Religiosity, Spirituality, and Mental Health in Eight Countries

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Abstract

Objective: Meta-analyses suggest that religiosity has a positive relationship with mental health. However, methodological concerns limit findings. The purpose of the study was to analyze linear and curvilinear relationships among religiosity, spirituality, and mental health using open science practices and a multinational sample.

Methods: Relationships among self-reported religiosity, spirituality, depression, anxiety, stress and life satisfaction were assessed using mixed-effect linear regressions from a publicly available multinational dataset of participants (N = 1754; eight countries: Brazil, Indonesia, Thailand, China, Russia, India, Turkey, and the United States).

Results: Within a multinational sample, religiosity was associated with depression (β = -0.09, p < 0.001, 95% CI [-0.15, 0.04]) and life satisfaction (β = 0.22, p < 0.001, 95% CI [.17, .27]), but not anxiety or stress. Religiosity was quadratically associated with anxiety (β = -0.07, p = .03, 95% CI [-0.13, -0.01]) and stress (β = -0.06, p = .05, 95% CI [-.012, .00]), but not depression or life satisfaction. Spirituality was associated with depression (β = -0.08, p < .001, 95% CI [-.13, .03]) and life satisfaction (β = 0.14, p < .001, 95% CI [.09, .19]), but not anxiety or stress. Spirituality had no quadratic associations.

Conclusions: Findings suggest accounting for methodological limitations and acknowledging the importance and murkiness regarding relationships among religiosity, spirituality, and mental health.

Religiosity, Spirituality, and Mental Health in Eight Countries

Within Bronfenbrenner's ecological model, religious institutions and health services are situated alongside family and school, within the microsystem--the layer directly outside of the individual. This showcases the impact that both religious and health services may have on an individual. It is important to understand how the relationships among these constructs are experienced within the individual, as well as with its surrounding systems. From an empirical standpoint, meta-analyses provide evidence that religiosity and/or spirituality is associated with better mental health for an individual (Oman & Luckoff, 2018; Bonelli & Koenig, 2013).

However, science can also improve the understanding of these relationships through addressing the common methodological limitations of studies that comprise these meta-analyses. These limitations include often focusing on a single facet of religiosity assessment (e.g. Galen & Kloet, 2011), using analytic strategies that only test relationships linearly when there is evidence for curvilinear relationships (e.g., Ross, 1990) and relying on sampling strategies which inadvertently omit much of the world's diversity (e.g. Hill, 2013). In working towards addressing these concerns, the current study provides tests of linear and curvilinear relationships between religiosity, spirituality, and distinct facets of mental health in individuals sampled from Brazil, Indonesia, Thailand, China, Russia, India, Turkey, and the United States.

Definitions

According to Jong (2015), "Definitions are and ought to be provisional" (p. 22). This is especially relevant when there has been fervent dissent within the field as there has been regarding whether religiosity and spirituality can be separated into distinct constructs and to whether nonreligious individuals can actually be spiritual (R/S; e.g. Pargrament, 1999; Rayborn, 2004). While important, this debate is beyond the scope of this study. For simplicity's sake,

rather than addressing the important nuances of these discussions, this study relies on an individual's own perception of how religious and/or how spiritual they perceive themselves. When the concepts of religiosity and spirituality have not been differentiated, or when referring to individuals that identify themselves as religious and spiritual, the term "religiosity/spirituality" (R/S) is used. Although acknowledging the distinctive variations among adherents of specific faith traditions, the term "religious" is used to define these individuals. Likewise, acknowledging the distinct differences among individuals who identify as atheist, agnostic, or unaffiliated with a faith tradition, the term "nonreligious" is used to describe these individuals.

Evidence from meta-analyses and systematic reviews

There is substantial evidence regarding the positive associations of R/S and health outcomes. A 2001 systematic review found roughly eighty percent of studies had a positive relationship among R/S and well-being indicators (Koenig & Larson, 2001). A 2003 meta-analysis found that R/S buffers against depressive symptoms (Smith et al., 2003). Another 2003 meta-analysis found a positive relationship between religiosity and overall mental health (Hackney & Sanders, 2003). More nuanced, systematic reviews also found positive relationships among R/S and disordered eating, health-related quality of life, and even athlete well-being (Akrawi et al., 2015; Borges et al., 2021; Noh & Shahdan, 2020). In perhaps the most comprehensive review of quantitative research between 1872 and 2010, this review found positive associations between R/S and measures of well-being (Koenig, 2012).

Methodological concerns

The effectiveness of meta-analyses and systematic reviews are inherently restricted by the included studies, which are often limited in various way (each discussed in turn): a dearth of samples that include individuals that are from non-majority faith traditions, individuals who are

nonreligious, and non-English readers, the overreliance of categorical affiliation or religious proxies, failing to disentangle spirituality from religiosity, only assessing linear relationships, and not accounting for societal privileges.

Firstly, the majority of extant work samples narrowly from the world's religious diversity by focusing on Christian and Jewish faith traditions, which limits the perspective of followers of other faith traditions (Hill, 2013; Kier & Davenport, 2004). To better understand the relationships among religious and spiritual belief among all persons, followers of multiple faith traditions, including followers of the Christian and Jewish faith traditions, must be included in these analyses. The sample includes individuals from a myriad of faith traditions.

Secondly, much of this research has not adequately included nonreligious populations (e.g. Moore & Leach, 2016). In 2012, the Pew Research Center identified that "nones" were just under 20% of all adults in the United States (Pew Research Center, 2012). In 2021, the Pew Research Center identified this population grew to 29% of the of all adults in the United States (Smith, 2022). Additionally, this number should be considered a lower-bound estimate given the stigma associated with non-belief (e.g., Abbott & Mollen, 2018). This practice limits the understanding of these relationships to those with a faith tradition. To better understand the relationships among religious and spiritual belief among all persons, nonreligious individuals must be included in these analyses. The sample included individuals who are nonreligious.

A third limitation is that most research within this domain utilizes only English-speaking samples. This practice limits the parameters of understanding these relationships among non-English speakers (Jafari, 2016). To better understand these relationships among, it would be helpful to include individuals without English-reading competencies. The questionnaire was translated into the majority language for each country solicited.

A fourth limitation is that much research within this domain is overly reliant on categorical affiliation or proxies (e.g. faith tradition service) to assess religiosity (Sherkat, 2008; Galen & Kloet, 2011). While categorical affiliation and proxies have utility, this practice fails to account for individual differences within followers of specific faith traditions. Given the stigma of non-belief, these practices may also inadvertently include nonreligious persons as religious persons who for various reasons may be posing as a follower of a faith tradition. Using individual measures of religiosity and spirituality would better be able to detect an individual's religiosity and spirituality. The questionnaire used individual measures as opposed to proxies.

A fifth limitation is that much research in this domain may not differentiate spirituality's relationships among mental health constructs (Pargament, 1999). Failing to tease apart religion and spirituality within research leads to a "confounding and conundrum effect that understanding" religiosity or spirituality to "any real extent will be seriously prohibited" (Rayburn, 2004, p. 53). While there is debate about whether these constructs may be separate (e.g. Koenig, 2008), separating religiosity and spirituality will better elucidate if individuals perceive there are differences regarding these constructs. The questionnaire asks participants to what extent they consider themselves both religious and spiritual.

A sixth limitation in this domain is that much research only tests for linear relationships, as opposed to curvilinear relationships. Galen and Kloet note that the linear approach conflates individuals with "weak belief and those with complete non-belief" in samples that contain both religious and non-religious individuals (2011; p. 674). Assessing curvilinear effects would detect potential variation in outcomes among individuals from both sides of the spectrum, as well as the middle. While previous curvilinear studies (Warlick et al., 2021; Dilmaghani, 2018) intentionally included nonreligious populations, and populations of different faith traditions, these studies are

often limited to residents of North America who can read English. The analytic plan assessed for linear and curvilinear relationships.

Lastly, much research within this domain may not account for privilege. This privilege may come via different demographic categories (e.g. race and ethnicity), including being identified as a follower of a majority faith tradition (Galen & Kloet, 2011). There are benefits to belonging to the powerful group within each society (Hays, 2008). To better understand the relationships among religious and spiritual beliefs among all persons, it is helpful to tease apart demographics, including whether an individual is a member of the privileged faith tradition. The exploratory hypotheses accounted for majority status for the majority faith tradition.

The strength of Gebauer and colleagues' study in examining the social value hypothesis cross-culturally (2017) is acknowledged. Their study is an exception to several of the critiques mentioned, but not all of them. Their study used data from the Big 5 Personality Project that included individuals who were religious and non-religious, who were from multiple countries, who completed the survey in English, Spanish, German, or Dutch over eight years. The researchers also tested linear and curvilinear effects using a single-item measure of self-esteem, and they also accounted for in-country and individual variance.

However, the focus of their study remains different. Whereas they are assessing if the relationship across religiosity and self-esteem is different across participants in different countries, this study is assessing relationships among religiosity and spirituality in mental health while accounting for country of origin. In this study, the pre-existing dataset recruited individuals from eight different countries: Brazil, Indonesia, Thailand, China, Russia, India, Turkey, and the United States, using surveys in nine different languages. This method is different than Gebauer and colleagues' who used data from individuals who opted to complete a survey,

who may have a preexisting interest in these constructs. Additionally, this study assesses spirituality as well as religiosity, and it assesses four different mental health constructs using established scales as opposed to using a one-item self-esteem scale.

Present study

In summation, meta-analyses and systematic reviews have shown positive relationships among religiosity, spirituality, and mental health. However, there are limitations to much of the research that comprises these studies. In the present study, linear and curvilinear relationships between religiosity, spirituality, and mental health were explored using a multinational sample. By using the publicly available sample from Jong and colleagues (2020) and crafting an appropriate analytic approach, several of the limitations present in the literature were addressed. To address the first limitation of overreliance on Christian samples, individuals from diverse faith traditions were included. To address the second limitation of excluding non-religious participants, individuals who identified as areligious were included. To address the third limitation of overreliance on English-speaking participants, a translated questionnaire was used to allow for soliciting both English-speakers and non-English speakers. To address the fourth and fifth limitations of using categorical association to assess religiosity and collapsing religiosity and spirituality, individual measures were employed to assess both religion and spirituality in the sample In the current study, linear and curvilinear approaches were employed to address the sixth limitation of prior research, which relied solely on linear approaches. To address the seventh limitation of failing to control for various privileges that may influence mental health, demographic differences were controlled for in the analysis using the sample.

Given the validity of the previous research, and how many of those studies were systematic reviews and meta-analyses that found positive relationships among religiosity,

spirituality, and mental health, as well as the limitations of the previous research, null hypotheses were issued. These null hypotheses were organized into two clusters. The first cluster focused on religiosity and mental health. The second cluster focused on spirituality and mental health.

It was assumed that there would be no significant relationships among religiosity, spirituality, and mental health constructs (H_0). For cluster one, it was hypothesized that after controlling for basic demographics, there would be no significant relationships among religiosity and depression (H_1), anxiety (H_2), stress (H_3), and life satisfaction (H_4). For cluster two, it was hypothesized that after controlling for demographics, there would be no significant relationships among spirituality and depression (H_5), anxiety (H_6), stress (H_7), and life satisfaction (H_8).

Method

This study was pre-registered in the Open Science Framework prior to accessing the data (OSF Karki et al. 2022; https://osf.io/kguaj/?view_only=b9105abdd0e5472ba0d33e0cfad5308c). This OSF page allows access to primary analyses, statistical scripts, and other files associated with this project. The dataset is described in Jong and colleagues (2020) and available via the OSF (https://osf.io/3d58w/). This study was approved by the University of Southern Mississippi Institutional Review Board (IRB-21-221).

Participants

Jong and colleagues' (2020) data (N = 1,754) from eight countries: Brazil, Indonesia, Thailand, China, Russia, India, Turkey, and the United States, were used in this study. The English survey was translated by Language Connect to collect 1,816 diverse responses from convenience sample size of ($n = 200$) for each country except for the United States ($n = 300$). Participants who failed the embedded honesty check ($n = 86$) were excluded from analyses, and one additional participant was excluded for incomplete data. All other participants ($n = 1,667$)

were included in these analyses. Of the included participants (M = 34.40 years, *SD* = 10.50), the majority were male (54%) Asian (non-Thai) (34.8%), and identified as Christian (28%), Atheist/Agnostic/Nonreligious (25%), Muslim (19%), Buddhist (12%) or Hindu (9%). Demographics are presented in Table 1.

Measures

The *Depression, Anxiety, and Stress Scale* (DASS) measures depression, anxiety, and stress. The DASS 21-item scale measured negative affective traits (Lovibond & Lovibond, 1995). The DASS-21 has three subscales, depression, anxiety, and stress with seven items in each subscale, a 4-point Likert style response scale ranging from 0 (*does not apply to me at all*) to 3 (*applies to me very much, or most of the time*), which yields a maximum score of three. Higher scores indicate greater severity or frequency of either depression, anxiety, or stress. The DASS-21 demonstrated good reliability in its validation in a United States sample (depression; α = 0.94, anxiety; α = 0.87, stress; α = 0.91; Antony et al., 1998), as well as in a non-United States sample (depression; α = 0.82 anxiety; α = 0.79, stress; α = 0.89; Xavier et al., 2016).

The *Satisfaction with Life Scale* (SWLS) measures global life satisfaction. The SWLS was used as an indicator of subjective well-being (Diener et al., 1985). The SWLS is one-factor scale with five-items, a 7-point Likert-style response system ranging from -3 (*strongly agree*) to 3 (s*trongly disagree*), which yields the maximum score of three. Measures of mental health is shown to have been correlated with the scores on the SWLS (Pavot & Deiner, 2009). The SWLS demonstrated good scale reliability in its initial validation in the United States sample (α = 0.87; Pavot & Deiner, 2009), and in a non-United States sample (α = 0.85; Galanakis et al., 2017).

Religiosity was measured using the item, "Do you consider yourself a religious person?" (Jong et al., 2020). Religiosity assessed the degree to which participants identified as religious.

This is one item with an 8-point Likert-style response system ranging from 0 (*not at all*) to 8 (*very much so*), which yields a maximum score of eight. Within Jong and colleagues (2020) dataset, this one item religiosity measure was correlated with the multi-item Supernatural Beliefs Scale (SBS; Jong et al., 2013) with *r* values ranging from 0.42 (Thailand) to 0.7 (United States).

Spirituality was measured using the item, "Do you consider yourself a spiritual person?" (Jong et al., 2020). Spirituality assessed the degree to which someone identifies as spiritual. This is one item with an 8-point Likert-style response system ranging from 0 (*not at all*) to 8 (*very much so*), which yields a maximum score of eight. Like the religiosity item, this one item spirituality measure was correlated with the multi-item SBS with *r* values ranging from 0.34 (Thailand) to 0.78 (United States).

Analyses

Prior to analyses, instrument reliability was assessed. To test the hypotheses, eight sets of mixed effect linear regressions were conducted. The first four sets focused on religiosity; the latter four sets focused on spirituality. The results were analyzed using the statistical package lme4 and sjPlot for visualizations/table generation, using the open-source software R.

Results

Psychometrics

Cronbach's alpha was calculated for the DASS subscales and the SWLS for both the total sample and individual countries: Brazil, Indonesia, Thailand, China, Russia, India, Turkey, and the United States. DeVellis' criteria were used to assess reliability (1991). Within these criteria, any scales with alpha levels greater than 0.599 were deemed acceptable. Psychometric information is presented in Table 2.

Religiosity and Mental Health

To address the first four hypotheses regarding religiosity and depression (H_1), anxiety (H_2), stress (H_3), and life satisfaction (H_4), mixed effect linear regression procedures were used. In each procedure, the appropriate mental health measures were used as the outcome variable. The first model included demographic covariates of age, gender, and income. In the second model, the linear effect of religiosity was added. In the third model, the quadratic effect of religiosity was added. In the fourth model, religiosity was allowed to be estimated as varying among the different countries. Using these mixed effect linear regression procedures allows for testing of country effects and individual effects.

Overall, religiosity was negatively associated with depression (H_1; $\beta = -0.09$, $p < 0.001$, 95% CI [-0.15, -0.04]) and positively associated with life satisfaction (H_4; $\beta = 0.22$, $p < 0.001$, 95% CI [0.17, 0.27]), but religiosity was not significantly related to anxiety (H_2; $\beta = 0.01$, $p = 0.655$, 95% CI [-0.04, 0.07]) or stress (H_3; $\beta = -0.02$, $p = 0.516$, 95% CI [-0.07, 0.04]). To the contrary, religiosity was not quadratically associated with depression (H_1; $\beta = -0.03$, $p = 0.303$, 95% CI [-0.09, 0.03]) or life satisfaction (H_4; $\beta = 0.05$, $p = 0.066$, 95% CI [-0.00, 0.11]), but it was negatively associated with anxiety (H_2; $\beta = -0.07$, $p = .03$, 95% CI [-0.13, -0.01]) and with stress (H_3; $\beta = -0.06$, $p = .05$, 95% CI [-0.12, -0.00]). Indeed, the addition of quadratic effects to these models did not improve out of sample prediction accuracy (i.e. reduce AIC scores). These results were in opposition to the null-hypotheses (H_1 - H_4). Religiosity was found to have a statistically significant relationship with all of the outcome variables, whether linearly (depression and life satisfaction) or quadratically (anxiety and stress).

Spirituality and Mental Health

To address the final four *a priori* hypotheses regarding spirituality and depression (H_5), anxiety (H_6), stress (H_7), and life satisfaction (H_8), mixed effect linear regressions procedures

were used. The procedures employed for the final four hypotheses were identical to those used for the first four, with the only difference being the use of spirituality as the predictor variable in these analyses. The first model included the same demographic covariates. The second model added the linear effect of spirituality. The third model added the quadratic effect of spirituality. Lastly, the fourth model allowed for spirituality to be estimated as varying among the different countries.

Overall, spirituality was negatively associated with depression (H_5; β = -0.08, p = 0.001, 95% CI [-0.13, -0.03]) and positively associated with life satisfaction (H_8; β = 0.14, p < .001, 95% CI [.09, .19]), but it was not significantly related to anxiety (H_6; β = 0.03, p = 0.207, 95% CI [-0.02, 0.08]) or stress (H_7; β = 0.01, p = 0.722, 95% CI [-0.04, 0.06]). Spirituality was not quadratically associated with depression (H_5; β = 0.05, p = 0.071, 95% CI [-0.00, 0.10]), anxiety (H_6; β = 0.02, p = 0.467, 95% CI [-0.03, 0.07])), stress (H_7; β = 0.03, p = 0.253, 95% CI [-0.02, 0.08]), or life satisfaction (H_8; β = 0.03, p = 0.179, 95% CI [-0.02, 0.08]). These findings provide mixed support for the null hypotheses. Like religiosity, spirituality also had a statistically significant relationship with depression and life satisfaction. Unlike religiosity, spirituality possessed no quadratically associated relationship with outcome variables.

Exploratory

Given these mixed findings, two additional analyses were added to assess how religious affiliation may influence one's mental health. Like Bronfenbrenner's model, Hays' ADDRESSING Model of diversity (2008) recognizes the dynamic interactions between the individual and the systems in which the individual exists. Differing from Bronfenbrenner, Hays's model focuses on diverse identities within the individual (age, disability, religiosity, ethnicity, sexual orientation, socioeconomic status, indigenous heritage, national origin, and gender) while

it also emphasizes that individual's experiences are influenced by various systems regarding whether their identities are either in the dominant category or the non-dominant category. Individuals who are in the dominant category may be more apt to experience privilege from affiliating with a group that is in the majority whereas individuals in the non-dominant category may be more apt to experience minority stress, prejudice, and discrimination from affiliating with a group that is a non-majority—all of which could affect one's mental health.

For the first exploratory analysis, a variable was created to assess whether participants identified as a member of the majority religious group in their own country or the non-majority religious group in their own country. Individuals who identified as non-religious, atheist, or agnostic were included among the non-majority grouping variable. The exception to this was China, where individuals who identified as nonreligious were categorized as the majority group. The procedures were identical to the first eight hypotheses, except that religious majority status was used as the predictor variable in this analysis. Religious majority status was not significantly associated with either depression, anxiety, stress, or life satisfaction.

For the second exploratory analysis, another variable was created that separated nonreligious individuals from members of the religious majority faith tradition and members of the religious minority faith traditions. While in most countries, nonreligious individuals tend to be in the minority, Moore and Leach (2016) acknowledge that grouping nonreligious individuals alongside religious individuals and then comparing that first group to a second group of other religious individuals can be problematic. This can be problematic as nonreligious individuals are significantly less likely to associate with a faith tradition and engage in faith-related behaviors than the religious individuals within their group, as well as the group to which they are

compared. In addition to not being part of the dominant religious group, nonreligious individuals may experience discriminatory stress based on their nonreligious status (Hammer et al., 2012).

Given this, a 3-way index was used to compare depression, anxiety, stress, and life satisfaction across religious grouping status (majority religious group, minority religious group, and nonreligious group) using the Tukey method. To do so, a 3-way index was used to compare depression, anxiety, stress, and life satisfaction across religious grouping status (majority religious group, minority religious group, and nonreligious group) using the Tukey method.

Regarding nonreligious group status and religious majority and religious minority group status, there was no significant difference regarding depression. Additionally, nonreligious group status and religious majority group did not differ on anxiety at the traditional .05 level (diff = -0.34, p = 0.06, 95% CI[-0.67, 0.01]). However, post hoc contrasts did show significant differences on anxiety between the nonreligious group and the religious minority group (diff = -0.44, p = 0.02, 95% CI[-0.83, -0.05]) stress between the nonreligious group and religious majority group (diff = -0.58, p = 0.0002, 95% CI[-0.93, -.24]), as well as between the nonreligious group and religious minority group (diff = -0.65, p = 0.0002, 95% CI[-1.04, -0.27]). These contrasts also show significant differences on life satisfaction between the nonreligious group and the religious majority group (diff = -0.37, p = 0.02, 95% CI[0.05, 0.70]) and the religious minority group (diff = -0.50, p = 0.0045, 95% CI[0.13, 0.86]). The Tukey method was used to control for Type 1 error within each multiple comparison, but the Bonferroni approach was not initially used to control for Type 1 error across the comparisons since these analyses were exploratory. After a Bonferroni correction (0.05/8 = 0.0063), significant differences persisted between nonreligious groups and religious minority groups on life satisfaction and stress, as well as between the nonreligious group and the religious majority group on stress.

Discussion

Summary

This study examined linear and curvilinear relationships among religiosity, spirituality, and mental health using Jong and colleagues' (2020) multinational dataset. The null hypotheses were quite wrong. Religiosity had either linear or quadratic relationships with depression, anxiety, stress, and life satisfaction. Within spirituality, the hypotheses had some support. Spirituality had linear relationships with depression and life satisfaction, but no relationships with anxiety or stress. These results, with a multinational sample from eight countries indicate that religiosity, and to a lesser extent, spirituality, are associated with mental health.

The larger literature (e.g. Chatters et al., 2014) and this study's results regarding depression and life satisfaction, indicate positive relationships among religiosity, spirituality, and mental well-being. However, the results also suggest that positive linear relationships among religiosity, spirituality, and mental health cannot be assumed. It is important to test these assumptions with all constructs. While religiosity and spirituality were both linearly associated with depression and life satisfaction, they possessed no linearly significant relationship with anxiety or stress. In fact, anxiety and stress were both quadratically associated with religiosity, which indicated that individuals who were on both the high end and low end of the spectrum had lower levels of anxiety and stress than individuals in the middle. These curvilinear findings are similar to previous studies that incorporated religious and non-religious participants (e.g. Galen & Kloet, 2010), and participants from multiple countries (e.g. Okulicz-Kozaryn, 2010).

It cannot be assumed that the relationships between religiosity and spirituality with mental health are the same. There is debate in the literature about the distinction between religiosity and spirituality as separate constructs (e.g. Pargament, 1999; Stifoss-Hanssen, 1999).

Here, relationships among religiosity and spirituality were statistically significant at a medium effect, but this relationship suggests these constructs are not interchangeable. Additionally, these results still suggest that separating the constructs of religiosity and spirituality may be necessary when assessing individuals' mental health. This is especially prominent regarding quadratic relationships. Contrary to spirituality, which did not exhibit any significant quadratic relationships, the findings indicated that religiosity was linked to anxiety and stress in a quadratic manner. While the AIC was lower for linear relationships as opposed to quadratic relationships, the findings suggest that the added model complexity may still be worth exploring to determine if there are quadratic relationships between religiosity, spirituality, and mental health.

Group status within country was also examined. In the first analysis, where the religious majority was compared with the religious minorities, no significant differences were found regarding the mental health constructs. However, when the nonreligious affiliation was separated from either religious majority status (China) or religious minority status (all other nations), the post hoc contrasts showed significant differences between the nonreligious group and the religious minority group regarding anxiety, stress, and life satisfaction. While there was no difference regarding the nonreligious group and the religious majority group regarding anxiety, the differences regarding stress and life satisfaction persisted. After inserting a Bonferroni correction, these findings persisted regarding stress (nonreligious and religious minority, nonreligious and religious majority) and life satisfaction (nonreligious and religious minority). While these were exploratory post hoc analyses, these findings are worth exploring in other multinational religious datasets. Future research may also wish to explore whether the nonreligious individuals conceal their nonreligious identity and levels of anticipated-stigma

towards their nonreligious identity, as these have been linked to decreased mental and physical

health among atheists (Abbott & Mollen, 2018).

Questions regarding the relationships among religiosity, spirituality, and mental health

have been asked in a variety of studies—each study with its strengths and weaknesses. The

strengths of this study are centered around the dataset, the analytic plan, and the transparency

exhibited in the research. This sample from Jong and colleagues (2020) included participants

from eight countries across four continents. While the majority of the participants identified as

followers of the Christian faith tradition (28%), this sample included individuals from the Islamic

faith tradition (18.7%), the Buddhist faith tradition (12.8%), the Hindu faith tradition (9.1%),

among other faith traditions (6.9%) as well as nonreligious individuals (25%). Additionally, this

survey was translated into non-English languages, which allowed for the assessment of these

relationships among non-English speaking individuals. This survey also assessed an individual's

self-rating of their religiosity and spirituality separately as opposed to combining these constructs

together or using a proxy (e.g. religious organization membership or religious service

attendance). This is important as it allows for the assessment of an individual's experience,

especially given that non-believers may be stigmatized (Cimino & Smith, 2011). Also, this

dataset assessed psychopathology, as well as well-being, using established measures, which

allowed for a fuller assessment of one's mental health (Warlick et al. 2020).

The analytic plan in this study allowed for the assessment of linear and quadratic

relationships, and also accounted for potential variations due to country-level differences. Within

the exploratory analyses, Hays' model (2008) was also considered, which meant affiliative

privilege based on the country of origin was taken into account using group comparisons across

variables of religious majority, religious minority, and nonreligious grouping.

Lastly, a strength of this study is transparency. In their systematic review, Charles and colleagues (2019) found the psychology of religion has been slow to embrace practices regarding open science. These practices can increase transparency, confidence within findings, and increase access to research. Matsick and colleagues' assert that "everyone deserves to have access to research conducted about their lives and interests" (2021, p. 14). Research regarding religiosity, spirituality, and mental health falls within that domain. In particular, transparency needs to be prioritized by clinical and health psychologists as they were among the least likely psychology faculty to use an open science account (Nosek 2019b as cited in Nosek et al., 2022). The study was preregistered on the Open Science Framework (OSF), and all study materials, including the code used, are available on the OSF platform. Additionally, this study utilized Jong and colleagues' dataset, which is freely available within the OSF.

Limitations

Our primary limitation is that one-item scales were utilized to assess religiosity and spirituality. These items asked if participants considered themselves as either religious or spiritual persons. We acknowledge that "while the single item question can provide valuable information….it is at the expense of detail (Bowling, 2005, p. 343). That stated, there is an argument for the utility of single-item measures in psychological science (Allen, et al., 2022). There is also ample support for single-item scales within the study of religiosity in individual research studies (e.g., Johnson et al., 2023; Kelley & Eddie, 2020; Speed & Lamont, 2021; Yamada et al., 2020) and in large surveys (e.g., Kosmin et al., 2001; Pew Research Forum on Religion and Public Life, 2008; Smith et al., 2018; Statistics Canada, 2019). Additionally, our single-item measures were positively correlated with a multi-item measure that was designed for cross-cultural usage (i.e. Supernatural Beliefs Scale; Jong et al., 2013).

Moreover, these single-item scales permitted the innermost section of Bronfenbrenner's levels (1979), the individual, whereas other commonly used single-item scales (e.g., religious affiliation, service attendance) only permit assessment of an individual's interaction with a microsystem. While Cronbach's alpha was used to report reliability for each measure globally and at the country-level, we note that additional validity evidence for these one-item scales, such as those found at either Bronfenbrenner's individual level (e.g., prayer), or including the integration with the microsystem level (e.g., affiliation, service attendance) would be helpful. Future research that investigates these relationships with multi-item or multidimensional scales, would be beneficial at clarifying our results. Lastly, this study relied on self-report which could be supplemented using self-report and informant-report (e.g., Gebauer et al. 2017). However, these are minor limitations given the strengths of the sample and analytic plan.

Conclusion

This is the largest, and most diverse, curvilinear examination of the relationships among religiosity, spirituality, and mental health to date. This project provides a better understanding of the intricacies of these connections within a multinational sample. Together, these findings suggest that as researchers and clinicians, it is important to acknowledge the murkiness among these relationships and do the due diligence of teasing apart religiosity and spirituality, teasing apart mental health, and extending beyond straight correlation to test these relationships quadratically, as well as testing these relationships by grouping variables. In doing these things, a better understanding of the connections between religiosity, spirituality, and mental health can be achieved among all individuals.

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Table 1

Demographic Characteristics of the Sample

	M	SD
Participant age (17 - 91)	34.40	10.50
Income (1 – 10)	5.35	1.73
	N	%
Participant Gender		
Male	907	50
Female	760	46
Participant Ethnicity		
Asian (excluding Thai)	581	34.8
White/non-Hispanic	256	15.4
Thai	168	10.1
Turkish	154	9.2
Slavic	154	9.2
Latinx/Latina/o	144	8.63
Unknown	115	6.9
Black/African American	36	2.2
Multiracial	46	2.7
Arab	4	0.2
Indigenous/Native	4	0.2
Jewish	2	0.1

Note. Unknown is comprised of individuals who entered non-ethnicities (e.g., religious group, city location) or their entered answer was unreadable.

Table 2

Instrument Psychometrics

Variable	Depression	Anxiety	Stress	SLWS
Brazil	.88	.86	.87	.88
China	.92	.87	.88	.90
India	.83	.66	.66	.83
Indonesia	.86	.80	.83	.90
Russia	.82	.78	.87	.89
Thailand	.86	.82	.84	.91
Turkey	.85	.79	.80	.93
USA	.92	.84	.88	.92
Cross-Sample	.88	.81	.85	.90

Note. SWLS = Satisfaction with Life Scale.

MULTINATIONAL CURVILINEAR