Psychology of Religion and Spirituality

Religious Service Attendance and Common Mental Disorders and Well-Being: Causal Effects Based on a Longitudinal Marginal Structural Model Approach

Gabriele Prati

Online First Publication, July 31, 2025. https://dx.doi.org/10.1037/rel0000581

AMERICAN PSYCHOLOGICAL ASSOCIATION

Psychology of Religion and Spirituality

ISSN: 1941-1022

https://doi.org/10.1037/rel0000581

Religious Service Attendance and Common Mental Disorders and Well-Being: Causal Effects Based on a Longitudinal Marginal Structural Model Approach

Gabriele Prati
Department of Psychology, University of Bologna

Frequent religious service attendance is associated with a decreased risk of common mental disorders and greater well-being. However, whether this is a causal relationship or merely a correlation influenced by confounding factors remains unclear. This study aimed to test the causal effects of religious service attendance on mental disorders and well-being while handling time-varying and time-invariant confounding. This study used longitudinal data spanning over 20 years from the Midlife Development in the United States study (n = 7,108). The Midlife Development in the United States study consisted of a nationally representative sample of adults living in the United States. The effects of religious service attendance on common mental disorders and well-being were tested using a longitudinal marginal structural modeling approach. Age, gender, income, and ethnicity were included as time-invariant confounders, while personality factors, self-rated physical health, economic status, and contact with friends were modeled as time-varying confounders. Frequent religious service attendance did not influence the probability of developing a major depressive episode, panic disorder, or generalized anxiety disorder. Moreover, the relationship between religious service attendance and psychological well-being was not statistically significant. This study provides evidence that the associations between religious service attendance and a reduced risk of common mental disorders and increased well-being do not reflect genuine causal effects. In addition to complex ethical questions, this study raises issues regarding the possible mental health benefits of promoting religious service attendance.

Keywords: mental health, religious service attendance, well-being, causal inference, religion

Supplemental materials: https://doi.org/10.1037/rel0000581.supp

A substantial body of theory and research supports the notion that religious service attendance is beneficial for mental health and well-being (e.g., Hood et al., 2018; Koenig, 1997; Moon et al., 2023; Oman & Syme, 2018; Pargament et al., 1992; Rosmarin & Koenig, 2020; Schieman et al., 2013; VanderWeele, 2017a). From a theoretical perspective, religious service attendance is thought to provide mental health benefits through increased social contacts, positive social relationships, and social support (Koenig et al., 2012; Schieman et al., 2013; VanderWeele, 2017b); reduced engagement in unhealthy behaviors and increased participation in healthy lifestyles (Moon et al., 2023); and greater positive emotions, cognitions, and use of religious coping (Koenig et al., 2012; Moon et al., 2023; VanderWeele, 2017b).

There is a great deal of research supporting the link between religious service attendance and better mental health and well-being. Literature reviews (e.g., Balboni et al., 2022; Koenig et al., 2012; Moon et al., 2023; Rosmarin & Koenig, 2020; VanderWeele, 2017a) and meta-analyses (e.g., Ano & Vasconcelles, 2005; Garssen et al., 2021; Hackney & Sanders, 2003; Hodapp & Zwingmann, 2019; Salsman et al., 2015; Smith et al., 2003; Yonker et al., 2012) have documented beneficial effects of religious service attendance on mental health and well-being. Although the body of this literature is extensive, most studies are cross-sectional or based on only two waves of data collection. While the limitations of cross-sectional studies for causal inference are well-known, observational studies consisting of two time points are not regarded as a truly longitudinal design (Ployhart & MacKenzie, 2015).

In the last 10 years, several longitudinal studies employed well-established estimation strategies from the causal inference literature to investigate the effect of religious service attendance on mental health and well-being. However, most of these longitudinal studies examining service attendance and mental health and well-being did not employ good control for potential confounders. For instance, several longitudinal studies (e.g., Chen et al., 2020; Pawlikowski et al., 2019) revealed positive effects of religious service attendance on mental health and well-being. However, these studies did not employ good control for potential time-varying confounders. One longitudinal study (Li et al., 2016) controlled for time-varying confounding by weighting techniques and found that a higher frequency of religious service attendance predicted a decreased risk of incident depression. Although this study is remarkable for its methodology, several issues need to be considered. First, a large set of variables as controls was

Amy Wachholtz served as action editor.

Gabriele Prati https://orcid.org/0000-0002-0749-183X

All data can be downloaded from the Midlife Development in the United States (MIDUS) Portal at https://midus.wisc.edu/data/index.php. Analysis codes are available at https://osf.io/wcs5a/?view_only=e647209c16a94add84ea4bc1490c8f6c. Publicly available data from the MIDUS study were used for this research.

Since 1995, the MIDUS study has been funded by the following: the John D. and Catherine T. MacArthur Foundation Research Network and the National Institute on Aging (P01-AG020166, U19-AG051426).

Correspondence concerning this article should be addressed to Gabriele Prati, Department of Psychology, University of Bologna, Piazza Aldo Moro, 90, 47521 Cesena FC, Italy. Email: gabriele.prati@unibo.it

used, and the rationale for including each confounding variable was not explained. While a large number of covariates can correct for confounding, this may also increase instead of reduce the omitted variable bias (Greenland, 2003; Steiner & Kim, 2016). For instance, bias amplification caused by controlling for instrumental and collider variables and cancelation of offsetting biases should also be considered in addition to confounding bias. The selection of confounders is crucial for reliable causal inference. Confounders should be selected based on theoretical and conceptual considerations, prioritizing variables that are causes of the exposure, the outcome, or both (VanderWeele, 2019). Moreover, the use of marginal structural models requires the estimation and assessment of balancing weights, verification of the positivity assumption, and correct specification of the causal model.

Recent longitudinal studies have investigated the within-person associations between religion and well-being (Joiner et al., 2022; Joshanloo, 2021, 2022, 2024). These studies are noteworthy because the separation of within-person dynamics from stable between-person differences is important for causal inference (Hamaker, 2023; Hamaker et al., 2020). The findings of these studies revealed that the within-person relationships between religion and subjective well-being were nonsignificant. These findings align with the notion that the effects of religion on well-being are complex because a great variety of religious experiences, meanings, and practices exists (Prati, 2024d). A limitation of these studies was that they did not include an assessment of mental illness. Well-being and mental illness are distinct phenomena (Westerhof & Keyes, 2010). Moreover, in some of these studies, an index of general religiosity encompassing different facets of religion was used instead of religious service attendance. A recent study investigated the within-person relationships between six separate dimensions of religion (including religious service attendance as a separate dimension) and depression (Prati, 2024a). The results revealed only a few significant lagged effects of religious service attendance on depression, and the sign of the significant relationships suggested a detrimental (rather than beneficial) effect of religious service attendance. One limitation of this study is that it was conducted in a secular country (i.e., Germany). The "religiosity as social value" hypothesis (Gebauer et al., 2012) suggests that the beneficial effects of religious service attendance might be found in countries that tend to value religiosity more. In countries with lower levels of secularization, such as the United States (Joshanloo & Gebauer, 2020), religious people might receive benefits (e.g., social support) as a consequence of religious service attendance. Finally, while examining within-person associations is informative, it is not sufficient for establishing causality. Marginal structural models offer a particularly promising approach for causal inference using longitudinal data (Rohrer & Murayama, 2023).

Purpose of the Present Study

The current research sought to examine the effects of religious service attendance on mental health using a causal inference perspective that is based on joint modeling of exposure and outcome as functions of confounders (Hernán & Robins, 2020; Loh & Ren, 2023). Mental health refers to both positive mental health and the absence of disorder (Westerhof & Keyes, 2010). Specifically, mental health was operationalized broadly, including diagnoses of three common mental disorders (i.e., major depressive episode [MDE], panic disorder [PD], and generalized anxiety disorder [GAD]; Steel et al., 2014) and psychological well-being (PWB). Age, gender, and ethnicity were included as time-invariant confounders because previous research highlighted their association with religious service attendance (e.g., Hayward & Krause, 2013; Major-Smith et al., 2023; Robinson et al., 2022). As time-varying confounders, personality factors, self-rated physical health, income, perceived economic status, personality factors, and contact with friends were chosen because of their ability to predict mental health and/or regular religious service attendance. Specifically, contact with friends and self-rated physical health are considered predictors of both mental health (e.g., Cable et al., 2016; Hays et al., 1994) and religious service attendance (e.g., Cowden et al., 2022). Moreover, there is theory and evidence supporting the effect of income and perceived economic status on mental health (e.g., Prati, 2024c; Tan et al., 2020). Finally, personality traits such as neuroticism, conscientiousness, and extraversion were linked to mental health (Kotov et al., 2017). T1 variables allow for the control of confounding of the effect of the exposure measured at T2 on the outcome at T3. These T1 controls also include baseline measurements of the exposure (i.e., religious service attendance) and the outcomes. Following the approach used by Li et al. (2016), the marginal structural models were adjusted for past religious service attendance frequency and mental health outcome. Figure 1 displays the structural relationships among the variables in this study. The directed acyclic graph is adapted from the diagram presented by VanderWeele et al. (2016).

Method

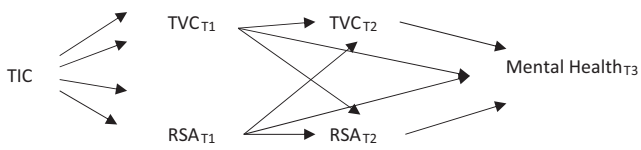
Transparency and Openness

American Psychological Association Style Journal Article Reporting Standards were followed to determine the sample size and all data exclusions and to describe all measures in the study. All data can be downloaded from the Midlife Development in the United States (MIDUS) Portal at https://midus.wisc.edu/data/index.php. Analysis codes are available (Prati, 2025a). Data were analyzed using R and the packages pwrss (Bulus, 2023), mice (van Buuren & Groothuis-Oudshoorn, 2011), MatchThem (Pishgar et al., 2021), cobalt (Greifer, 2024), and RISCA (Foucher, 2025). This study's design and its analysis were not preregistered.

Design and Sample

Participants for this study (n = 7,108) were drawn from the MIDUS study. The first three waves of the MIDUS survey were

Figure 1
The Causal Diagram for This Study



Note. T denotes the time point. TIC = time-invariant covariates (i.e., age, gender, and ethnicity) measured at baseline; TVC = time-varying covariates (i.e., personality factors, self-rated physical health, economic status, personality factors, contact with friends, and past mental health and attendance); RSA = religious service attendance.

conducted in 1995–1996 (MIDUS 1 or M1; Brim et al., 2020), 2004–2005 (MIDUS 2 or M2; Ryff et al., 2021), and 2013–2014 (MIDUS 3 or M3; Ryff et al., 2019). In MIDUS, participants were drawn from a nationally representative sample of U.S. noninstitutionalized English-speaking adults. Data were collected through computer-assisted telephone interviewing and self-administered questionnaires. In MIDUS 1, the baseline sample included 7,108 participants. In the second and third follow-up surveys, participants were 4,963 and 3,294, respectively. An overall mortality-adjusted retention rate of 75% and 77% was found for MIDUS 2 and MIDUS 3, respectively (Radler & Ryff, 2010; Ryff & Krueger, 2018). The MIDUS study was reviewed and approved by the Education and Social/Behavioral Sciences and the Health Sciences Institutional Review Board at the University of Wisconsin–Madison (2016-1051). Informed consent was obtained from all participants. Detailed information on the study methods has been published elsewhere (e.g., Radler & Ryff, 2010; Ryff et al., 2004; Ryff & Krueger, 2018). Supplemental Table S1 displays the sample characteristics. The sample size was sufficiently large for detecting a small effect size (odds ratio equal to 1.50) in binary logistic regressions. Specifically, with an odds ratio of 1.50 and an α level of .05, 473 participants would be needed to achieve a statistical power of 0.80, assuming a squared multiple correlation of 0.20 between the main predictor and other covariates and a base probability of $p_0 = .15$ (Bulus, 2023).

Instrument

Dependent Variables

Mental health was assessed by obtaining (a) diagnoses for 12-month MDE, PD, and GAD and (b) participants' scores on PWB. Mental health diagnoses were assessed with the World Health Organization Composite International Diagnostic Interview Short Form (Kessler et al., 1998). The sensitivity of the Composite International Diagnostic Interview Short Form classification for MDE, GAD, and PD is 89.6%, 96.6%, and 90.0%, with a specificity of 93.9%, 99.8%, and 99.5%, respectively (Kessler et al., 1998). The Composite International Diagnostic Interview Short Form has been used for a variety of purposes, including the assessment of the prevalence of mental disorders in the general population (Wang et al., 2000). For each mental health diagnosis (i.e., MDE, PD, and GAD), one binary score was developed for each respondent, in which 0 indicated the absence of the disorder and 1 the presence of the disorder.

PWB was assessed using the theoretical model of PWB of Ryff (1989), encompassing six dimensions (i.e., personal growth, autonomy, positive relations with others, environmental mastery, purpose in life, and self-acceptance). Specifically, an 18-item scale was used (e.g., Ryff et al., 2004, 2015), with three items associated with each dimension. Participants were asked to report the extent to which the statements described them using a 7-point scale (from 1 = *strongly agree* to 7 = *strongly disagree*). Negative items were reverse-coded so that higher scores represented higher PWB. A score of PWB was constructed by calculating the sum of each dimension.

Treatment Variable

To assess frequent religious service attendance, the following question was used: "How often, if at all, do you attend religious services or meetings?" Participants responded using the following options: once a week or more; less often but at least once a month; less often but at least once a year; never or practically never; only at weddings, funerals, etc. According to Cowden et al. (2022), the binary measure of religious service attendance (<1×/week or ≥1×/week) has been associated with better health and well-being. Therefore, frequent religious service attendance was modeled as a binary variable (0 = less than once a week; 1 = once a week or more).

Covariates

Neuroticism, conscientiousness, extraversion (personality factors), self-rated physical health, perceived economic status, and contact with friends were included as time-varying covariates. Neuroticism, conscientiousness, and extraversion were assessed via the Midlife Development Inventory Personality Scale (Lachman & Weaver, 1997), which is an adjectival measure of the Big Five employed in both MIDUS 1 and 2. Participants were asked how much each of 25 adjectives (for all five factors) described themselves on a scale ranging from 1 (*not at all*) to 4 (*a lot*). Sample adjectives were moody, worrying, nervous, and calm (neuroticism); organized, responsible, hardworking, and careless (conscientiousness); and outgoing, friendly, lively, active, and talkative (extraversion). The Midlife Development Inventory Scale used in MIDUS 1 and 2 exhibited good validity and adequate reliability (e.g., Turiano et al., 2012). After reverse coding, personality trait scales were constructed by calculating the mean across each set of items, with greater scores indicating higher standings in each dimension. Self-rated physical health was assessed using one question ("In general, would you say your physical health is excellent, very good, good, fair, or poor?"). A higher score indicates better physical health. To measure perceived economic status, participants were asked to respond to the following question: "Using a scale from 0 to 10 where 0 means 'the worst possible financial situation' and 10 means 'the best possible financial situation,' how would you rate your financial situation these days?" Contact with friends was assessed using the following question: "How often are you in contact with any of your friends—including visits, phone calls, letters, or electronic mail messages?" Participants responded to this question using an 8-point scale ranging from 1 (*several times a day*) to 8 (*never or hardly ever*). Time-invariant covariates included age, gender (1 = man; 2 = woman), household income, and ethnicity (1 = White; 2 = minority ethnic groups).

Statistical Analysis

Marginal structural models were estimated. Propensity scores for marginal structural models were estimated using a binomial regression model (i.e., propensity score weighting using generalized linear models). Covariate balance was assessed using the R package cobalt (Greifer, 2024), while potential positivity violation was evaluated using a regression tree–based algorithm (Positivity Regression Trees; Danelian et al., 2023). To handle missing data, multiple imputation was employed using the R package mice (van Buuren & Groothuis-Oudshoorn, 2011). Marginal structural models on multiply imputed data sets were implemented using the R package MatchThem (Pishgar et al., 2021). Specifically, the following steps were performed: (a)

creation of the multiply imputed data sets ($N = 10$) stratified by exposure group (Zhang et al., 2023), (b) weighting on the imputed data sets, (c) extraction of the multiply imputed weighted data sets, (d) analysis of the model using each imputed data set, and (e) estimation of a single coefficient and standard errors after pooling the coefficients and standard errors estimated across the imputed data sets. To compute the variance of the estimated parameters, the asymptotically correct M-estimation-based method was used. The outcome model was adjusted for time-invariant and time-varying covariates. The inclusion of covariates in the outcome model not only improves precision and reduces any slight remaining imbalance but also conceptually aligns with the use of doubly robust estimators (Greifer & Stuart, 2021). In line with the approach of Li et al. (2016), analyses were adjusted for past religious service attendance and mental health.

Results

Balance and Positivity

Table 1 displays the balance table with absolute standardized mean difference, variance ratios, and Kolmogorov–Smirnov statistics. Data revealed that a satisfactory balance has been achieved. For instance, the absolute standardized mean differences were below the threshold of .25 proposed by Stuart et al. (2013). In addition, no potential positivity violation was identified using a regression tree–based algorithm (Danelian et al., 2023).

Main Results

Table 2 displays the results of marginal structural models examining the relationship between frequent religious service attendance (once a week or more) and MDE, GAD, PD, and PWB. Frequent religious service attendance was not significantly associated with a subsequent diagnosis of MDE. Similarly, frequent religious service attendance did not predict a subsequent diagnosis of GAD and PD. Finally, the relationship between frequent religious service attendance and subsequent PWB was statistically nonsignificant.

Robustness Analysis

To examine the robustness of the main findings, we repeated the analysis using information on religious service attendance in its original form. The covariate balancing generalized propensity score was used as the approach for calculating inverse probability weights for quasicontinuous ordinal exposures (Sack et al., 2023). Table 3 displays the findings. The main results remained robust even when using the original ordinal measure of religious service attendance.

Discussion

Religious service attendance has been viewed as a protective factor against mental disorders (e.g., Koenig et al., 2012; Moon et al., 2023; Rosmarin & Koenig, 2020; Schieman et al., 2013; VanderWeele, 2017a). However, the majority of the studies investigating the protective role of religious service attendance on mental health have had serious methodological limitations. The present study is an advancement over previous research because this work (a) justified the selection of each potential confounder based on background knowledge, (b) estimated and assessed balancing weights before fitting marginal structural models, (c) tested the positivity assumption, and (d) used appropriate methods to deal with missing data (i.e., multiple imputation). Moreover, to date, this is the second study to use marginal structural models to investigate the prospective relationship between religious service attendance and mental disorders.

The findings of the present study do not support the theory that religious service attendance is a protective factor against mental disorders. Specifically, religious service attendance did not predict later occurrences of MDE, GAD, PD, or changes in PWB. The role of both time-invariant and time-varying confounders was taken into account in the analyses. These time-invariant and time-varying variables may influence the frequency of religious service attendance and are likely associated with mental health due to shared underlying causes. The results of this study are in line with the findings of recent studies employing a different approach (i.e., the analysis of within-person relationships) to causal inference in longitudinal research. There is evidence that the within-person associations between religion variables and well-being are nonsignificant (Joiner et al., 2022; Joshanloo, 2021, 2022, 2024; Prati, 2024a, 2025b). That is, increases

Table 1
Balance Measures

	MDE		GAD		PD		PWB	
Covariate	ASMD/RDP	KS	ASMD/RDP	KS	ASMD/RDP	KS	ASMD/RDP	KS
RSA	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01
Physical health	0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.01
Contact with friends	0.01	0.02	0.02	0.02	0.01	0.02	0.01	0.02
Financial situation	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Mental health	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.03
Gender	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Age	0.02	0.05	0.02	0.05	0.02	0.05	0.02	0.05
Ethnicity (White)	0.01	0.01	0.01	0.01	0.00	0.00	0.01	0.01
Income	0.01	0.03	0.02	0.03	0.02	0.02	0.02	0.03
Extraversion	0.02	0.02	0.02	0.02	0.02	0.02	0.03	0.02
Neuroticism	0.01	0.03	0.02	0.02	0.02	0.02	0.02	0.02
Conscientiousness	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.01

Note. MDE = major depressive episode; GAD = generalized anxiety disorder; PD = panic disorder; PWB = psychological well-being; ASMD = absolute standardized mean difference; RDP = raw differences in proportions; KS = Kolmogorov–Smirnov statistics; RSA = religious service attendance.

Table 2

Results From Marginal Structural Models Examining the Relationship Between Frequent Religious Service Attendance (Once a Week or More) and MDE, GAD, PD, and PWB

Outcome and predictor	Estimate	*SE*	*z*	*p*	95% CI
MDE T3					
RSA T2	−0.09	0.16	−0.54	.595	[−0.43, 0.25]
GAD T3					
RSA T2	−0.63	0.41	−1.51	.150	[−1.51, 0.25]
PD T3					
RSA T2	−0.08	0.21	−0.37	.712	[−0.50, 0.35]
PWB T3					
RSA T2	−0.62	0.50	−1.25	.227	[−1.67, 0.42]

Note. T denotes the time point. MDE = major depressive episode; GAD = generalized anxiety disorder; PD = panic disorder; PWB = psychological well-being; *SE* = standard error; CI = confidence interval; RSA = religious service attendance.

in religious variables relative to an individual's typical levels were not followed by improvements in well-being. The findings of the present study regarding well-being corroborate the results of these studies. Two recent studies demonstrated that the within-person relationships between religious service attendance and depression do not support the theory that religious service attendance is a protective factor against mental disorders (Prati, 2024a, 2025c). However, these studies used an analytic approach that is valuable but not sufficient for causal inference (Rohrer & Murayama, 2023). Moreover, given that these studies were conducted in secular countries (i.e., Germany and the United Kingdom), their findings cannot be generalized to countries that tend to value religiosity more based on the "religiosity as social value" hypothesis (Gebauer et al., 2012). The present study was conducted in the United States, a country characterized by a lesser degree of secularization (Joshanloo & Gebauer, 2020). The findings of the current research using the approach of marginal structural models corroborate the results of these previous studies (Prati, 2024a, 2025b).

Implications for Theory

Abundant theoretical work indicates that religious service attendance is a powerful determinant of mental health (e.g., Koenig et al., 2012; Moon et al., 2023; Rosmarin & Koenig, 2020; Schieman et al., 2013; VanderWeele, 2017a). The findings of the present study, in conjunction with previous research (Joiner et al., 2022; Joshanloo, 2021, 2022, 2024; Prati, 2024a, 2024d, 2025b), question the widespread assumption of a universal protective effect of religious service attendance on mental disorders and well-being. It is important to consider the complexity and diversity of individuals' religious experiences, practices, and meanings and how this heterogeneity can lead to a range of outcomes (Prati, 2024d). These findings have theoretical implications, highlighting the need to revise current models to clarify the conditions under which religious service attendance may or may not result in positive and negative effects on mental health.

Table 3

Results From Marginal Structural Models Examining the Relationship Between Religious Service Attendance (as a Quasicontinuous Ordinal Exposure) and MDE, GAD, PD, and PWB

Outcome and predictor	Estimate	*SE*	*z*	*p*	95% CI
MDE T3					
RSA T2	−0.01	0.11	−0.07	.941	[−0.22, 0.20]
GAD T3					
RSA T2	0.13	0.23	0.59	.555	[−0.32, 0.58]
PD T3					
RSA T2	0.08	0.13	0.62	.539	[−0.18, 0.34]
PWB T3					
RSA T2	0.26	0.49	0.53	.595	[−0.71, 1.23]

Note. T denotes the time point. MDE = major depressive episode; GAD = generalized anxiety disorder; PD = panic disorder; PWB = psychological well-being; *SE* = standard error; CI = confidence interval; RSA = religious service attendance.

Implications for Practice

The results of the present study should not be interpreted to mean that health professionals should neglect the role of religious faith, beliefs, and practices when working with clients, patients, and families. Yet at the same time, the idea that, among religious patients, health professionals should encourage religious service attendance among religious patients (Li et al., 2016) or raise the topic of spiritual community engagement (Balboni et al., 2022) to promote mental health may oversimplify the complex relationship between religion and mental well-being. Health professionals should recognize that religious service attendance is not necessarily a meaningful form of social participation (e.g., Ellison et al., 2009; Krause et al., 1998; Nooney & Woodrum, 2002) and that not every form of social participation has a beneficial effect on mental health (Prati, 2024b). Health professionals are expected to evaluate the existing evidence critically before offering specific advice.

Limitations

This study has several limitations that should be considered when interpreting its findings. First, the estimation of causal effects from observational data poses unique challenges and rests on four crucial assumptions: positivity, consistency, exchangeability, and noninterference. While positivity was tested, other assumptions can be challenging to justify defensively or are empirically untestable. Another limitation involves measurement error and response biases, such as social desirability and recall bias. Methodological artifacts can introduce biases, either by attenuating true effects or by implying effects where none exist. While there is a debate in the literature as to whether religious service attendance is overreported in surveys (e.g., Hadaway et al., 1993; Hout & Greeley, 1998; Woodberry, 1998), Li et al. (2016) argued that the relative ordering of frequency might still be preserved with overreporting. A third limitation concerns potential model misspecification. A fourth is that the findings of the present study cannot rule out the hypothesis that different results would have been obtained using a more fine-grained temporal resolution. However, previous research employing a shorter time lag confirmed the results of the present study (Prati, 2024a, 2025b). In addition, a shorter timeframe would suggest that the effect of religious service attendance is transient. Another limitation concerns the multidimensional nature of the construct of mental health. In the present study, the focus was on MDE, PD, GAD, and PWB. However, mental health encompasses dimensions that were not captured in the present study. Moreover,

given the importance of insomnia for mental health (Nguyen et al., 2022), future studies may also focus on sleep quality as a possible outcome of religious service attendance. Last, caution is needed when generalizing these results to cultural or demographic groups. Although these findings are in line with those obtained in other countries such as Germany and the United Kingdom (Prati, 2024a, 2025b), a generalization to other cultural or demographic groups requires additional research.

Conclusion

In conclusion, the results raise the question of whether the relationship between religious service attendance and mental health is spurious rather than causal, as previously hypothesized. Although the findings do not rule out a causal role of religious service attendance in specific groups of people and contexts, they raise substantive questions about the validity of models that assume a universal causal effect of religious service attendance. The present study demonstrated that frequent religious service attendance per se, without taking other factors and conditions into account, is not a protective factor for common mental disorders and well-being.

References

Ano, G. G., & Vasconcelles, E. B. (2005). Religious coping and psychological adjustment to stress: A meta-analysis. *Journal of Clinical Psychology*, *61*(4), 461–480. https://doi.org/10.1002/jclp.20049

Balboni, T. A., VanderWeele, T. J., Doan-Soares, S. D., Long, K. N. G., Ferrell, B. R., Fitchett, G., Koenig, H. G., Bain, P. A., Puchalski, C., Steinhauser, K. E., Sulmasy, D. P., & Koh, H. K. (2022). Spirituality in serious illness and health. *Journal of the American Medical Association*, *328*(2), 184–197. https://doi.org/10.1001/jama.2022.11086

Brim, O. G., Baltes, P. B., Bumpass, L. L., Cleary, P. D., Featherman, D. L., Hazzard, W. R., Kessler, R. C., Lachman, M. E., Markus, H. R., Marmot, M. G., Rossi, A. S., Ryff, C. D., & Shweder, R. A. (2020). *Midlife in the United States (MIDUS 1), 1995–1996* [Data set]. Inter-university Consortium for Political and Social Research. https://doi.org/10.3886/ICPSR02760.v19

Bulus, M. (2023). *pwrss: Statistical power and sample size calculation tools* (Version 0.3.1) [Computer software]. https://doi.org/10.32614/CRAN.package.pwrss

Cable, N., Chandola, T., Lallukka, T., Sekine, M., Lahelma, E., Tatsuse, T., & Marmot, M. G. (2016). Country specific associations between social contact and mental health: Evidence from civil servant studies across Great Britain, Japan and Finland. *Public Health*, *137*, 139–146. https://doi.org/10.1016/j.puhe.2015.10.013

Chen, Y., Kim, E. S., & VanderWeele, T. J. (2020). Religious-service attendance and subsequent health and well-being throughout adulthood: Evidence from three prospective cohorts. *International Journal of Epidemiology*, *49*(6), 2030–2040. https://doi.org/10.1093/ije/dyaa120

Cowden, R. G., Nakamura, J. S., Chen, Z. J., Case, B., Kim, E. S., & VanderWeele, T. J. (2022). Identifying pathways to religious service attendance among older adults: A lagged exposure-wide analysis. *PLOS ONE*, *17*(11), Article e0278178. https://doi.org/10.1371/journal.pone.0278178

Danelian, G., Foucher, Y., Léger, M., Le Borgne, F., & Chatton, A. (2023). Identification of in-sample positivity violations using regression trees: The PoRT algorithm. *Journal of Causal Inference*, *11*(1), Article 20220032. https://doi.org/10.1515/jci-2022-0032

Ellison, C. G., Zhang, W., Krause, N., & Marcum, J. P. (2009). Does negative interaction in the church increase psychological distress? Longitudinal findings from the Presbyterian Panel Survey. *Sociology of Religion*, *70*(4), 409–431. https://doi.org/10.1093/socrel/srp062

Foucher, Y. (2025). *RISCA: Causal inference and prediction in cohort-based analyses* (R package Version 1.0.7). https://doi.org/10.32614/CRAN.package.RISCA

Garssen, B., Visser, A., & Pool, G. (2021). Does spirituality or religion positively affect mental health? Meta-analysis of longitudinal studies. *International Journal for the Psychology of Religion*, *31*(1), 4–20. https://doi.org/10.1080/10508619.2020.1729570

Gebauer, J. E., Sedikides, C., & Neberich, W. (2012). Religiosity, social self-esteem, and psychological adjustment: On the cross-cultural specificity of the psychological benefits of religiosity. *Psychological Science*, *23*(2), 158–160. https://doi.org/10.1177/0956797611427045

Greenland, S. (2003). Quantifying biases in causal models: Classical confounding vs collider-stratification bias. *Epidemiology*, *14*(3), 300–306. https://doi.org/10.1097/01.EDE.0000042804.12056.6C

Greifer, N. (2024). *cobalt: Covariate balance tables and plots* (Version 4.5.5.9000) [Computer software]. https://doi.org/10.32614/CRAN.package.cobalt

Greifer, N., & Stuart, E. A. (2021). Matching methods for confounder adjustment: An addition to the epidemiologist's toolbox. *Epidemiologic Reviews*, *43*(1), 118–129. https://doi.org/10.1093/epirev/mxab003

Hackney, C. H., & Sanders, G. S. (2003). Religiosity and mental health: A meta–analysis of recent studies. *Journal for the Scientific Study of Religion*, *42*(1), 43–55. https://doi.org/10.1111/1468-5906.t01-1-00160

Hadaway, C. K., Marler, P. L., & Chaves, M. (1993). What the polls don't show: A closer look at U.S. church attendance. *American Sociological Review*, *58*(6), 741–752. https://doi.org/10.2307/2095948

Hamaker, E. L. (2023). The within-between dispute in cross-lagged panel research and how to move forward. *Psychological Methods*. Advance online publication. https://doi.org/10.1037/met0000600

Hamaker, E. L., Mulder, J. D., & van IJzendoorn, M. H. (2020). Description, prediction and causation: Methodological challenges of studying child and adolescent development. *Developmental Cognitive Neuroscience*, *46*, Article 100867. https://doi.org/10.1016/j.dcn.2020.100867

Hays, R. D., Marshall, G. N., Wang, E. Y. I., & Sherbourne, C. D. (1994). Four-year cross-lagged associations between physical and mental health in the Medical Outcomes Study. *Journal of Consulting and Clinical Psychology*, *62*(3), 441–449. https://doi.org/10.1037/0022-006X.62.3.441

Hayward, R. D., & Krause, N. (2013). Patterns of change in religious service attendance across the life course: Evidence from a 34-year longitudinal study. *Social Science Research*, *42*(6), 1480–1489. https://doi.org/10.1016/j.ssresearch.2013.06.010

Hernán, M. A., & Robins, J. M. (2020). *Causal inference: What if*. Chapman & Hall/CRC.

Hodapp, B., & Zwingmann, C. (2019). Religiosity/spirituality and mental health: A meta-analysis of studies from the German-speaking area. *Journal of Religion and Health*, *58*(6), 1970–1998. https://doi.org/10.1007/s10943-019-00759-0

Hood, R. W., Hill, P. C., & Spilka, B. (2018). *The psychology of religion: An empirical approach* (5th ed.). Guilford Press.

Hout, M., & Greeley, A. (1998). What church officials' reports don't show: Another look at church attendance data. *American Sociological Review*, *63*(1), 113–119. https://doi.org/10.2307/2657482

Joiner, R. J., Martinez, B. S., Nelson, N. A., & Bergeman, C. S. (2022). Within-person changes in religiosity, control beliefs, and subjective well-being across middle and late adulthood. *Psychology and Aging*, *37*(7), 848–862. https://doi.org/10.1037/pag0000713

Joshanloo, M. (2021). Within-person relationship between religiosity and life satisfaction: A 20-year study. *Personality and Individual Differences*, *179*, Article 110933. https://doi.org/10.1016/j.paid.2021.110933

Joshanloo, M. (2022). Temporal associations between religiosity and subjective well-being in a nationally representative Australian sample. *The International Journal for the Psychology of Religion*, *33*(2), 107–114. https://doi.org/10.1080/10508619.2022.2108257

Joshanloo, M. (2024). No evidence of longitudinal association between religiosity and psychological well-being: Challenging prevailing assumptions. *Journal of Pacific Rim Psychology*, *18*, 1–7. https://doi.org/10.1177/18344909241262209

Joshanloo, M., & Gebauer, J. E. (2020). Religiosity's nomological network and temporal change: Introducing an extensive country-level religiosity index based on Gallup World Poll data. *European Psychologist*, *25*(1), 26–40. https://doi.org/10.1027/1016-9040/a000382

Kessler, R. C., Andrews, G., Mroczek, D., Ustun, B., & Wittchen, H.-U. (1998). The World Health Organization Composite International Diagnostic Interview short-form (CIDI-SF). *International Journal of Methods in Psychiatric Research*, *7*(4), 171–185. https://doi.org/10.1002/mpr.47

Koenig, H. G. (1997). *Is religion good for your health? The effects of religion on physical and mental health*. Routledge.

Koenig, H. G., King, D. E., & Carson, V. B. (2012). *Handbook of religion and health* (2nd ed.). Oxford University Press.

Kotov, R., Krueger, R. F., Watson, D., Achenbach, T. M., Althoff, R. R., Bagby, R. M., Brown, T. A., Carpenter, W. T., Caspi, A., Clark, L. A., Eaton, N. R., Forbes, M. K., Forbush, K. T., Goldberg, D., Hasin, D., Hyman, S. E., Ivanova, M. Y., Lynam, D. R., Markon, K., … Zimmerman, M. (2017). The Hierarchical Taxonomy of Psychopathology (HiTOP): A dimensional alternative to traditional nosologies. *Journal of Abnormal Psychology*, *126*(4), 454–477. https://doi.org/10.1037/abn0000258

Krause, N., Ellison, C. G., & Wulff, K. M. (1998). Church-based support, negative interaction and psychological well-being: Findings from a national sample of Presbyterians. *Journal for the Scientific Study of Religion*, *37*(4), 725–741. https://doi.org/10.2307/1388153

Lachman, M. E., & Weaver, S. L. (1997). *The Midlife Development Inventory (MIDI) personality scales: Scale construction and scoring*. Brandeis University.

Li, S., Okereke, O. I., Chang, S.-C., Kawachi, I., & van IJzendoorn, T. J. (2016). Religious service attendance and lower depression among women—A prospective cohort study. *Annals of Behavioral Medicine*, *50*(6), 876–884. https://doi.org/10.1007/s12160-016-9813-9

Loh, W. W., & Ren, D. (2023). A tutorial on causal inference in longitudinal data with time-varying confounding using G-estimation. *Advances in Methods and Practices in Psychological Science*, *6*(3), 1–11. https://doi.org/10.1177/25152459231174029

Major-Smith, D., Morgan, J., Halstead, I., Tohidinik, H., Iles-Caven, Y., Golding, J., & Northstone, K. (2023). Demographic and socioeconomic predictors of religious/spiritual beliefs and behaviours in a prospective cohort study (ALSPAC) in Southwest England: Results from the parental generation [version 3; peer review: 3 approved]. *Wellcome Open Research*, *7*, Article 159. https://doi.org/10.12688/wellcomeopenres.17897.2

Moon, J. W., Cohen, A. B., Laurin, K., & MacKinnon, D. P. (2023). Is religion special? *Perspectives on Psychological Science*, *18*(2), 340–357. https://doi.org/10.1177/17456916221100485

Nguyen, V. V., Zainal, N. H., & Newman, M. G. (2022). Why sleep is key: Poor sleep quality is a mechanism for the bidirectional relationship between major depressive disorder and generalized anxiety disorder across 18 years. *Journal of Anxiety Disorders*, *90*, Article 102601. https://doi.org/10.1016/j.janxdis.2022.102601

Nooney, J., & Woodrum, E. (2002). Religious coping and church-based social support as predictors of mental health outcomes: Testing a conceptual model. *Journal for the Scientific Study of Religion*, *41*(2), 359–368. https://doi.org/10.1111/1468-5906.00122

Oman, D., & Syme, S. L. (2018). Weighing the evidence: What is revealed by 100+ meta-analyses and systematic reviews of religion/spirituality and health? In D. Oman (Ed.), *Why religion and spirituality matter for public health: Evidence, implications, and resources* (pp. 261–281). Springer International Publishing. https://doi.org/10.1007/978-3-319-73966-3_15

Pargament, K., Maton, K., & Hess, R. (Eds.). (1992). *Religion and prevention in mental health. research, vision, and action*. Haworth.

Pawlikowski, J., Białowolski, P., Węziak-Białowolska, D., & van IJzendoorn, T. J. (2019). Religious service attendance, health behaviors and well-being-an outcome-wide longitudinal analysis. *European Journal of Public Health*, *29*(6), 1177–1183. https://doi.org/10.1093/eurpub/ckz075

Pishgar, F., Greifer, N., Leyrat, C., & Stuart, E. (2021). MatchThem: Matching and weighting after multiple imputation. *The R Journal*, *13*(2), 292–305. https://doi.org/10.32614/RJ-2021-073

Ployhart, R. E., & MacKenzie, W. I. J. (2015). Two waves of measurement do not a longitudinal study make. In C. E. Lance & R. J. Vandenberg (Eds.), *More statistical and methodological myths and urban legends* (pp. 85–99). Routledge/Taylor & Francis Group. https://doi.org/10.1177/1094428110391814

Prati, G. (2024a). Is religion beneficial for mental health? A 9-year longitudinal study. *International Journal of Clinical and Health Psychology*, *24*(3), Article 100491. https://doi.org/10.1016/j.ijchp.2024.100491

Prati, G. (2024b). The reciprocal relationship between political participation and mental health in Germany: A random-intercept cross-lagged panel analysis. *Social Science Quarterly*, *105*, 1751–1762. https://doi.org/10.1111/ssqu.13440

Prati, G. (2024c). The reciprocal relationships between economic status and mental health: Investigating the between-person and within-person effects in a three-wave longitudinal study. *Journal of Affective Disorders*, *366*, 16–24. https://doi.org/10.1016/j.jad.2024.08.169

Prati, G. (2024d). Religion and well-being: What is the magnitude and the practical significance of the relationship? *Psychology of Religion and Spirituality*, *16*(4), 367–377. https://doi.org/10.1037/rel0000515

Prati, G. (2025a, June 27). *Attendance and mental disorder*. https://osf.io/wcs5a/

Prati, G. (2025b). Does religious-service attendance increase mental health? A random-intercept cross-lagged panel analysis across 18 years. *Psychological Science*, *36*(3), 157–167. https://doi.org/10.1177/09567976251325449

Prati, G. (2025c). Within-person, longitudinal associations between neighborhood cohesion and adult mental health: A test of bidirectional relations. *The International Journal of Social Psychiatry*, *71*(3), 575–584. https://doi.org/10.1177/00207640241298897

Radler, B. T., & Ryff, C. D. (2010). Who participates? Accounting for longitudinal retention in the MIDUS national study of health and well-being. *Journal of Aging and Health*, *22*(3), 307–331. https://doi.org/10.1177/0898264309358617

Robinson, E., Sutin, A. R., Daly, M., & Jones, A. (2022). A systematic review and meta-analysis of longitudinal cohort studies comparing mental health before versus during the COVID-19 pandemic in 2020. *Journal of Affective Disorders*, *296*, 567–576. https://doi.org/10.1016/j.jad.2021.09.098

Rohrer, J. M., & Murayama, K. (2023). These are not the effects you are looking for: Causality and the within-/between-persons distinction in longitudinal data analysis. *Advances in Methods and Practices in Psychological Science*, *6*(1), 1–14. https://doi.org/10.1177/25152459221140842

Rosmarin, D. H., & Koenig, H. G. (2020). *Handbook of spirituality, religion, and mental health* (2nd ed.). Academic Press.

Ryff, C. D., Almeida, D., Ayanian, J., Binkley, N., Carr, D. S., Coe, C., Davidson, R., Grzywacz, J., Karlamangla, A., Krueger, R., Lachman, M., Love, G., Mailick, M., Mroczek, D., Radler, B., Seeman, T., Sloan, R., Thomas, D., Weinstein, M., … Williams, D. (2019). *Midlife in the United States (MIDUS 3), 2013–2014* [Data set]. Inter-university Consortium for Political and Social Research. https://doi.org/10.3886/ICPSR36346.v7

Ryff, C. D. (1989). Happiness is everything, or is it? Explorations on the meaning of psychological well-being. *Journal of Personality and Social Psychology*, *57*(6), 1069–1081. https://doi.org/10.1037/0022-3514.57.6.1069

Ryff, C. D., Almeida, D. M., Ayanian, J. Z., Carr, D. S., Cleary, P. D., Coe, C., Davidson, R. J., Krueger, R. F., Lachman, M. E., Marks, N. F., Mroczek, D. K., Seeman, T. E., Seltzer, M. M., Singer, B. H., Sloan, R. P., Tun, P. A., Weinstein, M., & Williams, D. R. (2021). *Midlife in the United States (MIDUS 2), 2004–2006* [Data set]. Inter-university Consortium for Political and Social Research. https://doi.org/10.3886/ICPSR04652.v8

Ryff, C. D., Keyes, C. L. M., & Hughes, D. L. (2004). Psychological well-being in MIDUS: Profiles of ethnic/racial diversity and life-course uniformity. In O. G. Brim, C. D. Ryff, & R. C. Kessler (Eds.), *How healthy are we? A national study of well-being at midlife* (pp. 398–422). University of Chicago Press.

Ryff, C. D., & Krueger, R. F. (2018). Approaching human health as an integrative challenge: Introduction and overview. In C. D. Ryff & R. F. Krueger (Eds.), *The Oxford handbook of integrative health science* (pp. 3–22). Oxford University Press. https://doi.org/10.1093/oxfordhb/9780190676384.013.1

Ryff, C. D., Radler, B. T., & Friedman, E. M. (2015). Persistent psychological well-being predicts improved self-rated health over 9–10 years: Longitudinal evidence from MIDUS. *Health Psychology Open*, *2*(2), 1–11. https://doi.org/10.1177/2055102915601582

Sack, D. E., Shepherd, B. E., Audet, C. M., De Schacht, C., & Samuels, L. R. (2023). Inverse probability weights for quasicontinuous ordinal exposures with a binary outcome: Method comparison and case study. *American Journal of Epidemiology*, *192*(7), 1192–1206. https://doi.org/10.1093/aje/kwad085

Salsman, J. M., Pustejovsky, J. E., Jim, H. S. L., Munoz, A. R., Merluzzi, T. V., George, L., Park, C. L., Danhauer, S. C., Sherman, A. C., Snyder, M. A., & Fitchett, G. (2015). A meta-analytic approach to examining the correlation between religion/spirituality and mental health in cancer. *Cancer*, *121*(21), 3769–3778. https://doi.org/10.1002/cncr.29350

Schieman, S., Bierman, A., & Ellison, C. G. (2013). Religion and mental health. In C. S. Aneshensel, J. C. Phelan, & A. Bierman (Eds.), *Handbook of the sociology of mental health* (pp. 457–478). Springer. https://doi.org/10.1007/978-94-007-4276-5_22

Smith, T. B., McCullough, M. E., & Poll, J. (2003). Religiousness and depression: Evidence for a main effect and the moderating influence of stressful life events. *Psychological Bulletin*, *129*(4), 614–636. https://doi.org/10.1037/0033-2909.129.4.614

Steel, Z., Marnane, C., Iranpour, C., Chey, T., Jackson, J. W., Patel, V., & Silove, D. (2014). The global prevalence of common mental disorders: A systematic review and meta-analysis 1980–2013. *International Journal of Epidemiology*, *43*(2), 476–493. https://doi.org/10.1093/ije/dyu038

Steiner, P. M., & Kim, Y. (2016). The mechanics of omitted variable bias: Bias amplification and cancellation of offsetting biases. *Journal of Causal Inference*, *4*(2), Article 20160009. https://doi.org/10.1515/jci-2016-0009

Stuart, E. A., Lee, B. K., & Leacy, F. P. (2013). Prognostic score-based balance measures can be a useful diagnostic for propensity score methods in comparative effectiveness research. *Journal of Clinical Epidemiology*, *66*(8), S84–S90.e81. https://doi.org/10.1016/j.jclinepi.2013.01.013

Tan, J. J. X., Kraus, M. W., Carpenter, N. C., & Adler, N. E. (2020). The association between objective and subjective socioeconomic status and subjective well-being: A meta-analytic review. *Psychological Bulletin*, *146*(11), 970–1020. https://doi.org/10.1037/bul0000258

Turiano, N. A., Pitzer, L., Armour, C., Karlamangla, A., Ryff, C. D., & Mroczek, D. K. (2012). Personality trait level and change as predictors of health outcomes: Findings from a national study of Americans (MIDUS). *The Journals of Gerontology Series B: Psychological Sciences and Social Sciences*, *67*(1), 4–12. https://doi.org/10.1093/geronb/gbr072

van Buuren, S., & Groothuis-Oudshoorn, K. (2011). mice: Multivariate Imputation by Chained Equations in R. *Journal of Statistical Software*, *45*(3), 1–67. https://doi.org/10.18637/jss.v045.i03

VanderWeele, T. J. (2017a). Religion and health: A synthesis. In M. J. Balboni & J. R. Peteet (Eds.), *Spirituality and religion within the culture of medicine: From evidence to practice* (Vol. 419, pp. 357–401). Oxford University Press.

VanderWeele, T. J. (2017b). Religious communities and human flourishing. *Current Directions in Psychological Science*, *26*(5), 476–481. https://doi.org/10.1177/0963721417721526

VanderWeele, T. J. (2019). Principles of confounder selection. *European Journal of Epidemiology*, *34*(3), 211–219. https://doi.org/10.1007/s10654-019-00494-6

VanderWeele, T. J., Jackson, J. W., & Li, S. (2016). Causal inference and longitudinal data: A case study of religion and mental health. *Social Psychiatry and Psychiatric Epidemiology*, *51*(11), 1457–1466. https://doi.org/10.1007/s00127-016-1281-9

Wang, P. S., Berglund, P., & Kessler, R. C. (2000). Recent care of common mental disorders in the United States: Prevalence and conformance with evidence-based recommendations. *Journal of General Internal Medicine*, *15*(5), 284–292. https://doi.org/10.1046/j.1525-1497.2000.9908044.x

Westerhof, G. J., & Keyes, C. L. M. (2010). Mental illness and mental health: The two continua model across the lifespan. *Journal of Adult Development*, *17*(2), 110–119. https://doi.org/10.1007/s10804-009-9082-y

Woodberry, R. D. (1998). When surveys lie and people tell the truth: How surveys oversample church attenders. *American Sociological Review*, *63*(1), 119–122. https://doi.org/10.2307/2657483

Yonker, J. E., Schnabelrauch, C. A., & Dehaan, L. G. (2012). The relationship between spirituality and religiosity on psychological outcomes in adolescents and emerging adults: A meta-analytic review. *Journal of Adolescence*, *35*(2), 299–314. https://doi.org/10.1016/j.adolescence.2011.08.010

Zhang, J., Dashti, S. G., Carlin, J. B., Lee, K. J., & Moreno-Betancur, M. (2023). Should multiple imputation be stratified by exposure group when estimating causal effects via outcome regression in observational studies? *BMC Medical Research Methodology*, *23*(1), Article 42. https://doi.org/10.1186/s12874-023-01843-6

Received September 12, 2024
Revision received May 9, 2025
Accepted June 26, 2025 ■