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Religiosity/Spirituality and Mental Health: A Meta-analysis of Studies from the German-Speaking Area

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Abstract

The meta-analysis presented here investigates the relationship between religiosity/spirituality (R/S) and mental health based on 67 studies from the German-speaking area (Germany, Austria, Switzerland). The weighted average correlation is .03 (95% CI [.01, .05]), indicating that a greater R/S is minimally but significantly associated with better mental health. The results are moderated by the type of R/S measure: negative R/S types correlate − .20 with mental health, whereas other R/S measures exhibit small positive associations. In comparison with US-American meta-analyses, the average effect size is lower, and the associations between negative R/S types and lower mental health are particularly strong.

Keywords Meta-analysis · Religiosity · Spirituality · Mental health · Germany

Introduction

Recent meta-analyses from the North-American-language area repeatedly show a slightly positive correlation for the relationship between R/S and mental health for different populations (mean correlation between .06 and .19; Ano and Vasconcelles

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2005; Hackney and Sanders 2003; Salsman et al. 2015; Smith et al. 2003; Yonker et al. 2012).

Different correlations were found especially with regard to diverse measures and forms of R/S. For some of the measures of R/S, for example, negative religious coping and extrinsic religiosity, an inverse relationship can be found. For these measures, the correlation between R/S and mental health is negative (Ano and Vasconcelles 2005; Smith et al. 2003).

It is questionable whether the results from the North-American-language area can be transferred to the German-speaking area with regard to their structure and their magnitude. An overhasty generalization should be avoided due to the differences between the North-American "religious landscape" and the more secularized German-speaking area. Religiosity is much more prevalent in the USA than it is in the German-speaking area: Nearly 95% of US citizens state that they believe in God. This number has hardly changed since 1944. (In comparison: Switzerland: 59%, West Germany: 53%, Austria: 47%, East Germany: 13%; cf. Huber 2011). Further differences between the US-language area and the German-speaking area can be found for other indices of personal religiosity (Bertelsmann Stiftung 2008a; Pickel 2013) and for the personal description as "spiritual" (Zwingmann and Gottschling 2015). The German-speaking area is characterized by a large number of people without any denomination; they represent up to one-third of the population. Furthermore, the German-speaking area is characterized by a decreasing religious attachment. Beyond that, the religious practices in the USA exhibit a bigger social component than in the German-speaking area. The high number of diverse denominations (among them the Evangelical Free Church, Pentecostal Church and charismatic movements), the greater implicitness for a change of denomination, and the smaller congregations facilitate an individual choice of a personal religious community and a narrow net of religiously connotated social support (Bertelsmann Stiftung 2008b). The German-speaking area, in contrast, is dominated by either one of two large nation-wide churches. Almost everyone with a religious denomination is a member of one of these two churches. Changing the denomination is—in contrast to withdrawing the membership in a church—much more unusual in the German-speaking area than it is in the USA. Moreover, the membership in a church in the German-speaking area is linked with a liability for taxation or a financial contribution, respectively, and the church is determined by the location of residence.

Due to these differences, it is not implausible to expect other, perhaps smaller effect sizes for the personal R/S on mental health for the more secularized German-speaking area (Heinemann and Wörmann 2010; Kremer 2001; Zwingmann 2005). In comparison to the US-language area, several authors have drawn some more cautious conclusions. Schowalter and Murken (2003), for example, state that empirical studies with samples not burdened with illness or other negative life events or data analyses of the general population find no or only a small positive effect of religiosity on health in the German-speaking area. Ten years later, Zwingmann and Klein (2013) stated that the results of the different studies were inconsistent: the relationship between R/S and indicators of mental health was sometimes negative, sometimes positive, and sometimes no effects were found at all, for both healthy and clinical samples. They further pointed out that the strongest effect sizes are often found when negative aspects of religiosity are under

study: for example, a negative relationship with God and a subsequent poorer mental health or a less subjective well-being, as well as higher values of anxiety and depression due to negative religious coping (Zwingmann and Klein 2013; see also Klein and Albani 2011). Thus, Utsch (2012; 2014) summarized that the German-speaking-area studies indicate rather ambivalent effects of R/S.

However, these conclusions are based on only the subjective impressions of those particular authors against the background of a more or less complete overview of the available literature. To obtain a valid review, we conducted a systematic search of relevant primary studies from the German-speaking area and integrated them by undertaking a meta-analysis.

Method

Literature Search

In August/September 2015, we consulted the data bases PSYNDEX, PsycINFO, and MEDLINE for an extensive, systematic literature search. We used multiple search terms in both German and English languages in order to detect relevant studies. In addition, we manually examined the reference sections of past reviews and of primary studies meeting the inclusion criteria for articles not identified in the database searches. Furthermore, we reviewed the tables of contents and registers of the following journals: *Archive for the Psychology of Religion/Archiv für Religionspsychologie*, *Journal of Empirical Theology*, and *Spiritual Care*. Finally, we screened the lists of publications of several relevant researchers in the field of interest. We included studies that were published until the beginning of our analysis in June 2016.

Criteria of Inclusion and Exclusion

A primary study was included in the meta-analysis if it fulfilled the following criteria: 1. The study was published in a journal, as a monograph, as a chapter in an anthology, as a dissertation thesis or as a habilitation treatise. 2. It was published in German or English. 3. It was an empirical study. 4. The sample originated from the German-speaking area (Germany, Austria, German-speaking Switzerland; a slight deviation of $\leq$10% was tolerated). 5. A quantitative measure for both R/S and mental health was available. 6. A correlation coefficient (or an effect size that can be transferred into a correlation coefficient; for the particular calculations see Sedlmeier and Renkewitz 2008) was provided. 7. The sample size was denoted.

A primary study was not included if it fulfilled the following criteria: 1. The study analyzed a predominantly non-Christian sample. 2. It operationalized R/S only by denomination or by measures of religious/spritual needs. 3. The sample consisted of more than 10% a) children or adolescents, b) (future) religious leaders or c) members of so-called new religious movements.

Coding of the Studies

If one empirical study was published more than once, but the papers were based on the same sample, that study was considered only once. If, on the contrary, several samples were analyzed separately, each of these samples was counted as a single study. If available, the following information was extracted and coded for each primary study included: 1. author(s), 2. year of publication, 3. research area (Germany, Austria, German-speaking Switzerland; several), 4. sample with illness or in a crisis situation (no; yes; mixed), 5. sample size and proportion of women and men, 6. age of the sample (*M*, *SD*, Range—if no *SD* was available), 7. distribution of denomination (Catholic; Protestant; other; without; no information available or unknown), 8. measure of R/S (centrality[1] or any other measure of religious salience [1]; religious interest [2]; belief in God [3]; religious ideology or beliefs other than belief in God [4]; religious experience [5]; private religious practice [6]; frequency of church attendance [7]; public religious practice other than frequency of church attendance [8]; religious practice without further specification [9]; consequences [10]; intrinsic religiosity [11]; extrinsic religiosity [12]; quest religiosity [13]; positive image of God/positive relationship with God [14]; negative image of God/negative relationship with God [15]; positive religious coping [16]; negative religious coping [17]; religious/spiritual well-being[2] [18]; spirituality[3] [19]; multidimensional measures of R/S [20]; other measures of R/S [21]), 9. indicator for measuring mental health (only positive indicators; only negative indicators; both positive and negative indicators), 10. statistical control of third variables (no; yes; partially); 11. effect sizes, i.e., the correlation coefficients or the calculated correlation coefficients based on the available data (Pearson correlation r or in some studies the Spearman's rank correlation r_s) or, in cases of a statistical control of third variables, partial measures of association (regression coefficients, partial correlation coefficients). The direction of the effect sizes was coded uniformly so that positive values indicate that R/S is associated with better mental health. The inter-rater reliability was calculated for the different categories of the coding scheme on the basis of 26 primary studies. The studies were randomly selected and coded by both of the two authors. The inter-rater reliability for all of the categories was good to very good (Cohens $\kappa \geq .65$ with a median $\kappa = .96$).

[1] This refers to the global score of the Centrality of Religiosity Scale (CRS) by Huber (2003, 2004; Huber and Huber 2012) which exists in different versions. Centrality conceptualizes the importance religiosity has in the life of an individual. Centrality consists of five dimensions, referring to Stark and Glock (1968): religious interest, religious ideology, religious experience, private and public religious practice.

[2] This concept uses R/S as a component of health-related quality of life (see Zwingmann et al. 2011). In the meta-analysis at hand, only measures with an explicit religious or transcendent reference were considered.

[3] The category "spirituality" was coded if the studies employed non-theistic approaches to transcendence, particularly beyond institutionalized religion.

Data Analysis

The calculation of the weighted mean effect size *r*+ was based on a random effects model (Borenstein et al. 2009). The assumption of the random effects model is that the true effect sizes between the primary studies are not equal but can be different from each other. On the one hand, studies with a larger sample size—like in the fixed effect model—get more weight in the random effects model. On the other hand, this increase in weight is not linear so that the specific information out of the smaller studies is represented in an appropriate way. (See Borenstein et al. 2009, Chapter 13; Lipsey and Wilson 2001, Chapter 6.)

The calculation of the mean effect size was based on the effect sizes of the primary studies. Each primary study was considered with only one effect size. If a primary study delivered more than one effect size *r*, these effect sizes were aggregated (via the Fisher's Z transformation).

Several methods were used to examine whether the calculated mean effect is robust against a possible publication bias, namely the tendency that studies have a higher likelihood of being published if they yield large or statistically significant effect sizes. The methods used are as follows: a funnel plot (e.g., Bax et al. 2008), Rosenthal's Failsafe N (e.g., Heene 2010), Orwin's Failsafe N (e.g., Borenstein et al. 2009, Chapter 30), Duval and Tweedie's Trim and Fill (e.g., Borenstein et al. 2009, Chapter 30), the rank correlation test according to Begg and Mazumdar (e.g., Papageorgiou et al. 2015), Egger's regression analysis (e.g., Niemeyer et al. 2012), and a cumulative meta-analysis (e.g., Borenstein et al. 2009, Chapter 30).

We also calculated three tests of heterogeneity (Q statistic, T^2 statistic, I^2 statistic) to check whether they support the assumption of the appropriateness of a random effects model. Subsequently, we conducted several moderator analyses. For this purpose, we built subgroups for study aspects or socio-demographic variables and recalculated weighted mean effect sizes *r*+ based on the random effects model for every subgroup. For these calculations, the program *Comprehensive Meta-Analysis* (CMA, version 3; https://www.meta-analysis.com) was used.

Results

Descriptive Characteristics

In the meta-analysis, $k = 67$ studies with $N = 119{,}575$ participants were included. Out of these studies, more than 250 effect sizes could be extracted. Table 1 contains descriptions and the effect size estimate for each of the 67 studies included in the meta-analysis. Table 2 provides an overview of descriptive information about these studies. The first column of Table 2 informs about the formal and socio-demographic aspects of the included studies. The publication period dates from 1990 to 2016, which equates to a span of 27 years. Since 2006, more and more studies have been published, and most studies were published within the past 5 years. Those studies predominantly come from Germany (71.6%) and were conducted with both healthy or unstressed people (46.3%) and people suffering from an illness or

Table 1 Descriptions of the 67 studies included in the meta-analysis

No.	References	Research area	Sample type[a]	*N*	Proportion of women [%]	Age: *M* (*SD*)	Denomination[b]	Mental health[c]	Measure of *R*/*S*	Control[d]	No. of effect sizes	Mean effect size [CI]
1.	Allemand and Znoj (2004)	S	1	112	69.6	41.0 (13.6)	3	1	6, 8, 9, 13, 15, 16, 19, 20	1	24	.16 [.09, .22]
2.	Appel et al. (2010); Appel (2012)	G	1	113	n.a.	n.a.	3	3	15, 16	0	6	−.28 [−.40, −.16]
3.	Becker et al. (2006)	G	1	66	13.6	56.4 (n.a.)	3	3	6	0	5	.03 [−.21, .27]
4.	Berthold and Ruch (2014)	Sev	0	20,538	70.0	39.0 (12.4)	3	1	1	0	4	.14 [.13, .15]
5.	Büssing and Mundle (2012)	G	1	111	48.6	47.5 (10.1)	3	3	10	0	2	.19 [.00, .36]
6.	Büssing and Recchia (2015)	G	1	1092	8.0	n.a.	3	3	10, 12	0	4	−.12 [−.16, −.08]
7.	Büssing et al. (2008, 2009a)	G	2	5248	34.0	63.1 (10.6)	3	1	10	0	1	−.03 [−.06, .00]
8.	Büssing et al. (2009b)	G	1	580	80.0	53.8 (14.4)	3	1	10, 12	0	2	.11 [.05, .17]
9.	Büssing et al. (2013); Wirth and Büssing (2016)	G	1	213	78.0	42.6 (11.4)	3	1	1, 6	0	1	.06 [−.05, .14]
10.	Büssing et al. (2015)	G	0	489	66.0	53.5 (10.2)	3	1	6, 21	0	2	.08 [.02, .14]
11.	Dörr (2001, 2004)	G	1	192	70.3	39.1 (9.9)	3	2	1, 6, 8, 15, 20	0	9	−.15 [−.21, −.08]

Table 1 (continued)

No.	References	Research area	Sample type[a]	*N*	Proportion of women [%]	Age: *M* (*SD*)	Denomination[b]	Mental health[c]	Measure of *R/S*	Control[d]	No. of effect sizes	Mean effect size [CI]
12.	Fischer et al. (2006) (study 1)	G	0	146	44.5	30.8 (8.5)	3	3	10	0	2	.02 [−.14, .18]
13.	Fischer et al. (2006) (study 2)	G	0	74	44.6	30.6 (9.0)	3	3	10	0	1	.17 [−.06, .38]
14.	Fitchett et al. (2014)	S	1	540	52.9	63.0 (15.3)	3	2	16	1	2	−.11 [−.19, −.03]
15.	Francis et al. (2003)	G	0	331	62.0	n.a.	1	1	22	0	1	.13 [.02, .23]
16.	Gebauer et al. (2012) (Germany)	G	0	19,318	n.a.	n.a.	3	1	6	0	1	.03 [.02, .04]
17.	Gebauer et al. (2012) (Austria)	A	0	17,109	n.a.	n.a.	3	1	6	0	1	.06 [.05, .07]
18.	Gebauer et al. (2012) (Switzerland)	S	0	11,183	n.a.	n.a.	3	1	6	0	1	.01 [−.01, .03]
19.	Geiss et al. (2005)	G	0	472	68.4	44.0 (11.9)	3	1	21	0	2	.12 [.03, .21]
20.	Grözinger and Matiaske (2014)	G	0	16,850	47.7	n.a.	3	1	2	0	1	.13 [.12, .14]

Table 1 (continued)

No.	References	Research area	Sample type[a]	*N*	Proportion of women [%]	Age: *M* (*SD*)	Denomination[b]	Mental health[c]	Measure of *R/S*	Control[d]	No. of effect sizes	Mean effect size [CI]
21.	Headey et al. (2010); Lechner and Leopold (2015); Sinnewe et al. (2015)	G	0	6568	n.a.	n.a.	3	1	1, 6	0	2	.10 [.08, .11]
22.	Heinemann and Wörmann (2010)	G	1	368	n.a.	n.a.	3	1	6	0	1	.15 [.05, .25]
23.	Hess (2009)	G	1	97	92.4	54.5 (11.1)	2	2	15, 16	0	2	−.41 [−.52, −.29]
24.	Hofner and Michalak (2013)	G	1	51	100.0	61.8 (13.2)	2	2	6	0	1	.29 [.02, .52]
25.	Hunger (2010) (non-clinical sample)	G	0	79	78.5	32.0 (11.0)	3	2	13, 14, 15, 16, 21	0	5	−.01 [−.12, .09]
26.	Hunger (2010) (clinical sample)	G	1	52	69.2	39.7 (9.1.)	3	2	13, 14, 15, 16, 21	0	5	.09 [−.04, .21]
27.	Jendro (2013)	G	1	287	72.5	n.a.	3	1	9, 13, 16, 20	0	4	.05 [−.01, .11]
28.	Klein (2010)	G	0	135	71.9	21.1 (2.8)	3	2	6, 21	0	18	−.13 [−.25, −.01]
29.	Klein et al. (2016)	G	0	919	n.a.	n.a.	3	1	21	0	3	.06 [.00, .12]
30.	Kralovec et al. (2014)	A	0	625	32.6	36.2 (11.8)	1	2	20	0	5	.03 [−.05, .11]

Table 1 (continued)

No.	References	Research area	Sample type[a]	*N*	Proportion of women [%]	Age: *M* (*SD*)	Denomination[b]	Mental health[c]	Measure of *R/S*	Control[d]	No. of effect sizes	Mean effect size [CI]
31.	Kremer (2001, 2002)	G	1	30	53.3	69.7 (n.a.)	2	2	10	0	1	−.38 [−.65, −.02]
32.	Maercker and Herrle (2003)	G	1	47	80.9	72.5 (8.7)	3	3	22	0	4	−.07 [−.35, .22]
33.	Malfent et al. (2010)	A	0	129	82.9	80.3 (7.5)	3	2	6	0	1	.02 [−.15, .19]
34.	Mehnert et al. (2003)	G	1	117	56.4	57.0 (n.a.)	2	3	15	0	2	.03 [−.15, .21]
35.	Meulemann (2001)	G	0	1989	n.a.	30.0 (n.a.)	3	1	2, 6, 18, 20, 22	0	15	.10 [.08, .12]
36.	Möller and Reimann (2004)	G	0	212	67.0	21.2 (n.a.)	3	1	13	0	1	.00 [−.13, .13]
37.	Müller (2008); Zwingmann et al. (2006, 2008)	G	1	167	100.0	57.1 (10.7)	3	2	6, 13, 14, 15, 16	0	6	.02 [−.05, .09]
38.	Murken (1998a, b)	G	1	465	74.6	39.8 (10.6)	3	3	1, 10, 13, 14, 20, 21	0	36	−.02 [−.11, .07]
39.	Murken et al. (2010)	G	1	341	43.7	64.0 (10.5)	3	3	15, 16	0	8	−.04 [−.11, .04]
40.	Muthny et al. (1992)	G	1	451	100.0	52.7 (12.6)	3	3	20	2	2	−.02 [−.11, .07]
41.	Pfeifer and Waelty (1995) (clinical sample)	S	1	44	70.5	34.4 (10.1)	2	1	6	0	1	.26 [−.04, .52]

Table 1 (continued)

No.	References	Research area	Sample type[a]	*N*	Proportion of women [%]	Age: *M* (*SD*)	Denomination[b]	Mental health[c]	Measure of *R/S*	Control[d]	No. of effect sizes	Mean effect size [CI]
42.	Pfeifer and Waelty (1995) (non-clinical sample)	S	0	45	62.2	36.6 (16.3)	2	1	6	0	1	.40 [.12, .62]
43.	Reidick (2013)	G	0	113	77.9	90.4 (2.8)	2	2	3, 5, 6, 7, 8, 13, 14, 20, 21	0	18	.17 [.11, .23]
44.	Renner and Salem (2004)	A	1	26	73.1	27.8 (11.9)	1	3	6	1	4	−.33 [−.63, .07]
45.	Rowold (2011)	G	0	207	69.9	45.7 (10.6)	3	1	13	0	3	.21 [.08, .34]
46.	Schaal et al. (2014)	G	1	61	62.3	65.9 (15.1)	1	2	1, 22	1	2	−.19 [−.35, −.01]
47.	Schowalter et al. (2003)	G	1	465	73.1	40.6 (10.7)	3	3	13	0	2	.04 [−.05, .13]
48.	Schwab and Petersen (1990)	G	0	149	n.a.	n.a.	3	2	13, 14	0	2	.02 [−.09, .13]
49.	Selinger and Straube (2002)	G	0	302	65.3	41.5 (15.99)	3	1	6, 15	1	2	.16 [.08, .24]
50.	Stavrova et al. (2013) (Germany)	G	0	3640	n.a.	n.a.	3	1	2, 6	0	8	.16 [.13, .18]
51.	Stavrova et al. (2013) (Austria)	A	0	1396	n.a.	n.a.	3	1	2, 6	0	8	.08 [.04, .12]

Table 1 (continued)

No.	References	Research area	Sample type[a]	*N*	Proportion of women [%]	Age: *M* (*SD*)	Denomination[b]	Mental health[c]	Measure of *R/S*	Control[d]	No. of effect sizes	Mean effect size [CI]
52.	Stavrova et al. (2013) (Switzerland)	S	0	2282	n.a.	n.a.	3	1	2, 6	0	8	.03 [.00, .05]
53.	Tagay et al. (2006)	G	2	389	68.3	35.5 (12.4)	3	3	6	0	8	−.04 [−.14, .06]
54.	Tagay et al. (2007)	G	1	230	75.2	51.1 (n.a.)	3	2	6	0	2	.00 [−.13, .13]
55.	Tagay et al. (2009)	G	1	184	60.9	43.1 (12.6)	3	2	2, 3, 6, 20	0	5	−.07 [−.14, .00]
56.	Thomas et al. (2009, 2010)	G	1	60	75.0	72.0 (n.a.)	2	2	5, 15, 16, 22	0	4	.15 [.03, .28]
57.	Unterrainer et al. (2012a)	A	1	81	0	41.3 (8.4)	3	2	17, 20	0	6	.06 [−.09, .22]
58.	Unterrainer (2010, 2014); Unterrainer et al. (2012b, 2013, 2014)	A	1	220	54.1	37.4 (10.6)	1	2	6, 13, 14, 16,17, 20	0	16	−.13 [−.18, −.07]
59.	Unterrainer et al. (2015)	A	1	39	30.8	47.0 (12.4)	1	2	6, 7	0	4	.27 [.05, .47]
60.	Unterrainer et al. (2011)	A	0	102	52.0	23.8 (3.0)	3	2	6, 7	0	2	−.28 [−.40, −.14]
61.	Wigger et al. (2008)	G	1	60	78.3	51.0 (11.7)	1	3	15, 16	0	8	.01 [−.17, .19]

Table 1 (continued)

No.	References	Research area	Sample type[a]	*N*	Proportion of women [%]	Age: *M* (*SD*)	Denomination[b]	Mental health[c]	Measure of *R*/*S*	Control[d]	No. of effect sizes	Mean effect size [CI]
62.	Winter (2005); Winter et al. (2009)	S	1	328	74.1	44.5 (13.4)	3	3	6, 15, 16	0	12	.03 [−.04, .09]
63.	Wolf (2002)	G	0	276	58.0	25.5 (n.a.)	3	1	10, 11, 20, 22	0	5	−.15 [−.21, −.09]
64.	Zimmermann (1995)	G	0	181	57.5	34.0 (13.0)	1	1	21	0	1	.18 [.04, .32]
65.	Zink (2011)	Sev	0	525	79.0	34.5 (n.a.)	3	1	6	0	1	.28 [.20, .36]
66.	Znoj et al. (2004)	S	1	55	65.5	39.6 (n.a.)	3	3	15, 16, 20	0	8	.01 [−.14, .17]
67.	Zwingmann (1991); Zwingmann et al. (1991)	G	0	209	52.2	38.9 (16.9)	1	1	2, 6, 10, 11	0	12	.04 [−.03, .11]

G Germany, *A* Austria, *S* German-speaking Switzerland, *Sev* Several, *n.a.* not available

[a]Sample with disease or in crisis situation?: 0 = no, 1 = yes, 2 = both

[b]Denomination: 1 = Catholic > 50%, 2 = Protestant > 50%, 3 = other distribution or no data available

[c]Indicator of mental health: 1 = only positive indicators, 2 = only negative indicators, 3 = both positive and negative indicators

[d]Control of third variables: 0 = no, 1 = yes (completely), 2 = yes (partially)

Table 2 Characteristics of the primary studies which were included in the meta-analysis: number of studies and effect sizes *r*+ of the subgroups

	Number of studies	Effect sizes *r*+ of the subgroups [95% confidence interval]
Publication period: $\Delta r+ = .09$ ($Q = 9.67$, $df = 3$, $p = .022$)		
Before 2000	8	.04 [− .03, .12]
2001–2005	14	.02 [− .03, .07]
2006–2010	21	− .02 [− .06, .02]
2011–2016	24	.07** [.03, .10]
Research area: $\Delta r+ = .20$ ($Q = 9.18$, $df = 3$, $p = .027$)		
Germany	48	.02 [− .01, .05]
Austria	9	− .00 [− .07, .06]
German-speaking Switzerland	8	.05 [− .02, .12]
Several	2	.20** [.08, .32]
Sample with disease or in crisis situation: $\Delta r+ = .11$ ($Q = 16.64$, $df = 2$, $p < .001$)		
No	31	.07** [.04, .10]
Yes	34	− .01 [− .04, .02]
Both	2	− .04 [− .13, .06]
Sample size: $\Delta r+ = .06$ ($Q = 5.08$, $df = 4$, $p = .280$)		
< 50	6	.05 [− .06, .17]
50–100	11	.00 [− .06, .09]
101–250	20	− .00 [− .04, .04]
251–1000	18	.04* [.00, .08]
> 1000	12	.06* [.01, .10]
Proportion of women: $\Delta r+ = .06$ ($Q = 3.25$, $df = 3$, $p = .355$)		
< 40%	6	.02 [− .06, .10]
40–60%	13	− .02 [− .07, .04]
> 60%	36	.04* [.01, .07]
No data available	12	.04 [− .01, .09]
Mean age: $\Delta r+ = .21$ ($Q = 19.86$, $df = 3$, $p < .001$)		
M(age) < 30 years	5	− .16** [− .24, − .07]
30 years < *M*(age) < 60 years	37	.05** [.02, .08]
M(age) > 60 years	10	.00 [− .06, .07]
No data available	15	.04* [− .00, .08]
Denomination: $\Delta r+ = .04$ ($Q = 0.49$, $df = 2$, $p = .781$)		
Catholic > 50%	9	.02 [− .05, .08]
Protestant > 50%	8	.06 [− .05, .08]
Other or no data available	50	.03* [.00, .05]
Indicator of mental health: $\Delta r+ = .12$ ($Q = 36.40$, $df = 2$, $p < .001$)		
Only positive indicators	28	.09** [.06, .12]
Only negative indicators	22	− .03 [− .07, .01]
Both positive and negative indicators	17	− .03 [− .08, .01]

Table 2 (continued)

	Number of studies	Effect sizes *r*+ of the subgroups [95% confidence interval]
Statistical control of third variables: $\Delta r+ = .05$ ($Q = 0.89$, $df = 2$, $p = .641$)		
No	61	.03** [.01, .06]
Yes, partially	1	−.02 [−.19, .15]
Yes, completely	5	.02 [−.07, .11]

$\Delta r+$: difference between the highest and the lowest effect size of subgroups for each characteristic
*$p < .05$; **$p < .01$

a current crisis (50.7%). Most of the studies comprise sample sizes between 101 and 250 participants (29.9%), contain more women than men (53.7%), and exhibit a mean age between 30 and 60 years (55.2%). In only a quarter of the samples, more than half of the persons are Catholics (13.4%) or Protestants (11.9%). In most of the studies, only positive indicators of mental health were measured (44.8%; most commonly used: satisfaction, subjective well-being, mental health, and personal growth), but there are also quite a number of studies in which either only negative indicators (32.8%; most commonly used: depression, anxiety, psychological strain, and loneliness) or both positive and negative indicators (22.4%) were used. For nearly all studies, effect sizes could be extracted without any statistical control of third variables (91%).

Aggregating the socio-demographic data across all primary studies (if they were available for the effect sizes used here), one gets the following distribution: information about the sex of the participants is available in 55 studies (82.1%). Out of these participants, 57.6% are female. The mean age was reported in 52 studies (77.6%) and the weighted mean age for all of those studies is 43.5 years (with a weighted *SD* of 10.8 years). Details about the denominations of the study participants are only available in 34 studies (50.7%). Out of these, 33.9% are Catholic, 34.6% Protestant, 27.7% had no denomination at all, and 3.7% belonged to another religion. If one compares these distributions with a representative sample of Germany (in 2013: 53% female; *M*(age) = 44.1 years; 30% Catholic; 28.5% Protestant; 31.1% non-denominational; 9.3% other religion; https://www.destatis.de), it is obvious that the data are quite congruent with one another. Nevertheless, female participants, Catholics, and Protestants were slightly overrepresented in the included primary studies.

Mean Effect Size

Out of all of the 67 included mean effect sizes *r*, 20 (29.9%) are negative, 2 are equal to zero (3.0%), and 45 (67.2%) are positive. The effect sizes of the primary studies range from −.41 to .40. The calculated weighted mean effect size based on the random effects model is $r+ = .03$ ($z = 2.79$, $p < .01$; 95% CI [.01, .05]). In Fig. 1, these results are shown using a forest plot.

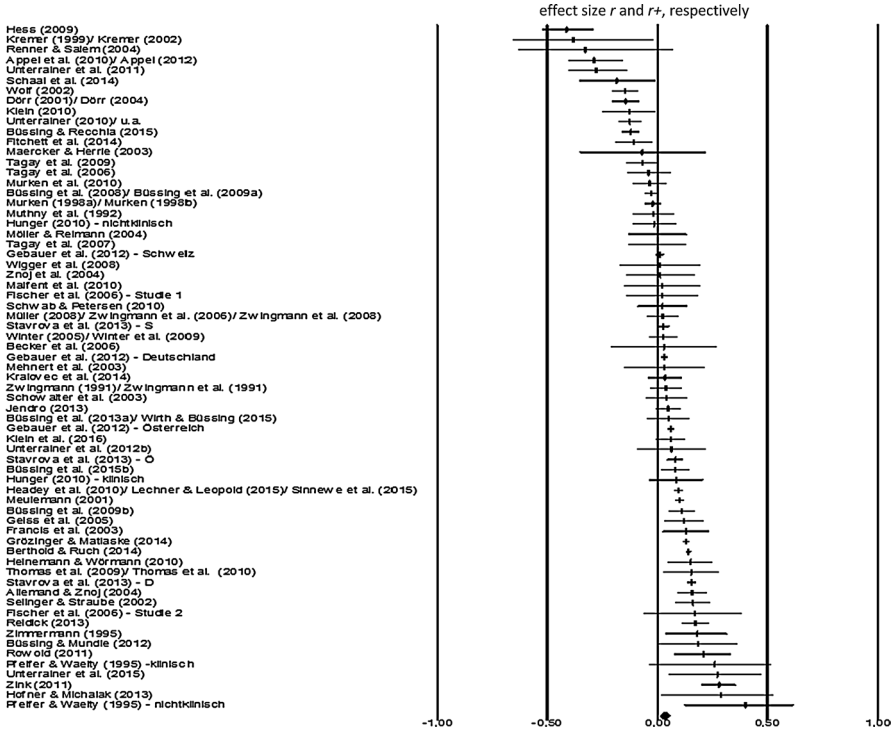

Fig. 1 Forest plot for all of the primary studies which were included in the meta-analysis. The figure displays the 67 primary studies with their study-specific effect size *r* and the 95% confidence interval. The studies are sorted according to the height of their effect size. On the bottom line of the graph, the mean effect size *r*+ for all studies is represented with its 95% confidence interval by a diamond. The confidence interval of the mean effect size is the difference between the left and the right end of the diamond

Moderator Analyses

The forest plot in Fig. 1 illustrates the heterogeneity of the effect sizes between the primary studies. Consistently, several tests of heterogeneity quantitatively confirm that there is a considerable amount of dispersion between effect sizes. The Q statistic ($Q = 894.38$, $df = 66$, $p < .001$) indicates that the effect sizes of the primary studies included in the meta-analysis are significantly different from each other. The T^2 value is .01 ($SE = .00$, $V = .00$), which means that 95 percent of all true effects lie between $r = -.13$ and $r = .19$. The I^2 statistic reaches a value of 92.62%, indicating that a high proportion of the observed variance is real variance of the true effects.

In order to explain these differences, moderator analyses were conducted for the study-specific aspects and socio-demographic variables listed in Table 2, as well as for the categories of the R/S measures. All of these moderator analyses were calculated based on subgroup comparisons.

The third column of Table 2 demonstrates that, for most of the study-specific aspects and socio-demographic variables, the mean effect sizes $r+$ of the subgroups fall within a small range. The differences $\Delta r+$ between the highest and the lowest effect size among subgroups of a particular variable range from .04 to .12 in most of the cases. For the characteristics "sample size" ($Q=5.08$, $df=4$, $p=.280$), "proportion of women" ($Q=3.25$, $df=3$, $p=.355$), "denomination" ($Q=0.49$, $df=2$, $p=.781$), and "statistical control of third variables" ($Q=0.89$, $df=2$, $p=.641$), the moderator analyses do not exhibit statistically significant results. However, for the characteristics "publication period" ($Q=9.67$, $df=3$, $p=.022$), "research area" ($Q=9.18$, $df=3$, $p=.027$), "sample with disease or in crisis situation" ($Q=16.64$, $df=2$, $p<.001$), "mean age" ($Q=19.86$, $df=3$, $p<.001$) and "indicator of mental health" ($Q=36.40$, $df=2$, $p<.001$), the moderator analyses reach a statistically significant level, while the effect size differences are still small. For the characteristics of "research area" and "mean age," slightly higher differences of $\Delta r+=.20$ and $\Delta r+=.21$, respectively, are found. But both of these differences are based solely on one aberrant subgroup with only few studies.

Apparently, higher differences $\Delta r+$ are found when subgroups are built according to the different measures of R/S that were used in the primary studies. Note, however, that, unlike the characteristics listed in Table 2, the subgroups of the measures of R/S are not independent from each other. This is due to the fact that, in many cases, different measures of R/S were used in one single study. However, according to the recommendations of Eisend (2004), all available effect sizes, that is, possibly several effect sizes of the same study, were included.

We conducted these analyses on three hierarchical levels. This means that we successively summarized the different measures of R/S into broader categories based on their conceptual similarities.[4] The results of the subgroup analyses for the three hierarchical levels are shown in Table 3. The subgroups are sorted by the number of their effect sizes.

On the first hierarchical level, with a difference of $\Delta r+=.49$ ($Q=240.28$, $df=20$, $p<.001$), it is striking that three measures of R/S ("extrinsic religiosity": $r+=-.27$, $z=-3.87$, $p<.01$; "negative religious coping": $r+=-.21$, $z=-10.14$, $p<.01$; "negative image of God/negative relationship with God": $r+=-.16$, $z=-5.35$, $p<.01$) exhibit significant and relatively high negative correlations with mental health. In contrast, the effect sizes $r+$ for the other measures range from $-.08$ to .22 and are thus predominantly positive.

An analogous pattern appears for the analysis on the second level with a difference of $\Delta r+=.27$ ($Q=146.73$, $df=4$, $p<.001$). The effect sizes for the different subgroups are shown by the forest plot in Fig. 2. The effect sizes are sorted from smallest to largest. "Maladaptive dealing with religion or God" has a fairly strong negative association with mental health ($r+=-.20$, $z=-10.62$, $p<.01$). On the contrary, the correlation coefficients $r+$ of the four other subgroups ("spirituality";

[4] Due to the restrictions of the software program CMA, we had to aggregate some single effect sizes before the successive integration of the subgroups. CMA only allows one effect size per combination of a certain subgroup with a particular measure of mental health.

Table 3 Comparison of subgroups for the different measures of R/S on three hierarchical levels: number of effect sizes *r* and effect sizes of the subgroups *r*+

	Number of effect sizes *r*	Effect sizes of the subgroups *r*+ [95% confidence interval]
First hierarchical level: $\Delta r+ = .48$ ($Q = 240.28$, $df = 20$, $p < .001$)		
Centrality/salience [1]	53	.06** [.03, .09]
Negative religious coping [17]	28	− .21** [− .25, − .17]
Positive religious coping [16]	27	.10** [.05, .14]
Other religious/spiritual measures [21]	23	.04 [− .00, .08]
Positive image of God/positive relationship with God [14]	17	.06* [.01, .11]
Intrinsic religiosity [11]	16	.01 [− .04, .06]
Spirituality [19]	15	.03 [− .02, .08]
Negative image of God/negative relationship with God [15]	12	− .16** [− .22, − .11]
Frequency of church attendance [7]	10	.09** [.04, .14]
Religious practice without further specification [9]	10	.06* [.00, .12]
Religious ideology other than belief in God [4]	7	.02 [− .07, .11]
Religious experience [5]	5	.04 [− .09, .16]
Religious interest [2]	5	.12* [.02, .22]
Religious/spiritual well-being [18]	5	.15** [.06, .25]
Consequences [10]	3	.18** [.05, .30]
Public religious practice other than frequency of church attendances [8]	3	.08 [− .05, .21]
Private religious practice [6]	3	.21** [.06, .35]
Quest religiosity [13]	3	− .08 [− .17, .02]
Extrinsic religiosity [12]	2	− .27** [− .40, − .14]
Multidimensional religious/spiritual measures [20]	2	.22* [.05, .37]
Belief in God [3]	1	.10 [− .06, .26]
Second hierarchical level: $\Delta r+ = .27$ ($Q = 146.73$, $df = 4$, $p < .001$)		
Centrality (including its dimensions according to Huber 2003)/salience/intrinsic religiosity [1–9, 11]	76	.05** [.03, .08]
Adaptive dealing with religion or God [14, 16]	39	.07** [.03, .11]
Maladaptive dealing with religion or God [12, 15, 17]	37	− .20** [− .23, − .16]
Other [10, 13, 18, 20, 21]	28	.04 [− .00, .08]
Spirituality [19]	15	.03 [− .03, .09]
Third hierarchical level: $\Delta r+ = .26$ ($Q = 148.35$, $df = 1$, $p < .001$)		
Positive overall [1–11, 13, 14, 16, 18–21]	110	.06** [.04, .08]
Maladaptive dealing with religion or God [12, 15, 17]	37	− .20** [− .23, − .16]

The numbers in squared brackets after the name of the categories of the subgroups correspond to the codes which were introduced in "method" section. $\Delta r+$: difference between the highest and lowest effect size of subgroups per level of the hierarchical analysis

*$p < .05$; **$p < .01$

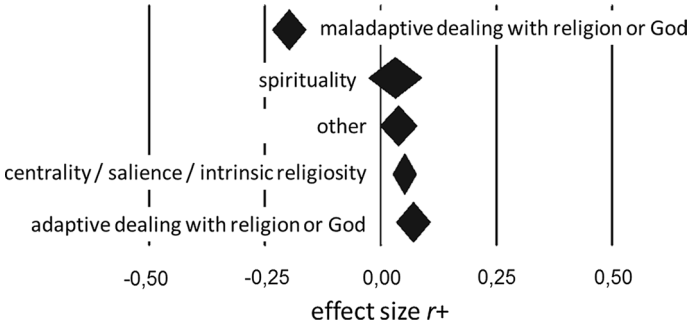

Fig. 2 Forest plot for the comparison of the subgroups for the different measures of R/S (second hierarchical level). The figure shows the effect sizes of the subgroups *r*+, sorted ascending from the left to the right with the 95% confidence interval displayed by the distance of the diamond from the upper end to the lower end

"other"; "centrality/salience/intrinsic religiosity"; "positive dealing with God/religion") are small positive with a range between .03 and .07.

On the third hierarchical level, all of the four categories mentioned above ("spirituality"; "other"; "centrality/salience/intrinsic religiosity"; "positive dealing with God/religion") are merged into one broader category named "positive overall." Thus, on this level of analysis, only two subgroups remain: "maladaptive dealing with religion or God" (the numerical values for this category were adopted from the analysis of the second level) and "positive overall" ($r+ = .06$, $z = -10.86$, $p < .01$). The difference between these two groups is $\Delta r+ = .26$ ($Q = 148.35$, $df = 1$, $p < .001$) and the pattern remains the same as in the analyses on the first and second levels: higher and negative correlations for the negative measures, and a smaller but positive mean effect size for the positive measures.

Assessment of Publication Bias

Different methods were used to examine if the calculated mean effect is robust against a possible publication bias. As seen in Fig. 3, the funnel plot of the reported effect sizes estimates does not display noticeable asymmetry that would indicate reporting bias. Using Duval and Tweedie's Trim and Fill, only five studies have to be imputed to get a totally balanced distribution. For Rosenthal's Failsafe N, we calculated a value of 2813 ($z = 12.85$, $p < .001$). This means that 2813 studies with an effect size of 0 would be required to render the present effect-size estimate statistically nonsignificant. Using Orwin's Failsafe N with a mean correlation of $r = -.03$, 142 studies would be necessary to get a mean effect-size estimate of the meta-analysis below zero. For the rank correlation test according to Begg and Mazumdar, we calculated a value of Kendall's tau-b = .06 ($p = .24$). Applying Egger's regression analysis, the value of the intercept is $b_0 = -1.36$ (95% CI [−2.57, −0.14]; $p = .01$). The results of the cumulative meta-analysis show a pattern contrary to what would be expected in cases of publication bias. Based on these analyses, publication bias seems to be an unlikely threat to the results presented here.

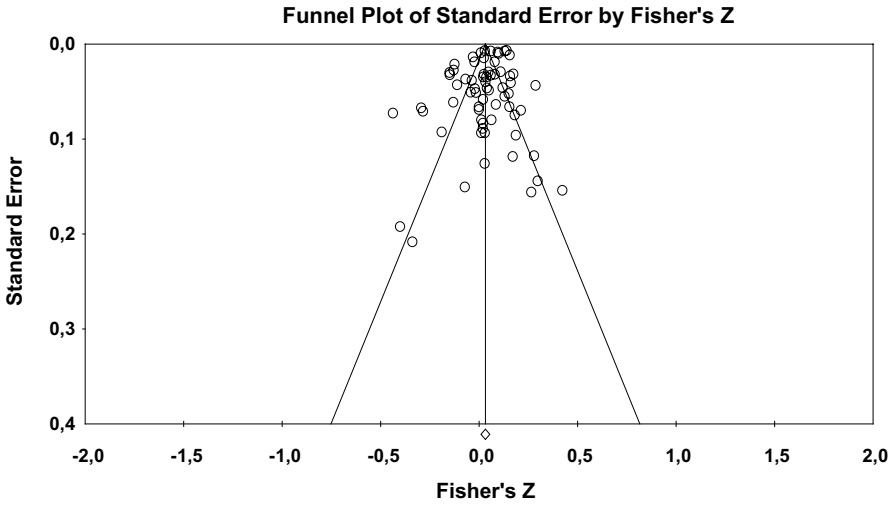

Fig. 3 Funnel plot. The vertical axis shows the standard error, while the horizontal axis exhibits the effect sizes of the primary studies (Fisher's Z)

Discussion

Despite the application of rather strict inclusion and exclusion criteria, we were able to include 67 primary studies into the meta-analysis presented here. This is a first and unexpected result: more studies investigating the relationship between R/S and mental health in the German-speaking area exist than previously assumed. Thus, the claim that only a few empirical studies in this research field have been conducted in the German-speaking area so far (Heinemann and Wörmann 2010; Klein and Albani 2011; Utsch 2005; Zwingmann 2005; Zwingmann and Klein 2013) cannot longer be supported.

The analysis of the publication period of the studies included demonstrates that the research about the relationship of R/S and mental health has clearly increased since 2006. As a result of these intensified research activities, a lot of studies are available for the German-speaking area at this point. Due to this fact, the quantitative meta-analytic integration of the results of these primary studies seems all the more to be a reasonable and fruitful endeavor. With a data basis of 67 primary studies, the meta-analysis presented here, can be quantitatively compared to the existing meta-analyses from the US-language area: the five meta-analyses that were mentioned in the introductory section with a mean of 91 studies included only slightly more studies (with a range of 35 to 148 studies; Ano and Vasconcelles 2005; Hackney and Sanders 2003; Salsman et al. 2015; Smith et al. 2003; Yonker et al. 2012). However, this unexpected positive result does not change the fact that the field of socio-scientific and medical research about R/S and mental health is underdeveloped in the German-speaking area (Klein et al. 2011). More research for the future is desirable, especially with regard to some of the aspects that are discussed below.

The weighted mean effect size for all of the 67 included primary studies is $r+=.03$. This effect size is, on the one hand, significantly different from zero. On the other hand, it represents only a very small positive correlation between R/S and mental health: only 0.001% of the variance of mental health is accounted for by R/S. This is far beyond what can be called a "small" effect according to Cohen's rules of thumb (Cohen 1987). Nevertheless, this result basically supports the findings of the recent meta-analyses from the US-language area, which all found a slightly positive mean effect size (between .06 and .19) for the relationship between R/S and mental health. However, the mean effect size for the German-speaking area is smaller. This conclusion remains unchanged even if one excludes the negative measures of R/S. In this case, the mean effect size increases a little ($r+=.06$) but still has to be considered as very "small" according to Cohen's rules of thumb. Furthermore, it only reaches the lower limit of the results of the meta-analyses of the US-language area. Thus, the presented meta-analysis has proven that, for the more secularized German-speaking area, R/S and mental health are, on average, barely associated.

The effect sizes of the primary studies included in the meta-analysis at hand, however, exhibit a remarkable range from $r=-.41$ to $r=.40$. This finding is comparable to the results of the meta-analyses from the US-language area. For instance, in the meta-analysis of Smith et al. (2003), the correlations of the primary studies fall within the range of $-.24$ and .54.

To investigate which characteristics can possibly explain the heterogeneity of the effect sizes of the primary studies, we conducted a number of moderator analyses. For this purpose, different subgroups were built based on the characteristics of the coding scheme, and new effect sizes were calculated for each of these subgroups. First, study and socio-demographic characteristics were considered: for the different subgroups of the variables "sample size", "proportion of women", "denomination", and "statistical control of third variables", only small, nonsignificant and hardly relevant differences were found ($\Delta r+$ between .04 and .06). For the characteristics "publication period", "sample with disease or in crisis situation", and "indicator of mental health" the moderator analyses reach a statistically significant level, while the effect sizes are still small ($\Delta r+$ between .09 and .12). For the characteristics of "research area" and "mean age", slightly higher differences of $\Delta r+=.20$ and $\Delta r+=.21$, respectively, are found for the comparisons of the effect sizes between the different subgroups. But both of these differences are based solely on one aberrant subgroup with only few studies. These results support the assumption that the heterogeneity of the effect sizes of the primary studies cannot be explained very well by study-specific aspects and socio-demographic variables.

Regarding the variable "proportion of women", the subgroup analyses confirm the results of the meta-analyses of the US-language area: They could not find a statistical influence for the variable "sex" on the relationship between R/S and mental health (Salsman et al. 2015; Smith et al. 2003). On the one hand, it is known that women—at least for the Western world—are by trend more religious (Klein 2012) and suffer more from mental diseases such as anxiety disorders, depression, and eating disorders (World Health Organization 2009). On the other hand, this does not seem to have an influence on the relationship between R/S and mental health.

For samples with participants in a life crisis, such as serious health problems or the loss of a closely related person, the subgroup analyses of the meta-analysis at hand do not show higher correlations between R/S and mental health. On the contrary, the mean effect size for persons without a recent life crisis is slightly higher ($r+ = .07$) than for persons with such a crisis ($r+ = -.01$). The thesis postulated both for the US-language area and the German-speaking area that R/S can unfold its resources especially in times of a life crisis and then correlates higher with mental health (see, e.g., Dörr 2001; Murken 1998a; 1998b) is not supported by the data at hand. Correspondingly, a study conducted by Heuft (2016) showed that "risky" patients in a psychosomatic–psychotherapeutic clinic do not report a stronger R/S than a representative sample of the German population. These findings contrast the results of the North-American meta-analysis conducted by Smith et al. (2003). Smith et al. (2003) stated a considerably stronger correlation between R/S and depression for persons in a situation of a recent crisis ($r+ = -.15$) than for persons without such a crisis ($r+ = -.08$).

Looking at the effect sizes of the different subgroups for the variable "indicator of mental health," the difference between positive indicators, negative indicators or the category with both positive and negative indicators is quite small, too ($\Delta r+ = .12$). Nevertheless, the direction of the differences point in the same direction as the findings of the North-American meta-analysis by Hackney and Sanders (2003): For positive indicators of mental health, one can find stronger positive correlations between R/S and mental health.

For the two variables "research area" and "mean age," somewhat higher effect sizes of $\Delta r+ = .20$ were found in the meta-analysis at hand. However, for the variable "research area," the effect sizes of the subgroup analyses for the three countries Germany, Austria, and German-speaking Switzerland are close to each other ($r+$ between $-.00$ and .05); a higher difference appears only for the category of "potentially several research areas" (for example in the context of online studies), which was the case in only two studies.

Regarding the variable "age," R/S has a negative correlation of ($r+ = -.15$) with mental health for samples of younger groups ($M < 30$ years). In contrast, for all of the other subgroups of the variable "age," the correlation is zero or slightly positive ($r+$ between .00 and .05). Because the mean effect size for the group with a mean age of less than 30 years is only based on the results of five studies, more research is needed to investigate the possibly different effects R/S has on mental health for different age groups. According to the *Religions monitor 2008*, younger people from Germany, Austria, and Switzerland generally appear to be less religious (Bucher 2009; Ziebertz 2008). They also state that their religion has an impact on coping with critical life events in comparison with people who are older than 60 years (Ebertz 2008). Nevertheless, the data from the *Religions monitor 2008* also show that not all aspects of R/S are more salient for older people (Ebertz 2009). Finally, it is also possible—considering the more secularized society in the German-speaking area—that more people of the younger generation with psychological strains are more religiously engaged than in the average population.

In the next step of the moderator analyses, we also compared the effect sizes for the different measures of R/S. For the three different hierarchical levels of analyses

($\Delta r+$ between .26 and .48), "maladaptive dealing with religion or God" ($r+ = -.20$) is considerably negatively correlated with mental health. The correlations in detail are as follows: "negative religious coping": $r+ = -.23$, "negative image of God/negative relationship with God": $r+ = -.18$, and "extrinsic religiosity": $r+ = -.27$. In contrast, all other measures of R/S have shown small positive correlations with mental health. This pattern of results is not surprising: when dealing negatively with God or religion, one can expect—with regard to contents—indeed psychological strains (for an overview, see: Bucher 2017; Exline and Rose 2013). Analogous findings were shown in the meta-analyses from the USA: In contrast to general tendencies, a positive relationship between extrinsic religiosity ($r+ = .16$) and negative religious coping ($r+ = .14$) were found (Smith et al. 2003). In the meta-analysis of Ano and Vasconcelles (2005), negative religious coping correlated with indicators of emotional strain such as depression, anxiety, and anger ($r+ = .22$). In contrast, positive religious coping was positively associated with positive adjustment. Finally, one can go back to the early countings of Batson et al. (1993, Table 8.7), showing that 48 out of 80 studies (60%) have revealed a negative relationship between extrinsic religiosity and mental health (38.8% unclear results, 1.3% distinct positive results). Compared to the results of North-American meta-analyses, it is conspicuous that, in the meta-analysis presented here, the mean effect sizes $r+$ for the negative measures of R/S are quite high.

Considering this, the assumption of some authors that the strongest association between R/S and mental health in the German-speaking area can be found for negative measures of R/S (Klein and Albani 2011; Utsch 2012, 2014; Zwingmann and Klein 2013) is now confirmed on an objective base by means of the meta-analysis at hand. One can only speculate about reasons for these findings. Klein and Albani (2011) refer to the low implicitness of religiosity in the German-speaking area: One has to legitimate their religiosity and one cannot be sure of the tolerance of the personal environment. In the German-speaking area, religious coping can in turn lead to a higher feeling of uncertainty. Zwingmann et al. (2017) discuss the possibility that religiosity has a negative impact on health especially for those people who were born in Germany in the 1950s and 1960s with its strict, partially repressive Christian education. Primary studies focusing on this possible cohort effect could be helpful in clarifying this issue.

In any case, for preventative, therapeutic, or rehabilitative interventions in the context of psychological or medical settings in the German-speaking area, one can recommend assessing the personal religious/spritual practices of the clients. This should be done especially for negative aspects of R/S in order to identify potential strains and to counteract their negative influences. With regard to the socio-scientific research about R/S in the German-speaking area, one can state that the relationship between negative measures of R/S and mental health should be further investigated in methodically high-quality primary studies. In the meta-analysis at hand, negative aspects of R/S were (co-)examined in only 17 out of 67 studies (25.4%).

Different methods were used to examine whether or not the calculated mean effect is robust against a possible publication bias. Based on the results of these analyses, publication bias seems to be an unlikely threat to the results presented here.

There are several limitations with regard to the generalization of the findings of the meta-analysis at hand: The calculations are based on correlative data and, therefore, it is not allowed to draw causal conclusions. On the one hand, the question of whether or not certain practices of R/S lead to better or worse mental health cannot be answered. On the other hand, one can also not conclude if a certain state of mental health leads to the practice of particular forms of R/S or if there are third variables that affect both R/S and mental health. Using bivariate effect sizes, one has to point out that it is not possible to identify a potential curvilinear relationship between R/S and mental health. In most of the cases, data were gathered by questionnaires, so it is not possible to rule out a social desirability bias.

To summarize, one can state that the presented meta-analysis enables a quantitative overview of empirical research in the German-speaking area for the relationship between R/S and mental health for the first time. In comparison with the results of the meta-analyses of the US-language area, there are structural similarities but also specific characteristics.

Compliance with Ethical Standards

Conflict of interest All authors declare that they have no conflict of interest.

Human and Animal Rights This article does not contain any studies with human participants or animals performed by any of the authors. Therefore, an informed consent was not necessary.

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