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Dysfunctional beliefs in patients with obsessive-compulsive disorder and depression as assessed with the Beliefs Questionnaire (BQ)

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ABSTRACT

There is an ongoing debate about the specificity of dysfunctional beliefs in patients with obsessive-compulsive disorder (OCD) as some of these beliefs seem to be relevant in depressed patients as well. The present study aimed to elucidate the specificity of dysfunctional beliefs using the newly developed Beliefs Questionnaire (BQ). A combination of an online assessment and clinical interviews was carried out. One hundred thirty OCD patients (M = 38.7 years; 68% women) were compared to 85 patients with depression (M = 36.6 years; 75% women) and 220 nonclinical controls (M = 38.9 years; 71% women) on the BQ, which contains 13 items tapping cognitive beliefs. The BQ was validated against the Obsessive Beliefs Questionnaire (OBQ). Patients with OCD and depression scored higher on the BQ compared to nonclinical controls. OCD patients displayed higher values on overestimation of threat and the fear of becoming insane. Correlation between BQ and OBQ total scores was high (r = 0.751), supporting the validity of the new scale. Our results show that two beliefs are OCD-specific. However, the BQ covers mainly transdiagnostic features and should be replicated with the inclusion of an anxiety disorder sample.

1. Introduction

Obsessive-compulsive disorder (OCD) is a mental disorder that is characterized by intrusive, repetitive, and perturbing thoughts (i.e., obsessions) that evoke negative feelings (e.g., fear of or disgust related to germs; Kim et al., 2016). Obsessions are usually followed by ritualized behavior (i.e., compulsions such as excessive cleaning or hand washing; American Psychiatric Association, 2013) aimed at neutralizing the intrusive thought (Abramowitz et al., 2014). OCD has a high lifetime prevalence (2–3%; Kessler et al., 2012) and is associated with significant distress in patients and low quality of life (for a meta-analysis, see Coluccia et al., 2016). Cognitive-behavioral therapy (CBT) with exposure and response prevention, as well as pharmacotherapy, have been shown to be effective in the treatment of OCD (Skapinakis et al., 2016). Yet a large number of OCD patients suffer from severe residual symptoms, even after clinically successful treatment (i.e., a reduction of 35% or more on the Y-BOCS) with CBT and/or pharmacotherapy (Pittenger and Bloch, 2014), tentatively suggesting that our understanding of OCD and ways to improve symptoms are still incomplete. Gaining more insight into the cognitive underpinnings of OCD may help in developing novel therapeutic strategies that will yield greater effects.

1.1. Beliefs in OCD

Several cognitive models implicate dysfunctional beliefs in OCD (McFall and Wollersheim, 1979; Salkovskis, 1985; Tallis, 1995), and an increasing body of studies has investigated their relationship to OCD (e.g., Coles et al., 2015; Hezel and McNally, 2016; Mantz and Abbott, 2017; Zetsche et al., 2015). Krech and Crutchfield (1948) define a belief as an enduring organization of perceptions and cognitions about several aspects of an individual's world.

The Obsessive Compulsive Cognitions Working Group (OCCWG, 2001) initiated the development of the Obsessive Beliefs Questionnaire (OBQ) for use with OCD patients. The OBQ captures six domains that tap dysfunctional beliefs: (1) inflated responsibility, (2) importance of thoughts, (3) control of thoughts, (4), overestimation of threat, (5) intolerance of uncertainty, and (6) perfectionism. As the intercorrelation of the dimensions was quite high, in 2005 the OCCWG developed an abbreviated OBQ (44 items) that aggregated the six original dimensions to three subscores (responsibility/threat, perfectionism/certainty, importance/control of thoughts), which show good internal consistency (Myers et al., 2008). Each of the original six domains of the OBQ as well as additional cognitive beliefs are described below in greater detail.

The responsibility domain is at the core of Salkovskis's (1985)

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cognitive-behavioral model of OCD (for a recent review and update, see Hezel and McNally, 2016). Salkovskis et al., (1995) define inflated responsibility as "the belief that one has a power which is pivotal to bring about or prevent subjectively crucial negative outcomes" (p. 285). The interpretation of a nonclinical intrusive thought is taken as proof of danger by patients with OCD and induces a strong feeling of responsibility for preventing harm to themselves or others (Hezel and McNally, 2016). A study by Moritz et al., (2011) found that OCD patients exceeded healthy controls on a scale assessing inflated sense of responsibility. Moreover, the authors suggest that an inflated sense of responsibility represents a "super bias" (p. 183) that is affected by many influences (e.g., thought-action fusion, latent aggression). Supporting these findings, Coles and Schofield (2008) identified four factors that may contribute to a sense of inflated responsibility: (1) heightened responsibility as a child, (2) overprotection as a child, (3) exposure to rigid and extreme codes of conduct and duty during childhood, and (4) incidents in which one's actions/inactions caused misfortune. Speaking for the specificity of the sense of inflated responsibility, a study by Cougle et al. (2007) found a greater sense of responsibility in OCD groups (i.e., checkers and non-checkers) than in anxious and nonclinical controls. In contrast, a meta-analysis by Pozza and Dèttore (2014) investigated the sense of responsibility in three clinical samples (OCD, anxiety disorder, and depression) and found that responsibility was not related significantly more to OCD than to anxiety disorder or depression when analyses were restricted to the responsibility measures created by the OCCWG. The authors conclude that an inflated sense of responsibility is a transdiagnostic factor for psychopathology in general.

Importance of thoughts is defined as the belief that "the mere occurrence of thoughts implies that they are meaningful and dangerous" (Myers et al., 2008, p. 476). This belief is central to the metacognitive model of OCD by Wells (1997, 2000), which emphasizes the importance of thought-action fusion (TAF; i.e., the belief that the mere thought of a negative event can cause an unwanted personal action or have moral consequences). In this model, inflated responsibility is seen as an epiphenomenon of importance of thoughts (Myers and Wells, 2005). Importance of thoughts is significantly associated with OCD symptoms (Wheaton et al., 2010) and seems to predict their course (e.g., Abramowitz et al., 2006).

Rachman and Hodgson (1980) suggest that if people evaluate their negative thoughts as significant and even dangerous, they try to control them in order to protect themselves or others from harm or danger (for a recent review and update, see Hezel and McNally, 2016). In accordance with this, the OCCWG (1997) found a correlation between importance of thoughts and control of thoughts. Moreover, researchers (e.g., Bouvard et al., 2017; Purdon and Clark, 2002) have found that OCD patients scored higher on control of thoughts compared to healthy individuals. A study by Morillo et al., (2007) compared control strategies associated with clinical obsessions in three clinical groups (i.e., OCD, depressed, and anxious patients) and healthy controls. The OCD sample showed significantly more thought control strategies (e.g., thought suppression and searching for reassurance) than the other samples. However, thought control strategies also play a role in depressive patients. Halvorsen et al. (2014) investigated thought control strategies in currently depressed, previously depressed, and never-depressed individuals. As expected, depressed patients scored higher on thought control strategies compared to the control group. In line with this, in one study (Wenzlaff et al., 1988) depressed patients also showed strong thought suppression, suggesting an association between depression and mental control. This is supported by a study investigating coping strategies (Moritz et al., 2018) that found less adaptive coping (e.g., problem solving, acceptance) in an OCD compared to a depressed sample. Yet, no difference was found in maladaptive coping (e.g., thought suppression, rumination), so this does not support the specificity of control of thoughts for OCD.

Overestimation of threat is a heterogeneous construct (Moritz and Pohl, 2009) and implies that OCD patients tend to overestimate the likelihood of danger in general and particularly their personal vulnerability to adverse events (Moritz and Pohl, 2009; OCCWG, 1997). This construct has already been shown to be relevant in anxiety disorders (e.g., Garnefski and Kraaij, 2016; Pergamin-Hight et al., 2015) but not in depression (Garnefski and Kraaij, 2016). Whether patients with OCD overestimate the actual occurrence of harm and other adverse events is the subject of an ongoing debate (Harrison et al., 2012; Moritz and Jelinek, 2009; Moritz and Pohl, 2009). Studies suggest that OCD patients lack "unrealistic optimism" (i.e., the illusion that positive events are more likely to happen to oneself than others; Moritz and Jelinek, 2009). In line with these results, a study comparing overestimation of threat between samples with OCD, panic disorder, and pathological gambling showed higher scores for OCD patients compared to the two other clinical groups (Anholt et al., 2004), emphasizing the specificity of this belief.

Intolerance of uncertainty represents a cognitive bias that refers to the distress OCD patients experience in ambiguous or unpredictable situations (Boswell et al., 2013; OCCWG, 1997; Sarawagi et al., 2013). For OCD, it has been assumed that compulsions, especially checking, are an attempt to resolve the uncertainty associated with an obsessive preoccupation (Tolin et al., 2001). Interestingly, different researchers (e.g., Buhr and Dugas, 2009; Ladouceur et al., 2000) found that intolerance of uncertainty increases worry. Intolerance of uncertainty is assumed to be a transdiagnostic feature that is also common in generalized anxiety disorder, social anxiety disorder, panic disorder, and depression (Carleton et al., 2012; Hezel and McNally, 2016) and can be conceptualized as a continuum variable (Carleton et al., 2012).

Perfectionism relates to a belief in the existence of perfect solutions and to a need for certainty (Frost and DiBartolo, 2002), which can be interpreted as a (dysfunctional) strategy to avoid negative outcomes such as negative feedback from others and loss of control (Frost et al., 2002). Arguing against the specificity of this belief, two studies showed that perfectionism did not differ between (1) OCD patients and a control group with anxiety disorders (Taylor et al., 2002) and (2) participants with disordered eating and anxiety (Bardone-Cone et al., 2017). In accordance with these findings, a meta-analysis that investigated the relationship between several domains of perfectionism and psychopathology concluded that perfectionism is a transdiagnostic process that is implicated in several psychological disorders (Limburg et al., 2017).

The six factors of the OBQ summarized above may not be exhaustive in assessing all cognitive beliefs that are relevant in OCD. In their review, Hezel and McNally (2016), as well as other researchers (e.g., Melli et al., 2016; Wahl et al., 2011), suggest that additional cognitive beliefs may be relevant (e.g., depressive thinking style, fear of becoming insane, rumination). Patients with OCD often suffer from residual symptoms even after receiving evidence-based therapy (Pittenger and Bloch, 2014), which tentatively suggests that the cognitive processes (including the cognitive beliefs) underlying OCD may not yet be fully understood and are not sufficiently targeted by existing treatments. Additionally, as stated above, the findings on the specificity of these beliefs are inconsistent, so the present study aims to provide more clarity on the specific connection of cognitive beliefs to OCD. This may contribute to improving the development of new therapies as well as the advancement of existing therapies, especially the metacognitive trainings developed by our working group (e.g., Jelinek et al., 2018; Moritz and Woodward, 2007). Therefore, our group developed a new questionnaire called the Beliefs Questionnaire (BQ) that covers all cognitive beliefs of the OBQ as well as additional beliefs. The BQ covers the beliefs addressed in a self-help approach for OCD called myMCT (Hauschildt et al., 2016; Moritz et al., 2010). This training aims to raise metacognitive awareness (metacognition is thinking about thinking) of these "cognitive traps" on two levels: metacognitive processes and content. MyMCT addresses the aforementioned six cognitive processes that the OCCWG has implicated in the formation and maintenance of

OCD (1997, 2003, 2005). However, it also addresses a number of other beliefs: depressive thinking styles—as one or two in three OCD patients also suffer from depression (Moritz, 2008)— fear of becoming psychotic, and rumination/worry (Melli et al., 2016; for the prevalence of these worries, see Hauschildt et al., 2010). Rumination was added because a ruminative thinking style is related to OCD symptom severity even after controlling for depression (Wahl et al., 2011). Because the fear of becoming psychotic (fear of becoming insane) has not yet been studied extensively in patients with OCD—it has mainly been studied in patients with panic disorder (e.g., Cox et al., 1994; Kogan et al., 2016)—it was integrated into the BQ and may elucidate the possible importance of this cognitive belief in patients with OCD.

Hirsch et al. (2006) assume that a "combined cognitive bias" (p. 224) may contribute to the maintenance of several disorders. For depression, dysfunctional cognitive beliefs were described decades ago (Kovacs and Beck, 1978; for a detailed description of cognitive processes in depression, see Gotlib and Joormann, 2010). Depression is one of the most prevalent mental disorders, with a 1-year prevalence of 7.5% (Avenevoli et al., 2015), and it has a high comorbidity with OCD (56.6% comorbidity of OCD and a major depressive disorder in a lifetime; Rickelt et al. 2016). The aim of the current study was to assess beliefs using the BQ in an OCD sample as well as in clinical (i.e., depressive patients) and nonclinical controls to shed light on both specific and transdiagnostic processes. We hypothesized that two cognitive beliefs assessed by the BQ, specifically importance of thoughts and overestimation of threat, are specific to OCD (i.e., these beliefs distinguish OCD patients from both healthy and depressed controls), whereas the others represent transdiagnostic factors. A further goal of the study is a closer examination of those cognitive beliefs that are not included in the OBQ but are included in the newly developed BQ in order to more precisely determine their relevance to OCD.

2. Methods

2.1. Recruitment and procedure

All participants completed an anonymous online survey that was carried out via Unipark/Questback® (Globalpark AG). The online assessment contained the following sections: electronic informed consent, demographic information (e.g., gender, age), medical history (e.g., diagnosis of a mental disorder, including the profession of the person who diagnosed the disorder, if applicable), psychopathology, and cognitive beliefs (see below). At the end of the survey, participants were asked to provide an anonymous email address or a telephone number for further assessments. Participants were between 18 and 70 years old. Cookies were used to prevent multiple logins using the same computer.

2.1.1. OCD sample

The OCD sample was derived from a randomized controlled forerunner study (Hauschildt et al., 2016) that compared patients using myMCT (see above) against a wait-list control group across three time points. The study by Hauschildt et al. (2016) was approved by the ethics committee of the medical council in Hamburg (Ethik-Kommission der Ärztekammer Hamburg, Germany, PV3671). For the present study, only baseline data from 130 patients with OCD were considered. Participants were recruited via German internet forums devoted to OCD. Additionally, a self-help organization for OCD (the German Association for OCD, or DGZ) distributed leaflets to its members containing information about the study's design and purpose and the main inclusion and exclusion criteria. A combination of an online assessment and a subsequent structured clinical interview via telephone was carried out (using the Mini International Neuropsychiatric Interview [MINI] and Y-BOCS) to verify diagnostic status as well as inclusion and exclusion criteria. The telephone interviews were scheduled within three days after the completion of the online survey and were conducted by well-trained raters at the master's level. The inclusion criteria were a current diagnosis of OCD (*DSM-IV* criteria verified by the MINI; Sheehan et al., 1998), a Y-BOCS total score greater than 8 points, and age between 18 and 75 years. The comparably low Y-BOCS cutoff score was chosen because the forerunner study by Hauschildt et al. (2016) had investigated a large, representative sample with symptom severity ranging from mild to severe. Lifetime psychotic symptoms, bipolar disorder, or current substance dependence (*DSM-IV* criteria verified by the MINI) led to exclusion. Comorbid depression and additional anxiety symptoms were permitted. After they had completed the online survey, participants were given a telephone number with which they could contact the interviewer for the subsequent telephone interview if they did not wish to provide their email address and telephone number. Nearly half of the patients (47.22%) were currently taking psychopharmacological medication.

2.1.2. Depressed sample

The depressed sample (n = 85) was drawn from a multi-center trial comparing the effects of psychological online intervention (Deprexis®) with a care-as-usual control condition (Klein et al., 2013; Moritz et al., 2014). The studies by Klein et al. (2013) as well as by Moritz et al. (2014) were approved by the Ethics Committee of the German Psychological Association (DGPs; reference number SM 04_2012). Participants were invited to participate in an anonymous online survey and did not receive any financial compensation. Again, only baseline data were included in the present study. A score greater than 9 points (the cutoff for mild to moderate depression) on the Patients Health Questionnaire-9 (PHQ-9; Kroenke et al., 2001) served as inclusion criterion. After the online assessment, the MINI (Sheehan et al., 1998) was conducted via telephone. Information from the Web Screening Questionnaire (WSQ; Donker et al., 2009) as well as participants' reports of a prior diagnosis of depression or dysthymia by a mental health specialist supplemented the diagnostic screening with the MINI. For inclusion, participants had to fulfill criteria for either depression or dysthymia as assessed by the MINI (Sheehan et al., 1998). Patients with a history of psychosis or bipolar disorder (via screening information from the MINI) or acute suicidal tendencies (based on the Suicide Behavioral Questionnaire-Revised; Osman et al., 2001) were excluded from the analyses. Approximately one third of the patients (31%) were currently taking prescription antidepressant medication.

2.1.3. Nonclinical sample

The nonclinical control sample (n = 220) was recruited via WisoPanel®. This platform offers scientists the opportunity to advertise noncommercial studies (for the reliability of this and related services, see Göritz, 2007, 2009; Judge et al., 2006; Picolo and Colquitt, 2006). Participants with a PHQ-9 (Kroenke et al., 2001) score greater than 9 (the cutoff for mild to moderate depression) as well as individuals with a lifetime diagnosis of any mental disorder were excluded based on screening information from the MINI.

Blind to results on the primary measure (i.e., the BQ), the samples were iteratively reduced to make the three groups similar in terms of background characteristics (18 participants in the original sample and 380 participants in the healthy sample were not included in the final sample due to the iterative matching process). The study was conducted in accordance with the Declaration of Helsinki.

2.2. Measures

2.2.1. Mini International Neuropsychiatric Interview (MINI)

This standardized structured interview (Sheehan et al., 1998; German version: Ackenheil et al., 1999) is based on *DSM-IV* criteria and was conducted in all three samples. The MINI was developed to explore 17 disorders (Axis I disorders [*DSM-IV*] and the symptoms of criterion A for schizophrenia). Sensitivity and specificity were good to very good for most diagnoses. Inter-rater and test-retest reliability were good as well (Lecrubier et al., 1997).

Table 1
Demographic, Psychopathological, and Obsessive Beliefs (OBQ) of the Samples. Means and Standard Deviations (in Brackets) or Frequency (Percent).

Variable	OCD (n = 130)	Depression (n = 85)	Nonclinical (n = 220)	Statistics
Background				
Gender (male/ female)	41 (32%)/89 (68%)	21 (25%)/64 (75%)	63 (29%)/156 (71%)	$\chi^2(2) = 1.170$, $p = 0.557$
Age in years	38.67 (10.26)	36.58 (11.80)	38.89 (7.96)	$F(2,432) = 1.903$, $p = 0.159$
13th grade/ below 13th grade	80 (62%)/50 (38%)	60 (71%)/25 (29%)	149 (68%)/71 (32%)	$\chi^2(2) = 2.220$, $p = 0.330$
Psychopathology				
Y-BOCS	22.06 (6.49)	- - -	- - -	- - -
Obsession	11.17 (3.72)	- - -	- - -	- - -
Compulsion	10.89 (4.47)	- - -	- - -	- - -
Resistance	2.69 (1.01)			
PHQ-9	- - -	13.89 (4.10)	2.56 (2.13)	$t(303) = 31.647$, $p < 0.001$
BDI				
Mild depression	81 (62%)	- - -	- - -	- - -
Moderate depression	32 (25%)	- - -	- - -	- - -
Severe depression	14 (11%)	- - -	- - -	- - -
OBQ	179.93 (53.90)	- - -	- - -	- - -
Importance/ Control of Thoughts	38.64 (17.09)			
Perfectionism/ Certainty	72.22 (24.15)			
Responsibility/ Threat	69.09 (23.64)			

Note. BDI-I = Beck Depression Inventory, OBQ = Obsessive Beliefs Questionnaire, PHQ-9 = Patient Health Questionnaire, Y-BOCS = Yale-Brown Obsessive Compulsive Scale.

2.2.2. Beliefs Questionnaire (BQ)

We posed 13 questions to all three samples concerning cognitive beliefs (e.g., inflated sense of responsibility, fear of becoming psychotic, thought suppression). Each question relates to one chapter of the myMCT self-help book for OCD patients (Hausschildt et al., 2016). No item was omitted. For example, the BQ item "Does brooding help you to solve problems?" corresponds to chapter 11 on rumination. One item of the questionnaire is not the same across all three samples. It reads "OCD is a brain disorder. I cannot do anything to change it" for OCD patients, but for those with depression and for nonclinical controls, the word "OCD" is replaced by "depression." Items have to be answered on a 4-point Likert scale (1 = not at all, 2 = a little, 3 = a lot, 4 = extremely). Higher mean scores express a stronger endorsement of the particular cognitive belief (see Table 2 for all items).

2.2.3. Obsessive Beliefs Questionnaire (OBQ)

The Obsessive Beliefs Questionnaire (OBQ; OCCWG, 1997, 2001; German version: Ertle et al., 2008) taps typical cognitive biases in OCD, as compiled by the OCCWG, and was administered to the OCD sample only. Its 44 items can be divided into six subscales (OCCWG, 1997, 2003, 2005): control of thoughts, importance of thoughts, responsibility, intolerance of uncertainty, overestimation of threat, and perfectionism. The OBQ has shown good convergent and discriminant validity (OCCWG, 2005) with good internal consistency (OCCWG, 2001, 2005).

2.2.4. Yale-Brown Obsessive Compulsive Scale (Y-BOCS)

The Yale-Brown Obsessive Compulsive Scale (Y-BOCS; Baer et al., 1993; Goodman et al., 1989; ; German version: Hand and Büttner-Westphal, 1991) is a semi-structured interview and was conducted via telephone by trained psychologists for the OCD sample. It is considered the gold standard for the assessment of OCD symptoms. The German version of the Y-BOCS demonstrated good reliability ($\alpha = 0.80$; Jacobsen et al., 2003). For the present study, we only considered the first 12 items of the Y-BOCS that are evaluated on a 5-point Likert scale (0–4; higher scores indicate greater symptom severity). Symptom severity was calculated using the first 10 items of the Y-BOCS. Items 1 to 5 contain questions related to obsessions, and items 6 to 10 measure different aspects of compulsions. Item 11 measures insight, and item 12 measures avoidance behavior. The scale is sensitive to change and has good to excellent psychometric properties (Taylor, 1995).

2.2.5. Patient Health Questionnaire (PHQ-9)

Depressive symptoms were measured in the depressive and nonclinical samples with the PHQ-9 (Kroenke et al., 2001; German version: Löwe et al., 2002), a self-report instrument derived from the Primary Care Evaluation of Mental Disorders (PRIME-MD). Its items correspond to *DSM-IV* criteria. The German version of the PHQ-9 demonstrated excellent reliability ($\alpha = 0.88$; Löwe et al., 2004). The 4-point Likert scale contains four options: 0 = not at all, 1 = several days, 2 = more than half the days, and 3 = nearly every day. The possible overall score thus ranges from 0 to 27. Studies of the PHQ-9 have shown good sensitivity at 0.80 and a specificity of 0.92 (Gilbody et al., 2007).

2.2.6. Beck Depression Inventory (BDI-I)

The BDI (Beck and Steer, 1993; German version: Hautzinger et al., 1995) was administered to the OCD sample only. It consists of 21 items and encompasses depressive symptoms. The Likert scale ranges from 0 to 3. Higher mean scores express higher rates of depression. It is possible for participants to choose more than one alternative on each item (the highest rating is counted when the total score is computed). The German version of the BDI demonstrated good reliability ($\alpha = 0.74$–0.92; Hautzinger et al., 1995). Paper-and-pencil administration of the BDI and internet administration have also previously shown good reliability (Moritz et al., 2010).

2.3. Data analysis strategy

First, relevant demographic and psychopathological information for all samples were displayed. Then, items were compared between all samples and an exploratory principal component analysis was performed. Lastly, the BQ subscales were correlated with psychopathology of the participants.

3. Results

The samples did not differ with regard to demographic and psychopathological characteristics (see Table 1). Twenty-two percent of the patients with OCD had a comorbid anxiety disorder. The majority of the participants were females in their mid to late 30 s who had completed 13th grade (the German university entrance qualification), which means that the participants had passed the "Abitur" but had not necessarily gone to college. As expected, the depressed sample scored significantly higher on PHQ-9 than the nonclinical controls. On average, the depressive patients showed moderate depressive symptoms

(PHQ-9). The OCD sample showed Y-BOCS total scores typical of an inpatient population (see Table 1).

For the BQ total score, the nonclinical sample scored lower than both the other samples at a medium effect size (see Table 2). A subsidiary analysis revealed that the OCD sample scored significantly higher on overestimation of threat (item 4) and fear of becoming insane (item 13) compared to the two other samples. The OCD sample scored significantly higher on control of thoughts (item 3) as well as thought suppression (item 5) compared to the nonclinical sample but not compared to the depressed sample. Moreover, both clinical samples scored significantly higher on overestimation of threat (item 4), responsibility (item 8), perfectionism (item 9), negative self-esteem (item 12), and fear of becoming insane (item 13) compared to the nonclinical sample. In addition, the OCD sample and the nonclinical sample scored significantly higher on hopelessness (item 11) compared to the depressed sample. In contrast, the depressed and the nonclinical sample scored significantly higher on consequences of thoughts (item 2) and fearful obsessions (item 7) compared to the OCD sample. The nonclinical sample scored significantly higher on overestimation of thoughts (item 1), overinterpretation of feelings (item 6), and brooding (item 10) compared to the two clinical samples. Even after correcting comparisons for multiple testing (i.e., the Bonferroni correction), most comparisons remained significant.

3.1. Factor analysis

In order to identify the underlying factors of the BQ, an exploratory principal component analysis with varimax rotation was conducted for the data of the OCD sample. We considered factors with an eigenvalue greater than 1 and carefully examined the scree plot concurrently. A three-factor solution emerged, which is presented in Table 3.

Items were only assigned to a dimension if their respective loading was at least 0.5. Accordingly, item 11 was not allocated to any of the factors. Approximately half of the variance (50.92%) was explained by this solution. The first factor represented Beliefs about Negative Thoughts (29.09% of total variance), the second factor represented Exaggerated Standards/Perfectionism (11.66% of total variance), and the third factor represented Dealing with Thoughts (10.17% of total variance). Internal consistency of the BQ was satisfactory ($\alpha = 0.775$), and internal consistency of the factors indicated some heterogeneity within the scales, especially for Beliefs about Negative Thoughts ($\alpha = 0.656$) and Dealing with Thoughts ($\alpha = 0.612$). Internal consistency for Exaggerated Standards/Perfectionism was satisfactory ($\alpha = 0.763$). Test-retest reliability was acceptable for Dealing with Thoughts ($r = 0.56$), excellent for Beliefs about Negative Thoughts ($r = 0.78$), and good for Exaggerated Standards/Perfectionism ($r = 0.70$).

Comparisons of the three factors of BQ to all samples revealed a significant difference only for the Exaggerated Standards/Perfectionism factor (F (2,432) = 40.985, $p < 0.001$). A subsidiary analysis revealed that the OCD and the depressive sample scored significantly higher on the Exaggerated Standards/Perfectionism factor compared to healthy controls ($p < 0.001$). The OCD sample ($M = 2.24$) scored somewhat higher on the Exaggerated Standards/Perfectionism factor compared to the depressive sample ($M = 2.12$), but this difference only bordered statistical trend level ($p = 0.102$, nonsignificant after the Bonferroni correction).

3.2. Correlation of the subscales with psychopathology

Table 4 displays correlations between the BQ total score and its subscales with the other psychometric scales in the OCD sample. In line with the hypotheses and supporting the validity of the BQ, the BQ total score and the OBQ total score were strongly correlated ($r = 0.751$; see Table 4). The three OBQ subscales (importance/control of thoughts, perfectionism/certainty, and responsibility/threat) showed medium to large correlations[1] with the BQ subscales; only the correlation between OBQ responsibility/threat and the BQ factor Dealing with Thoughts was weak. The Y-BOCS total score and the Obsession subscale showed small to medium correlations with BQ total score, Beliefs about Negative Thoughts, and Exaggerated Standards/Perfectionism (except for the Y-BOCS total score and the BQ Beliefs about Negative Thoughts). No associations were found between the Y-BOCS total score and the Obsession scale with BQ Dealing with Thoughts nor between the Y-BOCS Compulsions and Resistance scales with the BQ. The BDI total showed weak to large correlation with all BQ scales.

All correlations of the BDI numerically exceeded those of the Y-BOCS total score and its subscales (correlational differences, at least $p < 0.05$) except for four analyses, three of which achieved trend level: BDI and Beliefs about Negative Thoughts were more highly correlated compared to correlations of Y-BOCS Obsessions and Beliefs about Negative Thoughts ($p = 0.089$), and BDI and Dealing with Thoughts were more highly correlated compared to correlations of Y-BOCS total and Dealing with Thoughts ($p = 0.079$), Y-BOCS Obsessions and Dealing with Thoughts ($p = 0.075$), and Y-BOCS Compulsions and Dealing with Thoughts ($p = 0.074$).

The BQ factor Dealing with Thoughts correlated more highly with the related OBQ subscale importance/control of thoughts. Yet, neither difference was significant (perfectionism/certainty: $p = 0.338$; responsibility/threat: $p = 0.089$). The BQ factor Beliefs about Negative Thoughts correlated more highly with the corresponding OBQ subscale (i.e., OBQ importance/control of thoughts exceeded) than with the other two OBQ subscales (correlational differences, $p < 0.001$).

Item 13 (fear of becoming insane) was moderately correlated with the BDI item on suicidality ($r = 0.245$, $p = 0.009$) and highly correlated with the PHQ-9 item on suicidality ($r = 0.394$, $p < 0.001$). Correlations of the BQ total score and its three subscales with participant demographics showed significant correlations of the education level with the BQ total score ($r = -0.235$, $p < 0.001$), with Beliefs about Negative Thoughts ($r = -0.232$, $p < 0.001$), with Exaggerated Standards/Perfectionism ($r = -0.113$, $p = 0.018$), and with Dealing with Thoughts ($r = -0.184$, $p < 0.001$). Another significant correlation was found with age and Exaggerated Standards/Perfectionism ($r = -0.137$, $p = 0.004$). There was a significant gender difference for the BQ total score ($t = 2.062$, $p = 0.040$) and Exaggerated Standards/Perfectionism ($t = 2.432$, $p = 0.020$). All other correlations of the demographics (age and gender) with the BQ total score and the three subscales remained nonsignificant.

4. Discussion

The present study aimed to examine whether a set of circumscribed cognitive beliefs implicated in the pathogenesis of OCD is specific to OCD or represents transdiagnostic factors. To achieve this, we devised the Beliefs Questionnaire (BQ), which addresses 13 prominent dysfunctional cognitive beliefs (e.g., inflated sense of responsibility, fear of becoming insane, thought suppression).

Before interpreting the results in greater detail, it should be mentioned that all results regarding the OCD-specific as well as the transdiagnostic beliefs can only be interpreted in comparison to the samples that we analyzed (patients with depression and healthy controls). An exploratory principal component analysis suggested a three-factor solution of the BQ: Beliefs about Negative Thoughts, Exaggerated Standards/Perfectionism, and Dealing with Thoughts. Although the OBQ and BQ subscales were highly correlated, the correlations between analogous subscales of the OBQ and BQ (e.g., Importance/Control of Thoughts and Beliefs about Negative Thoughts) were highest, which corroborates the validity of the BQ.

[1] This is based on Cohen's (1988) suggestion to call an effect size of 0.1 “small,” 0.3 “medium,” and 0.5 “large.”

Table 2
Means, Standard Deviations, and Group Comparisons (Including Post-Hoc Tests) for the Beliefs Questionnaire (BQ).

Variable	OCD (O, $n = 130$)	Depression (D, $n = 85$)	Nonclinical (N, $n = 220$)	Statistics (post-hoc; corrected and uncorrected for multiple comparisons)
BQ total score	2.14 (0.49)	2.05 (0.47)	1.93 (0.38)	$F(2,432) = 9.66$, $p < 0.001$; N < O, $p < 0.001$*, $d = 0.479$; N < D, $p = 0.033$*, $d = 0.281$
1. Are bad thoughts abnormal?	2.18 (1.07)	2.04 (0.97)	2.39 (0.89)	$F(2,432) = 4.69$, $p = 0.010$; D < N, $p = 0.004$*, $d = 0.376$; O < N, $p = 0.050$, $d = 0.213$
2. Do bad thoughts lead to bad deeds?	1.85 (0.84)	2.12 (0.85)	2.23 (0.77)	$F(2,432) = 9.13$, $p < 0.001$; O < N, $p < 0.001$*, $d = 0.471$; O < D, $p = 0.016$*, $d = 0.320$
3. Must my thoughts completely obey my will?	2.64 (1.02)	2.54 (0.95)	2.42 (0.87)	$F(2,432) = 2.25$, $p = 0.107$; N < O, $p = 0.037$, $d = 0.232$
4. Is the world a dangerous place?	1.93 (1.01)	1.67 (0.88)	1.27 (0.60)	$F(2,432) = 29.56$, $p < 0.001$; N < O, $p < 0.001$*, $d = 0.795$; N < D, $p < 0.001$*, $d = 0.531$; D < O, $p = 0.020$, $d = 0.274$
5. Must bad thoughts be suppressed?	2.00 (0.93)	1.81 (0.76)	1.80 (0.74)	$F(2,432) = 2.73$, $p = 0.067$; N < O, $p = 0.025$, $d = 0.238$
6. Is danger definitely present when I feel alarmed?	2.55 (0.83)	2.72 (0.93)	2.95 (0.73)	$F(2,432) = 10.15$, $p < 0.001$; O < N, $p < 0.001$*, $d = 0.512$; D < N, $p = 0.026$, $d = 0.275$
7. Do obsessions irrevocably poison thoughts?	1.50 (0.73)	1.72 (0.87)	1.79 (0.76)	$F(2,432) = 5.72$, $p = 0.004$; O < N, $p = 0.001$*, $d = 0.389$; O < D, $p = 0.044$, $d = 0.274$
8. Am I responsible for everything?	2.68 (0.99)	2.54 (1.03)	1.95 (0.80)	$F(2,432) = 30.65$, $p < 0.001$; N < O, $p < 0.001$*, $d = 0.811$; N < D, $p < 0.001$*, $d = 0.640$
9. Is good not good enough?	2.16 (0.96)	2.16 (0.95)	1.90 (0.81)	$F(2,432) = 4.81$, $p = 0.009$; N < O, $p = 0.008$*, $d = 0.293$; N < D, $p = 0.019$, $d = 0.295$
10. Does brooding help to solve problems?	1.92 (0.92)	1.80 (0.84)	2.15 (0.81)	$F(2,432) = 6.41$, $p = 0.002$; O < N, $p = 0.014$*, $d = 0.265$; D < N, $p = 0.001$*, $d = 0.424$
11. OCD/Depression (OCD sample: OCD; depressive and nonclinical samples: Depression) is a brain disorder. So does that mean I can't do anything to change it?	1.82 (0.82)	1.39 (0.66)	1.77 (0.78)	$F(2,432) = 9.57$, $p < 0.001$; D < N, $p < 0.001$*, $d = 0.526$; D < O, $p < 0.001$*, $d = 0.578$
12. Am I a failure?	2.53 (1.07)	2.40 (0.97)	1.28 (0.58)	$F(2,432) = 113.88$, $p < 0.001$; N < O, $p < 0.001$*, $d = 1.452$; N < D, $p < 0.001$*, $d = 1.401$
13. Does this mean that I won't get better and might end up insane?	2.03 (1.09)	1.73 (0.91)	1.20 (0.49)	$F(2,432) = 46.80$, $p < 0.001$; N < O, $p < 0.001$*, $d = 0.982$; N < D, $p < 0.001$*, $d = 0.725$; D < O, $p = 0.007$*, $d = 0.299$

Note. * The group comparison would have withstood the Bonferroni correction.

Table 3
Results of Exploratory Principal Component Analysis of the BQ.

Item	Beliefs about Negative Thoughts	Exaggerated Standards/ Perfectionism	Dealing with Thoughts	Communalities
1. Bad thoughts are not normal.	**0.564**	−0.115	0.408	0.498
2. Bad thoughts lead to bad deeds.	**0.609**	0.200	0.427	0.594
3. My thoughts must completely obey my will.	.0481	0.117	**0.631**	0.642
4. The world is a dangerous place.	0.121	**0.570**	−0.128	0.355
5. Bad thoughts must be suppressed.	0.121	0.206	**0.762**	0.637
6. Danger is definitely present when I feel alarmed.	−0.080	−0.039	**0.660**	0.443
7. Obsesssions irrevocably poison thoughts.	**0.683**	0.309	−0.002	0.562
8. I'm responsible for everything.	0.165	**0.669**	−0.002	0.475
9. Good is not good enough.	0.051	**0.666**	0.449	0.648
10. Brooding helps to solve problems.	−0.143	**0.669**	0.208	0.512
11. OCD/Depression is a brain disorder. I cannot do anything to change it.	0.261	0.227	0.275	0.195
12. I am a failure.	0.341	**0.551**	0.173	0.454
13. I'm going insane.	**0.770**	0.021	−0.102	0.604

Note. This represents a three-factor solution for 130 OCD patients. Loadings > 0.5 are in bold type.

Table 4
Correlations of the BQ and Its Three Factors with Psychopathology of the OCD Sample.

	BQ (total score)	Beliefs about Negative Thoughts	Exaggerated Standards/Perfectionism	Dealing with Thoughts
OBQ	0.751****	0.557****	0.728****	0.387****
Importance/Control of Thoughts	0.675****	0.706****	0.433****	0.401****
Perfectionism/Certainty	0.636****	0.368****	0.727****	0.321****
Responsibility/Threat	0.573****	0.383****	0.604****	0.273***
Y-BOCS	0.182*	0.006	0.284***	0.072
Obsessions	0.293***	0.198*	0.321****	0.075
Compulsions	0.021	−0.157	0.145	0.042
Resistance	0.035	−0.041	0.103	0.006
BDI	0.512****	0.344****	0.516****	0.233****

Note. BDI = Beck Depression Inventory, OBQ = Obsessive Beliefs Questionnaire, Y-BOCS = Yale-Brown Obsessive Compulsive Scale. The subscales of the OBQ and the BQ that tap similar constructs are underlined.
**** $p < 0.001$,*** $p < 0.005$, ** $p < 0.01$, * $p < 0.05$.

As expected, both clinical samples showed significantly more dysfunctional cognitive beliefs compared to the nonclinical controls for most items. Interestingly, the OCD sample displayed significantly higher values for overestimation of threat and the fear of becoming psychotic (fear of becoming insane) compared to the other two samples, suggesting some specificity. Further analyses revealed that the OCD and the depressed sample scored higher on the BQ factor Exaggerated Standards/Perfectionism compared to nonclinical controls and the OCD sample exceeded the depressed sample on the same factor numerically; however, the difference only bordered trend level.

Findings of the study suggest that most of the beliefs assessed by the BQ are transdiagnostic, which is in line with several studies demonstrating the ubiquity of many dysfunctional cognitive beliefs beyond OCD (e.g., Egan et al., 2011; McEvoy et al., 2013). We now discuss our results in greater detail.

Our findings that overestimation of threat is an OCD-specific belief are in line with several studies (e.g., Anholt et al., 2004; García-Soriano et al., 2014; Moritz and Jelinek, 2009; Tolin et al., 2006). For instance, García-Soriano et al., (2014) demonstrated that overestimation of threat was higher in OCD patients compared with eating disorder patients. Moreover, one study used the OBQ to assess obsessive beliefs in OCD and anxiety disorder patients as well as nonclinical controls and found that OCD patients more strongly endorsed beliefs associated with threat estimation compared to nonclinical and anxious controls (Tolin et al., 2006). However, as already mentioned in the introduction, overestimation of threat has already been found to be relevant in anxiety disorders (e.g., Garnefski and Kraaij, 2016; Pergamin-Hight et al., 2015). Future research should compare an OCD sample to a sample of patients with anxiety disorder to clarify specificity.

Somewhat unexpectedly, the fear of becoming psychotic (fear of becoming insane) seems to be OCD-specific as well; this differentiated the OCD from both the nonclinical and depressed samples. In line with our findings, different studies highlight doubt and catastrophizing thoughts such as “What if I am crazy?” as central to OCD (Abramowitz, 2006; Nikodijevic et al., 2015; Van Schalkwyk et al., 2016). Moreover, Moritz (2008) found that 63.8% of a sample of OCD patients were worried that they might become “mad” or psychotic, which was therefore reflected in the myMCT by the statement that “many OCD patients are worried that they have or might get schizophrenia” (p. 217). However, the fear of becoming insane is known to be a relevant factor in panic disorder, too (e.g., Cox et al., 1994; Kogan et al., 2016). To the best of our knowledge, the fear of becoming psychotic has not yet been investigated in depression. Our findings tentatively support the specificity of this fear to OCD in comparison to a depressed sample. However, this result needs to be replicated and further investigated with an anxiety sample.

The BQ factor Exaggerated Standards/Perfectionism seems to separate clinical from nonclinical individuals and likely represents a relevant factor in the pathogenesis of different disorders (e.g., Lloyd et al., 2014; Sadri et al., 2017). For instance, a review by Egan et al., (2011) showed that perfectionism increases vulnerability to an eating disorder and that it contributes to the maintenance of OCD, social anxiety, and depression.

As mentioned above, the BQ factor Beliefs about Negative Thoughts is strongly linked to the OBQ subscore importance/control of thoughts, which captures one major aspect of metacognition identified by the OCCWG (2005). Importance/control of thoughts is strongly related to obsessive-compulsive symptoms (e.g., Abramowitz et al., 2007; Clark, 2004; OCCWG, 2001, 2003, 2005; Wheaton et al., 2010).

The BQ factor Dealing with Thoughts seems to represent a

transdiagnostic factor. Dealing with Thoughts (e.g., “Bad thoughts must be suppressed”) has been tied to OCD (e.g., Abramowitz et al., 2001; Harsányi et al., 2014) and was thus incorporated into the BQ. Yet, the literature is in line with our results and suggests that Dealing with Thoughts is also linked to depression (e.g., Hülsenbusch et al., 2016; Watkins and Moulds, 2009; Yoon et al., 2013).

Besides the expected results, three findings were surprising. However, these findings should be interpreted with caution as the psychometric qualities of these new measures are expected to be limited. On the item level, healthy patients showed significantly higher scores on overestimation of thoughts (item 1), overinterpretation of feelings (item 6), and brooding (item 10). This is clearly not in line with current research because researchers argue that overestimation of thoughts (Wheaton et al., 2010) and overinterpretation of feelings, which has some associations with the concept of overestimation of threat (Moritz and Pohl, 2009), are particularly relevant in OCD. In contrast, it is well known that brooding is a major facet of depression (Piraman et al., 2016). It could be speculated that an individual's prior experience with psychotherapy contributes to these results. Both clinical samples had suffered from their symptoms for many years (approximately 20 years in the OCD group), and most of them had already received psychotherapy (68% of the OCD sample). One major aspect of psychotherapy, especially in the treatment of OCD, is psychoeducation (e.g., the myMCT self-help book; Hauschildt et al., 2016), which often includes information about overestimation of thoughts, overinterpretation of feelings, and brooding. Patients may be more aware than controls of the dysfunctionality of these features, but it is not known whether this knowledge positively impacts symptomatology. Future research should take this into account and possibly examine these beliefs in patients both with and without psychotherapy experience. Additionally, recent research has highlighted that brooding can be functional at times (e.g., Yang et al., 2018), which may explain why the healthy patients scored highest on that item. A more differentiated assessment of brooding, which captures both functional and dysfunctional brooding, should be considered in future studies. This item will be revised in future research by our working group.

In comparison to the OBQ, the BQ covers some important novel aspects of OCD (e.g., the fear of becoming insane). Yet, a number of limitations need to be acknowledged. One problem with the present study is that we did not include another clinical sample in addition to the depressed group (e.g., patients with anxiety disorders). Therefore, we cannot be sure whether the differences between OCD patients and depressed patients come from sources other than core OCD symptoms (e.g., anxiety). Consequently, as overestimation of threat and the fear of becoming psychotic seem to be relevant in anxiety disorders as well (22.3% of the OCD sample had a comorbid anxiety disorder), the conclusion about the specificity of these biases to OCD is only possible to a limited extent. On the one hand, the brevity of the BQ can be viewed as an advantage as it may enhance completion rates. Many patients have only limited attention capacities, which results in a greater probability that they will not finish answering a survey. Long test batteries may bias the selection of participants in favor of more functional patients. Additionally, long scales often come with redundant items that could evoke suspicion in OCD patients, who often have higher scores on suspiciousness and paranoia (Moritz et al., 2004; Moritz et al., 2011; Poyurovsky and Koran, 2005). Accordingly, they could interpret redundant items as an attempt to verify their trustworthiness. On the other hand, the low number of items (13) that assess different cognitive beliefs entails the risk of not capturing all relevant aspects. Additionally, a questionnaire with more items has greater reliability (at least in nonclinical samples). Furthermore, the item assessing hopelessness (OCD/Depression is a brain disorder. I cannot do anything to change it”) did not reach a loading of 0.5 on any factor and therefore could not be mapped onto any of the factors. Finally, the healthy and the depressed samples did not receive any financial compensation, but the OCD sample received a 60€ online voucher because the OCD assessment took these participants a long time to complete; this difference might have biased the results.

According to our study, the BQ is a brief and valid instrument for screening cognitive beliefs deemed relevant in OCD. However, in our opinion a revision of the BQ might benefit from testing more subcomponents of each belief. To illustrate, overestimation of threat was captured by a single item but may actually represent different facets such as general overestimation of the incidence of certain events, unrealistic pessimism about one's ability to endure such events, and/or exaggeration of the consequences of such events (Moritz and Jelinek, 2009; Moritz and Pohl, 2006; 2009). An expert rating might be added, which would allow a comparison between subjective and objective ratings and might elucidate a potential discrepancy between those two perspectives, such as whether patients over- or underreport certain beliefs. Furthermore, we intend to revise item 13 (“Does this mean that I won't get better and might end up insane?”) in order to clarify what is meant by “does this mean.”

As mentioned in the introduction, OCD and depression have a high degree of comorbidity (56.6% comorbidity of OCD and major depressive disorder in a lifetime; Rickelt et al., 2016). A possible explanation for some of the nonsignificant differences between the OCD and the depressed sample could be this high comorbidity. In further studies, it might be helpful to only include OCD patients without depression so that OCD-specific beliefs could be identified without the influence of depression. Moreover, other psychiatric control groups beyond depression should be examined.

5. Conclusions

To conclude, the present study indicates that the BQ is a valid screening instrument that assesses certain aspects important to our understanding of OCD that are not covered by the OBQ. Overestimation of threat and the fear of becoming psychotic are OCD-specific beliefs, and we therefore recommend that they should be addressed more specifically in therapy for patients with OCD.

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Compliance with ethical standards and conflict of interest

• **Funding:** This study did not receive external funding

• **Conflict of interest:** None.

• **Ethical approval:** All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Declaration of Helsinki and its later amendments or comparable ethical standards. The present study integrates data from two different studies, both of which received ethical approval (see the methods section).

• **Ethical approval:** This article does not contain any studies with animals performed by any of the authors.

• **Informed consent:** Informed consent was obtained from all individual participants included in the study.

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