Religiosity, Magical Ideation, and Paranormal Beliefs in Anxiety Disorders and Obsessive-Compulsive Disorder

A Cross-Sectional Study

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Abstract: The relation between religiosity/spirituality (R/S), personal beliefs, and mental health has been extensively studied. However, concerning anxiety disorders (ADs), empirical evidence is scarce. This study investigated the differences in R/S and magical/paranormal ideation among obsessive-compulsive disorder patients (OCD; $n = 49$), patients with other ADs ($n = 36$), and healthy controls (HCs; $n = 35$). Our results suggest negative religious coping as being the only parameter showing significantly higher scores in OCD and AD participants in comparison with HCs. Negative religious coping reflects negative functional expressions of R/S in stressful situations. Logistic regression also suggested negative religious coping as the strongest predictor of group affiliation to the nonhealthy group. Further results show no significant differences between other R/S, magical, and paranormal ideation traits among groups. This study underlines an important role of negative religious coping in ADs yet does not clearly indicate a specific causality. Religious-sensitive treatment targeting cognitive aspects of negative religious coping are discussed.

Key Words: Anxiety disorders, obsessive-compulsive disorder, OCD, paranormal beliefs, magical ideation, coping, religiosity, spirituality.

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Religiosity as a term reflects various aspects of religious beliefs and activities in a person's life (Koenig et al., 2001). Literature has repeatedly suggested different coexisting underlying structures of religiosity, such as intrinsic and extrinsic religiosity (Allport and Ross, 1967; Hunt and King, 1972). Lately, an additional emphasis has been given to spirituality as something different and independent from religiosity. Spirituality is suggested to be a transcultural and transreligious parameter of human experience with a complex, idiographic, and multidimensional construct, not closely associated to a particular belief system, church, or cult (Pargament, 1997). Over the past years, the relation between religiosity/spirituality (R/S), personal beliefs, and mental health has been extensively studied, pointing out a close but complex relationship between these variables (Koenig, 1998; Koenig et al., 2001; Hackney and Sanders, 2003). R/S and other personal beliefs (*i.e.*, magical/paranormal ideation) have been repeatedly suggested as important factors in the expression, course, and coping of psychiatric disorders (Ano and Vasconcelles, 2005; Koenig, 2007; Sisask et al., 2010; Sterling et al., 2006). Nevertheless, with respect to anxiety disorders (ADs), the empirical evidence is still scarce, leaving space for further research.

R/S and Anxiety

A literature review suggests that in comparison with other psychiatric disorders, there are only few exploratory studies investigating the specific relation between R/S and anxiety (Shreve-Neiger and Edelstein, 2004). Hereby, three main theories become apparent. The first one promotes the Freudian hypothesis that anxiety can arise through negative religious conflicts and that there is a positive relation between R/S and anxiety symptoms (Freud, 1953). There are only some studies that support this hypothesis (Trenholm et al., 1998), and most of them indicate a specific positive correlation only between anxiety and extrinsic religiosity (Baker and Gorsuch, 1982; Bergin et al., 1987; Tapanya et al., 1997).

The second thesis suggests religiosity being negatively associated with anxiety and buffering the effects of stress, leading to lowered distress (Ellison, 1991; Koenig et al., 1988; Shreve-Neiger and Edelstein, 2004) and even to better outcome in the treatment of ADs (Bowen et al., 2006). Hereby, results associating particularly regular church attendance with lower anxiety scores have been often replicated (Shreve-Neiger and Edelstein, 2004), whereas other studies report results of lower anxiety levels among the more religious in subjects of both healthy and nonhealthy (NH) subjects (Kaczorowski, 1989; Thorson and Powell, 1990).

The third and final thesis supports a missing specific relation between R/S and anxiety and is also supported by various study results, failing to find any correlation between neuroticism, anxiety, and R/S (Frenz and Carey, 1989; Koenig et al., 1993; McCoubrie and Davies, 2006; Pfeifer and Waelty, 1995).

R/S and Obsessive-Compulsive Disorder

Contrary to other ADs, the specific relation of R/S to obsessive-compulsive disorder (OCD) has been investigated more thoroughly in the literature. The consideration of OCD as even being, to some extent, a so-called ecclesiogenic neurosis was postulated early in the literature (Schätzing, 1955). Higgins et al. (1992) found, indeed, that the percentage of patients with reported religious conflict was significantly higher in the OCD group than in other anxiety and nonanxiety control subjects. Many other studies have also confirmed some specific positive correlations between R/S and OCD traits (*i.e.*, subclinical and clinical OCD symptoms and cognitions, intolerance for uncertainty, control of thoughts, perfectionism, responsibility, religious themes in obsessive thoughts and compulsive rituals, overvaluation of thoughts, maladaptive beliefs, etc.) (Abramowitz et al., 2004; Rachman, 1997, 2006; Rasmussen and Tsuang, 1986; Sica et al., 2002; Steketee et al., 1991; Yorulmaz et al., 2009).

However, there have also been many studies suggesting a very small or even lacking relationship between R/S and OCD (Hermesh et al., 2003; Lewis, 1994; Siev et al., 2010; Tek and Ulug, 2001;

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Zohar et al., 2005), whereas a demographic study by Neziroglu et al. (1994) has even shown that more atheist/agnostic individuals were found among OCD patients as compared with other disorders.

Magical and Paranormal Beliefs in Anxiety and OCD

Prior studies indicate that besides R/S, other personal beliefs, such as magical ideation and paranormal beliefs, are also not yet fully understood in some way in relation to psychiatric disorders, particularly with anxiety and OCD. Paranormal beliefs are beliefs in paranormal phenomena, which violate basic limiting principles in science (Broad, 1953; Tobacyk, 2004). The term *magical ideation* refers to beliefs about causality in which individuals believe they have some degree of control or events that are believed to be magical in nature and to defy both physical laws and culturally accepted explanations (Markle, 2010).

Most exploratory studies investigate the specific relation of magical ideation to OCD, reporting repeatedly a positive correlation between magical ideation scores and OCD symptoms in clinical and nonclinical populations (Bolton et al., 2002; Einstein and Menzies, 2004a, 2004b, 2006; Emmelkamp and Aardema, 1999; Fonseca-Pedrero et al., 2010; West and Willner, 2011). Interestingly, the relation between magical ideation and other ADs has been barely investigated, not allowing any clear statements. There are only two studies found in the literature. In the first one, magical ideation scores did not differ significantly between OCD and generalized AD, whereas the OCD group showed significantly higher scores than the healthy sample (West and Willner, 2011). In the second study, panic disorder patients reported significantly lower magical ideation scores compared with OCD patients (Einstein and Menzies, 2006). Panic disorder patients were hereby found to score similarly to healthy control (HC) groups (Einstein and Menzies, 2006).

Finally, the role of paranormal beliefs in OCD and other ADs has been hardly investigated. Some studies suggest an association between belief in the paranormal and lower anxiety/neuroticism (Goulding, 2004; Kennedy and Kanthamani, 1995; Wolfradt, 1997), whereas others report no significant (Tobacyk, 1982) or even a negative (Thalbourne et al., 1995) correlation.

Research Gaps and Study Objectives

Despite the growing literature focus on the impact of R/S on mental well-being in the last few decades, one must note a failure of incorporating the broader concept of the religious and spiritual construct in research. Personal religious beliefs and experiences are far more multidimensional than believed so far, and different styles of religious coping can have both positive and negative influences on the individual (Ano and Vasconcelles, 2005; Kendler et al., 2003). The lack of defined and universally accepted multidimensional measures of R/S has additionally led to poor operationalization, unmatchable and incomparable data, and finally to several contradictory results (Shreve-Neiger and Edelstein, 2004). For example, a recent literature review listed more than different 70 psychometric instruments designed to assess spirituality and related constructs (MacDonald et al., 1995). Furthermore, most studies tend to dichotomize their results by using only a static religious variable and not multidimensional measures or even quantified religious variables and, in addition, generally assess only a small sample size. Finally, especially with respect to ADs, relevant articles are comparatively very sparse (Larson et al., 1986; Shreve-Neiger and Edelstein, 2004), indicating a present gap in the literature.

Thus, the first goal of the present study was to replicate past findings with standardized and internationally used multidimensional instruments and investigate differences in R/S traits and magical/paranormal ideation in a clear exploratory cross-sectional design for both anxiety and OCDs in comparison with healthy subjects. Our further objective was to elucidate differences in individual cognitive R/S aspects and coping strategies between the investigated sample groups, as it is suggested that especially these R/S parameters show the greatest impact on and are closely linked to psychopathological symptoms (Baetz et al., 2006; Ellison, 1991; Koenig et al., 1995). Individual beliefs and R/S coping are underestimated but very important aspects of individual psychiatric and psychotherapeutic treatment (Baetz et al., 2004; Stanley et al., 2011), and their incorporation in the psychotherapeutic process of religious patients can lead to better treatment outcomes (Azhar et al., 1994; Berry, 2002; Paukert et al., 2009). This study is, to the best of our knowledge, the first one parallel comparing R/S, magical, and paranormal belief traits between these groups and thus promises to provide further findings and point out new specific objectives for psychotherapeutic interventions, targeting at the reduction of individual religious and spiritual distress. Finally, this study aims the better understanding of R/S vulnerability and resilience factors and could drive on further research in this field.

METHODS

Participants

A total of 85 unselected inpatient subjects with a principal diagnosis of OCD or another AD, established in a structured clinical interview according to *DSM-IV* criteria, were found eligible and were recruited in this cross-sectional exploratory study. The sample for this study was recruited in the CBT Unit for Anxiety Disorders of the Department of Psychiatry and Psychotherapy of the University Medical Centre Hamburg-Eppendorf, Germany. All recruited subjects were assessed within the first week of admission with a face-to-face interview using the Mini-International Neuropsychiatric Interview (MINI) (Sheehan et al., 1998). Inclusion and exclusion criteria were chosen to minimize the effect of known confounding factors. Inclusion criteria were as follows: a) 18 to 60 years of age and b) IQ higher than 70 as assessed with the multiple choice vocabulary test. Exclusion criteria were comorbidity with *DSM-IV* schizophrenia spectrum disorders or disorders involving psychotic symptoms, comorbidity of both anxiety and OCD diagnosis, posttraumatic stress disorder (PTSD) diagnosis, major depression, and substance/alcohol dependence disorders. Participants with PTSD were excluded from participation because of potential changes in personal beliefs suggested after trauma (Falsetti et al., 2003). Similarly, acutely admitted patients in our clinic were also excluded to minimize the impact of an acute psychiatric hospitalization in our sample. Subjects were classified on the basis of their primary diagnosis. All diagnoses were double checked with the treatment diagnoses at dismissal.

Control subjects were recruited from various sources (outreach community workers, clinical staff, students, etc.) and underwent an initial short interview to assess eligibility criteria. The final sample of recruited HCs was subsequently equally screened in a face-to-face interview with the MINI for the absence of any psychiatric disorder and were assessed equally.

The research project was approved by the local ethics committee. After a complete description of the study, written informed consent was obtained. All recruited subjects were fluent German language speakers. All questionnaires were completed directly after the face-to-face interview in the same interview room in all sample groups.

Measures

Paranormal beliefs were assessed by the Revised Paranormal Belief Scale (RPBS). The RPBS is a 26-item self-report scale that measures the following seven dimensions of paranormal beliefs: traditional religious belief, psi (extrasensory perception of anomalous processes of information or energy transfer, *i.e.*, telepathy), witchcraft, superstition, spiritualism, extraordinary life forms, and precognition (*cf.* Table 1). Responses to each item are assessed by a 7-point Likert scale ("totally disagree" to "totally agree"), with a

TABLE 1. Paranormal Beliefs Subscales as Measured With the Revised Paranormal Belief Scale

Subscales	Statements
Traditional religious beliefs	The soul continues to exist although the body may die.
	There is a devil.
	I believe in God.
	There is a heaven and hell.
Psi	Some individuals are able to levitate (lift) objects through mental forces.
	Psychokinesis, the movement of objects through psychic powers, does exist.
	A person's thoughts can influence the movement of a physical object.
	Mind reading is not possible (inverse rating).
Witchcraft	Black magic really exists.
	Witches do exist.
	Through the use of formulas and incantations, it is possible to cast spells on persons.
	There are actual cases of witchcraft.
Superstition	Black cats can bring bad luck.
	If you break a mirror, you will have bad luck.
	The number 13 is unlucky.
Spiritualism	Your mind or soul can leave your body and travel (astral projection).
	During altered states, such as sleep or trances, the spirit can leave the body.
	Reincarnation does occur.
	It is possible to communicate with the dead
Extraordinary life forms	The abominable snowman of Tibet exists.
	The Loch Ness monster of Scotland exists.
	There is life on other planets.
Precognition	Astrology is a way to accurately predict the future.
	The horoscope accurately tells a person's future.
	Some psychics can accurately predict the future.
	Some people have an unexplained ability to predict the future.

higher rating indicating stronger endorsement, forming a total score. Satisfactory reliability and validity were reported already using the original form of the Paranormal Belief Scale (Tobacyk et al., 1983), whereas the test-retest reliability for the subscales was improved in the revised version (Tobacyk, 2004). For this study, an exact German translation of the questionnaire was used.

Magical ideation was assessed by the Magical Ideation Scale (MIS) (Eckblad and Chapman, 1983). MIS measures belief in form of causation that by conventional standards are not valid but magical. Internal consistency coefficients for the original MIS ranged from 0.82 to 0.85, and a variety of data support the criterion and construct validity of the MIS. Some examples of MIS questions are "I think I could learn to read other's minds if I wanted to," "Horoscopes are right too often for it to be a coincidence," and "I have sometimes sensed an evil presence around." In our study, the German version of MIS was used, a shortened 20-item true-false scale for assessing magical ideation given as a total score. This version has been used repeatedly in the past, confirming validity and reliability (Meyer and Hautzinger, 1999a, 1999b).

Religiosity and spirituality were assessed by the Brief Multidimensional Measure of Religiousness/Spirituality (BMMRS). The BMMRS is a dimensional, 40-item inventory encompassing subscales assessing various aspects of religion and spirituality developed by a Fetzer Institute/National Institute of Aging Working Group (2003). This instrument has recently been validated in adolescent and adult subjects (Harris et al., 2008; Stewart and Koeske, 2006), and findings suggest that BMMRS is also useful for multiethnic research (Neff, 2006). For this study, a slightly modified German version of the questionnaire was used (*cf.* Table 2). Responses to each item are assessed by Likert scales of different point numbers in an inverse rating scale (high scores represent lower R/S).

Statistical Analysis

Descriptive statistics are given in total numbers and percentages for nominal scaled variables and in mean and standard deviation for ordinal and interval scaled variables. For the purpose of proper comparison, raw scores of all used instruments (BMMRS, MIS, and RPBS) were converted (in BMMRS also inverted) and are given as a percentage of the maximum possible score of each scale. Group comparisons were performed via chi-square tests (nominal scale, parametric) and *t*-tests (ordinal and interval scale, parametric). All tests of significance were two tailed, and p-values < 0.05 were considered significant. Statistical analyses were conducted using the Statistical Package for Social Sciences Version 15 (SPSS Inc, Chicago, IL).

TABLE 2. Subscales of Religiosity/Spirituality as Measured With the Brief Multidimensional Measurement of Religiosity/Spirituality

Subscales	Factors
Public religious activities	Religious service attendance
	Other public religious activities
Private religious activities	Private prayer
	Meditation
	Bible reading
	Religious programs on television/radio
	Prayer before meal
Congregation benefits	Congregation helps with illness
	Congregation helps with problems
Congregation problems	Congregation makes too many demands
	Congregation is critical
Positive religious coping	Life is part of a larger force
	Work with God as a partner
	Look to God for support
Negative religious coping	Feel that God is punishing
	Wonder if God has abandoned
Self-directed coping	Self decision making
Overall coping	Role of religion in coping
Religious intensity	Religious person
	Spiritual person
Forgiveness	Forgiven self
	Forgiven others
	Know that God forgives
Daily spiritual experiences	Feel God's presence
	Find comfort in religion
	Feel deep inner peace
	Desire to be closer to God
	Feel God's love
	Touched by beauty of creation
Beliefs and values	God watches over me
	Responsibility to reduce pain and suffering
	Carry beliefs to other areas of life

Initially, exploratory between-group analysis of variance (ANOVA) with post hoc comparisons using the Tukey HSD test was computed to control for significant differences concerning the scores of the used instruments. In addition, an independent-samples *t*-test was conducted between the OCD group and the anxiety group, as well as between the HC and NH (OCD and AD) groups, when the initial ANOVA found significant differences between groups.

Logistic regression analysis was performed to assess the impact of factors on the likelihood of group affiliation to the HC or NH group (dependent variable). The model included six independent variables (MIS, RPBS, and BMMRS total scores; religious intensity; public religious activity; and negative religious coping; *cf.*). Negative religious coping was included because of the significant group differences found in Table 4. Religious intensity and public religious activity were included because these parameters have been repeatedly pointed out in the recent literature as predictors of mental health status (Kasen et al., 2011; Miller et al., 2011; Rasic et al., 2011). Demographic data were been included in the regression because they have been initially controlled for differences between the two groups (*cf.* Table 3).

RESULTS

Sample Characteristics

A total of 120 subjects (58 men, 62 women) with a mean age of 36.8 ± 12.0 years were found eligible for recruitment and classified in three groups: OCD ($n = 49$), other ADs ($n = 36$), and HC ($n = 35$) group (*cf.* Table 3). There were no statistically significant differences in age, sex, years of school education, religious affiliation, and nationality distribution of the sample (*cf.* Tables 3 and 4). The different diagnostic subgroups in participants with ADs are also reported in Table 3 (footnotes).

Group Differences

The results of the initial exploratory between-group ANOVA showed no significant differences with respect to most of the parameters assessed. In particular, there were no significant differences between the OCD, AD, and HC groups with respect to all magical ideation and paranormal belief traits. In addition, no significant differences at all were found between the OCD and anxiety subjects. Of all BMMRS subscales analyzed, only the parameter of negative religious coping (*i.e.*, belief that God is punishing, wonder if God has abandoned somebody) showed a statistical significant difference among the three groups (HC, 8.2 ± 11.7; OCD, 15.4 ± 19.0; AD, 21.0 ± 20.8; $p = 0.013$, $\eta^2 = 0.073$, power = 0.757). Post hoc analysis showed that healthy subjects reached lower scores in negative religious coping than the anxiety and OCD groups (data not shown). Computed *t*-tests between the HC and NH groups indicated significant differences with respect to negative religious coping, with healthy individuals reaching significantly lower scores of negative religious coping ($t = -2.63$, mean difference = −9.47; 95% confidence interval, −16.60 to −2.34; $p = 0.002$). The magnitude of the differences in the means is considered moderate ($r = 0.30$, Cohen $d = 0.63$). There were no significant differences in the sex and age distribution between the two groups (*cf.* Table 3).

An additional ANOVA investigating the differences between the different groups in separately all positively answered items on the MIS showed only a significant difference in item 16 ("At times, I perform certain little rituals to ward off negative influences"). The between-group difference was highly significant ($p < 0.001$,

TABLE 3. Distribution of Sample and Statistical Differences With Respect to Group, Sex, Age, Education, Nationality, and Religious Affiliation

	HC	OCD	AD	OCD	NH	Total	Between-Group ANOVA	HC Vs. NH
Screened samples	56	55	53	55	108	164		
Included samples (*n*)[a]	35	49	36[b]	49	85	120		
Male:female	15:20	20:29	23:13	20:29	43:42	58:62	$p = 0.081$	$p = 0.569$
Age, mean (SD), y	39.0 (12.5)	33.9 (10.5)	36.2 (12.2)	33.9 (10.5)	35.0 (11.3)	36.8 (12.0)	$p = 0.158$	$p = 0.089$
School education, mean (SD), y	11.5 (1.5)	11.1 (1.7)	10.9 (1.6)	11.1 (1.7)	11.0 (1.6)	11.2 (1.6)	$p = 0.260$	$p = 0.110$
Nationality								
German	31	44	34	44	78	109 (91.2%)	$p = 0.478$	$p = 0.319$
German (second generation of foreign nationality)[c]	3	3	1	3	4	7 (5.6%)		
Other[d]	1	2	1	2	3	4 (3.2%)		
Religious affiliation								
Protestant	9	14	15	14	29	38 (31.6%)	$p = 0.284$	$p = 0.117$
No religion	15	14	10	14	24	39 (32.5%)		
Roman Catholic	4	5	4	5	9	13 (10.8%)		
Muslim	1	3	1	3	4	5 (4.2%)		
Other Christians[e]	5	9	4	9	13	18 (15.0%)		
Other[f]	1	4	2	4	6	7 (5.9%)		

[a]Main exclusion reasons for anxiety and OCD group: diagnosis not confirmed, other main diagnosis, exclusion criteria violated (IQ<70, $n = 1$; schizophreniform disorder, $n = 2$; bipolar disorder, $n = 2$; substance/alcohol dependence, $n = 3$; comorbidity of obsessive-compulsive and other anxiety disorder, $n = 11$; other main first diagnosis [major depression, PTSD, autism spectrum disorder, personality disorder], $n = 4$). Main exclusion reasons for the healthy group: psychiatric diagnosis or positive psychiatric history ($n = 21$).

[b]Distribution of different anxiety disorders diagnoses within the anxiety group: panic disorder without agoraphobia ($n = 14$, 39%), panic disorder with agoraphobia ($n = 12$, 33%), agoraphobia without panic ($n = 1$, 3%), social phobia ($n = 6$, 17%), and generalized anxiety disorder ($n = 3$, 8%).

[c]Polish, Greek, Turkish, Austrian: respectively <1%.

[d]Greek, Italian, Portuguese, Turkish: respectively <1%.

[e]Christ, Baptist, Greek Orthodox, Christ N/A.

[f]Buddhist, Jehova's Witness, Naturalistic, Lutheran, Jew, "I believe in God": respectively <1%.

HC indicates healthy controls; OCD, obsessive-compulsive disorder; AD, anxiety disorder; NH, nonhealthy; ANOVA, analysis of variance; PTSD, posttraumatic stress disorder.

TABLE 4. Means and Group Differences in Subscales and Total Scores on the Brief Multidimensional Measure of Religiousness/Spirituality, Revised Paranormal Belief Scale, and Magical Ideation Scale for Healthy Controls and OCD and Anxiety Patients

	Percentage of Maximum Possible Score				ANOVA Between Groups
	HC (n = 35)	OCD (n = 49)	AD (n = 36)	NH (n = 85)	p
Revised Paranormal Belief Scale					
Traditional religious beliefs	10.5 (5.1)	10.3 (5.3)	10.6 (4.8)	10.4 (5.1)	0.974
Psi	8.5 (3.6)	8.3 (4.0)	9.3 (3.8)	8.7 (4.0)	0.487
Witchcraft	6.8 (3.6)	6.5 (4.7)	6.9 (4.1)	6.7 (4.4)	0.916
Superstition	7.6 (3.2)	8.3 (5.0)	8.2 (5.1)	8.3 (5.0)	0.736
Spiritualism	7.7 (5.1)	7.5 (4.9)	7.0 (4.0)	7.3 (4.5)	0.813
Extraordinary life forms	11.1 (4.1)	11.0 (4.8)	10.7 (5.8)	10.9 (5.2)	0.944
Precognition	6.8 (3.5)	6.3 (3.2)	7.0 (4.0)	6.6 (3.5)	0.636
Total score	31.3 (12.1)	30.7 (11.4)	31.7 (11.5)	31.1 (11.3)	0.928
Brief Multidimensional Measurement of Religiosity/Spirituality					
Daily spiritual experiences	18.2 (19.0)	17.2 (19.7)	11.7 (12.9)	14.9 (17.2)	0.253
Beliefs and values	28.4 (18.6)	28.2 (19.6)	27.1 (16.4)	27.8 (18.2)	0.950
Forgiveness	21.8 (20.9)	20.0 (18.5)	19.3 (20.1)	19.7 (19.1)	0.860
Private religious activities	9.1 (14.4)	9.3 (17.2)	5.5 (9.3)	7.7 (14.5)	0.441
Positive religious coping	21.4 (24.9)	19.1 (22.5)	12.5 (15.7)	16.4 (20.1)	0.205
Negative religious coping	8.2 (11.7)	15.4 (19.0)	21.0 (20.8)	17.7 (19.8)	0.013[a,]*
Self-directed coping	57.9 (27.0)	57.4 (29.9)	53.7 (30.8)	55.9 (30.2)	0.803
Overall coping	15.7 (22.7)	16.5 (25.7)	11.8 (16.5)	14.5 (22.3)	0.625
Congregation benefits	11.1 (18.4)	13.9 (18.1)	15.7 (17.4)	14.7 (17.7)	0.569
Congregation problems	2.9 (8.1)	6.0 (11.2)	6.4 (10.6)	6.2 (10.9)	0.281
Public religious activities	9.3 (12.9)	5.7 (9.7)	4.7 (6.2)	5.3 (8.4)	0.131
Religious intensity	16.8 (20.3)	15.4 (15.5)	12.5 (13.1)	14.2 (14.5)	0.547
Total score	18.5 (12.5)	18.8 (11.4)	15.8 (9.1)	17.5 (10.5)	0.507
Magical Ideation Scale Total Score	18.9 (18.4)	18.4 (18.9)	19.5 (16.9)	18.9 (18.0)	0.963

Data are presented as mean (SD).
[a]Healthy < OCD = anxiety.
*$p < 0.05$.
OCD indicates obsessive-compulsive disorder; HC, healthy controls; AD, anxiety disorder; NH, nonhealthy; ANOVA, analysis of variance.

$\eta^2 = 0.179$, power = 0.995), whereas post hoc analysis showed that OCD subjects reached significantly higher scores than the anxiety and HC groups did.

Finally, repeated ANOVAs with respect to all measured subscales scores were computed to investigate the differences between the various diagnostic subgroups of the anxiety group. None of the scores reached statistically significant or trend scores, indicating no differences between the various anxiety subgroups.

Logistic Regression

The full regression model containing all four predictors was statistically significant ($\chi^2_6 = 14.31$, $p = 0.026$), indicating that the model was able to distinguish between participants who belonged to the HC and NH group. To evaluate model fit, we used the Hosmer and Lemshow goodness-of-fit test ($p = 0.257$). The model as a whole explained between 12.7% (Cox and Snell R square) and 17.8% (Nagelkerke R^2) of the variance in the NH status and correctly classified 70.5% of the cases. As shown in Table 5, negative religious coping was the only one of the independent variables that made a statistically significant contribution to the model ($p = 0.005$) and was also the strongest predictor of group affiliation to the NH group.

DISCUSSION

This cross-sectional study investigated the differences in R/S traits and magical/paranormal ideation in patients with OCD or other ADs in comparison with HCs. It tends to be the first study of this setting using standardized multidimensional questionnaires and intends to contribute clear results to the contradictory literature presented in the *Introduction*. Summarizing, the results of this study underline missing differences in R/S, magical ideation, and paranormal beliefs in the investigated groups and herewith partly contradicts prior literature results. With respect to magical ideation, we particularly suggest that prior results could have been biased because of OCD-specific items of the MIS. Finally, a possible central impact of negative religious coping in psychiatric disorders in general and ADs in particular becomes apparent.

Paranormal Beliefs

An exploratory analysis of the differences among the three groups showed no differences concerning RPBS subscales and total score. In particular, our study suggests no differences in paranormal belief between the OCD, anxiety, and HC groups; no differences between HC and NH subjects; and also no differences among the various anxiety subgroups. To our knowledge, this is the first time that differences in paranormal beliefs between OCD and other ADs have been investigated in the literature. Furthermore, our study contributes to the sparse findings investigating the relationship of paranormal beliefs to anxiety in general, being also the first one to investigate differences in paranormal beliefs between OCD and anxiety patients to HCs.

Magical Ideation

Our study showed no significant differences among the three groups with respect to the MIS total score, suggesting similar magical ideation traits in OCD, other ADs, and HCs. Our study is in accordance with the results of West and Willner (2011), finding no differences in

TABLE 5. Final Full Logistic Regression Model Predicting the Likelihood of Group Affiliation (Healthy *vs.* Nonhealthy)

							95% CI for OR	
	β	SE	Wald	*df*	*p*	OR	Lower	Upper
MIS total score	−0.01	0.01	0.16	1	0.689	0.99	0.96	1.02
RPBS total score	−0.01	0.03	0.04	1	0.831	0.99	0.94	1.05
BMMRS total score	−0.05	0.04	1.28	1	0.258	0.95	0.87	1.04
Public religious activities	−0.04	0.03	1.90	1	0.168	0.96	0.92	1.01
Religious intensity	0.01	0.02	0.26	1	0.609	1.01	0.97	1.06
Negative religious coping	0.07	0.02	8.05	1	0.005*	1.07	1.02	1.12
Constant	1.22	0.71	2.92	1	0.087	3.40		

*$p < 0.05$.

β indicates standardized beta; OR, odds ratio; CI, confidence interval; MIS, Magical Ideation Scale; RPBS, Revised Paranormal Belief Scale; BMMRS, Brief Multidimensional Measure of Religiousness/Spirituality.

magical ideation between patients with OCD and generalized AD (West and Willner, 2011). With respect to the findings of Einstein and Menzies (2006), reporting significantly lower magical ideation scores in the panic disorder group compared with OCD patients and no differences between the panic disorder group and healthy subjects (Einstein and Menzies, 2006), our results are only partly concordant.

On the other hand, our study contradicts many study results of the last years, which suggest a positive correlation between magical ideation scores and OCD symptoms/traits (Bolton et al., 2002; Einstein and Menzies, 2004a, 2004b, 2006; Emmelkamp and Aardema, 1999; Fonseca-Pedrero et al., 2010; West and Willner, 2011) and higher magical ideation in OCD patients than in HCs (West and Willner, 2011).

To further investigate these results, we conducted an additional exploratory ANOVA investigating group differences with respect to each of the 20 different MIS items (German Version of MIS), showing only significantly higher scores in the OCD group with respect to item 16 ("At times, I perform certain little rituals to ward off negative influences"; $p < 0.001$, data not shown). However, this item is the only one also assessing a specific superstition compulsive trait, which would normally be expected being higher rated in an OCD population, in comparison to other anxiety disorders or healthy controls. In the original 30-item MIS of Chapman, there are also additional items assessing OCD-specific traits (item 3: I have sometimes been fearful of stepping on sidewalk cracks; item 18: It is not possible to harm others merely by thinking bad thoughts about them; item 27: I have felt that I might cause something to happen just by thinking too much about it). We therefore suggest that the presence of four OCD-specific items in the original MIS questionnaire may be a reason leading to potential bias when assessing differences in magical ideation between an OCD and a control group, resulting in higher MIS total scores for the OCD group. A future retrospective reanalysis of prior studies controlling for these four items would be of particular interest and may deliver new aspects in the interpretation of these studies.

Religiosity and Spirituality

Our study did not show any significant differences between OCD, anxiety, and healthy subjects concerning most of the R/S subscales. These results are in accordance with studies finding no significant correlation between R/S and anxiety (Frenz and Carey, 1989; Koenig et al., 1993; McCoubrie and Davies, 2006) or OCD (Hermesh et al., 2003; Lewis, 1994; Siev et al., 2010; Tek and Ulug, 2001; Zohar et al., 2005). In addition, no significant differences at all were found between the various diagnostic anxiety subgroups and between OCD and anxiety subjects.

However, our study has reported statistically significant differences between the groups with respect to the factor of negative religious coping, with OCD and anxiety subjects reaching significantly higher scores than healthy subjects. A logistic regression suggested also higher negative religious coping as the only significant predictor of group affiliation to the NH group. Other religiosity traits (*i.e.*, public religious activities and subjective religious intensity), often suggested as significant positive predictors of better mental health, showed no significant predictive power in our study.

Lately, religious coping has been increasingly recognized as being especially closely related to certain psychopathologies. Religious coping reflects the functional expressions of R/S in stressful situations. Therefore, especially negative religious coping (*i.e.*, wonder whether God has abandoned someone or belief in a punishing God), although less frequent than positive religious coping, has been repeatedly found in close association to negative psychological adjustment (Ano and Vasconcelles, 2005), higher psychopathology scores, and worse mental health status (Bosworth et al., 2003; Braam et al., 2010; Dew et al., 2010; Hebert et al., 2009; Johnstone and Yoon, 2009; McConnell et al., 2006; Mohr et al., 2011). Our results are herewith in concordance with prior studies. However, although religious coping has been increasingly on research focus over the last years, most studies have investigated the relationship of religious coping to depression. Only a few studies assessed this parameter in association to anxiety (Chapman and Steger, 2010; McConnell et al., 2006) and mostly in hospitalized somatic ill patients (Zwingmann et al., 2008). The study of Chapman and Steger (2010) is the only one that indeed suggested a positive relationship between negative religious coping and anxiety symptoms, however, only in European Americans. Our study is therefore the first one assessing the parameter of negative religious coping with respect to both anxiety and OCD in clinical subjects in comparison with HCs. However, it remains unclear whether negative religious coping represents a common expression of a mentally ill condition in a symptomatic level or a common cognitive vulnerability factor, leading to negative psychological adjustment to stress (Ano and Vasconcelles, 2005) and therefore being more frequently found among the symptomatic population (Pirutinsky et al., 2011).

LIMITATIONS AND STRENGTHS

The current study included a relatively small number of patients. The modest sample size may have played a role in limiting the statistical power of some of the statistical comparisons conducted. Nevertheless, effect size and power calculations showed that the final sample size was sufficient to show differences in our primary outcomes. Prior studies with similar sample size and setting reported also sufficient power (Trenholm et al., 1998; West and Willner, 2011). Especially study results concerning the diagnostic anxiety subgroups should be considered with caution because of the low sample size and the uneven distribution of subjects between the subgroups.

Factors such as age, sex, education, religious affiliation, and race show also a very strong relationship to religious/spiritual parameters

(Kendler et al., 2003; McCullough and Larson, 1999; Nelson, 1989) and could therefore also lead to biases in the results. However, in our study, there were no statistical significant differences in age, sex, nationality, religious affiliation, and years of school education among the sample groups. With respect to negative religious coping, the results remain statistically significant, also after specific controlling for these parameters.

On the other hand, diagnostic procedures and psychometric rating based on a face-to-face interview with trained raters, as well as multidimensional self-rate psychometric scales especially chosen for their clinical validity and reliability, ensure homogeneity of patient groups with respect to known confounds. Nevertheless, the design of this study does not allow assuming a definite and direct causal relationship between R/S and magical/paranormal ideation and OCD or other ADs, which has to be an objective of further research.

CONCLUSION

Scientific approaches to the field of R/S and personal beliefs are very complex. In addition, the lack of defined and universally accepted multidimensional measures of these traits has led to poor operationalization, unmatchable and incomparable data, and finally to several contradictory results. Religious, magical, and paranormal beliefs and experiences are far more multidimensional than believed so far. Many studies suggest, in particular, that the greatest importance does not lie on personal beliefs in general but rather on specific coping strategies in particular.

Our study investigated for the first time systematically potential differences between R/S traits and paranormal ideation between OCD and other ADs with multidimensional measures, finding no significant differences between the two groups, as well as no differences between these two groups and HCs. We also did not find significant differences in magical ideation among the three groups when excluding OCD-specific items of the MIS. We herewith suggest a potential bias of prior studies suggesting higher scores of magical ideation in OCD patients because of certain OCD-specific items of the MIS scale. Consequently, our results also do not support significant differences between OCD and anxiety patients concerning underlying and predisposing R/S, paranormal, and magical ideation belief traits. However, in our study, OCD and anxiety subjects scored significantly higher in the factor of negative religious coping than HCs did, suggesting this factor as being closely associated to various forms of psychopathology in AD subjects. However, it remains unclear whether this represents a vulnerability factor, an accompanying symptom, or a sequel of the disorder.

These results suggest that religious patients may benefit more from a different form of psychotherapy, which emphasizes on better religious coping, promoting positive and preventing negative religious coping and its cognitive manifestations. Thus, religious-sensitive psychotherapy might especially focus on the negative R/S cognitive assumptions (belief of being abandoned by God, etc.) and give patients the opportunity to deal with their religious and spiritual struggles though an alternative kind of spiritual guidance. Nevertheless the "religiosity gap" between patients and therapists remains unheeded in research (Seyringer et al., 2007), emphasizing the need for additional religious-sensitive assessments and research in the treatment of mental disorders.

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DISCLOSURES

The authors declare no conflict of interest.

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