0 to 63. The German version (Hautzinger, Bailer, Worall, & Keller, 2001) demonstrated good reliability and validity.

1.2.7. Penn State Worry Questionnaire (PSWQ; Meyer, Miller, Metzger, & Borkovec, 1990)

The German version (Stöber, 1995) of the widely used PSWQ is a 16-item self-report scale assessing pathological worries typical of GAD, with a total score ranging from 16 to 240. It has demonstrated good reliability and convergent validity.

1.2.8. Beck Anxiety Inventory (BAI; Beck & Steer, 1993)

The BAI is a widely used 21-item self-report scale to assess clinical anxiety, with a total score ranging from 0 to 63. The German version (Margraf & Ehlers, 2002) demonstrated good reliability and satisfying validity.

1.2.9. Frost Multidimensional Perfectionism Scale (Frost, Marten, Lahart, & Rosenblate, 1990)

The German version of the 35-item FMPS (FMPS-D; Stöber, 1998) is a self-report scale that measures perfectionism as a multidimensional construct. Total score (ranging from 29 to 145) is obtained by summing 29 items. The FMPS-D has demonstrated good reliability and validity.

1.2.10. Subscale Sorgfältiger Stil [Careful Style] of the Persönlichkeits-Stil und Störungs-Inventar [Personality Style and Disorder Inventory] (PSSI; Kuhl & Kazén, 1997)

The PSSI is a reliable and valid self-report scale that assesses 14 different personality types as non-pathological equivalents of the personality disorders described in the DSM-IV and ICD-10. Each item is rated on a four-point Likert-type scale. In this study, only the 10-item subscale Careful Style (PSSI-CS) was used which assesses a personality style characterized by thoroughness, exactness, perfectionism, rigidity, excessive conscientiousness, excessively strict norms, excessive occupation with details, rules, order, and cleanliness.

1.3. Procedure

The questionnaires were administered at the beginning of treatment. Some participants did not complete the entire battery of measures. Some measures were only given to a part of the OCD sample. As a result, sample sizes vary depending on the measures involved and are reported for each analysis. A brief description of the purpose of the study was given. Participation was voluntary. All participants were diagnosed by experienced and licensed psychotherapists via an interview that utilized the International Diagnostic Checklists (IDCL; Hiller et al., 1995) to confirm the ICD-10 diagnoses. ICD-10 and DSM-IV-TR criteria for OCD are very similar, but the description of the disorder is more specific and the exclusion criteria are more extensive in the DSM-IV-TR. Only the DSM-IV-TR allows the specification with poor insight.

2. Results

2.1.1. Descriptive statistics and reliability

Descriptive statistics and item and reliability analyses calculated with SPSS 14.0 are presented in Table 1. The total scale and the Washing, Obsessing, Hoarding, Ordering, and Checking subscales had excellent internal consistency, with all coefficient α's $\geq$ .75 (20 of 24 coefficient α's $\geq$ .84). For each item, the corrected item–total correlations exceeded .50. For the Neutralizing subscale, results suggested adequate internal consistency only in the OCD sample (α = .76). In the non-OCD samples, internal consistency was poor (α-range = .51–.68). The item-scale correlations were acceptable ($r_{jt} > .40$) with two exceptions: in the DCs and ADCs samples, corrected item–total correlations were <.40 for Item 16 (''I feel that there are good and bad numbers'').

2.2. Cultural differences

In order to compare our sample with the US American ones of Abramowitz and Deacon (2006), Foa et al. (2002), and Huppert et al. (2007), confidence intervals were calculated for the mean scores in each sample. The patients in our sample had higher Checking and lower Obsessing and Hoarding scores (see Table 2). Differences between the US American samples were considerably smaller.

2.3. Factor structure of the OCI-R

To examine the six-factor structure of the OCI-R, a confirmatory factor analysis was conducted with AMOS 6.0 software. To handle the few missing data, we estimated the means and intercepts with the full information maximum likelihood estimates (FIML). In a first step, the model was calculated exclusively for the OCs. There are different types of fit indices to evaluate the fit of a model (for a review, see Kline, 1998). Different model fit indices showed an excellent fit for the model, root mean square error of approximation (RMSEA) = .052; Tucker–Lewis Index (TLI) = 0.961; Comparative Fit Index (CFI) = 0.973. Furthermore, the model had a significant Chi-square, $\chi^2(120) = 174.694$, χ^2/d.f. = 1.456, $p < .001$, indicating a difference between empirical and estimated data and an insufficient fit for the model (see Kline, 1998). This result is explainable by the large sample size. In large samples, the χ^2-value may best be ignored (Jöreskog & Sörbom, 1993).

Table 1
Descriptive statistics and reliability of the OCI-R scales

Sample	n	α	r_{jt}	Inter-item r	M	S.D.	Md	M range (items)	S.D. range (items)	Skewness	Kurtosis
Washing											
OCs	167	.91	.79–.85	.75–.82	4.62	4.42	3.0	1.41–1.67	1.54–1.63	0.43	−1.35
ACs	61	.93	.75–.92	.68–.82	0.79	2.06	0.0	0.21–0.28	0.69–0.80	3.11	9.38
DCs	80	.75	.55–.63	.36–.50	1.02	1.79	0.0	0.26–0.39	0.69–0.75	2.07	3.45
ADCs	69	.76	.52–.74	.40–.60	1.26	1.98	0.0	0.36–0.51	0.75–0.87	1.98	3.64
Obsessing											
OCs	165	.84	.65–.78	.49–.72	5.30	3.78	5.0	1.33–2.04	1.38–1.49	0.26	−0.97
ACs	62	.76	.55–.60	.48–.62	2.55	2.65	2.0	0.53–1.08	0.94–1.21	0.83	−0.44
DCs	82	.83	.65–.74	.49–.69	3.04	2.90	2.0	0.74–1.20	1.04–1.16	1.13	1.01
ADCs	69	.75	.52–.64	.33–.54	4.19	2.94	4.0	0.97–1.67	1.15–1.25	0.62	−0.12
Hoarding											
OCs	167	.84	.65–.76	.59–.70	2.31	2.82	1.0	0.64–1.13	0.96–1.24	1.22	0.74
ACs	61	.88	.67–.84	.49–.61	1.21	2.21	0.0	0.25–0.66	0.75–0.95	3.04	10.93
DCs	83	.91	.81–.86	.67–.73	2.65	3.05	2.0	0.72–1.19	1.05–1.14	1.45	1.70
ADCs	69	.85	.72–.78	.57–.61	1.74	2.47	1.0	0.42–0.86	0.76–1.15	1.86	3.53
Ordering											
OCs	166	.95	.87–.91	.82–.86	4.92	4.12	4.0	1.55–1.78	1.43–1.48	.41	−1.16
ACs	61	.87	.69–.83	.62–.78	2.08	2.50	1.0	.57–.79	0.88–0.99	1.25	1.02
DCs	82	.88	.72–.84	.60–.76	3.59	3.14	3.0	1.06–1.30	1.13–1.18	0.86	0.06
ADCs	69	.85	.66–.80	.53–.77	3.33	2.89	3.0	0.90–1.28	1.02–1.45	0.72	−0.31
Checking											
OCs	166	.94	.85–.89	.80–.85	6.46	4.26	6.5	1.95–2.49	1.40–1.58	−0.07	−1.41
ACs	61	.92	.80–.88	.67–.77	1.85	2.84	0.0	0.54–0.70	0.99–1.07	1.75	2.49
DCs	81	.96	.91–.93	.79–.83	2.74	3.49	2.0	0.86–0.98	1.18–1.22	1.49	1.28
ADCs	68	.92	.81–.87	.64–.72	2.54	3.27	1.5	0.71–1.03	1.13–1.19	1.60	1.89
Neutralizing											
OCs	165	.76	.44–.71	.34–.73	2.51	3.19	1.0	0.73–1.02	1.25–1.33	1.37	1.03
ACs	61	.68	.43–.67	.11–.41	0.70	1.54	0.0	0.18–0.34	0.53–0.85	3.59	15.38
DCs	83	.61	.29–.47	.21–.56	1.22	1.69	0.0	0.17–0.55	0.44–0.94	1.66	2.78
ADCs	69	.51	.04–.55	.05–.65	0.96	1.82	0.0	0.26–0.41	0.75–0.99	2.17	4.37
Total											
OCs	161	.85	.32–.62	–	26.22	13.38	25.0	–	–	0.64	0.08
ACs	57	.94	.41–.83	–	9.30	11.28	6.5	–	–	2.60	7.87
DCs	78	.92	.28–.85	–	14.53	12.25	11.0	–	–	1.54	2.24
ADCs	68	.85	.18–.67	–	14.15	9.83	11.0	–	–	1.06	0.57

Note. OCs = patients with OCD; ACs = patients with other anxiety disorders without depression; DCs = patients with depression without anxiety disorders; ADCs = patients with other anxiety disorders and depression; n = sample size; α = Cronbach's α; r_{jt} = corrected item–total correlations (range); inter-item r = Spearman inter-item correlations (range); M = mean; S.D. = standard deviation; Md = median; M range (items) = item means (range); S.D. range (items) = item standard deviations (range).

In a second step, the model was independently estimated for the four groups (OCs, ACs, DCs, and ADCs) indicating a poorer, but still acceptable fit for the model, $\chi^2(480) = 768.559$, χ^2/d.f. = 1.601; RMSEA = .040; TLI = 0.908; CFI = 0.936. It can be assumed that the six-factor structure was valid in each of the different samples. A multigroup comparison for all groups showed significant structural differences (d.f.-difference = 36; χ^2-difference = 66.837, $p = .001$) indicating that the six latent factors had different associations in the groups. As a result, we decided to regard the four samples separately in all following analyses.

Most items showed the highest squared multiple correlations (SMC) in the OCD group indicating that the measure had the best fit in this sample. In the OCD group, all items had acceptable to excellent SMCs (see Fig. 1) except for Item 16 (''I feel that there are good and bad numbers''). In the other groups the fit of this item was also very poor (SMC-range = 0.01–0.25). The other 17 items mostly showed acceptable SMC-values > 0.40 (65 of 68 coefficients). For the Washing, Obsessing, Hoarding, Ordering, and Checking subscales the criteria of other local fit indices (factor reliability $> .60$; average estimated variance $> .50$; and

Table 2
Cultural differences

	Abramowitz and Deacon (2006)				Huppert et al. (2007)				Foa et al. (2002)				Gönner et al.			
	M	S.D.	CI−	CI+	*M*	S.D.	CI−	CI+	*M*	S.D.	CI−	CI+	*M*	S.D.	CI−	CI+
Total	27.0	13.2	25.0	29.0	26.3	12.8	24.5	28.1	28.0	13.5	26.2	29.8	26.1	13.3	24.1	28.1
Obsessing	6.4	4.1	5.8	7.0	6.6	3.8	6.1	7.2	7.2	3.8	6.7	7.7	5.3	3.8	4.7	5.9
Washing	5.0	4.3	4.4	5.7	4.1	4.0	3.5	4.7	4.4	4.3	3.8	4.9	4.6	4.4	4.0	5.3
Checking	5.0	3.7	4.4	5.6	4.4	3.6	3.9	4.9	4.8	3.8	4.3	5.3	6.5	4.3	5.8	7.1
Neutralizing	2.6	3.4	2.1	3.1	2.5	3.2	2.0	3.0	3.2	3.8	2.7	3.7	2.5	3.2	2.0	3.0
Ordering	4.9	4.0	4.3	5.5	4.4	3.5	3.9	4.9	4.8	4.0	4.2	5.3	4.9	4.1	4.3	5.6
Hoarding	3.2	3.7	2.6	3.8	4.3	4.1	3.7	4.9	3.7	3.9	3.2	4.2	2.3	2.8	1.9	2.7

Note. *M* = mean; S.D. = standard deviation; CI− to CI+ = 95% confidence interval.

Fornell–Larcker-Ratio < 1) were fulfilled in each sample with only one exception (ACs group: FL-Ratio$_{hoarding}$ = 1.01). The Neutralizing scale completely fulfilled these criteria only in the OCs group.

2.4. Correlations between OCI-R scales

Spearman correlations of the OCI-R scales are presented in Table 3. The pattern of correlations differed considerably between subgroups. In the OCD sample, correlations between subscales were low to moderate. The highest correlation was found between Hoarding and Ordering (r_s = .50). All other coefficients were ≤.37. In the ACs and DCs samples, correlations between subscales were moderate (ACs: r_s-range = .28–.47; DCs: r_s-range = .22–.55). In the ADCs sample, correlations between subscales mainly were low to moderate (ADCs: r_s-range = .04–.51). In all samples, correlations between the subscales and the total score were moderate to high (r_s-range = .41–.79).

2.5. Convergent and divergent validity

2.5.1. OCD sample

Convergent and divergent validity of the German version of the OCI-R and its subscales in the OCD sample are presented in Table 4. Correlations of the OCI-R and its subscales with corresponding PI-WSUR scales and the SOAQ demonstrated excellent convergent validity of the OCI-R total scale (r_s = .80) and the

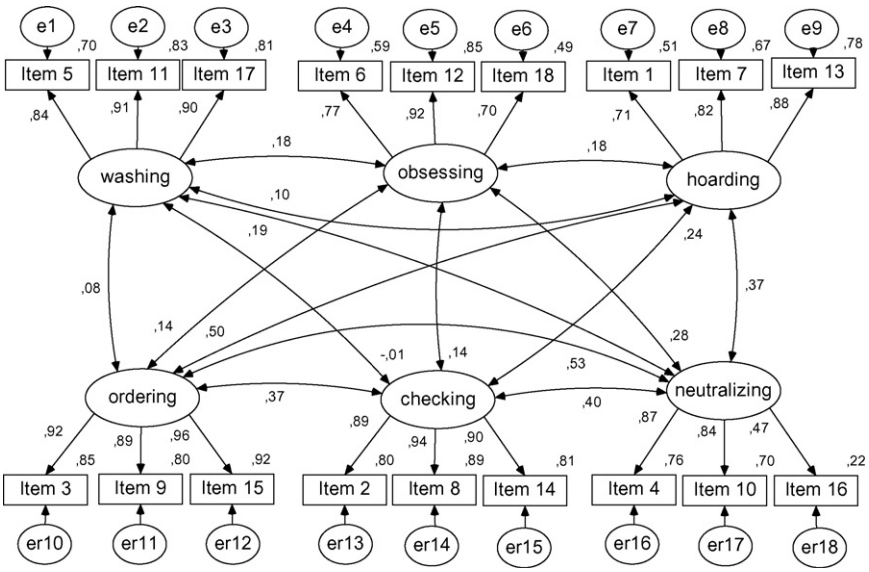

Fig. 1. Model of the confirmatory factor analysis for the OCD group without any group comparison. All estimates are standardized. Rectangles represent observed variables (manifest variables, items), ellipses represent unobserved variables (latent variables, factors). Double-headed arrows are a symbol for a correlation. Values on top of a box are squared multiple correlations (percentage of explained variance). The entries near the arrows between the latent variables are standardized regression weights.

Table 3
Spearman correlations between OCI-R scales

	OCI-R					
	Total	Washing	Obsessing	Hoarding	Ordering	Checking
OCs						
Washing	.49** (167)	–				
Obsessing	.55** (165)	.18* (165)	–			
Hoarding	.59** (167)	.13 (167)	.21** (165)	–		
Ordering	.68** (166)	.15 (166)	.14 (164)	.50** (166)	–	
Checking	.56** (166)	.02 (166)	.16* (164)	.23** (166)	.34** (165)	–
Neutralizing	.64** (165)	.24** (165)	.32** (163)	.33** (165)	.37** (164)	.30** (164)
ACs						
Washing	.52** (61)	–				
Obsessing	.72** (62)	.28* (61)	–			
Hoarding	.59** (61)	.36** (60)	.45** (61)	–		
Ordering	.69** (61)	.32* (60)	.32* (61)	.31* (60)	–	
Checking	.72** (61)	.42** (60)	.30* (61)	.33* (60)	.47** (60)	–
Neutralizing	.51** (61)	.35** (60)	.26* (61)	.22 (60)	.31* (60)	.50** (60)
DCs						
Washing	.62** (80)	–				
Obsessing	.78** (82)	.46** (80)	–			
Hoarding	.61** (83)	.40** (80)	.31** (82)	–		
Ordering	.73** (82)	.41** (79)	.47** (81)	.32** (82)	–	
Checking	.79** (81)	.49** (79)	.55** (80)	.50** (81)	.51** (80)	–
Neutralizing	.53** (83)	.35** (80)	.47** (82)	.22* (83)	.37** (82)	.44** (81)
ADCs						
Washing	.41** (69)	–				
Obsessing	.54** (69)	.04 (69)	–			
Hoarding	.50** (69)	.02 (69)	.16 (69)	–		
Ordering	.79** (69)	.29* (69)	.26*(69)	.32** (69)	–	
Checking	.72** (68)	.37** (68)	.18 (68)	.28* (68)	.51** (68)	–
Neutralizing	.52** (69)	.26* (69)	.24 (69)	.25* (69)	.36** (69)	.27* (68)

Note. Numbers enclosed in parentheses = sample size; OCs = patients with OCD; ACs = patients with other anxiety disorders without depression; DCs = patients with depression without anxiety disorders; ADCs = patients with other anxiety disorders and depression.
* $p < .05$.
** $p < .01$.

subscales Washing ($r_s = .93$), Checking ($r_s = .88$), and Ordering (SOAQ: $r_s = .89$; PI-WSUR Dressing and Grooming: $r_s = .68$). The correlation of OCI-R-Ordering with PI-WSUR Dressing and Grooming was quite high, but not as high as the correlation with the SOAQ, reflecting the different degree of conceptual similarity of these two scales. Furthermore, moderate correlations were found between Obsessing and the PI-WSUR subscales Obsessional Thoughts of Harm ($r_s = .55$) and Obsessional Impulses to Harm ($r_s = .45$). The correlations between the OCI-R total scale and the Y-BOCS-SRS total scale ($r_s = .43$) and between OCI-R Obsessing and Y-BOCS-SRS Obsessions ($r_s = .40$) were moderate.

On the whole, correlations between OCI-R subscales and measures of anxiety, worry, and depression were low. The highest correlations were found between Obsessing and BAI ($r_s = .41$) and Obsessing and PSWQ ($r_s = .38$). The correlations of the total scale with measures of anxiety, worry, and depression were low to moderate (r_s-range = .32–.42). The correlations of the OCI-R total scale and the Washing, Checking, and Ordering subscales with the BDI, BAI, and PSWQ were clearly lower than the correlations with corresponding scales. However, this does not apply to the correlations of OCI-R Obsessing with the PI-WSUR subscales Obsessional Thoughts and Obsessional Impulses. All the correlations between OCI-R scales and perfectionism (FMPS-D) were low (r_s-range = −.05 to .20). In sum, these results demonstrate good convergent and divergent validity for the German version of the OCI-R in a sample of OCD patients.

2.5.2. Anxiety and depression samples

Convergent and divergent validity of the German version of the OCI-R and its subscales in the anxiety and depression samples are presented in Table 5. The

Table 4
Convergent and divergent validity (OCD sample only)

	OCI-R						
	Total	Washing	Obsessing	Hoarding	Ordering	Checking	Neutralizing
Y-BOCS-SRS							
Total	.43** (151)	.27** (151)	.34** (150)	.24** (151)	.25** (150)	.22** (150)	.28** (149)
Obsessions	.38** (151)	.15 (151)	.40** (150)	.19* (151)	.21* (150)	.23** (150)	.25** (149)
Compulsions	.36** (154)	.31** (154)	.18* (153)	.19* (154)	.27** (153)	.15 (153)	.22** (152)
PI-WSUR							
Total	.80** (167)	.68** (167)	.46** (165)	.40** (167)	.45** (166)	.46** (166)	.37** (165)
Ob. Thoughts	.44** (167)	.23** (167)	.55** (165)	.21** (167)	.15 (166)	.29** (166)	.14 (165)
Ob. Impulses	.35** (167)	.17* (167)	.45** (165)	.32** (167)	.15 (166)	.05 (166)	.19* (165)
Washing	.48** (167)	.93** (167)	.20** (165)	.20** (167)	.20** (166)	−.01 (166)	.22** (165)
Checking	.67** (167)	.12 (167)	.23** (165)	.37** (167)	.47** (166)	.88** (166)	.37** (165)
Dressing/Gr.	.67** (167)	.41** (167)	.21** (165)	.36** (167)	.68** (166)	.27** (166)	.38** (165)
SOAQ	.62** (138)	.16 (138)	.09 (136)	.46** (138)	.89** (137)	.25** (137)	.34** (136)
BAI	.42** (155)	.18* (155)	.41** (154)	.25** (155)	.25** (154)	.22** (154)	.08 (153)
BDI	.32** (156)	.21** (156)	.29** (156)	.22** (156)	.19* (155)	.10 (155)	.10 (154)
PSWQ	.35** (157)	.16* (157)	.38** (156)	.06 (157)	.15 (156)	.33** (156)	.07 (155)
MPS	.13 (126)	.00 (126)	.05 (125)	.19* (126)	.16 (125)	.12 (125)	−.06 (124)
PSSI-CS	.36** (127)	.00 (127)	.05 (126)	.18* (127)	.44** (126)	.32** (126)	.14 (125)

Note. Numbers enclosed in parentheses = sample size.
* $p < .05$.
** $p < .01$.

correlations of the OCI-R and its subscales with corresponding PI-WSUR scales demonstrated acceptable to excellent convergent validity of the OCI-R total scale (r_s-range = .76–.88) and the subscales Checking (r_s-range = .75–.81), Washing (r_s-range = .65–.76), and Obsessing (with PI-WSUR Obsessional Thoughts of Harm: r_s-range = .57–.68). In all samples the correlations of the OCI-R Washing and Checking subscales with corresponding PI-WSUR subscales and of OCI-R Obsessing with PI-WSUR Obsessional Thoughts were higher than the correlations with non-corresponding PI-WSUR subscales and higher than the correlations between corresponding PI-WSUR subscales and other OCI-R subscales, but in sum, the differences are not as high as in the OCD sample. The correlations between Obsessing and PI-WSUR Obsessional Impulses were quite low in the anxiety (r_s = .38) and anxiety/depression (r_s = .25) samples and adequate in the depression sample (r_s = .61). Correlations between Ordering and PI-WSUR Dressing and Grooming (r_s-range = .61–.74) were appropriate. Furthermore, substantial correlations were found between PI-WSUR Dressing and Grooming and the OCI-R subscales Washing and Checking, but also with the PI-WSUR subscales Contamination/Washing (r_s-range = .45–.65), Checking (r_s-range = .47–.64) and Obsessional Thoughts (r_s-range = .25–.62). This may indicate a low specificity of the PI-WSUR subscale Dressing and Grooming in samples of patients with anxiety and depression.

For all three clinical control samples, the correlations of anxiety, worry, and depression scales with the OCI-R total scale (BAI: r_s-range = .30–.52; BDI: r_s-range = .27–.41; PSWQ: r_s-range = .37–.48) and the subscales Washing (r_s-range = .06–.35), Hoarding (r_s-range = .01–.41), Ordering (r_s-range = .14–.37), Checking (r_s-range = .19–.35), and Neutralizing (r_s-range = .01–.41) were low to moderate. The coefficients were clearly lower than the correlations between the OCI-R scales and corresponding PI-WSUR scales. Mainly moderate correlations were found with the Obsessing subscale (BAI: r_s-range = .31–.62; PSWQ: r_s-range = .36–.54; BDI: r_s-range = .24–.48), indicating a moderate construct overlap of obsessing with anxiety, worry, and depression in the samples of patients with anxiety and/or depression. However, in all samples these correlations were lower than those between OCI-R Obsessing and PI-WSUR Obsessional Thoughts. These findings can be interpreted as modest support for the divergent validity of the Obsessing subscale. The divergent validity of the Obsessing subscale with regard to the measurement of impulses to harm is poor because the correlations of OCI-R Obsessing with PI-WSUR Impulses were not higher as those found with measures of anxiety, worry, and

Table 5
Convergent and divergent validity (samples with anxiety and/or depression)

	OCI-R						
	Total	Washing	Obsessing	Hoarding	Ordering	Checking	Neutralizing
ACs							
PI-WSUR							
Total	.88** (62)	.54** (61)	.62** (62)	.46** (61)	.59** (61)	.67** (61)	.58** (61)
Ob. Thoughts	.79** (62)	.46** (61)	.68** (62)	.44** (61)	.46** (61)	.53** (61)	.47** (61)
Ob. Impulses	.55** (62)	.38** (61)	.38** (62)	.32* (61)	.51** (61)	.36** (61)	.52** (61)
Washing	.63** (62)	.65** (61)	.34** (62)	.41** (61)	.46** (61)	.48** (61)	.42** (61)
Checking	.83** (62)	.41** (61)	.56** (62)	.42** (61)	.56** (61)	.76** (61)	.48** (61)
Dressing/Gr.	.69** (61)	.56** (60)	.36** (61)	.46** (60)	.61** (60)	.61** (61)	.48** (60)
BAI	.30* (58)	.19 (57)	.31* (58)	.02 (57)	.18 (57)	.24 (57)	.38** (57)
BDI	.41** (58)	.25* (57)	.36** (58)	.23 (57)	.33* (57)	.33* (57)	.31* (57)
PSWQ	.48** (62)	.17 (61)	.54** (62)	.41** (61)	.24 (61)	.33** (61)	.23 (61)
DCs							
PI-WSUR							
Total	.88** (82)	.65** (79)	.72** (81)	.43** (82)	.69** (81)	.73** (80)	.44** (82)
Ob. Thoughts	.72** (82)	.54** (79)	.68** (81)	.28** (82)	.60** (81)	.58** (80)	.40** (82)
Ob. Impulses	.49** (83)	.35** (80)	.61** (82)	.17 (83)	.33** (82)	.29** (81)	.33** (83)
Washing	.66** (83)	.76** (80)	.41** (82)	.43** (83)	.53** (82)	.51** (81)	.30** (83)
Checking	.81** (83)	.50** (80)	.60** (82)	.43** (83)	.63** (82)	.81** (81)	.45** (83)
Dressing/Gr.	.66** (83)	.49** (80)	.45** (82)	.31** (83)	.74** (82)	.56** (81)	.32** (83)
BAI	.52** (79)	.35** (76)	.62** (78)	.17 (79)	.35** (78)	.35** (77)	.41** (79)
BDI	.35** (82)	.24* (79)	.48** (81)	.06 (82)	.32** (81)	.19 (80)	.35** (82)
PSWQ	.37** (83)	.06 (80)	.36** (82)	.13 (83)	.25* (82)	.30** (81)	.18 (83)
ADCs							
PI-WSUR							
Total	.76** (67)	.53** (67)	.33** (67)	.38** (67)	.60** (67)	.67** (66)	.38** (67)
Ob. Thoughts	.60** (68)	.24* (68)	.57** (68)	.33** (68)	.48** (68)	.32** (67)	.22 (68)
Ob. Impulses	.29* (69)	.14 (69)	.25* (69)	.35** (69)	.14 (69)	.23 (68)	.29* (69)
Washing	.52** (69)	.68** (69)	.05 (69)	.21 (69)	.41** (69)	.53** (68)	.39** (69)
Checking	.69** (69)	.35** (69)	.22 (69)	.40** (69)	.52** (69)	.75** (68)	.31** (69)
Dressing/Gr.	.55** (67)	.52** (67)	.07 (67)	.24 (67)	.55** (67)	.48** (66)	.38** (67)
BAI	.37** (67)	.20* (67)	.26* (67)	.01 (67)	.34** (67)	.27* (66)	.23 (67)
BDI	.27* (67)	.08 (67)	.24 (67)	.04 (67)	.14 (67)	.27* (66)	.17 (67)
PSWQ	.44** (68)	.14 (68)	.44** (68)	.28* (68)	.37** (68)	.24 (68)	.01 (68)

Note. Numbers enclosed in parentheses = sample size; ACs = patients with other anxiety disorders without depression; DCs = patients with depression without anxiety disorders; ADCs = patients with other anxiety disorders and depression.
* $p < .05$.
** $p < .01$.

depression. In sum, the German version of the OCI-R demonstrated good convergent and divergent validity in samples of patients with anxiety and/or depression.

2.5.3. Comparisons of the divergent validity with depressive and anxious symptoms in different samples

To further examine the divergent validity of the OCI-R with depression, the correlations between OCI-R total score and BDI were examined in three subsamples: patients diagnosed with (a) OCD without depression ($r_s = .26$, $n = 96$), (b) depression without OCD ($r_s = .33$, $n = 149$), and (c) OCD and depression ($r_s = .40$, $n = 60$). The subsample of patients with comorbid OCD and depression showed the highest correlation. To further examine the divergent validity of the OCI-R with anxiety, the correlations between OCI-R total score and BAI were examined in three subsamples: patients diagnosed with (a) OCD without anxiety ($r_s = .42$, $n = 138$), (b) anxiety without OCD ($r_s = .36$, $n = 125$), and (c) OCD and anxiety ($r_s = .50$, $n = 17$). The subsample of patients with comorbid OCD and anxiety showed the highest correlation.

Table 6
Differences between patients with OCD and patients with anxiety and/or depression on the OCI-R and its subscales

OCI-R subscales	Groups												Brown–Forsythe JM[a]	
	OCs			ACs			DCs			ADCs			F^+	d.f.[2]
	M	S.D.	*n*	*M*	S.D.	*n*	*M*	S.D.	*n*	*M*	S.D.	*n*		
Washing	4.62	4.42	167	0.79*	2.06	61	1.03*	1.79	80	1.26*	1.98	69	59.76	351
Obsessing	5.30	3.78	165	2.55*	2.65	62	3.04*	2.90	82	4.19*	2.94	69	7.43	340
Hoarding	2.31	2.82	167	1.21*	2.22	61	2.65	3.05	83	1.74	2.47	69	4.30	306
Ordering	4.92	4.12	166	2.08*	2.50	61	3.59*	3.14	82	3.33*	2.89	69	13.83	353
Checking	6.46	4.26	166	1.85*	2.84	61	2.74*	3.49	81	2.54*	3.27	68	43.84	337
Neutralizing	2.51	3.19	165	0.71*	1.54	61	1.22*	1.69	83	0.96*	1.82	69	17.77	368
Total	26.1	13.3	167	9.3*	10.9	62	14.2*	12.0	83	14.0*	9.9	69	45.94	324

Note. Means with an asterisk were significantly lower at $p < .05$ compared to the OCs mean (Games–Howell's multiple comparisons). F^+: Brown–Forsythe-JM test score; OCs = patients with OCD; ACs = patients with other anxiety disorders without depression; DCs = patients with depression without anxiety disorders; ADCs = patients with other anxiety disorders and depression; *M* = mean; S.D. = standard deviation; *n* = sample size.
[a] For the total scale and all subscales Brown–Forsythe-JM tests of differences between means were significant at $p < .05$.

2.6. Construct validity of the OCI-R subscales with obsessive–compulsive personality features

As expected, the correlations between the OCI-R scales and the PSSI-CS indicated low to moderate relationships with the OCI-R subscales Hoarding ($r_s = .18$), Checking ($r_s = .32$), and Ordering ($r_s = .44$), but no association with Washing and Obsessing (see Table 4).

2.7. Known-groups validity: differences between OCD patients and non-OCD groups

For the OCI-R total scale and subscales, differences between patients with OCD and patients with anxiety and/or depression were examined. Results are presented in Table 6. For all scales Brown–Forsythe-JM tests of differences between means were significant and indicated group differences between OCs, ACs, DCs, and ADCs. For the total scale and the subscales Washing, Checking, Ordering, Obsessing, and Neutralizing Games–Howell's pairwise comparisons showed that OCD patients had significantly higher scores than the control groups. For the Hoarding subscale patients with OCD had significantly higher scores than the ACs but they did not differ significantly from the DCs and ADCs. α was set to $p < .05$, two-tailed.

2.8. Diagnostic accuracy of the OCI-R and its subscales

To examine the extent to which the total scale can accurately classify patients as having a diagnosis of OCD or a different disorder, receiver operating characteristic (ROC) analyses were conducted using the SPSS procedure ROC curves, and the sensitivity (accuracy of identifying true positives; i.e., OCD patients) and specificity (accuracy of identifying true negatives; i.e., non-OCD patients) were determined at different cutscores. The ROC analysis uses the association between the sensitivity (true positives) and one minus the specificity (false negatives) to estimate an area under the curve (AUC) which indicates how well the classifier (i.e., the OCI-R) discriminates between positive and negative cases. An AUC value of 1.0 evidences a perfect classifier, an AUC value of .5 level of chance. To identify an optimal cutscore, the Youden index (sensitivity + specificity − 1) was calculated at different cutscores. The predictive accuracy at selected cutoff scores is presented in Table 7 separately for each sample. The OCI-R total scale discriminated OCD patients best from those with other diagnoses (AUC = .81; confidence interval (CI) = .77–.85, $p < .01$). AUC estimates for the subscales ranged from .53 (Hoarding) to .78 (Checking). We further conducted ROC analyses using the total score separately for the different samples. The AUC estimates were better for distinguishing OCs from ACs (AUC = .88; CI = .82–.94, $p < .01$) than from both DCs (AUC = .78; CI = .72–.85, $p < .01$) and ADCs (AUC = .78; CI = .71–.84, $p < .01$).

In the total sample, the optimal cutscore was 17 (Youden index = .52). In the OCs–DCs and OCs–ADCs samples, the same cutscores were identified. In the OCs–ACs sample, different total scores (11, 12, and 14) showed the highest Youden indexes, and total scores ranging from 10 to 19 had good discriminative power. In

Table 7
Predictive accuracy of the OCI-R total score at selected cutscores

Cutscore	Total sample		OCs–ACs		OCs–DCs		OCs–ADCs	
	Sensitivity	Specificity	Sensitivity	Specificity	Sensitivity	Specificity	Sensitivity	Specificity
5	.98	.28	.98	.43	.98	.25	.98	.16
10	.88	.54	.88	.71	.88	.46	.88	.48
11	.85	.59	.85	.77	.85	.52	.85	.52
12	.83	.62	.83	.79	.83	.53	.83	.58
13	.82	.64	.82	.79	.82	.55	.82	.61
14	.81	.68	.81	.81	.81	.61	.81	.64
15	.77	.71	.77	.84	.77	.65	.77	.68
16	.75	.75	.75	.84	.75	.72	.75	.70
17	.74	.78	.74	.87	.74	.76	.75	.71
18	.71	.80	.71	.90	.71	.78	.71	.72
19	.68	.82	.68	.92	.68	.79	.68	.75
20	.65	.83	.65	.93	.65	.79	.65	.78
21	.64	.84	.64	.93	.64	.81	.64	.80
22	.61	.86	.61	.93	.61	.84	.61	.81
23	.55	.88	.55	.93	.55	.87	.55	.85
24	.52	.88	.52	.93	.52	.87	.52	.85
25	.48	.89	.48	.93	.48	.88	.48	.87
30	.28	.92	.28	.95	.28	.90	.28	.91

Note. OCs = patients with OCD; ACs = patients with other anxiety disorders without depression; DCs = patients with depression without anxiety disorders; ADCs = patients with other anxiety disorders and depression.

sum, a cutscore of 17 appears to be suitable for all samples. Overall, these results demonstrate good discriminative power of the OCI-R total scale for distinguishing OCD patients from both patients with other anxiety and depressive disorders, and its use as a diagnostic tool can be recommended.

3. Discussion

The current study examined the psychometric properties, factor structure, and convergent, divergent, and discriminant validity of the German version of the OCI-R in patients with OCD, other anxiety disorders, and depressive disorders. Our factor-analytic findings confirmed the original six-factor structure (Foa et al., 2002) in these clinical samples and replicated results reported in previous studies for the original version (e.g., Abramowitz & Deacon, 2006; Huppert et al., 2007). The model showed an excellent fit in the OCD sample and an acceptable fit in the samples with anxiety and depressive disorders. However, although the factor structure was replicated in each of the samples, our factor-analytic findings indicated different associations between the six latent factors in the four samples. In view of this discrepancy, we decided to conduct further analyses separately for each sample.

Low to moderate correlations of the subscales with each other and moderate to high correlations of the subscales with the total score demonstrated that the subscales cover differential aspects of OCD, but also share a common theme (obsessive–compulsive symptoms). This confirms the construct validity of the measure and the underlying assumption of distinct symptom dimensions/subtypes belonging to a joint disorder category, obsessive–compulsive disorder.

The total scale and all subscales showed excellent internal consistency and local fit indices in the different samples, except for Neutralizing. Internal consistency and local fit indices for this subscale were adequate only in the OCD sample, but poor in the non-OCD samples, consistent with previous studies which also found a poor internal consistency in clinical (Huppert et al., 2007) and non-clinical (Foa et al., 2002; Fullana et al., 2005) samples. Although a replacement of the Item ‘‘I feel that there are good and bad numbers’’ or a removal of the Neutralizing scale would significantly improve the factor structure of the OCI-R, given the excellent fit of the other subscales, we would argue for a revision of this subscale, as neutralizing strategies are an essential and treatment-relevant aspect of the clinical picture of OCD.

The items of the OCI-R Neutralizing scale relate to numbers and counting-complaints. Item 16 (‘‘I feel that there are good and bad numbers’’) and Item 10 (‘‘I feel I have to repeat certain numbers’’) refer to covert neutralizing on a ‘‘superstitious’’ basis, whereas Item 4 (‘‘I feel compelled to count while I am doing things’’) may also be endorsed, e.g., by OCD sufferers with washing or checking compulsions who simply count

how often they have already repeated a particular ritual. In this case, counting may not be motivated by superstitious beliefs, but by a need to define an (artificial) criterion for action completion (e.g., ''I always check twenty times'') despite continuing incompleteness feelings (Ecker & Gönner, 2006). Therefore, Item 4 cannot be unequivocally subsumed under the rubric *mental neutralizing*. Likewise, Abramowitz and Deacon (2006, p. 1033) emphasize that ''numbers and counting-complaints are observed across the various presentations of OCD ... [and] most prominent in patients with symmetry, ordering and incompleteness symptoms.''

Finally, a scale that restricts item contents to mental neutralizing with numbers fails to capture many clinically relevant neutralization phenomena. According to Clark (2004, p. 44), neutralization involves ''intentional, effortful and voluntary overt and covert acts directed at cancelling out the occurrence of an obsession or its associated discomfort, or to prevent a dreaded outcome symbolized in the obsession''. This includes, for example, overt neutralization by repeating compulsions based on superstitious beliefs, covert praying rituals in response to blasphemous intrusions or ''good thoughts'' conjured up to ''undo'' aggressive intrusions.

In sum, a revision of the Neutralizing subscale should correspond more closely to the definition of the clinical phenomenon in question. In order to achieve this goal, it would be necessary both to remove Item 4 that does not exclusively refer to neutralization, and to add items for covert (and possibly even overt) neutralization strategies unrelated to numbers and counting.

In addition, results indicated good convergent and divergent validity for the full scale and the subscales, and only a slight construct overlap between OCD and depression, anxiety, pathological worry, and perfectionism. In the different samples, the total scale and the Washing, Checking, and Ordering subscales demonstrated good to excellent convergent validity with self-rating measures of OCD and acceptable to excellent divergent validity with measures of anxiety, worry, and depression. The latter also applies to the Hoarding and Neutralizing subscales. Convergent validity of these two scales was not examined in this study and needs further exploration in clinical samples. Fullana et al. (2005) found a moderate relationship between Hoarding and the Saving Inventory-Revised (Frost, Steketee, & Grisham, 2004) in a non-clinical sample. The correlation of the OCI-R with the Y-BOCS-SRS was quite low and in the same range as correlations reported in studies which used the Y-BOCS interview to examine convergent validity of the OCI-R (Abramowitz & Deacon, 2006; Foa et al., 2002). Abramowitz and Deacon assumed that the lower than expected correlations between OCI-R and Y-BOCS interview might be due to (a) method variance (self-report measure versus interview) and (b) the fact that the OCI-R measures distress associated with specific OC symptoms, whereas the Y-BOCS is a global measure of symptom severity. Our results suggest that the influence of the inherent method variance is less important than differences in the contents covered by both instruments.

In our sample, the correlations between OCI-R and BDI were clearly lower (r_s-range = .27–.41) than those found by Foa et al. (2002), indicating a relatively slight construct overlap between these two measures, even if patients with comorbid depression are not excluded from the analyses. The clear differences between the results are not due to a reduction of the standard deviation in our study (S.D.-range = 9.83–13.38; Foa et al.: $S.D._{OCD} = 13.5$; $S.D._{non\text{-}clinical\ controls} = 11.1$), but it has to be taken into account that Foa et al. analyzed a mixed sample of OCD patients and non-clinical controls. Furthermore, more precise analyses demonstrated that the correlation between OCI-R and depressive symptoms was higher in the subsample of patients diagnosed with comorbid OCD and depression than in the samples of patients with either depressive disorders or OCD alone, supporting the assumption of Foa et al. that the high correlations found between measures of OCD and depression may reflect the high levels of depression observed in OCD patients. In analogy, the correlation between OCI-R and anxiety symptoms was higher in the subsample of patients diagnosed with comorbid OCD and anxiety disorders than in the samples of patients with either anxiety disorders or OCD alone. In general, it can be assumed that the divergent validity of OCD measures may be underestimated if it is not examined separately in different subsamples, especially in samples with high depressive and anxiety disorder comorbidity rates.

The Obsessing scale showed substantial correlations with the PI-WSUR scale Obsessional Thoughts of Harm, but only a weaker association with PI-WSUR Obsessional Impulses to Harm. This indicates that the Obsessing subscale may cover obsessional thoughts better than obsessional impulses. Substantial relationships were also found between Obsessing and measures of anxiety, pathological worry, and depression, indicating a moderate construct overlap of Obsessing with anxiety, worry, and depression. This raises questions

regarding the divergent validity of the Obsessing subscale and, in particular, its ability to differentiate between obsessions and intrusive phenomena in anxiety and depressive disorders. On the other hand, with regard to the divergent validity with symptoms of GAD, an inspection of the PSWQ shows that the wording of items is unspecific and captures *worries* independently from specific symptom contents. Thus, the PSWQ may not differentiate between obsessions and worries very well, and the problem of divergent validity of OCD scales might, in part, be a problem of an unspecific measurement of pathological worry. In accordance with this, Stöber (2000) reported high correlations of the PSWQ with measures of anxiety, depression, OCD, and perfectionism. The divergent validity of the OCI-R scales with perfectionism was excellent.

The differential pattern of low to moderate correlations of obsessive–compulsive personality features with the subscales Ordering, Checking, and Hoarding, but no correlation with the subscales Washing and Obsessing is in line with empirical findings of several studies (see Ecker & Gönner, 2007) and therefore supports the construct validity of the OCI-R subscales.

Furthermore, our results strongly support the discriminant validity of the OCI-R. OCD patients had higher scores than patients with anxiety and/or depressive disorders on the OCI-R and its subscales, except for the Hoarding scale. These results confirm those reported by Foa et al. (2002). The absence of mean differences concerning Hoarding between the OCD group and the groups with anxiety and/or depressive disorders in our study is likely to be due to the low prevalence of hoarding in our OCD sample. Huppert et al. (2007) found that patients with primary hoarding score higher on the OCI-R Hoarding scale than patients with other primary OC symptoms or GAD, supporting the divergent validity of this scale. In sum, the OCI-R appears to have clear support for its known-groups validity.

In the present study, patients with OC symptoms below the diagnostic threshold were not excluded in the samples of patients with anxiety and/or depressive disorders. This may have reduced the discriminative power of the OCI-R. An OCD patient with elevated scores exclusively on the Hoarding subscale, for example, might show a lower OCI-R total score than a depressive patient with ordering and checking symptoms below the diagnostic threshold. It can be assumed that some of the false positives were due to OC symptoms below the diagnostic threshold. Nevertheless, the German version of the OCI-R proved to be an effective and very useful diagnostic screening tool which discriminates well between OCD patients and patients with other anxiety disorders and/or depressive disorders. The optimal cutscore for distinguishing OCD patients from patients with anxiety and/or depressive disorders was 17, resulting in a correct classification of 74% of the OCD patients and 78% of patients with anxiety and/or depressive disorders. In view of the only small differences in discriminative power between several cutscores selected in our study, it is not surprising that different optimal cutscores were found in other studies with diverse compositions of the samples. Foa et al. (2002) found an optimal cutscore of 18 (for distinguishing OCD patients from a mixed sample of patients with GSP or PTSD), Abramowitz and Deacon (2006) a cutscore of 14 (for differentiating OCD patients from a mixed sample of patients with anxiety disorders). In our subsample of patients with anxiety disorders without depressive disorders, cutscores of 11, 12, and 14 showed the highest discriminative power. In all studies, approximately 75% of OCD patients and patients with other disorders can be correctly classified at the identified cutscores. The setting of a suitable cutscore decisively depends on the specific diagnostic problem and its requirements concerning the relative importance of sensitivity versus specificity. For utilization of the OCI-R as a screening tool, setting a lower cutscore might be better to reduce the rate of false negatives. Future studies should also examine the diagnostic accuracy of the OCI-R subscales to discriminate between OCD patients with a specific subtype, OCD patients without that symptom subtype, patients with other disorders and non-clinical controls.

Furthermore, the patients in our sample had higher Checking and lower Obsessing and Hoarding scores than the US American samples (see Abramowitz & Deacon, 2006; Foa et al., 2002; Huppert et al., 2007). Although this may be suggestive of cultural differences, the hypothesis that German OCD patients tend to suffer from checking more frequently and from hoarding and obsessional thoughts less frequently than OCD patients in the U.S.A. (or other countries) could only be tested by specific cross-cultural studies with representative samples.

In summary, our findings demonstrate that the German version of the OCI-R is, like the original version, a brief, psychometrically sound and valid measure for the assessment of a broad range of obsessive–compulsive symptoms, appropriate for the use in clinical and research settings. The present study replicated and extended previous findings with the original scale in a different cultural context. However,

the domains Neutralizing and Obsessions need further development.

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