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Religiosity, Spirituality, Meaning-Making, and Suicidality in Psychiatric Patients and Suicide Attempters: A Systematic Review and Meta-Analysis

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Learning Objective: After participating in this CME activity, the psychiatrist should be better able to:

- Explain current understanding of how religiosity, spirituality, and meaning-making (R/S/M) affect patients with psychiatric diagnoses.

Introduction: R/S/M generally protect against suicidality and suicide. Thus far, reviews on the topic have largely been descriptive, and there are no meta-analyses focused on psychiatric patients. This study systematically evaluates all empirical evidence on R/S/M's potential influences on suicidality for psychiatric patients and recent suicide attempters.

Methods: A systematic PROSPERO preregistered search following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses protocol was performed in MEDLINE and PsycInfo. Quantitative studies until 31 December 2022 on R/S/M and suicidality in psychiatric populations and recent suicide attempters were selected; psychological autopsy studies were excluded.

Results: The search identified 4,374 studies for screening. This resulted in 108 eligible studies for the systematic review and 75 studies for the meta-analysis, including 231 effect sizes (ES) and 17,561 subjects. Research focused mainly on the emotional, moral, and ritual aspects of R/S/M. Most research was cross-sectional; repeated R/S/M assessments were rarely reported. A combined significant and negative ES (Fisher $Z = -0.13$, $p = .006$, equivalent to Cohen's $d = -0.26$) was found for all good- and fair-quality studies.

Conclusion: Overall, R/S/M was associated with lowering suicidality. Maladaptive-distressing dimensions of R/S/M correlated with higher rates of suicidality (e.g., religious struggles). The explanatory value was limited by the predominantly cross-sectional nature of ESS.

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Keywords: meaning-making, mental disorders, protective factors, religion, spirituality, suicidal ideation

Over the past decade, a substantial body of empirical knowledge on the relationship between suicidality and religiosity, spirituality, and meaning-making

(R/S/M) has developed. R/S/M has been linked to both favorable and unfavorable outcomes. For example, religiosity likely reduces suicide risk by discouraging problematic alcohol and drug use, buffering psychological distress, and prohibiting suicidal behaviors.¹ Meaning in life (MiL) is also a protective factor against suicidal behavior.² R/S/M could influence suicidality through a range of possible mechanisms that

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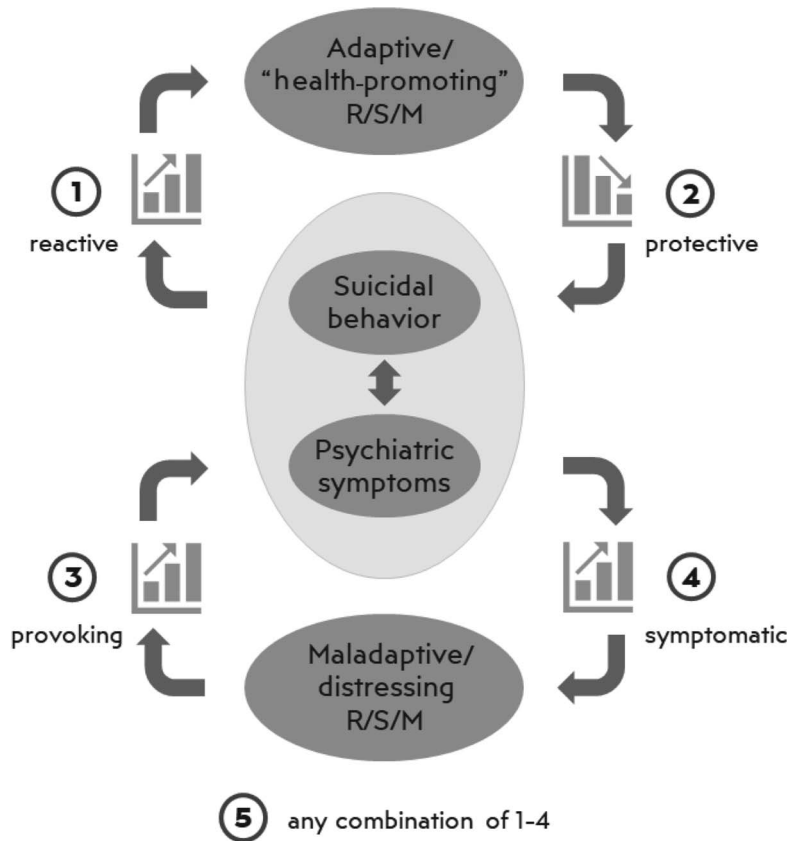


Figure 1. Model of reciprocal influences of religiosity, spirituality, and meaning-making with psychiatric symptoms and suicidal behavior. **Note:** Proposed model of reciprocal influences of R/S/M and suicidal behavior, adapted from Pargament and Lomax.³ Adaptive/health-promoting R/S/M may function as (1) a reaction to, or (2) a protective factor against, psychiatric illness or suicidality. Maladaptive/distressing R/S/M may function as (3) a provoking source of, or (4) a symptom of, psychiatric illness or suicidality. (5) Any combination of types 1–4 is also possible.

promote adaptive functioning, including self-regulation, attachment, and emotional comfort.³ Other R/S/M dimensions have been connected to psychological problems and maladaptive psychological functioning.^{3,4}

Suicidality, or formally suicidal behavior, includes the entire continuum of suicidal thoughts, planning, attempts, and suicide. Suicidality closely correlates with psychiatric disorders,⁵ but there has been no review or meta-analysis focused on psychiatric patients. Such a focus could be important for a variety of reasons: (1) suicidality is far more prevalent in the psychiatric patient population; (2) suicidality could be more intense during psychiatric episodes; and (3) suicidality and R/S/M could interact differently during such episodes.

Much research on suicidality and R/S/M focuses on R/S components. Existential meaning-making, however, which is not necessarily religious or spiritual, could be part of the global meaning system, especially in highly secularized contexts.⁶ The reciprocal influences between R/S/M and suicidality could be expected to similarly correlate for psychiatric symptoms, as shown in Figure 1. Adaptive/health-promoting R/S/M may function as (1) a reaction to, or (2) a protective factor against, psychiatric illness or suicidality. Maladaptive-distressing R/S/M may function as (3) a provoking source of, or (4) a symptom of, psychiatric illness or suicidality. Of course, (5) any combination

of the previous types is also possible (adapted from Pargament and Lomax³). Detailed knowledge on the reciprocal influences between R/S/M and suicidality is important to personalize and culturally adapt for suicide-prevention and treatment.

RECENT REVIEWS

Several reviews of R/S/M and suicidal behavior studies have been published in the past decade. (Supplemental Table 1 [http://links.lww.com/HRP/A218] summarizes these reviews, including their descriptive characteristics.) No review focused entirely on psychiatric patients. Two meta-analyses have been conducted but did not distinguish among specific R/S/M dimensions. Wu and colleagues⁷ focused only on completed suicides and found lower odds ratios for suicide among religious individuals, from 0.38 overall, down to 0.18 for geographical areas with higher religious homogeneity. Poorolajal and colleagues⁸ focused on the correlation between religion and different stages of suicidal behavior. They conducted a meta-analysis for more than eight million subjects from both general and clinical populations. Religious persons were less likely than nonreligious persons to engage in every suicidal behavior across the full continuum, including ideation, planning, attempt, and completed suicide.

All other reviews were narrative or systematic on specific R/S/M dimensions or subpopulations. Alonzo and Gearing⁹

reviewed research on persons affiliated with Buddhism, American Indian-Alaskan Native religions, African Traditional religions, atheism, and agnosticism. Gearing and Alonzo¹⁰ reviewed research on persons affiliated with Islam, Hinduism, Judaism, and Christianity. They concluded that R/S/M among these religious groups appears to be associated with lower suicidality, although only Judaism and Christianity were well represented in research. They suggested that these traditions provided suicidal individuals with effective coping strategies in the form of prayer, other rituals, and supportive social networks.

Some reviews have advocated an even more detailed and differentiated exploration of R/S/M to refine predictions for clinical outcomes. Lawrence and colleagues¹¹ tried to identify which R/S/M factors contribute to protection against suicidality. They concluded that religious affiliation “protects against suicide attempts,” but not necessarily against suicidal ideation. They cited social support from attending services as a confounder for the relationship between religious service attendance and lower suicidality. In another review, Lester and colleagues¹² encouraged future studies to be more precise in selecting measures of R/S to distinguish among different and sometimes overlapping (sub)dimensions. Liu’s¹³ review of research among Jewish people, Christians, and Muslims indicates that all three religions seem to share the same protective and risk factors, but that the strength of associations, for example, for religious prohibition of suicidality, could vary by tradition. He advised using varying research designs and expanding to other traditions and life views. Costanza and colleagues² reviewed studies of MiL in suicidal clinical and nonclinical populations and noted a trend that MiL, in particular presence of MiL and not search for MiL, emerged as a protective factor against suicidality.

Finally, some reviews examined R/S/M in relation to suicidal behavior in more detail. These reviews indicate protective effects for veterans and refugees with posttraumatic stress disorder,¹⁴ and the defensive influences of specific R/S/M variables, like moral objection to suicide, related to religious prohibition.¹⁵ Fanegan and colleagues¹⁶ only found studies indicating a protective or mixed relationship and no increase in suicidality for Black Americans. Finally, in their field summary, based primarily on large-scale prospective studies, Koenig and colleagues^{17,18} concluded that religious involvement, particularly religious attendance, predicts lower suicide risk.

R/S/M AS A MULTIDIMENSIONAL CONSTRUCT

R/S/M has many faces. On one end, R/S/M can buffer suicidality through, for example, positive religious coping, MiL, or social support. On the other end, R/S/M can exacerbate suicidality via other means, such as unresolved search for meaning or religious struggles. Generally, these factors fall into categories that account for different dimensions and functions of R/S/M. Since Glock¹⁹ proposed five domains or aspects of religion, several authors expanded them into a more complete classification of R/S/M.^{20,21} Saroglou²¹ combined and rearranged this classification into four basic aspects, while including meaning-making and spirituality.

R/S/M dimensions can be categorized into one or more of these aspects. For this review, we used the four basic aspects—believing and meaning, belonging, behaving, and bonding—to create a clear overview of the R/S/M field. (See Table 1 and Supplemental Table 2 [<http://links.lww.com/HRP/A219>] for a further overview.) To enable statistical analysis, the most prominent aspect for each R/S/M dimension was chosen, including its hypothesized connection to suicidality, either supportive/protective or maladaptive/distressing. For example, religious service attendance is classified within behaving, although service attendance can also be an expression of belonging. Increased religious service attendance could both precede and follow a decrease in suicidality. While attendance can reduce suicidality, in contrast, suicidality can also lessen attendance. Each of these dimensions may contain confounders. Religious service attendance, for example, may be confounded by social support or positive religious coping.

In-depth and prospective research focusing on such aspects, within or across the R/S/M dimensions, would account for these complex and intertwined relationships. Nevertheless, unlike the systematic reviews, previous meta-analyses did not distinguish among R/S/M aspects. Differentiating among aspects and their associated dimensions would help to discern how and to what extent different aspects of R/S/M affect suicidality.

POPULATION OF INTEREST AND STUDY AIM

Suicidality is subject to several influences. Presence and strength of psychiatric morbidity play pivotal roles in developing and strengthening suicidality. Notably, most patients presenting after a suicide attempt suffer from psychiatric disorders.^{5,22,23} Previous research indicates that R/S/M influences the etiology and experience of psychiatric disorders, and vice versa. For example, changes in depression symptom severity may precipitate shifts in R/S/M domains.²⁴ Given that R/S/M can be affected by underlying maladaptive psychopathology among psychiatric patients and suicide attempters, it stands to reason that R/S/M and its link to suicidality may present differently in these populations. Thus far, no meta-analyses and only a few reviews on specific subgroups have focused on psychiatric populations or recent suicide attempters.

The present systematic review and meta-analysis followed Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines.²⁵ We evaluated aspects and specific dimensions of R/S/M discerned in research on suicidality in persons with a psychiatric diagnosis or a recent suicide attempt worldwide, and to what extent those aspects/dimensions affected suicidality.

HYPOTHESES

We hypothesized that the meta-analysis would primarily find protective associations between R/S/M and suicidality in psychiatric patients. Additionally, R/S/M would connect to higher levels of suicidality in cases of religious struggle, search for meaning, or negative religious coping. In contrast, R/S/M would be associated with lower/less suicidality in cases of

Table 1
Evidence for R/S/M Aspects and Their Dimensions, Including Distribution of Effect Sizes by Dimension, Related to Suicidality Among Psychiatric Patients, Based on 75 Studies Worldwide up to 2022

R/S/M aspect	Supportive/protective (<i>n</i> studies; <i>n</i> negative/nonsignificant/ positive ES)	Maladaptive/distressing (<i>n</i> studies; <i>n</i> negative/nonsignificant/positive ES)
Believing and meaning	Meaning/purpose in life (17; 10/9/0) Trust (3; 1/2/0)	Search for meaning (1; 0/1/0)
Belonging	Affiliation (10; 1/11/2) Strength of affiliation (3; 2/4/0)	Transition in affiliation (1; 0/0/1)
Behaving	Moral objections to suicide (9; 9/3/0) Salience/intrinsic (12; 4/12/1) Religious service attendance (6; 3/9/2) Organizational involvement (5; 3/2/0) No organizational involvement (6; 2/5/0) Prayer (3; 1/6/0)	--
Bonding	Spiritual and religious well-being (6; 4/6/0) Positive religious coping (5; 2/3/1) Positive/supportive god representations (2; 2/5/0) Religious/spiritual experiences (4; 2/5/0) Spirituality (5; 1/8/0)	Religious struggles (4; 0/3/5) Negative religious coping (8; 0/5/4) Negative/distressing god representations (2; 0/7/0)

Note: *n* = 231 effect sizes (ES), all included in the meta-analysis in this article.
 Within parentheses, the number of studies that included this dimension is mentioned first, followed by the distribution of effect sizes (ES) for this specific dimension: (*n* studies; *n* ESs significantly negatively related to suicidality/*n* nonsignificant ESs/*n* ESs significantly positively related to suicidality). In total, 76 statistically significant negative, 22 significant positive, and 133 nonsignificant ESs on R/S/M related to suicidality were included. The level of statistical significance was set to $p \leq .05$.
 Some ESs could not be reported in this table, either because they combined several aspects into one variable (*n* = 30) or because of their isolated or atypical characters (*n* = 24).

increased religious behaviors, religious affiliation and salience, sense of purpose and MiL, and moral objections to suicide, among other factors. (An overview of expected correlations is provided in Supplemental Table 2 [http://links.lww.com/HRP/A219].) In addition, we expected to encounter studies within a predominantly Western, Christian, and White population, limited longitudinal studies, and a focus on religious affiliation, religious salience, and religious service attendance.

METHOD

Search and Selection Strategy

According to PRISMA guidelines,²⁵ we conducted a systematic PROSPERO preregistered literature search (registration CRD42023398692). We searched PsycInfo and MEDLINE using the terms “spirituality,” “meaning,” “religion,” “religiosity,” “religious affiliation,” or “religious beliefs,” AND “suicide,” “attempted suicide,” or “suicidality.” All corresponding medical subject heading terms were added. Scientific reports were included when written in English and published up to 31 December 2022, and when containing quantitative analyses on R/S/M variables and suicidal behavior. Two authors (BvdB and SH) performed and double-checked each other's selections. The popula-

tion consisted of persons with a mental disorder diagnosed by a clinician or based on structured diagnostic interviews, or persons who were clinically evaluated because of a suicide attempt in the prior 72 hours. We excluded (1) articles that were not published in peer-reviewed journals or as a dissertation; (2) studies without quantitative outcomes on R/S/M and suicidality; (3) studies in the general population; (4) articles on psychological autopsy outcomes, assisted suicide, suicide bombers, suicide bereavement, and nonsuicidal self-harm; and (5) meta-analytic, systematic, or narrative reviews, and book chapters.

Data Extraction and Analysis

Per study, study-type data, country, population demographics, R/S/M exposures, and suicidality-related outcomes were collected in a Microsoft Excel file. When available, demographic data on the subject's gender, nationality, age, and religion were recorded. All study results concerning the following central question were extracted: Does X (R/S/M parameter) correlate with Y (suicidal parameter) in P (a specific population)? Each study's quality was assessed independently by two authors (BvdB and RR, or BvdB and AC) using the GRADE tool kit.²⁶ R/S/M exposures were extracted and

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categorized as belonging primarily to one of four basic R/S/M aspects as developed by Saroglou.²¹

In the next step, based on available analyses suitable for the meta-analysis, a subset of studies was selected and double-checked by a second author. Only analyses examining the direct effects of R/S/M on suicidal behavior were eligible. Crude percentages or analyses lacking an outcome measurement on suicidality were excluded. Again, the descriptives are summarized on the subset studies. The metafor package for the R statistical software was used (v4.3.2).²⁷ We then conducted a multilevel random effects meta-analysis, including tests for publication bias, outliers, and several moderators.

Meta-analysis was performed in steps: (1) All ESs were pooled and analyzed; (2) after removing all ESs from poor-quality studies, good- and fair-quality studies were analyzed for ESs; and finally, (3) analysis of poor-quality studies was performed. Each step included three substeps: (a) a multilevel random effects meta-analysis to calculate an overall ES; (b) a series of tests for asymmetry and outliers to find inconsistencies in the study sets; and (c) moderation analyses. For specific R/S/M with 10 or more ESs, a post-hoc crude pooled ES was calculated.

In substep (b), a funnel plot was made and an Egger's test was conducted for plot asymmetry. Then a trim-and-fill procedure estimating potentially missing studies due to publication bias in the funnel plot was performed by calculating the studies needed to suppress the most extreme ESs on one side of the plot. Next, failsafe numbers by Rosenthal and Rosenberg were computed, estimating the number of additional potentially missing studies required to turn the ES from the included and additional studies insignificant. Last, the number of outlying studies was identified via a boxplot, and the number of standardized residuals that exceeded $|1.96|$ was calculated. Substep (c) consisted of moderation analyses testing for ES differences based on religious affiliation, gender, study design, quality, and all four R/S/M aspects. This step utilized Q tests that examined ES variations and calculated the moderator effects.

RESULTS

Systematic Review

Searches were performed on 17 February 2023. A PRISMA flowchart (Figure 2) reports the following steps: identification, screening, selection, and inclusion. The searches resulted in 5,401 records. After duplication using Covidence, 4,374 unique studies were identified and subsequently screened. Of these studies, 212 underwent full-text review for eligibility, and 108 eligible studies were included in the systematic review, with a total of 30,610 subjects. (All studies and relevant descriptions, like the number of subjects and R/S/M exposures, are summarized in Supplemental Tables 3 [<http://links.lww.com/HRP/A220>] and 4 [<http://links.lww.com/HRP/A221>].) The mean age per subject was 30.2 years, with 54.1% women. The number of studies per year has increased considerably since the start of the current millennium. Figure 3 plots per-year studies against the number of studies

on risk factors for suicidal thoughts and behaviors in general, showing a relatively low number on R/S/M. Cross-sectional studies were most prevalent ($n = 74$), followed by case-control designs ($n = 20$). Of all 12 longitudinal studies, only 3 reported on repeated R/S/M measurements. Only 1 intervention study, on the effect of logotherapy for suicidal persons, was identified, reporting a reduction of depression degree, hopelessness, and suicidal ideation for patients with depression.²⁸

The quality of most ($n = 78$) studies was graded as poor. Six studies were graded as good, and 24 studies were graded as fair. Many were of fine clinical quality and represented significant effort. Nevertheless, quality grading was performed in a strict way. The goal was to select high-quality studies representing valid effects on suicidality by including repeated measurements of R/S/M as exposure, correction for confounders, nondichotomous R/S/M operationalization, and methodical clarity and reproducibility. Cross-sectional studies were, at maximum, graded as fair because of an inherent lack of repeated measurements. Poor-quality ratings were mostly attributed to missing recruitment information, limited R/S/M operationalization, lack of adjustment for possible confounders, and/or missing follow-up assessments.

The geographical distribution of studies across all continents was unequal. (Figure 4 maps these outcomes across the different continents.) Two studies included subjects from all over the world. One study reported on participants from Australia/Oceania, all six reports from South America were from Brazil, and no studies reported on African participants. The other continents were more equally and substantially represented: North America with 40 studies, Europe with 30, and Asia with 29. There were no notable differences in unexpected positive or negative findings among the last three continents. Only three studies from Europe and three from North America were of good quality.

Nearly half ($n = 50$) of all studies reported on religious (non)affiliation in at least 75% of subjects. If reported, half of all participants, on average, were affiliated with Christianity (51%). Another 21% identified as atheist or agnostic, and less than 10% identified with any other affiliation. Few studies reported on (>75%) participants of one specific affiliation—2 on Islam, 3 on Judaism, 4 on atheism/agnosticism, 16 on Christianity, and 0 on any other affiliation.

For associations between any R/S/M factor and any type of suicidal behavior, 428 ESs were extracted from the 108 studies included in the systematic review. (See Supplemental File 5 [<http://links.lww.com/HRP/A222>].) Those ESs were well distributed across all four basic R/S/M aspects. Associations pertaining to bonding and behaving and suicidal behavior were described most frequently, in 123 and 119 analyses respectively. Believing and meaning were mentioned in 57, and belonging in 46 analyses. Eighty-three analyses could not be attributed to a specific aspect because ESs combined different dimension aspects into one variable.

Meta-Analysis

After double-checked selection by two authors, 231 ESs from 75 studies (a subset of the previously described 108 studies),

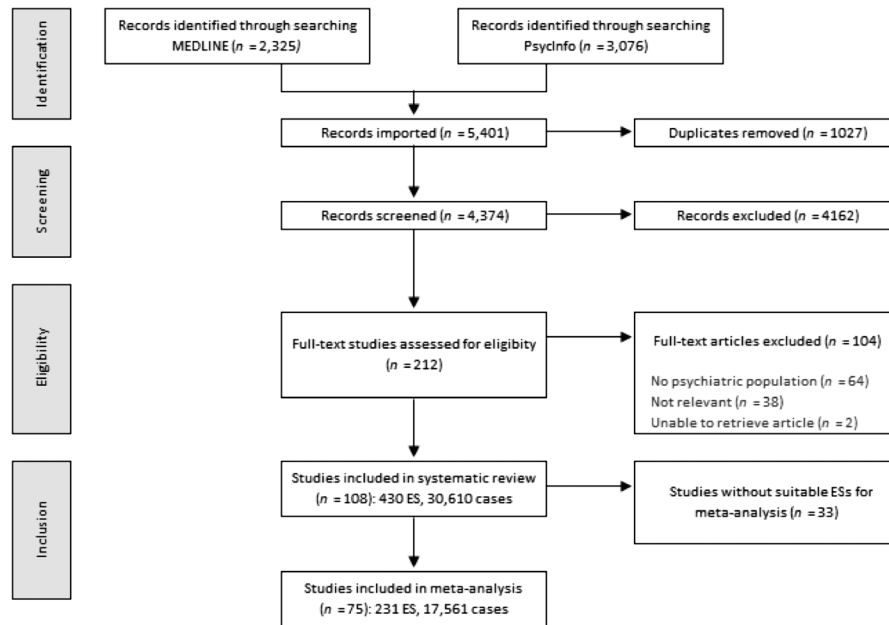


Figure 2. PRISMA flow diagram of the identification process for the 108 article sample Included in the systematic review and 75 studies included in the meta-analysis on religiosity, spirituality, and meaning-making with psychiatric symptoms and suicidal behavior.

with a total 17,561 subjects, were eligible for meta-analysis on the direct effects of R/S/M on suicidal behavior. (See Supplemental File 5 [http://links.lww.com/HRP/A222] and Supplemental Table 6 [http://links.lww.com/HRP/A223].) All other ESs were ineligible because outcomes, for example, a crude comparison of percentages, were not suitable for meta-analysis or did not quantify the direct effects of R/S/M on suicidal behavior. For instance, the studies may have compared affiliations, included a nonclinical population, or did not report ESs. Case-control studies were only included when

suicidality was the independent variable, or when an ES of R/S/M on suicidality without additional corrections was calculated. Exclusions were made, for instance, when a healthy community control group without a psychiatric diagnosis was included or a study was missing outcome analyses on R/S/M. Out of all 20 studies with a case-control design, only 4 provided eligible case-control ESs. They were missing for several reasons, including use of only a crude comparison of group percentages or confining logistic regression to outcome variables other than suicidality.

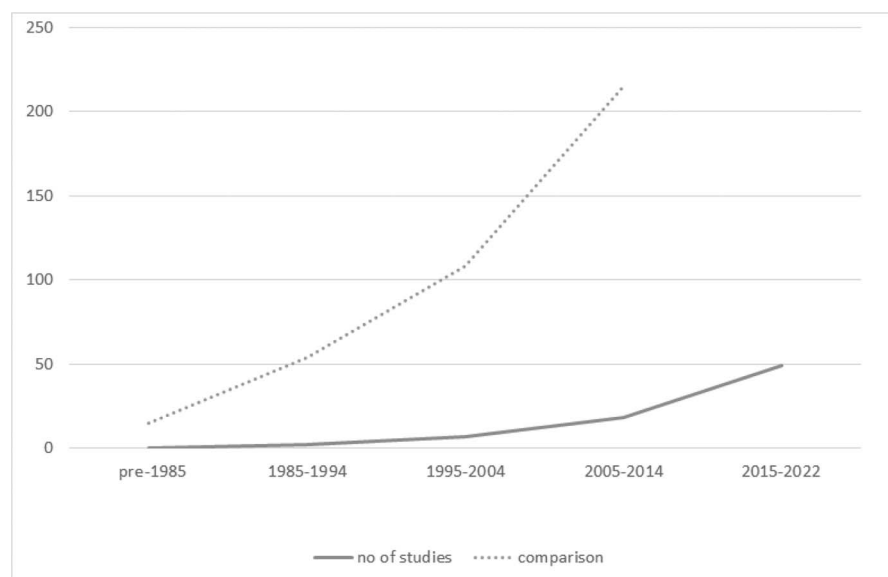


Figure 3. Overview of the number of studies per year on religiosity, spirituality, and/or meaning-making with psychiatric symptoms and suicidal behavior compared to the number of studies concerning risk factors for suicidal thoughts and behaviors. **Note:** Compared to the number of studies included in a meta-analysis concerning risk factors for suicidal thoughts and behaviors by Franklin and colleagues²²

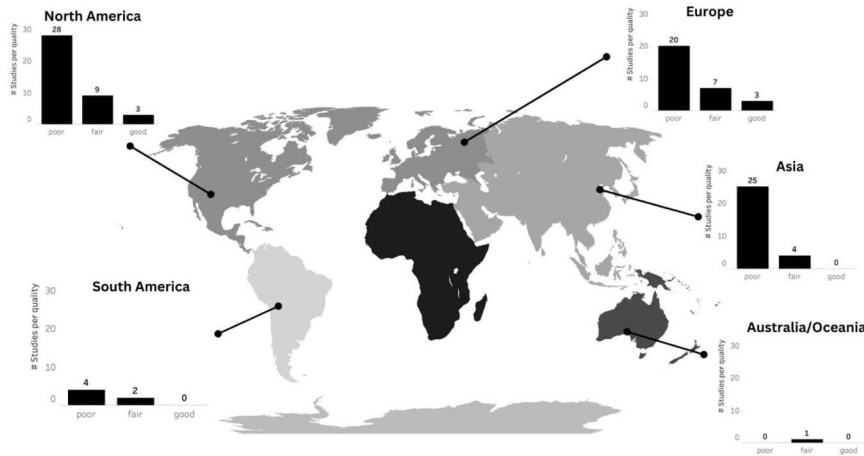


Figure 4. World map of study distribution with ESs on religiosity, spirituality, and meaning-making in relation to suicidality and suicidal behavior per continent, including study quality and size. **Note:** Study quality: number of studies per classification conform to GRADE criteria. Study size: distribution of studies by number of participants, in < 100, 100–500 or > 500 participants. No studies reported on psychiatric patients from Africa.

From these 231 selected ESs, 199 reported on potentially protective dimensions expected to have negative correlation, like religious affiliation and activities, positive R/S-coping, existential well-being, or moral objections to suicide. (See Table 1 for more details.) Only 32 reported on R/S/M dimensions expected to have potential positive correlations to suicidality (i.e., boosting suicidality) like struggles and negative R/S-coping. Believing and meaning had 32 matching ESs. Belonging, which encompasses identity, groups, social support, and affiliation, had 19 ESs. Behaving, including morality, norms, personal practices, and attendance, had 71 matching ESs. And bonding, which includes rituals, well-being, and emotions, had 79 ESs. Finally, the combined and other categories had 30 matching ESs.

ESs came from case-control (9), cross-sectional (197), and longitudinal designs (25). Christianity was frequently reported as the most prevalent religious affiliation for study samples (62.3%), while atheism/agnosticism, Hinduism, Islam, and Judaism, the most prevalent of other affiliations, ranged between 1.3% and 3.4% of all study samples. For 28.1% of affiliations, the religious denomination was unknown. ESs were significant ($p \leq .05$) for 98 analyses and corresponded to the predicted correlation for all but 12 analyses, randomly distributed over all four aspects. The ratio of ESs with unexpectedly higher suicidality for expected protective R/S/M dimensions versus all other ESs differed among countries. The most pronounced difference was found between China, with 3 out of 5 total ESs, and the United States with 6 out of 81. (Table 1 summarizes the number of studies and ESs per frequently used parameter to compare these results to prior research focusing on specific R/S dimensions.)

Excluding case-control studies, ES estimates were adjusted on average for other variables, such as age or symptom severity. Most ESs (85%) resulted from cross-sectional analyses. Only one included ES from a longitudinal study was based on repeated R/S/M assessments.

Meta-analysis was performed using a stepwise approach as described in the methods section. (Comprehensive reporting and results of this meta-analysis are available as Supplemental File 7 [available on request from the authors] and Supplemental File 8 [http://links.lww.com/HRP/A224], including forest plots, funnel plots, and boxplots per step.)

Step 1: All quality ESs

Step 1A. A multilevel random effects meta-analysis was conducted on all 231 ESs, including positively, negatively, and insignificantly associated ESs from 75 unique studies. (One study was split during analysis because effect-size availability was only for subsets by gender.) The analysis accounted for the nesting of multiple ESs in the same study. This revealed a nonsignificant overall ES of Fisher $Z = -0.014$ ($SE = 0.04$, $z = -.37$, $p = .709$). The heterogeneity was large/high ($I^2 = 95.3\%$) and significant ($Q(df = 230) = 4899.87$, $p < .001$).

Step 1B. Overall, there was limited asymmetry and no (high) risk of publication bias found using different tests. The Egger's test revealed no significant asymmetry (Kendall's $\tau = .011$, $p = .815$). A trim-and-fill procedure suggested seven additional ESs to achieve maximum symmetry. The pooled ES was already nonsignificant, so failsafe numbers did not exceed thresholds. Seventeen outlying studies were identified via a boxplot, and 14 standardized residuals (6.1%) exceeded $|1.96|$. Outliers could be the result of omitted moderators. Thus, before removing outliers and reanalyzing the data, moderation potential was inspected.

Step 1C. Differences among moderator variables were tested using Q tests to examine variation in ESs and calculate moderator effects. The most prevalent religious affiliation was a significant moderator, $Q_M(df = 6) = 297.61$, $p < .001$, with significant residual heterogeneity, $Q_E(df = 225) = 4257.24$,

$p < .001$. The ES found in “missing religious denominations” (Fisher $Z = -0.16$, $SE = 0.05$, $z = -3.55$, $p < .001$), atheism/agnosticism (Fisher $Z = 0.56$, $SE = 0.09$, $z = 6.03$, $p < .001$), and Islam (Fisher $Z = 0.98$, $SE = 0.08$, $z = 11.56$, $p < .001$) were significant and in different directions. With outliers removed, moderation remained significant for $k = 212$ ESs, but only with significant ES for “missing denominations” and Hinduism (Fisher $Z = 0.29$, $SE = 0.13$, $z = 2.17$, $p = .03$). Significant heterogeneity remained.

Only when outliers were removed did a larger proportion of females show moderation at a significant level ($Q_M(df = 1) = 5.96$, $p = .015$) and yield a slightly more negative ($B = -.002$, $SE = 0.001$, $p = .015$) lower ES. The design type (case-control, cross-sectional, longitudinal) was not associated with a significantly different pooled ES ($Q_M(df = 3) = 0.248$, $p = .970$). The pooled ES from all three design types was not significantly negative, both with and without outliers in the model.

Different quality categories were associated with significantly different ESs ($Q_M(df = 3) = 106.78$, $p < .001$). The pooled ES from good- and fair-quality categories was highly significant (Fisher $Z = -0.39$, $SE = 0.06$, $p < .001$ and Fisher $Z = -0.40$, $SE = 0.06$, $p < .001$ respectively). After outlier removal, they dropped to $-.15$ and $-.16$ but remained highly significant. Therefore, a moderation effect by quality of study was evident. The pooled ES for studies of poor quality was significant. But with outliers (Fisher $Z = 0.12$, $SE = 0.05$, $p = .007$), the ES was nonsignificant.

The four basic R/S/M aspects significantly moderated the ESs ($Q_M(df = 5) = 20.96$, $p = .005$). Separate analyses per dimension revealed a significant pooled ES for the belonging dimension, Fisher $Z = 0.15$, $SE = 0.07$, $p = .031$, with significant heterogeneity (93.5%, $Q(df = 18) = 708.73$, $p < .001$), and for the behaving dimension, Fisher $Z = -0.08$, $SE = 0.03$, $p = .022$, with significant heterogeneity (85.7%, $Q(df = 70) = 1393.37$, $p < .001$).

Step 2: Good- and fair-quality ESs

Step 2A. A significant overall ES was found for good- and fair-quality studies, with a Fisher $Z = -0.13$ ($SE = 0.05$, $z = -2.76$, $p = .006$; for interpretation, this is equal to Cohen's $d = -0.26$) in a multilevel random effects meta-analysis on 80 ESs from 21 unique studies, while accounting for nesting of multiple ESs in the same study. The heterogeneity was large/high ($I^2 = 88.1\%$) and significant ($Q(df = 79) = 562.23$, $p < .001$). A forest plot (Figure 5) and a funnel plot (Figure 6) demonstrate convergence around this overall ES. The average age for these ES samples was 45.1 years, and the average female-to-male ratio was 60.8%. ESs came from case-control (2), cross-sectional (55), and longitudinal designs (23). Christianity was reported as the most prevalent religious affiliation for study samples (73.8%), while for 26.2% religious denomination was unknown. No fair- or good-quality studies reported other religious affiliations or atheism/agnosticism as the most prevalent affiliation.

Step 2B. Testing for asymmetry and outliers suggested very limited asymmetry, and thus no (high) risk of publication bias within the good- and fair-quality study subsets. Six outlying studies were identified via a boxplot, and five standardized residuals (6.3%) exceeded $|1.96|$. Egger's test revealed some asymmetry (Kendall's $\tau = -.17$, $p = .034$). The trim-and-fill procedure suggested two additional studies (on top of $k = 80$ already included ES) to further improve symmetry. The failsafe numbers by Rosenthal and Rosenberg yielded 1,783 and 1,116 respectively. Both largely exceeded the threshold of $(5*k) + 10 = 420$ studies to reach either a null or nonsignificant combined ES, indicating robust results without suggestion of publication bias.

Step 2C. The most prevalent reported religious affiliation was a significant moderator ($Q_M(df = 2) = 18.1$, $p < .001$), with significant residual heterogeneity ($Q_E(df = 78) = 498.33$, $p < .001$). Only the ES found in “missing religious denominations” (Fisher $Z = -0.25$, $SE = 0.06$, $z = -4.23$, $p < .001$) was significant; ES for Christianity was not significant. This showed a lack of effect in studies reporting primarily Christian affiliations, but left open the question of participants' religious affiliations, and thus, the context of R/S/M dimensions in the other studies. Because of the low number of ESs and unique studies included, outliers were not removed.

The gender ratio did not significantly moderate the pooled ES ($Q_M(df = 1) = 0.95$, $p = .328$). Design types (case-control, cross-sectional, longitudinal) differed significantly in pooled ES ($Q_M(df = 3) = 35.79$, $p < .001$). The pooled ES from case-control designs ($Z = -0.66$, $SE = 0.12$, $p < .001$) and the pooled ES from cross-sectional designs ($Z = -0.04$, $SE = 0.06$, $p = .008$) were both significantly negative. The pooled ES from longitudinal designs was also negative, but did not reach significance.

ESs from different quality categories differed significantly ($Q_M(df = 2) = 7.74$, $p = .021$). The pooled ES from good- and fair-quality studies were both significant (Fisher $Z = -0.13$, $SE = 0.05$, $p = .005$ and Fisher $Z = -0.12$, $SE = 0.05$, $p = .021$ respectively).

The overall ES was significantly moderated by classification based on R/S/M aspects, $Q_M(df = 5) = 38.80$, $p < .001$. Separate analyses per aspect revealed a significant pooled ES for believing and meaning (including 11 ES), Fisher $Z = -0.26$, $SE = 0.09$, $p = .003$, with significant and high heterogeneity (88.8%, $Q(df = 10) = 124.98$, $p < .001$). For behaving (30 ES), the pooled ES was also significant, Fisher $Z = -0.06$, $SE = 0.02$, $p = .001$, with significant but low heterogeneity (16.1%, $Q(df = 29) = 125.40$, $p < .001$). Bonding (27 ES) and combined (8 ES) had (very) high heterogeneity, ranging between 82% and 92%. Heterogeneity was only nonsignificant for belonging (4 ES), which was likely due to the low number of ESs included.

Step 3: Poor-quality ESs

Step 3A. To check whether any effects had been overlooked by earlier analysis limited to good- and fair-quality studies, a

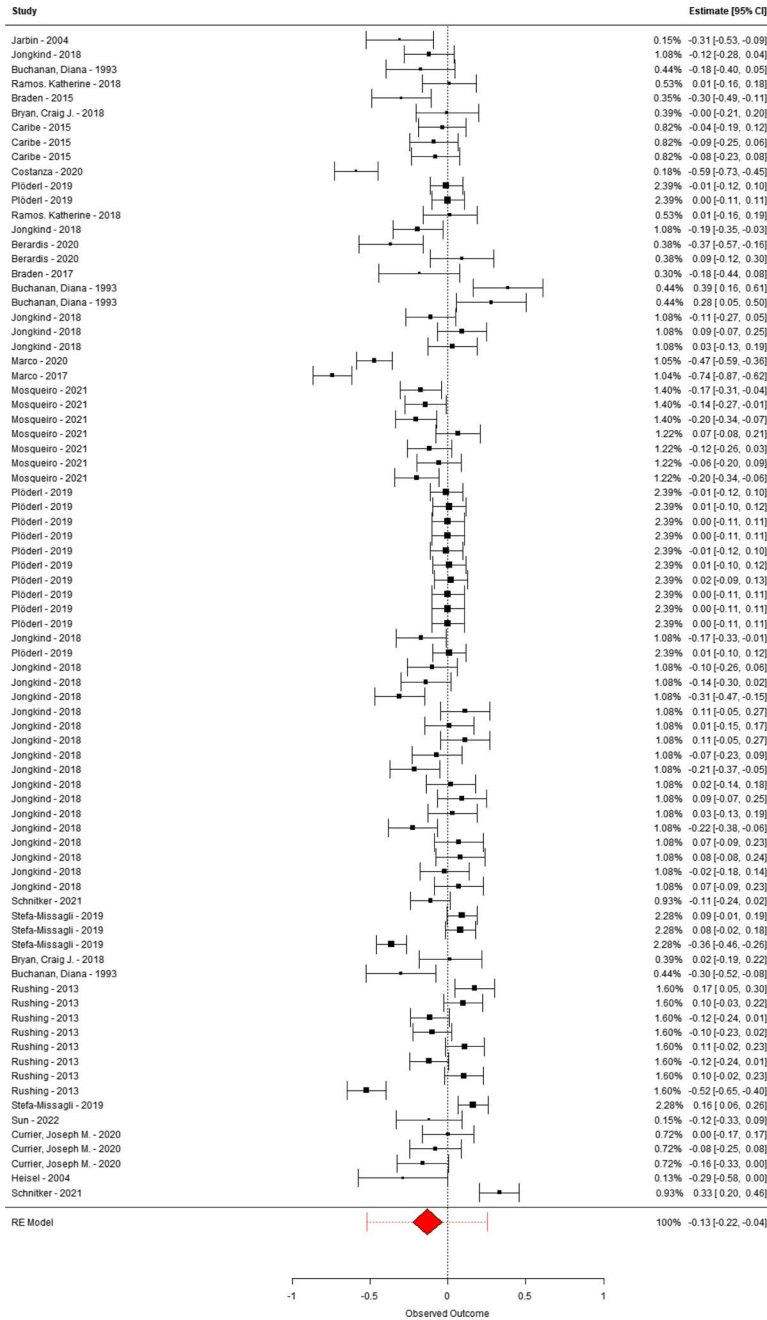


Figure 5. Forest plot of 80 ESs from 21 good- and fair-quality studies and their pooled ES of religiosity, spirituality, and meaning-making on suicidality and suicidal behavior. **Note:** This plot includes all good- and fair-quality studies from the multilevel random effects meta-analysis on 80 ESs from 21 unique studies. It accounts for nesting of multiple ESs in the same study, including the first author, with specific ES and 95% confidence interval per study, and relative study weight in percentage per unique study.

multilevel random effects meta-analysis was conducted, including 151 ESs from 54 unique studies of poor quality. This revealed a nonsignificant overall ES of Fisher $Z = 0.03$ ($SE = 0.05$, $z = 0.54$, $p = .587$), with large and significant heterogeneity ($I^2 = 96.1\%$; $Q(df = 150) = 4305.29$, $p < .001$). The majority of ESs came from cross-sectional ($n = 142$) designs.

Step 3B. For the poor quality ESs, tests suggested asymmetry and risk of publication bias. Thirteen outlying studies were

identified via a boxplot, and 12 standardized residuals (7.9%) exceeded $|1.96|$. Egger's test revealed no significant asymmetry (Kendall's $\tau = .062$, $p = .271$). The trim-and-fill procedure suggested seven additional ESs. The failsafe numbers were, as expected, below the threshold. This indicates weak results and possible publication bias.

Step 3C. The most prevalent religious affiliation was a significant moderator ($Q_M(df = 6) = 234.25$, $p < .001$), with

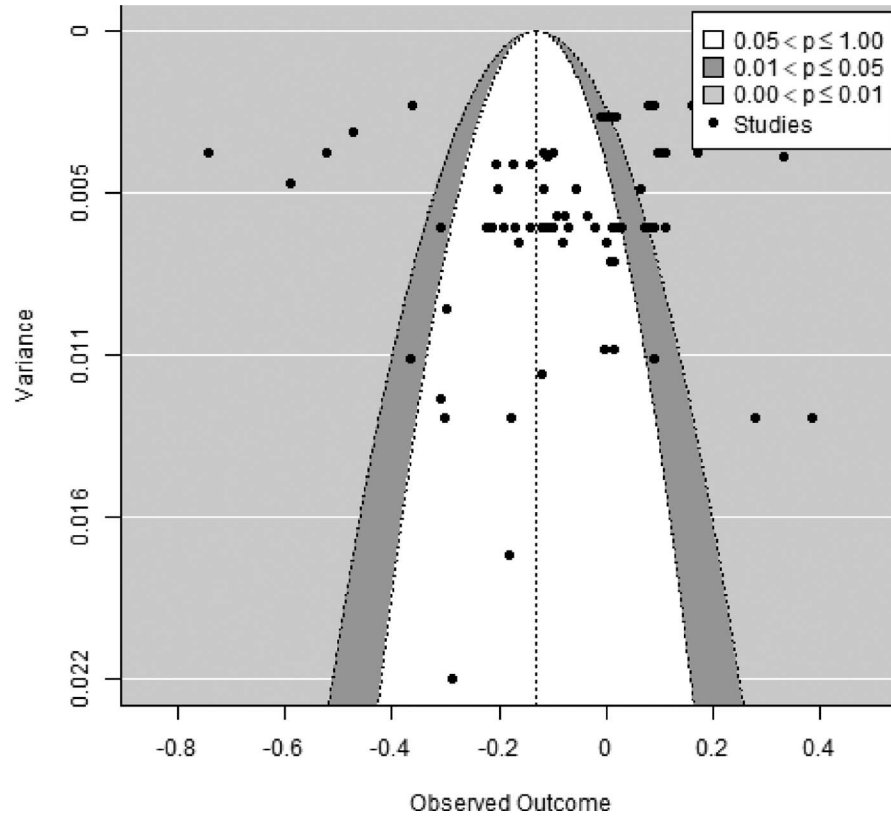


Figure 6. Funnel plot of 80 ESs from 21 good- and fair-quality studies and their pooled ESs of religiosity, spirituality, and meaning-making on suicidality and suicidal behavior. **Note:** This plot includes all 80 ESs from 21 unique, good- and fair-quality studies from a multilevel random effects meta-analysis.

significant residual heterogeneity ($Q_E(df = 145) = 3739.42, p < .001$). Design type (case-control, cross-sectional, longitudinal) differed significantly in pooled ES ($Q_M(df = 3) = 11.23, p = .011$). The pooled ES from case-control designs ($Z = 0.28, SE = 0.09, p < .002$) was significantly positive; the pooled ES from cross-sectional and longitudinal designs was not significant.

Post-hoc analyses on specific dimensions

Some R/S/M dimensions have been more frequently related to suicidality than others and received special attention in general and clinical population reviews.¹⁷ For all R/S/M dimensions that had ESs included in nine or more studies, a pooled ES was calculated. Given the small number of ESs, no quality selection and very limited statistical checks for outliers or heterogeneity were performed. (All available results and plots are reported in Supplemental File 7 [available upon request from the authors] and 8 [<http://links.lww.com/HRP/A224>].) For three dimensions, a significant pooled ES was found: (1) For moral objections to suicide we found (8 studies; 12 ES) a pooled ES of -0.11, 95% CI (0.22, -0.00), indicating lower suicidality in persons with higher MOS; (2) for affiliation we found (10 studies; 13 ES) a pooled ES of 0.11, 95% CI (0.02, 0.20), indicating a higher level of suicidality for the religiously affiliated; (3) for salience and intrinsic religiosity we found (11 studies; 16 ES) a pooled ES of -0.14, 95% CI (-0.20,

-0.06), indicating protective effects of individual importance of religiosity; and (4) for negative R/S/M (12 studies; 17 ES) we found a pooled ES of 0.20, 95% CI (0.10, 0.30), indicating increased suicidality during struggles and search for meaning. No significant pooled ES was found for meaning and/or purpose in life (17 studies, 19 ES; pooled ES -0.14 [-0.34, 0.05]), or for religious service attendance and organizational involvement (11 studies, 19 ES; pooled ES -0.02 [-0.08, 0.03]). When all ESs on meaning and/or purpose in life were left out, the meta-analysis again resulted in a negative pooled ES of -0.03. This ES, however, was no longer statistically significant (95% CI [-0.08, 0.01]).

DISCUSSION

This systematic review and meta-analysis found evidence for involvement of all R/S/M dimensions related to suicidality in persons with a psychiatric diagnosis or a recent suicide attempt worldwide. Various R/S/M dimensions affected suicidality, depending on different R/S/M beliefs and practices and whether they had adaptive or maladaptive functions. Poor-quality studies and cross-sectional designs were most common, and no significant indications of publication bias were found in fair- and good-quality studies. The high number of poor-quality studies is concerning, and primarily reflects correlational character and lack of correction for important confounders in many studies. Such impediments constrain

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any causal inferences. For this reason, we used only good- and fair-quality studies for the current meta-analysis.

Only a third of all studies suitable for meta-analysis could be rated as good or fair. Rarely were longitudinal designs with repeated R/S/M assessments used, and no randomized trials were employed, limiting causal inferences. Most case-control studies were designed inappropriately to answer whether R/S/M was associated with lower suicidality. Africa, Oceania, and South America were strikingly underrepresented, leaving out three spiritually and religiously diverse continents. Studies reported mainly on Christian participants. North American studies did report equally on White participants and those with other ethnic and cultural backgrounds.

Dimensions from all four aspects of R/S/M have been studied in relation to suicidality. We specifically employed Saroglou's conceptualization of believing, belonging, behaving, and bonding.²¹ This model provides a valuable approach to the cognitive, emotional, moral, and social dimensions of R/S/M across cultures. The inherent weakness of using this four-pronged model in meta-analysis is the reduction of R/S/M dimensions to only four aspects. Generally, correlations among R/S/M dimensions and suicidality were found in the expected direction. Our meta-analysis revealed a significant and negative pooled ES of R/S/M in relation to suicidality, especially for good- and fair-quality studies (Fisher $Z = -0.13$, $SE = 0.05$, $z = -2.76$, $p = .006$). These findings indicate a small but significant overall protective effect of R/S/M against suicidality. Separate analyses per aspect revealed only a significant negative pooled ES for behaving (Fisher $Z = -0.06$, $SE = 0.02$, $p = .001$) and believing and meaning (Fisher $Z = -0.26$, $SE = 0.09$, $p = .003$). No clear difference was found between ES for diverse religious affiliations and atheism/agnosticism; though, affiliation, including the missing affiliation category, was a moderating factor. Thus, the specific profile of an individual's R/S/M aspects, or the specifics of a religious subculture, seemed to have a stronger relationship with suicidality than affiliation type.

Most studies focused on behavioral and sociological aspects (behaving and belonging), such as studying, religious (non)affiliation, and religious service attendance. The cognitive and emotional aspects, believing, and meaning and bonding, were studied less frequently, but contained promising protective dimensions, especially MiL. MiL showed a relatively high number of significantly negative ESs. Additionally, MiL had a significant post-hoc crude pooled ES, combined with a negative pooled ES for all believing and meaning dimensions. In addition, in the post-hoc analysis excluding meaning variables, a weaker and no longer significant pooled ES was found, suggesting an important, mediating role for MiL in the protective influence of R/S for suicidality. This finding requires further exploration. For instance, we should ask such questions as: Is this protective effect inextricably linked to R/S, or does it also apply to secular existential meaning?

As previously reported, moral objection to suicide had a high number of significantly negative ESs, with a just significant post-hoc crude pooled ES. Religious affiliation, religious

salience, and religious service attendance were expected to have strong negative ESs, but had relatively low negative ESs. Nevertheless, religious salience exhibited a significantly negative association with suicidality in post-hoc analyses. In contrast with this outcome, as well as previous outcomes summarized by Koenig and colleagues,¹⁷ service attendance and organizational involvement were not associated with lower levels of suicidality. Religious affiliation was actually significantly associated with slightly higher levels of suicidality in these analyses. These outcomes suggest the importance of individual R/S/M beliefs and experiences in relation to lower suicidality.

In sum, studies were generally of poor quality and design, and focused on protective R/S/M dimensions. They were also unevenly distributed, with primarily Western and Christian populations, but not limited to White participants. The high number of poor studies is a cause for concern, and mainly reflects correlational character and lack of correction for important confounders. We found evidence supporting general protective character of R/S/M for suicidality, which was corroborated for psychiatric patients by a significant outcome in the meta-analysis and supported by a modest but clearly significant ES for good- and fair-quality studies. Protective dimensions seem to exert relatively stable effects across different religions and life views, consistent with a previous review.¹³ For example, moral objections to suicide were protective against suicidality for both Buddhists and Christians. The large proportion of ESs with higher suicidality for protective R/S/M aspects in China could indicate influence of contextual factors, such as minority status, on the interplay of R/S/M and suicidality. This finding fits previous research on moderating influences for religious homogeneity or isolation.^{11,29}

To our knowledge, this is the first systematic review on R/S/M in people diagnosed with a psychiatric diagnosis or with a very recent suicide attempt. It is also the first review systematically exploring different R/S/M dimensions in relation to suicidality. The results underline the importance of future multifactorial and longitudinal research, with special attention to religious and spiritual diversity. Future research should involve clear selection, recruitment, and R/S/M operationalization, adjust for possible confounders, and include R/S/M follow-up assessments. Such design could provide a stable foundation for R/S/M-informed interventions in suicidality. The only intervention study found provides a hopeful signal to follow this path.²⁸

Attentive examination of R/S/M, including its dimensions and dynamics, is important for everyone providing help and support to psychiatric patients, especially mental health professionals and clergy. Exploration of R/S/M and empowering resources within particular religious traditions and life views will decrease stigmatization and support development of effective suicide prevention efforts and interventions.³⁰

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article. The authors confirm their contribution to the paper as follows—study conception and design: BvdB, RR, RCAR, AC, AWB, and HSJ; search and screening: BvdB, RR, and SH; quality assessment: BvdB, RR, AC, and SH; material preparation, data collection, and analysis: BvdB and RR; meta-analysis: BvdB, RCAR, and KvL; figures: BvdB, KvL, and RCAR; draft manuscript preparation: BvdB. All authors reviewed and edited the manuscript and approved the final version.

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