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Religiosity, Psychological Resources, and Physical Health

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Various explanations have been given for the positive association between religiosity and physical health. Using data from two waves of the National Survey of Midlife in the United States (1995, 2005) and retrospective data on the importance of religion in the home in which respondents were raised we find that psychological resources, operationalized by measures of emotional and psychological well-being, mediate the effect of this early exposure to religion but only on self-rated health and physical symptomatology; chronic illnesses and health limitations on activities of daily living are unaffected.

Keywords: *religiosity*, *health*, *well-being*.

INTRODUCTION

It has long been argued that religious people enjoy better health. Only in the last two decades, however, has this argument undergone sustained scientific scrutiny. Most of the research has targeted mental health, where the possible influence of religiosity is more intuitive (Kelley-Moore and Ferraro 2001:S366; Krause, Ellison, and Marcum 2002:22). Less attention has been paid to physical health where biological changes are involved. Although for the most part studies have shown that religiosity does have salutary effects on physical health, experts note continuing inconsistencies between studies. They also call for more theory testing in this area rather than speculation about possible mechanisms.

Research on Religion and Physical Health

Numerous scholarly reviews have concluded that religious people enjoy better physical health, including "global self-ratings of health; individual items and rating scales assessing functional health and disability limitation; physical symptomatology; the incidence and prevalence of cancer, both overall and site specific; the incidence and prevalence of coronary heart disease, hypertension, and cerebrovascular disease" (Levin and Chatters 2008:160). Oman and Thorenson (2005:454) describe the relation between religion and physical health as "robust." Myers (2008:336) declares that "religious involvement rivals nonsmoking and exercise effects" as a predictor of physical health and longevity.

And yet there are also dissenting voices. Powell and colleagues discovered that none of three "well-controlled, prospective studies of the elderly . . . found any relationship between the religious variable and the development of disability" (Powell, Shahabi, and Thorenson 2003:43). In a study by Koenig and Vaillant (2009) the positive effect of church attendance on health disappeared over time. Park et al. (2008) found that service attendance was associated with lower rates of increase in the number of intermediate activities of daily living (IADL) activities (e.g., preparing meals) but had no effect on basic activities of daily living (BADL) such as dressing

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and undressing. Benjamins (2004) found that religious attendance among the "oldest old" helped delay the onset of functional impairment five years later but religious salience increased functional impairment. Kelly-Moore and Ferraro (2001) detected no effect of religious service attendance on functional limitations. A recent study of respondents in the Wisconsin Longitudinal Study, who were tracked from 1993 (when they were 53–54 years old) until 2004 (when they were 64–65 years old), found no association between either church attendance or religious importance and self-rated health (Brenner and Siegl 2008). These inconsistencies led Ellison et al. (2010:327) to describe the evidence for a link between religion and physical health as "inconclusive" and to bemoan "an absence of cumulative, well-replicated findings on the topic of religion and physical health." Musick and Worthen (2010:250) observe that the connection between religion and self-rated health "has not been well documented since 2000," adding that it "deserves more attention in the literature."

In light of this previous research there are two solid reasons for undertaking another study of this topic. The first is empirical. Can the salutary effects of religion on a range of physical health measures found in previous studies be replicated using a nationally representative sample of the U.S. adult population? The second is theoretical. Can the association between religion and physical health be explained by the kinds of mechanisms that have been suggested by experts in the field?

Explanatory Mechanisms

Explaining why religion might have positive effects on physical health means indicating what might link them together. For this, a mediation model is necessary, guided by the proposition "that religion leads to certain social and psychological outcomes, such as self-esteem or social support, that in turn tend to better health" (Musick and Worthen 2010:254). Potential mediators fall into three broad categories (Ellison and Levin 1998; Ellison et al. 2010; Flannelly, Ellison, and Strock 2004; Levin and Chatters 1998). The first is behaviors and lifestyles. This theory postulates that the relation between religion and morbidity "is, to a large extent, explained by the encouragement that religion or spirituality provides for living healthier life styles" (Powell, Shahabi, Thorenson 2003:42). Many congregations run programs and provide counseling services to protect the health of members and promote healthy lifestyles. Religious involvement can also inhibit behaviors injurious to health, such as excessive alcohol or tobacco consumption and drug abuse, and discourage risky behaviors that endanger health or cause stress. For example, religious youth in America are less likely to engage in health compromising behavior and more likely to take care of themselves (Wallace and Forman 1998). High levels of religious observance lead to greater use of preventive health care such as mammograms and Pap smears (Idler 2009:139).

The second category of mechanisms is social networks and social support. "Churches and synagogues, as well as the small groups they engender, may enhance . . . perceptions of support by fostering a sense of community that leads individual members to feel loved, cared for, valued and integrated" (Ellison and Levin 1998:706). More than other voluntary associations, congregations "offer a mix of strong and weak ties and can thus offer a broad range of both emotional and practical, instrumental supports" (Idler 2009:140). This helps explain why "church-based emotional support offsets the effects of financial strain on self-rated health in later life" whereas support from secular groups does not have the same effect (Krause 2006:S40).

The third category of mechanisms is psychological factors, sometimes referred to as "resources" because they make achieving good health easier (George, Ellison, and Larson 2002:195). Religious people are less likely to experience negative psychological states. A meta-analysis of 147 studies found an average correlation between religious involvement and depression of –.10,

increasing to –.15 for studies of stressed populations (Smith, McCullough, and Poll 2003).[1] Conversely, religious people are more likely to enjoy positive psychological states. Many suggestions have been made as to why this should be so, including: religious beliefs instill the feeling that a divine being loves you and that you have a personal relationship with a divine other, which enhances self-worth, efficacy, and mastery; support from fellow church members enhances self-appraisal; religious teachings and practices help manage negative affect such as anger, fear, and hostility, and encourage positive emotions such as hope and optimism; a belief that God's will is expressed in events instills a sense of purpose in and control over one's life; and religious guidance fosters a feeling of calm, reassurance, and ability to cope with stress stemming from illnesses, portraying them as opportunities for spiritual growth or as part of a larger plan (Ellison and Levin 1998:707; Krause 2010; Musick and Worthen 2010:254; Oman and Thoresen 2005:446; Ryff, Singer, and Love 2004:95).

Psychological resources, in turn, have a positive effect on physical health (Kaplan 2007:105; Krause 2010:9). Self-esteem is positively related to better self-rated health (Schieman 2002:637) and functional ability (Rietzes and Mutran 2006:S49). Conversely, depression in older adults increases the risk of later physical disability (Pennix et al. 1999). Psychological resources can even induce biological changes. Frequent churchgoers have lower allostatic load, the measure of the cumulative wear and tear of various physiological systems as measured by biological markers, and psychological factors could well account for some of this (Ellison et al. 2010; Maselko et al. 2007). Eudemonic well-being (purposeful life engagement) is positively related to low inflammation response, lower levels of glycosylated hemoglobin, lower waist-to-hip ratios, and lower total/high-density lipoprotein (HDL) cholesterol ratios (Ryff, Singer, and Love 2004:1390). Hedonic well-being (positive moods, contentment with life) also has biological benefits (Huppert 2009; Pressman and Cohen 2005; Salovey et al. 2000). For example, one study showed a negative effect of emotional well-being on the incidence of stroke in older adults (Ostir et al. 2001), another showed that positive mood helps buffer against cardiovascular response to stress (Fredrickson et al. 2000), and another showed that positive affect and emotions influence the secretion of the stress hormone cortisol (Lai et al. 2005). In general, prolonged reactivity to stress is harmful to immune function and to other physiological processes, while a rapid recovery from stress is beneficial for health.

In summary, there is good reason to believe, on the basis of prior research and theory about possible mechanisms, that the effect of religion on physical health can be partly explained by psychological resources.

Analytical Plan

Although the mediation model is often referred to in religion and health studies, it has rarely been tested. There are some notable exceptions. Koenig and Vaillant (2009:123) hypothesized that regular church attendance would protect people against poor physical health because it would "increase one's level of contentment, including through increased social support, a more positive outlook on life, [and] increased hope and encouragement." They found that "better moods" explained some of the effect of church attendance on subsequent physical health. However, their study was limited to males. Idler and Kasl (1997) used a 12-year follow-up of a sample of Americans to look at the influence of church attendance on functional disability. They hypothesized that some of the effect of religious attendance on functioning would be explained by higher levels of psychological well-being of frequent churchgoers. Although they found that only optimism mediated the religious effect on later functioning the study nevertheless supports the theory that psychological resources can help explain why religion affects physical health. This study was confined to the elderly. In sum, although each study has its own data limitations, they

[1] See also Ellison, Burdette, and Hill (2009), Hackney and Sanders (2003), and Shreve-Neiger and Edelstein (2004).

both support the general idea that psychological resources could explain the influence of religion on physical health.

The preferred method of testing the mediation model is to use three waves of data from a longitudinal survey where the second wave mediating variable is consequent upon the first wave and antecedent to the third wave. The National Survey of Midlife in the United States (MIDUS) has only two waves of data, collected in 1995 and 2005, but in 1995 respondents were asked a number of questions about what things were like when they were growing up, one of which asked them to recall how much importance was attached to religion in the home. Rather than call this variable "parental religiosity" as in Rossi (2001:302), we use the term home religiosity to refer to the fact that it measures the salience of religion in the home in which the respondent was raised. We treat these retrospective data as Time 1 because they refer to a state that clearly existed prior to 1995. We treat 1995 as Time 2, the stage at which to measure the mediating factor, and 2005 as Time 3, the time to measure the outcome variable.

We hypothesize that home religiosity has a positive effect on 1995 psychological resources, which in turn have a positive effect on 2005 physical health. Although the subjects in MIDUS ranged in age from 25 to 74 in 1995 when they were asked about religion in the family of origin we already know that the religiosity of one's parents can have long-lasting consequences. Krause and Ellison (2007:122) found that recalled parental religious socialization practices had a positive effect on the self-esteem of adults aged 66 or more. In addition, because we are able to measure the respondent's religion in 1995 we can estimate both mediated and unmediated effects. The family of origin religiosity probably influences 1995 religion, which in turn could have a positive effect on 2005 physical health regardless of the pathway through psychological resources. Nevertheless, if the mediation hypothesis is valid, part of the influence of home religiosity on 2005 physical health will be funneled through psychological resources in 1995.

Method

To estimate the mediating effects of psychological resources we use three scales of well-being included in MIDUS. The first of the scales is called "hedonic well-being" because it is rooted in the idea of pleasure, happiness, contentment, the satisfaction of human appetites. The second scale is called "eudemonic well-being" because it refers to purposeful life engagement (Ryff, Singer, and Love 2004). The third is a social well-being scale the inspiration for which comes from a definition of health issued by the World Health Organization (WHO) in 1948 in which reference was made to "social" as well as physical and mental well-being (WHO 1948).

MIDUS contains a wide range of health measures and in this study we subject them all to analysis. Self-rated health asks respondents to give an overall assessment of their current physical health, ranging from poor to excellent. Asking respondents to give an overall assessment of their health is a widely used measure of health status and is considered to be an accurate measure of a person's physical health status (Bjorner, Fayers, and Idler 2005:314). The measure is predictive of chronic disease incidence, recovery from illness, and functional decline (Idler and Kasl 1995:S35; Shields and Shooshtari 2001:37).

Because most studies on this topic have used only self-rated health as the outcome measure (Kelley-Moore and Ferraro 2001:S366), other health measures have been somewhat overlooked. For example, Benjamins (2004:357) observes that "only a small number of studies concentrate on functional limitations." We therefore draw upon MIDUS for measures of functional limitations, using a scale of BADL measuring limitations on daily routine activities such as bathing oneself and another scale on intermediate activities of daily living (IADL) measuring limitations on more challenging activities such as climbing stairs or walking several blocks. In addition to these health measures we also look at: physical symptomatology, which measures the incidence (in the past month) of physical discomforts such as headaches, hot flashes, and problems sleeping; and the

experience of chronic medical problems such as constipation, ulcers, asthma, high blood pressure, and diabetes.

Sample

We use the national random-digit-dialing sample from MIDUS, a two-wave panel survey. Eligible respondents were noninstitutionalized, English-speaking adults in the coterminous United States between ages of 25 and 74. The baseline national RDD sample was selected in 1995 from working telephone banks. Males between ages of 65 and 74 were oversampled. The respondents participated in a computer-assisted telephone interview and also completed two self-administered questionnaire booklets mailed to their households. The sample consists of 3,487 respondents. The response rate estimates are 70 percent for the telephone interview, 86.8 percent for the completion of the self-administered questionnaires, and 60.8 percent for the combined response (i.e., $.700 \times .868$).

A follow-up survey of the original MIDUS sample was conducted between 2004 and 2006. The mortality-adjusted retention rate of the national RDD sample is 71 percent. Multivariate logit regression of attrition revealed that those who failed to respond to the second wave were more likely to be nonwhite males with low education and income level. In light of the attrition, we employ multiply-imputed data throughout our analyses using Mplus 6.1, a structural equation modeling (SEM) package (Arbuckle 1996; Graham 2009; Peugh and Enders 2004; Rubin 1976; Schafer 2003). This procedure produces parameter estimates by averaging the set of analyses on the five multiply-imputed data sets, their standard errors being calculated on the basis of the average of the standard errors over the set of analyses and the between-analysis parameter estimation variation (Muthén and Muthén 2007). The imputed data sets were also weighted to correct for unequal stratified probabilities of household and within-household respondent selection at the baseline. The sample weight poststratified the sample to match the proportions of adults in the 1995 Current Population Survey in regard to age, gender, race, education, marital status, MSA (i.e., metropolitan and nonmetropolitan statistical areas), and region (Northeast, Midwest, South, and West). The final sample count of the multiply-imputed data sets is 3,257 excluding 228 respondents who died between the two waves and two who are not covered by the weight variable.

Variables

Table 1 provides a brief description of each of the variables used in the analysis together with response categories, means scores, standard deviations, and range.[2]

Results

As shown in Table 1 respondents reported significantly increased number of physical symptoms, BADL, and IADL across the two waves ($p < .001$), but their self-rated health and chronic medical problems did not change significantly. All three observed indicators of the psychological resources indicate significant losses in 10 years ($p < .001$). The mean for home religiosity—2.16 on a 0–3 scale—is quite high, indicating that most respondents recalled living in a home where religion was important. The average age of respondents in 1995 was 43, 55 percent were women, 86 percent were white, 67 percent were married, and 69 percent were working full-time.

[2] Additional information on the confirmatory factor loadings of religion across two waves is provided in Figure A of Appendix S1 along with details for the individual items in the three psychological resources scales (Table A). Appendix S1 may be accessed at wileyonlinelibrary.com.

Table 1: Variables in the analyses (multiply-imputed data [$N = 3{,}257$], sample weighted)

Measure	Measure Description
Endogenous measure (2005)	
Religion (factor)	A second-order latent factor of public religion (i.e., church attendance, religious meetings, and activities), religious identification (six indicators: e.g., religiosity, importance of religion), and religious coping (i.e., religious healing, religious decision making of daily-life matters).
Health outcomes	
Self-rated health	An item asking the respondent: "In general, would you say your physical health is . . . ?" (1 = poor, 2 = fair, 3 = good, 4 = very good, 5 = excellent; mean = 3.49; *SD* = 1.02; range: 1–5).
Physical symptoms	A nine-item summated scale asking whether, in the past month, the respondent had experienced symptoms of headaches, lower back aches, sweating a lot, and so forth (0 = not at all, 1 = once a month, 2 = several times a month, 3 = once a week, 4 = several times a week, 5 = almost every day; mean = 13.08; *SD* = 7.17; range: 0–45).
Chronic medical problems	A 29-item summated scale asking if, during the past 12 months, the respondent had experienced or been treated for conditions such as asthma, constipation, diabetes, stroke, arthritis, or varicose veins (0 = no, 1 = yes; mean = 2.45; *SD* = 2.61; range: 0–29).
BADL	A two-item summated scale measuring health limitations on bathing or dressing oneself and walking one block (0 = not at all, 1 = a little, 2 = some, 3 = a lot; mean = .53; *SD* = 1.29; range: 0–6).
IADL	A seven-item summated scale measuring health limitations on intermediate activities of daily living such as lifting or carrying groceries, climbing several flights of stairs (0 = not at all, 1 = a little, 2 = some, 3 = a lot; mean = 5.08; *SD* = 6.07; range: 0–21).
Psychological resources (factor)	A second-order latent factor of the following three well-being measures (see Appendix Table A for specific indicators of each well-being measure).
Emotional well-being	The summated scale consists of positive affect and life satisfaction. The former is measured by six questions in which the respondent was asked how much time during the past 30 days they felt (1 = none of the time, 2 = a little, 3 = some, 4 = most, 5 = all). For the latter, the respondent was asked to "rate their life overall these days" on a scale ranging from 0 to 10 (mean = 11.40; *SD* = 10.73; range: 1–33).
Psychological well-being	The summated scale, derived from the work of Ryff (1989), measures how much individuals see themselves as thriving in their personal life (mean = 61.17; *SD* = 13.42; range: 1–104).
Social well-being	The summated scale is an "appraisal of one's circumstances and functioning in society" (Keyes 1998:122) (mean = 45.00; 11.23; range: 1–81).
Exogenous measure (1995)	See above for descriptions of the measures except the home religiosity.

(*Continued*)

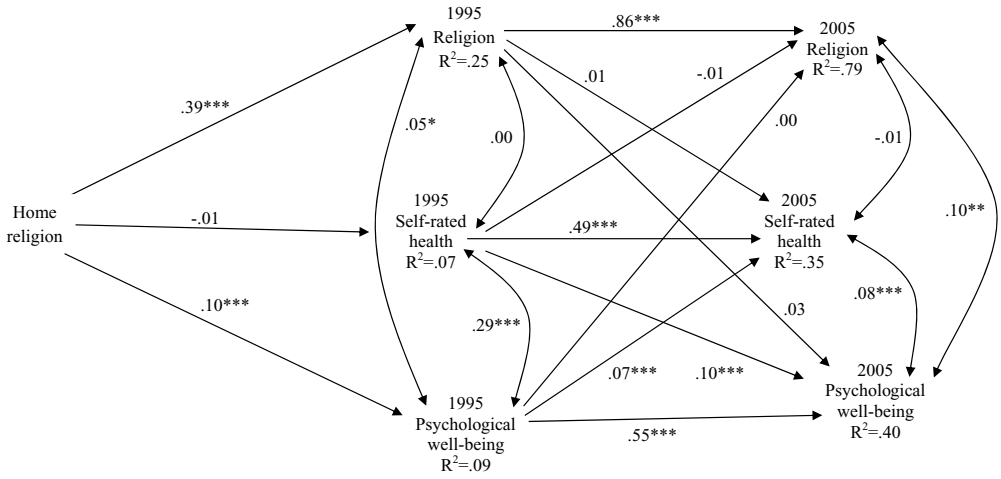
Table 1 (*Continued*)

Measure	Measure Description
Religion (factor)	
Health outcomes	
Self-rated health	Mean = 3.51; *SD* = .97; range: 1–5
Physical symptoms	Mean = 9.32; *SD* = 7.01; range: 0–44
Chronic medical problems	Mean = 2.36; *SD* = 2.51; range: 0–21
BADL	Mean = .28; *SD* = .95; range: 0–6
IADL	Mean = 3.53; *SD* = 5.17; range: 0–21
Psychological resources (factor)	
Emotional well-being	Mean = 22.75; *SD* = 5.47; range: 1–40
Psychological well-being	Mean = 63.40; *SD* = 13.60; range: 1–99
Social well-being	Mean = 51.02; *SD* = 12.46; range: 1–89
Home religiosity	A retrospective item asking, "how important was religion in your home when you were growing up?" (0 = not at all important, 1 = not very important, 2 = somewhat important, 3 = very important; mean = 2.16; *SD* = .87; range: 0–3).
Controls (1995)	
Age	A continuous variable in years (mean = 42.84; *SD* = 12.48; range: 20–74).
Female	A dichotomous variable (1 = female, 0 = male; mean = .55; *SD* = .50; range: 0–1).
White	A dichotomous variable (1 = white, 0 = other; mean = .86; *SD* = .35; range: 0–1).
Married	A dichotomous variable (1 = married, 0 = not married; mean = .67; *SD* = .47; range: 0–1).
Education	A variable indicating the highest educational grade of the respondent (1 = some grade school to some high school, 2 = GED or high school diploma, 3 = some college [no bachelor's degree], 4 = bachelor's degree or more advanced degree; mean = 2.80; *SD* = .96; range: 1–4).
Income	A 31-category measure of personal income in the past year (mean = 17.76; *SD* = 9.76; range: 1–31).
Employed	A dichotomous variable indicating employment status in the past year (1 = worked full-time [35+ hours/week], 0 = other [worked part-time (less than 35 hours/week), no work or worked less than six months in the past year, or full-time student]; mean = .69; *SD* = .46; range: 0–1).

We use the SEM path analysis to test the hypothesized psychological mediation of home religiosity on health outcomes. In the first stage of SEM testing we found that social well-being had no effect on any health outcome. We therefore dropped social well-being from further analysis. Psychological and emotional effects were found for self-rated health and physical symptoms but not the other three health measures (i.e., chronic medical problems, BADL, and IADL). We therefore report only the mediatory paths from home religiosity to psychological and emotional well-being to self-rated health and physical symptoms.

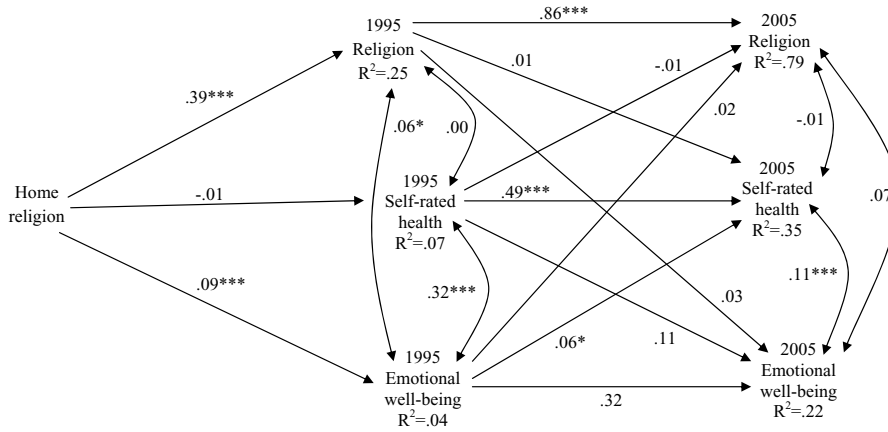
First, Figure 1-1 tests if home religiosity affects the 2005 self-rated health through the 1995 psychological well-being. Even though home religiosity is not significantly related to the 1995 self-rated health, it affects positively the psychological well-being of the respondents in 1995 (.10***), and psychological well-being in turn significantly enhances 2005 self-rated health (.07***). Apart from the mediation effect, the 1995 self-rated health also affects

Figure 1-1
SEM path analysis of religion, psychological well-being, and self-rated health



Notes: $N = 3{,}257$. All estimates are standardized. Model fits: CFI (comparative fit index)=.98, TLI (Tucker-Lewis index) = .96, RMSEA (root mean square error of approximation) = .03. The 1995 and 2005 religion variables are confirmatory latent variables with three indicators at each wave: public religion, religious identification, and religious coping. MLM (maximum likelihood parameter estimates with standard errors and a mean-adjusted chi-square test statistic) estimator applied due to the nonnormality of endogenous measures. The analyses employed five weighted multiply-imputed data sets. $^{*}p < .05$; $^{**}p < .01$; $^{***}p < .001$ (two tailed).

Figure 1-2
SEM path analysis of religion, psychological well-being, and self-rated health

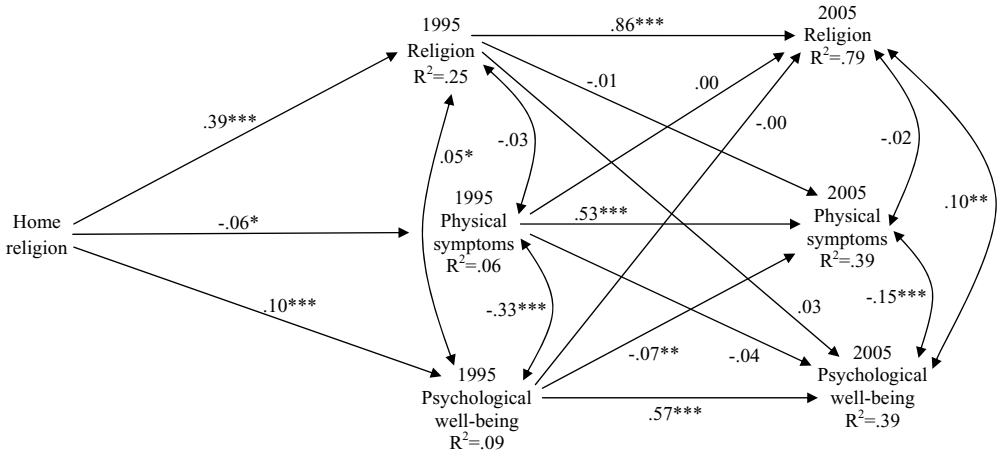


Notes: See full note to Figure 1-1.

the 2005 psychological well-being so that cross-lagged effects between self-rated health and psychological well-being are identified. Note that the mediatory path remains significant even after cross-sectional correlations between the 1995 self-rated health and psychological well-being (.29***) and between the 2005 self-rated health and psychological well-being (.08***) are taken into account. Home religiosity is also significantly related to the 1995 religion but this does not yield health benefits because the 1995 religion does not affect the 2005 self-rated health.

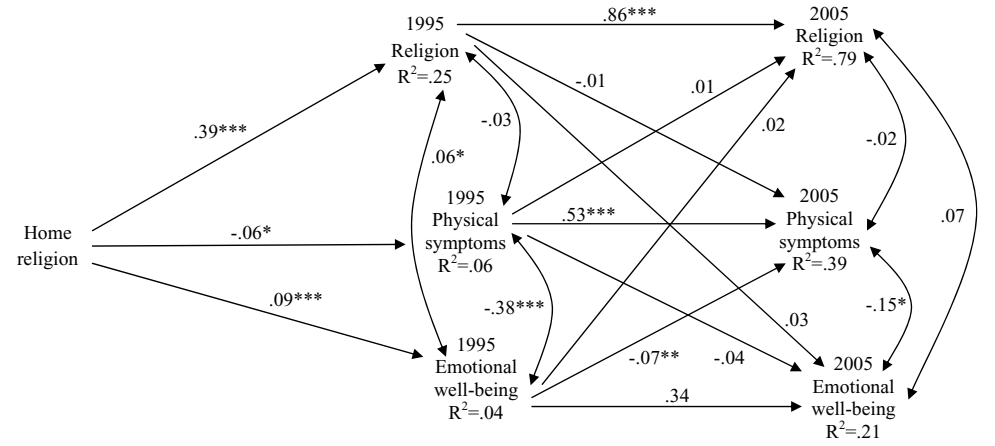
Figure 1-2 employs emotional well-being instead of psychological well-being. The mediation hypothesis is supported again: home religiosity significantly increases 1995 emotional well-being (.09***), which in turn promotes the 2005 self-rated health (.06*).

Figure 2-1
SEM path analysis of religion, psychological well-being, and physical symptoms



Notes: $N = 3{,}257$. All estimates are standardized. Model fits: CFI (comparative fit index) = .98, TLI (Tucker-Lewis index) = .96, RMSEA (root mean square error of approximation) = .03. The 1995 and 2005 religion variables are confirmatory latent variables with three indicators at each wave: public religion, religious identification, and religious coping. MLM (maximum likelihood parameter estimates with standard errors and a mean-adjusted chi-square test statistic) estimator applied due to the nonnormality of endogenous measures. The analyses employed five weighted multiply-imputed data sets. $^{*}p < .05$; $^{**}p < .01$; $^{***}p < .001$ (two tailed).

Figure 2-2
SEM path analysis of religion, psychological well-being, and physical symptoms



Note: See full note to Figure 2-1.

In the next step, we use physical symptoms as the endogenous measures replacing self-rated health (Figure 2-1). The same mediatory path works: home religiosity increases the 1995 psychological well-being (.10***) and the 1995 psychological well-being decreases the number of 2005 physical symptoms (–.07**). In addition, because home religiosity decreases the 1995 physical symptoms significantly it is likely that home religiosity has an indirect effect on the 2005 physical symptoms.

The pattern is repeated when emotional well-being is employed instead of psychological well-being in Figure 2-2. That is, the mediatory path from home religiosity to emotional

Table 2: Standardized total, direct, and indirect effects of home religiosity on health

Health Outcomes: Self-Rated Health, Physical Symptoms	β
Based on analysis represented in Figures 1-1 and 1-2	
Home religiosity to 2005 self-rated health (mediator: 1995 psychological well-being)	
HR to 2005 SH (total)	.013
HR→2005 SH (direct)	.007
HR→1995 PsyW→2005 SH (indirect)	.007**
HR→1995 SH→2005 SH (indirect)	−.003
HR→1995 R→2005 SH (indirect)	.002
Home religiosity to 2005 self-rated health (mediator: 1995 emotional well-being)	
HR to 2005 SH (total)	.013
HR→2005 SH (direct)	.008
HR→1995 EW→2005 SH (indirect)	.006**
HR→1995 SH→2005 SH (indirect)	−.003
HR→1995 R→2005 SH (indirect)	.002
Based on analysis represented in Figures 2-1 and 2-2	
Home religiosity to 2005 physical symptoms (mediator: 1995 psychological well-being)	
HR to 2005 PS (total)	−.031
HR→2005 PS (direct)	.009
HR→1995 PsyW→2005 PS (indirect)	−.007**
HR→1995 PS→2005 PS (indirect)	−.030**
HR→1995 R→2005 PS (indirect)	−.003
Home religiosity to 2005 physical symptoms (mediator: 1995 emotional well-being)	
HR to 2005 PS (total)	−.031
HR→2005 PS (direct)	.007
HR→1995 EW→2005 PS (indirect)	−.007**
HR→1995 PS→2005 PS (indirect)	−.029**
HR→1995 R→2005 PS (indirect)	−.002

Notes: HR = home religiosity, SH = self-rated health, PS = physical symptoms, PsyW = psychological well-being, EW = emotional well-being, R = religion. The SEM software (Mplus) does not provide indirect effects estimates when using multiply-imputed data; thus β (standardized) coefficients were averaged across five multiply-imputed data; z-scores were also averaged across the five data sets to produce two-tailed p-values for β estimates. $^{*}p < .05$; $^{**}p < .01$; $^{***}p < .001$ (two tailed).

well-being to the 2005 physical symptoms turns out to be significant. Also, because home religiosity reduces the 1995 physical symptoms, it has long-term effects on physical symptoms in 2005. Note that model fits are satisfactory given that comparative fit index and Tucker-Lewis index values are greater than .95 and root mean square error of approximation values are smaller than .05 in all the path analyses (Yu 2002). The seven control measures were taken into account for all endogenous variables in 1995 and 2005.

Considering that our main interest lies in the mediatory role of psychological resources between parental religiosity and health outcomes, indirect effects need to be tested. Because the SEM package does not provide estimates of the total, direct, and indirect effects when multiply-imputed data sets are used, we averaged the standardized structural coefficients and z-scores for the paths from home religiosity to the two health outcomes via the two psychological resources measures, running each of the five multiply-imputed data sets. The top two panels in Table 2 show the total, direct, and indirect effects of home religiosity when the final endogenous measure is the 2005 self-rated health and are based on Figures 1-1 and 1-2. The results confirm that psychological and emotional well-being are both significant mediators between home religiosity

and the 2005 self-rated health. Note that because the other three paths of direct and indirect effects are not significant the total effects are not significant either.

The next two panels at the bottom of the table report the total, direct, and indirect effects of home religiosity on the 2005 physical symptoms and are based on Figures 2-1 and 2-2. The mediation hypothesis is supported. In addition, the results also confirm that home religiosity is a significant suppressor of the 2005 physical symptoms through its effect on the 1995 physical symptoms; in other words, those who were raised in homes where religion was considered important had significantly fewer physical symptoms in 1995, which in turn meant they had fewer physical symptoms in 2005. The magnitudes of such indirect effects in terms of the standardized coefficients are small; however, they are not ignorable considering that we are dealing with life-long effect of religious upbringing on health outcomes through psychological resources.

Discussion

We tested the hypothesis that the influence of religion on physical health can be explained by the fact that religious people possess more psychological resources and enjoy better physical health. We combined retrospective and longitudinal data, using a question asked in the first wave of MIDUS about the importance of religion in the home when respondents were young, measures of their psychological resources in the first wave, and measures of their physical health 10 years later, controlling for their effects in 1995. The study therefore makes a contribution that is both empirical, in that it adds to the body of knowledge on the religion-physical healthlink, and theoretically, in that it helps explain why religion has long-term positive effects.

We tested for mediation effects of three types of psychological resources. One of these, social well-being, was unrelated to future physical health and was dropped from the analysis. The fact that the social well-being scale did not predict physical health in whatever form was interesting because many scholars have argued for the health benefits of social integration and the social well-being scale is, in some parts, a psychological measure of social integration. Indeed, this is the name given to one of the subsets of items that includes items such as "my community is a source of comfort." This suggests that social integration might not have psychological consequences for health but that it operates on physical health mainly through more instrumental methods such as providing support in times of illness and enforcing norms of health behavior. While there can be no doubt that religious congregations, as well as the small groups they engender, foster a sense of community "that leads individual members to feel loved, cared for, valued, and integrated" (Ellison and Levin 1998:706), it should not be assumed that this "sense of community" translates into better physical health.

Both emotional and psychological well-being mediated the effect of home religiosity on health but only for two of the outcomes: self-rated health and physical symptoms. The question arises as to why home religiosity had no effect on the other health outcomes through psychological resources. One answer is that self-rated health and physical symptoms have a larger psychological component than the other measures. It is widely acknowledged that self-rated health is a combination of "real" physical conditions and the assessments of those conditions—an indicator of how health disorders influence overall well-being (Zimmer et al. 2000:467). In other words, people's ratings of their health "are based on more than physical status," often including factors such as fitness and general well-being (Shields and Shooshtari 2001:37). This means that even after controlling for actual variation in health status psychological states have an impact on overall self-assessments (Tessler and Mechanic 1978:258). Researchers have also discerned a psychological component to physical symptomatology: "there is considerable evidence linking positive affect to reports of fewer symptoms, less pain, and better health . . . but there is reason to think that this association may be driven primarily by PA (positive affect) influences on how people

perceive their bodies rather than affect-elicited changes in physiological processes" (Pressman and Cohen 2005:939). Experiments confirm this: "the consistent effect of induced mood on symptom reporting does suggest that there are conditions under which mood can systematically alter symptom reports" (Salovey et al. 2000:113).

The health measures not affected by psychological resources, namely, health limitations on daily activities and chronic medical problems, could be more insulated from psychological bias. They are somewhat more specific, more concrete, and, perhaps, more objective. This could explain why religion has no effect on them either directly or indirectly through psychological resources. "It is entirely possible that going to religious services and activities has many health benefits that include lower depression and better subjective health—but that attendance has no effect on whether a respondent can walk up a flight of stairs" (Kelley-Moore and Ferraro 2001:S371). And yet research has shown that even when people respond to chronic illness questions their responses are biased by their psychological states and traits (Pressman and Cohen 2005:938). For example, higher positive affect results in fewer reported symptoms among patients suffering from Lyme disease, lupus, multiple sclerosis, coronary heart disease, and upper respiratory infection (Pressman and Cohen 2005:939). It might therefore be a matter of degree. All self-reported health statuses are subject to bias but some more than others. The gold standard for testing the psychological mediation model should therefore be the use of third-party reports on the respondent's health status. Without this, the most we can conclude is that psychological resources make a difference to how people deal with their health status and, to an unknown extent, their actual health status.

One benefit of using longitudinal data is that reciprocal effects can be estimated, thus helping answer the question whether religion "causes" health or *vice versa*. We can also see if the psychological resources are the cause or the effect of physical health. As displayed in the SEM figures, the 1995 religion has no effect on either self-rated health or physical symptoms nor do the earlier health measures have any effect on the 2005 religion. Emotional and psychological well-being have positive effects on both self-rated health and physical symptoms but only self-rated health has a reciprocal effect: the better the health of respondents in 1995 the better their psychological well-being in 2005. This is striking evidence of the reciprocal effect between psychological well-being and physical health as rated by the respondent but further confirmation, perhaps, that self-rated health has a psychological component.

In light of the fact that the 1995 religion had no direct effect on the 2005 health we experimented with different measurements of religiosity. It is often noted by scholars in this area that one dimension of religion has a different effect on health than another (Ainley, Singleton, and Swigert 1992). Using the three dimensions of religion identified earlier (public religion, religious identification, and religious coping) we estimated models for all five health outcomes. In no model did 1995 religion affect a health outcome.

Limitations

First, our study design calls for a "first wave" that measures religion prior to psychological resources. MIDUS does not provide information on religion prior to 1995 except the question asking respondents if religion was important in the home when they were growing up. It would have been preferable to have a measure of the respondent's own religiosity prior to 1995. There is some possibility that the effect of being raised in a religious home was transient and did not survive adolescence and is therefore not an accurate measure of the respondent's religiosity prior to 1995. And the home religiosity item could be subject to recall bias because current churchgoers are more likely to remember their homes being religious (Ploch and Hastings 1998). However, the path coefficient from parental religiosity to respondent's religiosity is large and highly significant (.39***), confirming what many other studies have shown about the intergenerational transmission of religiosity.

Second, the absence of any major changes in the health of the respondents in MIDUS limits the potential for significant results in a study with this design. The mean IADL score rose from 3.53 to 5.08 on a 0–21 scale between 1995 and 2005. In the same time, the mean for chronic illness rose from 2.36 to 2.45 on a scale of 0–29. This might explain why neither 1995 religion nor 1995 psychological resources had any effect on changes in three of the health outcomes. However, this cannot be the whole story because self-rated health declined only by a very small amount, from a mean of 3.51 to 3.49. Most respondents said they were in very good or excellent health in both waves. And yet psychological resources had a positive effect on self-ratings of health. Given the high initial scores it is likely that religion (through psychological resources) is helping maintain good health and staving off the onset of ill-health rather than improving it.

Third, we tested only one mediation model, featuring the role of psychological resources. As indicated earlier, there are several possible mechanisms linking religion to physical health, including health behaviors and social networks. These are undoubtedly important but our SEM analyses would have become extremely complicated had we inserted additional 1995 mediators (e.g., a measure of frequency of exercise, a question on smoking, an item on social networks) not least because paths to and from these factors and existing 1995 measures would need to be estimated. Future studies in this area using this method should substitute health behaviors or social networks for psychological resources.

Fourth, we cannot go into detail with respect to the physical health measures. The term "physical health" covers a very wide range of conditions and although MIDUS enables us to break down health outcomes into broad categories it is highly likely that the influence of religion on health is occluded by the fact they are each quite heterogeneous. For example, it is assumed that religion affects health by shaping lifestyles and behaviors and these in turn have a stronger effect on some health conditions than on others. Religious proscriptions might have a stronger effect on diseases associated with behaviors such as overeating, drug abuse, heavy smoking and drinking, and sexual promiscuity. In short, religion might "target" certain illnesses better than others. Similarly, religious counseling, where it is provided, might target certain conditions, such as hypertension, better than others. In short, "the effect of religion on morbidity . . . may vary across specific diseases and disorders" (Ellison and Levin 1998:715).

Conclusion

This study set out to make two contributions to the research on religion and physical health. The first was empirical. In a large, nationally representative sample of adult Americans aged 25–75 with a 10-year follow-up does religiosity have a positive effect on physical health? The second was theoretical. If religiosity does have a positive effect on health what could explain it? The study is noteworthy in its use of multiple measures of psychological resources and health status. The results suggest that the association between religion and physical health is not as robust as some other writers have stated. Instead, it replicates previous studies that found no connection between religion and functional disability. It indicates clearly the need to consider diverse measures of health status. It suggests that psychological resources will mediate the effect of religion when health measures have an obvious psychological component and indicates the need to test this mediation hypothesis on health outcomes that are objective, third-party assessments or diagnoses.

Future work, besides considering a range of physical health outcomes and using objective measures, should experiment with different mechanisms, such as social networks, and should also pay attention to the possible interaction between religious involvement and other factors known to influence physical health. For example, Schieman, Nguyen, and Elliot (2003:208) find that religiosity is a resource that bolsters mastery but only among people with greater educational and financial resources. This interaction needs to be embedded in the mediation model. The power of

psychological resources to mediate the effect of religion on physical health might well depend on other characteristics of the individual.

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Supporting Information

The following supporting information is available for this article:

Appendix S1. Table A: Scales of psychological resources and Figure A: Confirmatory factor loadings of religion across two waves.

Supporting Information may be found in the online version of this article at wileyonlinelibrary.com.

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