Religion and Mental Health: Is the Relationship Causal?

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Plan of Presentation

(1) Study Designs and Methodological Challenges
(2) Religion and Depression
(3) Religion and Suicide
(4) Religion and Anxiety
(5) Implications for Public Health
(6) Implications for Clinical Practice

Analysis from: Nurses' Health Study

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Religion and Depression

Freud: Religion works “by distorting the picture of the real world in delusional manner. . . by forcibly fixing [adherents] in a state of psychical infantilism and by drawing them into a mass delusion” (Freud, 1930, pp. 31-32, Civilization and Its Discontents)

Review of Sanua (1969 AJP): “The contention that religion as an institution has been instrumental in fostering general well-being… is not supported by empirical data… there are no scientific studies which show that religion is capable of serving mental health

The evidence on the connection between religion and mental health looks rather different today…

Religion and Depression

Religious participation has been associated with lower depression rates in numerous studies

Koenig et al. (2012) report that:

Of 272 cross-sectional studies published since 2000, 63% suggested a protective association; only 6% detrimental

Of 45 cohort studies since 2000, 47% suggested a protective association; only 11% detrimental

Perhaps some evidence from observational studies

But the vast majority (86%) are cross-sectional

This is problematic…

Religion and Depression

Maselko et al. (2012) examine, using longitudinal data, evidence for an effect in the reverse direction

They show that, among women, depression at age 18 predicts lower service attendance subsequently, controlling for baseline service attendance

There is evidence for reverse causation

This result essentially renders cross-sectional data useless for assessing causality

Even if there were no effect of service attendance on depression, one would find a “protective association” simply because those who became depressed stopped attending

Religion and Depression

However, even well-designed large longitudinal studies with baseline control for depression (Strawbridge et al., 2001; Van Vorhees et al. 2008; Norton et al., 2008; Balbuena et al., 2013; Li et al., 2016a) suggest an effect:

e.g. In Strawbridge et al. (2001), using a longitudinal study of 2,767 participants, service attendance at least once per week increased odds of depression recovery by 2.3 (95% CI: 1.23, 4.35)

But the analyses of Maselko et al. (2012):

(1) Make clear that cross-sectional data should not be used for analyses

(2) Suggest that there may in fact be effects in both directions

Study Design

Different study designs allow for different levels of robustness to confounding; we can establish a certain hierarchy:

- VanderWeele, T.J. (2021). Can sophisticated study designs with regression analyses of observational data provide causal inferences? *JAMA Psychiatry*, 78(3):244-246.

Cross-sectional studies

Cohort / follow-up with adjustment for demographic covariates

Cohort / follow-up with adjustment for baseline outcome

Studies looking at change in exposure (religiousness/spirituality) i.e. which also allow for adjust for baseline R/S

Longitudinal studies allowing for time-varying exposures and outcomes and for feedback

Randomized controlled trial (often not possible with religion)

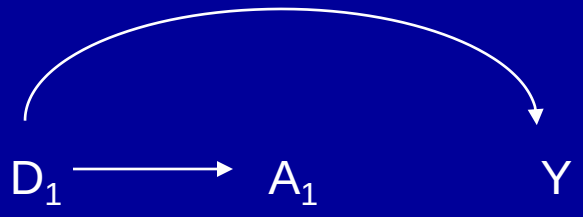
Too many of the studies on religion and health have been cross-sectional

Study Design

Control for baseline depression helps rule out reverse causation

It does so provided (VanderWeele et al., 2016):

- - Depression measurement two measurement periods back does not affect current depression independent of depression one period back

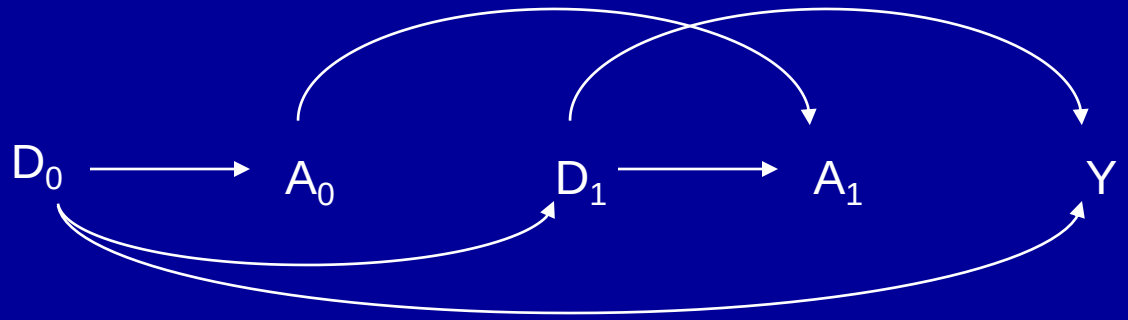


Study Design

Control for baseline depression helps rule out reverse causation

It does so provided (VanderWeele et al., 2016):

- - Depression measurement two measurement periods back does not affect current depression independent of depression one period back
- - If so we need to control for prior attendance as well



- Control for prior attendance also helps rule out confounding by other factors as the confounder would have to affect current attendance independent of past attendance

Marginal Structural Models

We can also use causal models that allow for assessing the effects of exposures that change over time allowing for feedback

Marginal structural models / weighting (Robins et al., 2000):

Allow for feedback between attendance and depression
Control for confounding is done by weighting
Similar to a generalization of propensity scores
There is a separate weight / propensity score for each period

By doing confounding control by weighting rather than regression we can divide the confounding task and thereby handle feedback

For a tutorial in the context of religion and health see:

- VanderWeele, T.J., Jackson, J.W., and 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.

Nurses Health Study

We apply this approach to the Nurses Health Study (Li et al., 2016)
Service attendance measured for many nurses from 1992

Depression analyses used 48,984 U.S. nurses, mean age 58 years

Service attendance was self-reported in 1992 and every 4 years

Depression was self-reported as being physician-diagnosed clinical depression or anti-depressant use in 1992 and every 4 years

Depressive symptoms were measured by the Center for Epidemiologic Studies Depression scale in 2004 and by Geriatric Depression Scale in 2008

Covariates: 1992 including baseline service attendance and depression
Exposure: Religious service attendance starting in 1996

Adjustment for censoring by inverse probability weighting

Nurses Health Study

Adjustment for many baseline covariates in 1992 in our analysis:

baseline service attendance,
baseline depression,
age,
race/ethnic groups,
geographic region,
employment status,
nurses education level,
husband education level,
census trace level income,
marital status,
living arrangement,
number of close friends,
having someone close to talk to,
physical limitations or disability
BMI at age 18
weight change since age 18,
height
physical activity,
diet quality,
smoking status,
alcohol consumption,
family history of MI,
family history of cancer,
family history of diabetes,
cancer,
cardiovascular disease,
hypertension,
high cholesterolemia,
diabetes,
post-menopausal hormone use.

Service Attendance and Depression

	Outcome: Depression in 2004					
	Binary			GDS continuous		
	OR	Lower 95% CI	Upper 95% CL	Estimate	Std Err	P value
Religious service attendance in 1996 (Never)	1.00	1.00	1.00	-	1.00	1.00
Religious service attendance in 1996 (< 1/wk.)	1.00	0.89	1.12	0.03	0.09	0.70
Religious service attendance in 1996 (1/wk.)	1.09	0.95	1.24	0.11	0.10	0.27
Religious service attendance in 1996 (> 1/wk.)	1.15	0.98	1.36	0.12	0.12	0.29
Religious service attendance in 2000 (Never)	1.00	1.00	1.00	-	1.00	1.00
Religious service attendance in 2000 (< 1/wk.)	0.87	0.79	0.97	-0.20	0.08	0.01
Religious service attendance in 2000 (1/wk.)	0.75	0.67	0.84	-0.48	0.09	<.0001
Religious service attendance in 2000 (> 1/wk.)	0.71	0.62	0.82	-0.53	0.10	<.0001

There are strong effects, and even strong dose-response for the effect of service attendance in 2000 on depression in 2004

Results are consistent across outcomes measures

Past service attendance (in 1996) does not seem to have much effect beyond current service attendance

Depression and Service Attendance

	Outcome: Service Attendance once per week or more in 2004
Depression in 1996	OR=0.91, (95% CI: 0.83, 1.00)
Depression in 2000	OR=0.74, (95% CI: 0.68, 0.80)

There also appears to be fairly strong evidence for an effect of depression in 2000 decreasing subsequent service attendance in 2004 as well

Here there does also seem to be an effect of depression in 1996 over and above that of depression in 2000

Service Attendance and Depression

VanderWeele, T.J. and Ding, P. (2017). Sensitivity analysis in observational research: introducing the E-value. *Annals of Internal Medicine*, 167:268-274.

* E-value = RR + sqrt[RR*(RR-1)]
* E-value Calculator: https://www.evalue-calculator.com/

Sensitivity Analysis: To explain away the estimate of 0.71, an unmeasured confounder (e.g. personality – conscientiousness, agreeableness – that was associated with both service attendance and lower depression by risk ratios of 2.1-fold each, above and beyond the measured confounders, could do so but weaker confounding could not

To bring the upper confidence limit of 0.82 for this estimate to 1, an unmeasured confounder that was associated with both attendance and lower depression risk ratios of 1.7-fold each could suffice

Service Attendance and Depression

The results on the effect of service attendance on depression confirm what is already reported in the literature but…

- With better study design (repeated measures on both)
- Larger study (about 50,000 women)
- Methods to address feedback

The results on depression decreasing service attendance may be just as important though; there are implications for religious communities:

- Those who become depressed tend to cease attendance, which may exacerbate depression yet further
- Further support could be extended to such persons before they leave

Allowing for feedback and accounting for both directions may give further important insights into the dynamics governing the relationship between religion and health

Suicide

The major religions have strong traditions of prohibiting suicide

- In Islam, Judaism, and Christianity, this prohibition is quite strong
- Buddhist, Tao, Confucian, and Hindu traditions are generally opposed to suicide, but perhaps grant more exceptions (Eliade 1986, Kok 1988)

Durkheim (1897) studied differences in suicide rates comparing Catholic and Protestants and found rates were higher among Protestants

- He attributed this to greater social integration and control among Catholics
- One of the earliest “religion and health” studies
- But Durkheim used ecologic (group-averaged) data

Suicide

- VanderWeele, T.J., Li, S., Tsai, A., and Kawachi, I. (2016). Association between religious service attendance and lower suicide rates among US women. JAMA Psychiatry, 73(8):845-851.

Proportional hazard analyses with NHS data

Service attendance in 1996 as exposure, with attendance in 1992 as a potential confounder, with control for aforementioned covariates including depression and social support

Limited number of events (36 suicides)

Also used exact logistic regression controlling only for depression and social support

Suicide

Attending once/week or more: **HR = 0.16 (95% CI: 0.06, 0.46)**

Exact Logistic Regression: **OR = 0.17 (95% CI: 0.06, 0.44)**

To explain away the HR=0.16 a confounder that was associated with both attendance and reduced suicide by RR's of 12-fold could suffice, but weaker confounding could not

To explain away the upper CI of 0.46 a confounder that was associated with both attendance and reduced suicide by RRs of 3.7-fold each could suffice

Similar effect estimate as case-control studies (Nisbet et al. 2000)

Only one prior longitudinal study with completed suicide as the outcome (Kleiman and Liu, 2014) but did not control for baseline depression

More evidence since then:

- Chen and VanderWeele (2020) in: Rosmarin, D. H., & Koenig, H. G. (Eds.). (2020). *Handbook of spirituality, religion, and mental health*. Academic Press.
- Chen, Y., Koh, H.K., Kawachi, I., Botticelli, M., and VanderWeele, T.J. (2020). Religious service attendance and deaths related to drugs, alcohol, and suicide among US health care professionals. *JAMA Psychiatry*, 77:737-744.

Interaction with Affiliation

Catholic vs. Protestant Differences:

Table 3. Joint Associations Between Religious Service Attendance in 1996 and Protestant vs Catholic Identity[a,b]

Frequency of Religious Service Attendance	Protestant		Catholic	
	Event/Years	HR (95% CI)	Event/Years	HR (95% CI)
Never or less than once per wk	14/260 486	1 [Reference]	8/129 319	0.97 (0.38-2.46)
Once per wk or more	5/292 735	0.34 (0.10-1.10)	1/322 692	0.05 (0.006-0.45)
Service attendance within strata of religious affiliation		0.34 (0.10-1.10)		0.05 (0.006-0.48)

Multiplicative Interaction $RR_{11}/(RR_{10}RR_{01}) = 6.8$, (P=0.05)

Confirmation of Durkheim's (1897) but w/individual level data (and attendance)

Pattern emerges only for those regularly attending; this would be consistent with Durkheim's mechanisms of social integration and control

Possible concerns about misclassification of suicide events (Catholic beliefs concerning suicide and hell; burial practices)

But effects of attendance with strata of denomination may be less affected

Suicide

We can examine social support, alcohol, and depression as mechanisms

We adjust for these in year 2000, controlling also for baseline values

Adjustment	Less Than Once per Week	Once or More per Week
Multivariable adjusted model[b]	0.85 (0.36-2.00)	0.16 (0.06-0.46)
Further adjusted for mediators		
Social integration score in 2000[c]	0.85 (0.36-2.02)	0.16 (0.06-0.46)
Alcohol consumption in 1998[d]	0.86 (0.36-2.05)	0.16 (0.06-0.45)
Depressive symptoms or antidepressant use in 2000[e]	0.92 (0.39-2.17)	0.17 (0.06-0.48)
Alcohol consumption in 1998, social integration score in 2000, and depressive symptoms or antidepressant use in 2000	0.94 (0.40-2.23)	0.16 (0.06-0.46)

Perhaps weak evidence that these may mediate the effect of those occasionally attending but not those regularly attending

Number of suicide events is very limited here though

Perhaps the most important mechanism here is the belief that suicide is wrong

Anxiety

Koenig et al. (2012) report that religious involvement is related to:

- Less anxiety 147 of 299 (49%) vs. greater 33 studies (11%) or no relation (40%)

In this case, however (unlike depression and suicide) it is not clear that the evidence holds up in more rigorous designs:

- Longitudinal studies suggest that there is perhaps little or no effect (Rasic et al., 2011; Li et al., 2016; Chen and VanderWeele, 2018)
- Meta-analytic standardized effect size from 90,078 participants in GUTS, NHSII, HRS (Chen et al., IJE 2020): –0.05 (–0.07, –0.03)

Speculation:

- For some religious practice brings peace and relieves and anxiety
- For others religious community and commitments create anxiety
- The average net effect of religious community on anxiety is small

Other Outcomes

We have focused here on mental health, but there is also evidence, from rigorous longitudinal studies, that participation in religious community also has beneficial effects on numerous other health and well-being outcomes as well…

- All-Cause Mortality: Strawbridge et al. (1997); Hummer et al. (1999); Musick et al. (2004); Chida et al. (2009); Li et al. (2016); etc.
- Life Satisfaction: Lim and Putnam (2010); Fancourt and Steptoe (2018); Chen and VanderWeele (2018)
- Meaning and Purpose: Krause and Hayward (2012); Chen et al. (2020)
- Less Substance Abuse: Green et al. (2010); Nonnemaker et al. (2003), Chen and VanderWeele (2018)
- Less Crime: Johnson et al. (2001)
- Social Relationships and Marital Stability: Strawbridge et al. (1997); Call and Heaton (1997); Wilcox and Wolfinger (2016); Li et al. (2018)
- Generosity/Volunteering/Civic Engagement/Prosocial Behavior: Putnam and Campbell (2012); Shariff et al. (2016); Chen et al. (2020)

Implications

Religious communities appears to be a major determinant of mental health and of numerous other health and well-being outcomes

The research has implications for:

(1) Research Designs
(2) Understanding Population Health and Well-Being
(3) Clinical Practice

Study Design and Future Research

While hundreds of studies on religion and depression have been published, the vast majority are cross-sectional

For attendance and life satisfaction >99% use cross-sectional

When effects may be in both direction, cross-sectional data is almost useless

Similar issues certainly arise in other areas

Perhaps particularly problematic with “softer” exposures and outcomes

Perhaps the biggest threat to applied causal inference today is study design!

- Researchers should avoid cross-sectional data unless the question truly hasn’t been studied previously
- Journals should begin to reject such cross-sectional studies again unless the association has never been studied before
- Cross-sectional studies should be bracketed from systematic reviews
- The evidence base often comes from too few studies
- Evidence is now considerably stronger for an effect of religious service attendance on health

Public Health Impact

Public health impact is assessed as a function of (i) prevalence of the exposure and (ii) size of the effect size

Religious participation is common:

Approximately 84% of the world's population report a religious affiliation

Within the United States (Gallup Poll, 2015-2016):

89% believe in God or a universal spirit

78% consider religion a very important or fairly important part of life

79% identify with a particular religious group

36% report having attended a religious service in the last week

The effect sizes as we have seen are relative large

Religious participation is an important social determinant of health

Should be included in curricula (VanderWeele and Koenig, 2017)

Public Health Impact

VanderWeele, T.J., Li, S. and Kawachi, I. (2017). Re: Religious service attendance and suicide rates. *JAMA Psychiatry*, 74:197-198.

The public health implications are potentially important

The CDC recently reported an increase in the suicide rate from 10.5-(per 100,000) in 1999 to 13.0 in 2014

During this period, the Gallup Poll indicates a decline in weekly service attendance from 43% in 1999 to 36% in 2014

If we were to extrapolate our study estimate to the general population, this would indicate that about 40% of the increase in suicide could be attributed to the decline in religious service attendance

Clinical Practice

Sloan et al. (NEJM, 2000): “Should physicians prescribe religious activities?”:

- Endorsement of service attendance is premature and unethical
- Religion can often cause tensions and antagonism
- It is difficult for physicians practically to address this as religious views differ; they are also not trained to do so; it generally shouldn’t be discussed

Koenig (2000) responds:

- Sloan et al. approach the question by setting up and attacking an extreme position i.e. physicians should prescribe religious activities
- This is very different from a recognition that such activities may be important in the patient’s life and understanding of illness
- The current recommendations for physicians are to take a short four-question spiritual history
- For those who are not religious, the discussion can quickly move on

To the Editor: In 16 years of family practice, my experience could hardly be more in conflict with the conclusions of Sloan et al. Although I do not routinely inquire about patients' religious or spiritual lives, it is not unusual for me to do so. Most frequently, I ask such a question when patients are suffering from progressive, incurable, or fatal illness. It also seems relevant to inquire when patients are struggling with mental anguish or addiction.

It is my practice to ask patients whether spirituality or religion is important in their lives. I then listen, respectfully, to their experience. Some patients report little engagement with these matters, and we go on to other subjects. Many patients talk of the central part God plays in their lives and in their experience of illness. Some describe the comfort and support they obtain from religious and spiritual sources, and I validate this response and encourage them. Some say they have lost touch with religion and spirituality and wish to reconnect with them, and we discuss that. We then go on to the issues of diagnosis and treatment.

I have had many hundreds of such conversations, and not a single patient has responded negatively. The information informs my approach to patients in discussing their illness and their medical choices, sometimes in important ways. I come to know my patients in a deeper way, and they feel seen and heard in ways that matter to them. This approach helps me treat them, and heal them, particularly when they are facing incurable illness or death.

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Clinical Practice

More generally, would it ever be ethical to encourage service attendance, for those who already consider themselves religious, within the context of an annual physical exam, or within psychiatric care?

- People do not make decisions about religion based on health
- Religious beliefs are shaped by: experiences, upbringing, values, truth claims, evidence, relationships, etc.
- But for those who already believe it would not seem unethical to encourage attendance as a form of meaningful social participation

However…

- Context needs consideration (e.g. former child abuse) but probably discussing attendance is reasonable in at least some contexts
- This might be facilitated by taking a spiritual history

Taking a Spiritual History

Koenig (2000 JAMA) proposes routinely taking a spiritual history:

Four questions are proposed:

(1) "Is faith (religion, spirituality) important to you in this illness?"

(2) "Has faith been important to you at other times in your life?"

(3) "Do you have someone to talk to about religious matters?"

(4) "Would you like to explore religious matters with someone?"

Asking these four questions was suggested by a consensus panel of the American College of Physicians for end-of-life care (Lo et al., 1999)

See also Puchalski (2014) for another common set of four questions

These could perhaps be simplified yet further:

- "Are religion or spirituality important to you in thinking about health and illness, or at other times?"
- "Do you have someone to talk to, or would you like someone to talk to about spiritual matters?"

Service Attendance Encouragement

An reasonable approach in clinical practice might be that, following a brief spiritual history (VanderWeele et al., AJE 2021) then…

- Religious service attendance could be encouraged for those who positively self-identify with a particular religious tradition
- Other forms of community involvement could be encouraged otherwise
- For those who have had past negative experiences with religious community, offer of referral to chaplains could be made

Other Considerations:

- Palliative care guidelines are to inquire about religion/spirituality (WHO, 2004)
- Religion can be protective for mental illness; religion can also sometimes be the source of tensions; it is important to inquire
- Patients state R/S as one of the top 2 factors of 7 in medical decision-making; physicians rank it 7th (Silvestri et al., 2003)

We can also turn the questions around…

- The effects of attendance across numerous outcomes are profound
- Are we doing harm by withholding this information…?

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