Religious Attendance and Loneliness in Later Life

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Purpose of the Study: Studies show that loneliness is a major risk factor for health issues in later life. Although research suggests that religious involvement can protect against loneliness, explanations for this general pattern are underdeveloped and undertested. In this paper, we propose and test a theoretical model, which suggests that social integration and social support are key mechanisms that link religious attendance and loneliness. **Design and Methods:** To formally test our theoretical model, we use data from the National Social Life Health and Aging Project (2005/2006), a large national probability sample of older adults aged 57–85 years. **Results:** We find that religious attendance is associated with higher levels of social integration and social support and that social integration and social support are associated with lower levels of loneliness. A series of mediation tests confirm our theoretical model. **Implications:** Taken together, our results suggest that involvement in religious institutions may protect against loneliness in later life by integrating older adults into larger and more supportive social networks. Future research should test whether these processes are valid across theoretically relevant subgroups.

Key Words: Religion, Social isolation, Social support

When adults approach the end of the life course, they retire from work, their children grow up and move away, they experience the loss of aging peers, and health conditions increasingly limit social activities. Under these unique conditions, older adults are especially vulnerable to loneliness (de Jong Gierveld & Havens, 2004; Hawkley & Cacioppo, 2007). As an important indicator of social well-being in later life, loneliness is known to increase the risk of poor health and premature death (Berkman & Syme, 1979; Cacioppo, Hughes, Waite, Hawkley, & Thisted, 2006; Cornwell & Waite, 2009b; Fees, Martin, & Poon, 1999).

Although the risk of social isolation and loneliness increases in old age, Carr and Moorman (2011) note that these conditions are "neither an inevitable nor universal feature of aging" (p. 153). If Carr and Moorman are correct, how do some older adults delay or avoid the conditions of isolation and loneliness? Research suggests that religious attendance can be an integrating force throughout the life course and especially in later life, as older adults exit social roles that were once tied to the family and work-related activities (Idler et al., 2003; Krause, 1997, 2008; Levin & Chatters, 1998).

Recent research by Idler and colleagues (2009) underscores the complex nature of the religious attendance variable. As they point out, most worship services include many facets, including rituals performed by clergy and congregants, scriptural readings, spoken and silent prayers, vocal and instrumental music, and opportunities for donations of time and money, among other elements. Worship services occur in sacred places, and at regularly scheduled times, and the experiences may elicit a broad range of emotions—positive and negative—from those present. Further, individual

participants may be able to give and receive various types of social support, to engage in exchanges about the worship activities and other matters with their fellows. In light of these diverse features of religious worship practices, Idler and colleagues conclude that: "It would appear that the single item of attendance at services—usually the social representative of the dimension of organizational religiousness—is a marker for a multidimensional experience" (p. 4).

Although several studies show that regular attendance at religious services is associated with lower levels of social isolation and loneliness (Gray, 2009; Johnson & Mullins, 1989; Kobayashi, Cloutier-Fisher, & Roth, 2009; Koenig, McCullough, & Larson, 2001; Schwab & Petersen, 1990), additional investigation is needed to explain these patterns. In this paper, we draw on "multidimensional experience" perspective of Idler and colleagues (2009) to develop a theoretical model, which suggests that social integration and social support are key mechanisms that link religious attendance and loneliness. We also use data collected from a nationally representative sample of older adults to formally test our model.

Theoretical Model

Figure 1 presents our theoretical model, which is defined by four indirect processes. First, we expect that religious attendance will reduce loneliness by increasing social integration (A→B→D). Second, we expect that religious attendance will increase social support by increasing social integration (A→B→C). Third, we expect that religious attendance will reduce loneliness by increasing social support (A→C→D). Finally, we expect that social integration will reduce loneliness by increasing social support (B→C→D). In the following paragraphs, we develop each of these indirect processes in greater detail.

Although social relationships have many dimensions, researchers typically emphasize the structure of social networks and the quality of social bonds (Carr & Moorman, 2011; House, Umberson, & Landis, 1988). Social integration is the structural element of social relationships and is defined by the number of ties in one's social network and the frequency of contact with network members (House et al., 1988). Social integration indicates the degree to which individuals are socially connected or socially isolated. Social support, in contrast, is the quality element of social relationships and is defined by the perception that or actual extent to which social ties meet the basic social needs of individuals (Karren, Hafen, Smith, & Frandsen, 2006). Social support indicates, therefore, the degree to which one's social ties can be counted on for emotional, material, or informational assistance.

Over a century ago, Durkheim (1912/1995) established the theoretical foundation for the integrative function of religious rituals. Since the publication of this seminal work, researchers have
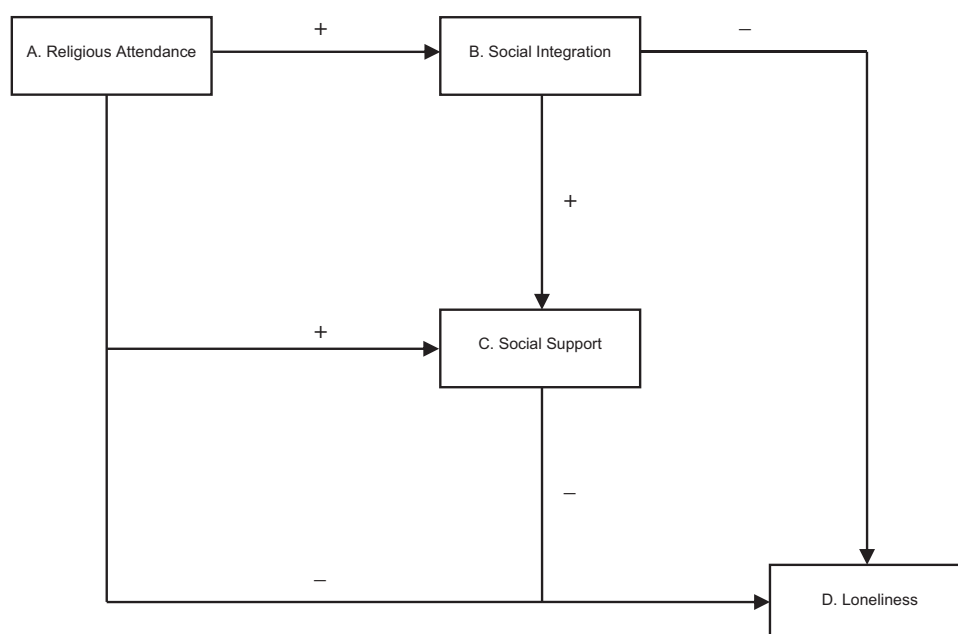

Figure 1. Theoretical model linking religious attendance and loneliness through social integration and social support.

further specified the ways in which religious attendance may enhance the structure of social relationships. First, it is well known that friendships are most likely to develop among individuals who share common interests, activities, and values. Worship services bring together such people on a regular basis to engage in shared rituals and other activities that are regarded as sacred (Bradley, 1995; Ellison & George, 1994). These joint activities facilitate the cultivation of friendships and tend to build feelings of closeness and solidarity among participants (Krause, 2006, 2008; Lim & Putnam, 2010). Feelings of solidarity may be augmented by the efforts of religious institutions and their leaders to build a sense of belonging among members, via the rhetoric of community and extended family as well as through regular social activities. In addition, congregations sponsor various opportunities for volunteering and involvement in charitable pursuits, and these activities may also build connections among participants (Wilson & Janoski, 1995). Further, congregation members may be especially prone to participate in secular prosocial and civic engagements, which can extend social networks (Musick & Wilson, 2008). Religious institutions also afford opportunities for joint attendance and other activities among spouses and partners and sometimes other family members as well (Ellison, Burdette, & Wilcox, 2010). Thus, religious attendance has been linked with larger social networks and greater contact with network members (Bradley, 1995; Ellison & George, 1994; Idler & Kasl, 1997a; Krause, 2006; McIntosh, Sykes, & Kubena, 2002).

Religious attendance can also enhance the stock and quality of supportive social ties (Bradley, 1995; Ellison & George, 1994; Idler, 1987). This may result from the role of congregations in fostering social integration because greater social integration provides the structural basis for greater social support (Berkman, Glass, Brissette, & Seeman, 2000; House et al., 1988). However, this may also reflect the influence of more direct and intentional processes. Briefly, religious discourse often encourages helping persons who are less fortunate or who have specific needs (Ellison, 1992). There is a wealth of evidence that religious congregations serve as conduits for various types of formal aid (e.g., programs, ministries, counseling) and informal assistance (e.g., tangible, informational, and socioemotional) among individual members (Krause, 2008; Taylor, Chatters, & Levin, 2004). In addition, religious congregations may help to strengthen the quality of familial relationships, by providing normative guidance regarding the definition and conduct of family roles (e.g., as "good" spouses, parents, grandparents, etc.) and imbuing these roles with special meaning and significance (Mahoney, Pargament, Murray-Swank, & Murray-Swank, 2003). Consistent with this logic, studies have linked religious involvement with the quality of relationships among spouses and romantic partners (Ellison et al., 2010), parents and adult children (King, 2010), and grandparents and grandchildren (King & Elder, 1999).

If regular religious attendance encourages the development and maintenance of social ties and supportive relationships, it may indirectly protect against loneliness through the mechanisms of social integration and social support. Loneliness is defined by the subjective sense that one's social relationships are lacking in either quantity or quality (Cacioppo et al., 2002; Carr & Moorman, 2011; Karren et al., 2006; Russell, Peplau, & Cutrona, 1980). In accordance with this definition, studies show that both higher levels of social integration and social support are associated with lower levels of loneliness (e.g., feeling alone, left out, and isolated) among older adults (de Jong Gierveld & van Tilburg, 1995; Hawkley et al., 2008; Heylen, 2010; Pinquart & Sorenson, 2003).

Alternative Models

Although our theoretical model suggests that religious attendance may protect against loneliness by integrating older adults into larger and more supportive social networks, it is important to acknowledge that these associations could be at least partially spurious due to processes related to health and personality selection.

Because religious attendance is a public behavior that requires regular travel to another location, it should require a certain level of health (Idler, 1987). The idea is that some people are able to attend religious services more frequently and to develop more supportive relationships simply because they are happier and healthier in the first place. Studies show that physical health problems, including broken hips, cancer, stroke, and disability can undermine or limit public religious activities in old age (Benjamins, Musick, Gold & George, 2003; Cornwell, Schumm, & Laumann 2008; Idler & Kasl, 1997a, 1997b; Idler et al., 2009; Kelley-Moore & Ferraro, 2001). Mental health issues could also lead people to avoid social activities and social contact and to rate aspects of their social relationships

(e.g., number of friends or the availability of social support) less favorably (Cornwell & Waite, 2009b; Johnson, 1991; Strawbridge, Shema, Cohen, & Kaplan, 2001). Although we have known for some time that the association between religious attendance and well-being (e.g., life satisfaction and mental health) may persist with adjustments for health status (Idler, 1987; Levin, Markides, & Ray, 1996; Markides, Levin, & Ray, 1987; Strawbridge, Shema, Cohen, Robert, & Kaplan, 1998), few studies consider how health selection processes might influence outcomes related to social integration and social support (Idler & Kasl, 1997a). To be conservative, subsequent analyses control for mental and physical health status.

Because religious attendance is a social activity, individuals with prosocial personality types may be selected into religious communities (Bradley, 1995; Hill, Burdette, & Idler, 2011). Personalities are patterned ways of thinking, feeling, and behaving. Some people are able to attend religious services more frequently and to develop more supportive relationships simply because they have more outgoing and attractive personalities. Research suggests that religious involvement is reliably associated with several personality characteristics, including lower levels of psychoticism (risk taking and lack of responsibility) and higher levels of agreeableness (friendly and helpful to others), conscientiousness (dependability and self-discipline), and co-operativeness (Koenig, King, & Carson, 2012). There is also some evidence to suggest that personality selection can at least partially attenuate the effects of religious attendance on indicators of social integration and social support (Bradley, 1995). In an effort to account for the possibility of personality selection, subsequent analyses control for interviewer ratings of attractiveness and self-reports of engagement in secular social activities.

Design and Methods

Data

We use data from the National Social Life, Health, and Aging Project (NSHAP) to formally test our theoretical model. The NSHAP is a nationally representative sample of older adults living in the United States. The National Opinion Research Center, along with Principal Investigators at the University of Chicago, conducted 3,005 interviews during 2005 and 2006 yielding a sample of U.S. adults aged 57–85 years (Suzman, 2009). Face-to-face interviews took place in respondents' homes.

Because one of the main goals of the NSHAP is to explore the importance of social relationships in the lives of older adults, the data include questions concerning the quantity and quality of social relationships (Cornwell, Lauman, Schumm, & Graber, 2009). Most of the questions concerning loneliness were asked in leave-behind surveys, and as a consequence, many respondents are missing in subsequent analyses. After listwise deletion of missing cases, our final analytic sample included 2,165 respondents. All analyses are weighted to adjust for respondent selection and nonresponse based on age and urbanicity.

Focal Variables

"Religious attendance" is measured with a single item. Respondents were asked, "Thinking about the past 12 months, about how often have you attended religious services?" Original response categories for this item included (0) *never*, (1) *less than once a year*, (2) *about once or twice a year*, (3) *several times a year*, (4) *about once a month*, (5) *every week*, and (6) *several times a week*. We recoded religious attendance by combining categories of attendance that are theoretically and empirically similar. For example, the categories of "less than once a year" and "about once or twice a year" capture sporadic yearly attendance and produce similar means on our focal outcomes. Our final religious attendance measure includes the following categories: (0) *never attend*, (1) *attend less than once a year or about once or twice a year*, (2) *attend several times a year or about once a month*, and (3) *attend every week to several times a week*. Although studies often treat religious attendance categorically, we employ a continuous specification to reflect observed linear associations with our focal outcomes. This continuous specification is consistent with several previous studies (e.g., Idler & Kasl, 1997a; Kelley-Moore & Ferraro, 2001; Krause, 2002a; Levin et al., 1996).

"Social integration" is measured by social network size and frequency of contact with network members. Respondents were asked, "Looking back over the last 12 months, who are the people with whom you most often discussed things that were important to you?" Respondents were then asked to indicate how often they were in contact with each of the nominated network members. Responses to the contact question were coded (0) *less than once a year* to (8) *every day*. Our final social integration measure is the product of network size and average frequency of contact with network members. The

original social integration measure ranged from (0) to (80); however, we top coded this measure to compensate for small sample sizes at the high end of the distribution. Our final measure ranges from (0) to (40), with higher scores indicating higher levels of social integration. Again, we employ a continuous specification to reflect observed linear associations with our focal outcomes.

"Social support" is measured as the mean response to two items that tap perceptions of the availability of instrumental and emotional support from friends. Specifically, respondents were asked to indicate how often they could "rely on friends for help" if they have a problem and "open up to friends" if they needed to talk about worries. Response categories for these items include (0) *none/never or hardly ever*, (1) *some of the time*, and (2) *often*. This measure ranges from (0) to (2), with higher scores indicating higher levels of social support. An exploratory principal components factor analysis with varimax rotation produced a single factor, with loadings of 0.87 for both items. A reliability analysis also suggests adequate internal consistency for two items (α = .67).

"Loneliness" is measured as the mean response to four items. Respondents were asked questions from a shortened version of the Revised University of California, Los Angeles Loneliness Scale (R-UCLA) (Cornwell & Waite, 2009a; Hughes, Waite, Hawkley, & Cacioppo, 2004; Russell et al., 1980). Specifically, respondents were asked to indicate how often they felt isolated, left out, or lacking in companionship. Response categories for these items were coded (0) *hardly ever or never*, (1) *some of the time*, and (2) *often*. To improve the reliability of our measurement of loneliness, we included an extra item to indicate how often in the past week the respondent felt lonely. Response categories for this item were coded (0) *rarely*, (1) *some of the time*, (2) *occasionally*, and (3) *most of the time*. All loneliness items were standardized to account for differences in response formats. The final loneliness measure ranges from –0.62 to –2.96, with higher scores indicating higher levels of loneliness. An exploratory principal components factor analysis with varimax rotation produced a single factor, with loadings ranging from 0.66 to 0.83. A reliability analysis also suggests adequate internal consistency (α = .79).

Selection Variables

Health selection is indicated by mental and physical health status. "Depression" is measured as the mean response to six items taken from an established shortened version of the Center for Epidemiologic Studies Depression Scale (CES-D) (Kohout, Berkman, Evans, & Cornoni-Huntley 1993). These items capture symptoms experienced in the past week, including "did not feel like eating," "everything was an effort," "could not get going," "felt depressed," "sleep was restless," and "felt sad." Response categories for each of these items range from (0) *rarely or none of the time* to (3) *most of the time* so that higher index scores would indicate higher levels of depression. We would like to acknowledge that the original version of shortened CES-D included 11 items. We omitted two items (enjoyed life and felt happy) because they failed to load on our six-item factor. We also omitted three items (felt lonely, felt people disliked me, and people were unfriendly) because they are conceptually related to our focal outcomes. An exploratory principal components factor analysis with varimax rotation produced a single factor for our six items, with loadings ranging from 0.55 to 0.72. A reliability analysis also suggests adequate internal consistency (α = .73).

Physical health is measured in three ways. "Chronic conditions" are indicated by a continuous count of diagnosed conditions, including arthritis, ulcers, emphysema, asthma, stroke, hypertension, diabetes, alzheimer's or dementia, cirrhosis, leukemia, lymphoma, skin cancer, cancer, poor kidney function, and thyroid problems. "Disability" is indicated by nine activities of daily living, including walking one block, walking across a room, dressing, eating, bathing/showering, getting in or out of bed, using the toilet, driving a car during the day, and driving a car during the night. Response categories for each of these items range from (0) *no difficulty* to (3) *unable to do*. We recoded this measure to distinguish between respondents who (1) *had any difficulty with these activities* and (0) *those who did not*. "Vision impairment" and "hearing impairment" are indicated by interviewer assessments. Interviewers were asked to "rate the respondent's functional health and behavior during the interview" on scales that range from "practically blind versus normal vision" and "practically deaf versus normal hearing." Response categories for these items are coded (0) for *normal vision or normal hearing* and (1) for *any vision or hearing impairment*.

Personality selection is indicated by the respondent's attractiveness and frequency of attendance at secular meetings. "Attractiveness" is measured

as the mean response to two items that tap the respondent's physical appearance and personality (α = .74). Interviewers were asked to "describe the respondent" using scales that ranged from (0) *physically attractive* to (4) *not physically attractive* and (0) *attractive personality* to (4) *not attractive personality*. Our final attractiveness measure ranges from (0) to (4), with higher scores indicating greater attractiveness as determined by the interviewer. "Meeting attendance" is measured with a single item. Respondents were asked, "In the past 12 months, how often did you attend meetings of an organized group." The survey provided several examples of organized groups, including a choir, a committee or board, a support group, a sports or exercise group, a hobby group, and a professional society. Response categories for this item range from (0) *never attend meetings* to (6) *attend meetings several times a week*.

Background Variables

We also control for several relevant background variables that are known to be associated with religious attendance and our focal outcomes. These variables include age, gender, race and ethnicity, education, employment status, income, marital status, and number of children and grandchildren. "Age" is a continuous variable, ranging from 57 to 85. "Gender" is coded (1) for *female* and (0) for *male participants*. "Race and ethnicity" is based on respondents' self-report of racial/ethnic identification and is coded with dummy variables indicating Black, Hispanic, other race/ethnicity, and non-Hispanic White (the reference category). "Education" is also coded with dummy variables indicating bachelor's degree or more, some college, high school diploma or equivalent, and less than a high school diploma (the reference category). "Employment status" is coded (1) for *currently employed* and (0) for *currently unemployed*. "Relative income" is measured as the mean response to two items (α = .70). Respondents were asked to compare their income to (a) people they know personally and (b) American families in general. Response categories for these items range from (0) *far below average* to (4) *far above average*. "Marital status" is dummy coded to indicate those who are (1) *married or living with a spouse* and (0) *those who are divorced, separated, widowed, or single*. "Number of children and grandchildren" is based on the respondent's total number of living daughters, sons, and grandchildren. Because we top coded the number of living children and grandchildren at 20 to compensate for small sample sizes at the high end of the distribution, our final measure ranges from (0) to (20).

Analytic Strategy

Our analytic strategy proceeds in three steps. In the first step, we present descriptive statistics for all study variables, including minimum and maximum values, means, standard deviations, and alpha reliability estimates (Table 1). In the second step, we estimate a series of ordinary least squares regressions to model our focal continuous outcomes (Tables 2–4). All statistical manipulations in these steps are performed using STATA10. In the final step, we calculate a series of Sobel (1982) tests to formally assess the statistical significance of the indirect effects that define our theoretical model. The Sobel test is the most widely used mediation test and is now used in popular structural equation modeling software packages like LISREL, EQS, and Mplus (MacKinnon, 2008). Although structural equation modeling is the optimal approach for testing elaborate causal models, our theoretical model is relatively simplistic, with only four mediation paths of interest.

We estimate several regression models for each of our focal outcomes to provide the specific coefficients and standard errors that are required to calculate our Sobel tests. Table 2 presents the association between religious attendance and social integration without controls (Model 1) and with controls for background variables (Model 2) and selection factors (Model 3). We are especially interested in the coefficient for religious attendance in Model 3 (A→B). Table 3 assesses the association between religion attendance and social support without controls (Model 1) and with controls for background variables (Model 2), selection factors (Model 3), and social integration (Model 4). We are mainly interested in the coefficients for religious attendance in Model 3 (A→C) and for social integration in Model 4 (B→C). Table 4 presents the association between religion attendance and loneliness without controls (Model 1) and with controls for background variables (Model 2), selection factors (Model 3), social integration (Model 4), and social support (Model 5). Because our theoretical model emphasizes the indirect effect of religious attendance on loneliness through social integration and social support, we are not interested in the direct effect of religious attendance on loneliness.

Table 1. Weighted Descriptive Statistics for Selected Study Variables

	Range	Mean/proportion	SD	Reliability (α)
Focal variables				
Loneliness	–0.62 to 2.96	–0.01	0.78	0.79
Religious attendance	0.00–3.00	1.93	1.17	
Social integration	0.00–40.00	19.71	11.71	
Social support	0.00–2.00	1.12	0.63	0.67
Selection variables				
Attractiveness	0.00–4.00	2.80	0.81	0.74
Meeting attendance	0.00–6.00	2.65	2.14	
Depression	0.00–18.00	3.70	3.39	0.73
Chronic conditions	0.00–9.00	2.23	1.52	
Disability	0.00–1.00	0.50		
Vision impairment	0.00–1.00	0.42		
Hearing impairment	0.00–1.00	0.40		
Background variables				
Age	57.00–85.00	69.10	7.79	
Female participants	0.00–1.00	0.52		
Black	0.00–1.00	0.13		
Hispanic	0.00–1.00	0.09		
Other	0.00–1.00	0.03		
College degree	0.00–1.00	0.24		
Some college	0.00–1.00	0.31		
High school	0.00–1.00	0.26		
Employed	0.00–1.00	0.32		
Relative income	0.00–4.00	1.85	0.90	0.70
Married	0.00–1.00	0.65		
Children/grandchildren	0.00–20.00	7.97	5.75	

Notes: National Social Life, Health, and Aging Project (2005/2006). *N* = 2,165.

In fact, a direct effect is not required to assess an indirect effect (MacKinnon, 2008). To assess the indirect effects of interest, we are primarily interested in the coefficients for social integration in Model 4 (B→D) and for social support in Model 5 (C→D).

After testing each link in our theoretical model, we use the appropriate coefficients and standard

Table 2. Ordinary Least Squares Regression of Social Integration

	Model 1	Model 2	Model 3
Focal variables			
Religious attendance	1.30 (0.13)***	1.03 (0.11)**	0.69 (0.07)*
Selection variables			
Attractiveness			1.08 (0.07)*
Meeting attendance			0.57 (0.11)***
Depression			0.15 (0.04)
Chronic conditions			0.16 (0.02)
Disability			0.33 (0.01)
Vision impairment			–1.04 (0.04)
Hearing impairment			0.09 (0.004)
Model statistics			
Intercept	17.65***	19.31***	16.28***
Model F	15.46***	18.49***	12.09***
Adjusted R-squared	0.02	0.11	0.13

Notes: National Social Life, Health, and Aging Project (2005/2006). Shown are unstandardized coefficients with standardized coefficients in parentheses. Model 1 is unadjusted. Models 2 and 3 adjust for age, gender, race and ethnicity, education, employment status, relative income, marital status, and number of children/grandchildren. *N* = 2,165. *$p < .05$, **$p < .01$, ***$p < .001$ (two-tailed tests).

Table 3. Ordinary Least Squares Regression of Social Support

	Model 1	Model 2	Model 3	Model 4
Focal variables				
Religious attendance	0.06 (0.12)***	0.07 (0.13)***	0.04 (0.08)***	0.04 (0.07)**
Social integration				0.01 (0.22)***
Selection variables				
Attractiveness			0.03 (0.04)	0.02 (0.03)
Meeting attendance			0.03 (0.11)**	0.03 (0.09)**
Depression			–0.01 (0.03)	–0.01 (0.04)
Chronic conditions			0.02 (0.05)*	0.02 (0.04)
Disability			–0.04 (0.04)	–0.05 (0.04)
Vision impairment			–0.007 (0.006)	0.01 (0.004)
Hearing impairment			–0.003 (0.003)	–0.003 (0.005)
Model statistics				
Intercept	1.02***	1.86***	1.85***	1.66***
Model F	28.48***	19.28***	18.33***	21.62***
Adjusted R-squared	0.01	0.11	0.12	0.17

Notes: National Social Life, Health, and Aging Project (2005/2006). Shown are unstandardized coefficients with standardized coefficients in parentheses. Model 1 is unadjusted. Models 2–4 adjust for age, gender, race and ethnicity, education, employment status, relative income, marital status, and number of children/grandchildren. $N = 2,165$. *$p < .05$, **$p < .01$, ***$p < .001$ (two-tailed tests).

errors from our separate regressions to execute the following formula:

$$z = \frac{ab}{\sqrt{a^2 s_b^2 + b^2 s_a^2}}$$

In this formula, a is the unstandardized coefficient for a given mediator regressed on a predictor variable, b is the coefficient for a given outcome regressed on a given mediator, s_a is the standard error of a, and s_b is the standard error of b. As indicated in Figure 1, we are primarily interested in four indirect effects: religious attendance on loneliness through social integration (A→B→D), religious attendance on social support through social integration (A→B→C), religious attendance on loneliness through social support (A→C→D), and social integration on loneliness through social support (B→C→D).

Missing Data

Missing data on the majority of our measures are minimal. However, nearly 21% of the total possible sample failed to respond to three loneliness items (felt isolated, left out, or lacking in companionship) that were asked in a leave-behind survey. Because so many respondents are missing on these items, it is important to consider the possibility of systematic nonresponse. To formally assess this issue, we estimated a binary logistic regression model predicting the log odds of nonresponse. In these analyses, the dependent variable is dummy coded such that respondents who were missing on loneliness were given a value of one, and those who had a valid response were given a value of zero. The independent variables include all selected variables (except loneliness).

These results suggest that nonresponse on loneliness is mostly random. In fact, we observed only three statistically significant odds ratios. Although religious attendance increased the odds of nonresponse (odds ratio [OR] = 1.96, $p < .01$), meeting attendance (OR = 0.74, $p < .01$) and some college (OR = 0.28, $p < .05$) reduced the odds of nonresponse. As a precaution, we replicated our regression models using a single loneliness item (felt lonely) that almost all respondents completed in the original in-home survey. These results were substantively identical to our analysis with the multiitem loneliness index. Because nonresponse is mostly random and research argues against imputing data on dependent variables (Cohen & Cohen, 1985), we use listwise deletion to handle missing data in subsequent analyses.

Results

Descriptive Analysis

According to Table 1, the average respondent reports low levels of loneliness and irregular religious attendance (about once a month). Respondents also tend to report low levels of social integration and moderate levels of social support. Characteristics related to personality selection suggest moderately

Table 4. Ordinary Least Squares Regression of Loneliness

	Model 1	Model 2	Model 3	Model 4	Model 5
Focal variables					
Religious attendance	–0.04 (0.06)*	–0.03 (0.05)*	–0.01 (0.01)	–0.004 (0.01)	–0.0004 (0.0007)
Social integration				–0.004 (0.06)*	–0.003 (0.04)
Social support					–0.11 (0.09)***
Selection variables					
Attractiveness			–0.02 (0.02)	–0.02 (0.02)	–0.02 (0.02)
Meeting attendance			–0.01 (0.04)	–0.01 (0.03)	–0.01 (0.02)
Depression			0.10 (0.43)***	0.10 (0.43)***	0.10 (0.43)***
Chronic conditions			–0.01 (0.02)	–0.01 (0.02)	–0.01 (0.01)
Disability			–0.01 (0.01)	–0.01 (0.01)	–0.02 (0.01)
Vision impairment			–0.02 (0.01)	–0.03 (0.02)	–0.03 (0.02)
Hearing impairment			0.01 (0.01)	0.01 (0.01)	0.01 (0.01)
Model Statistics					
Intercept	0.02	1.14***	0.55*	0.61*	0.79**
Model F	5.65*	13.56***	41.67***	39.99***	38.38***
Adjusted R-squared	0.003	0.13	0.29	0.30	0.30

Notes: National Social Life, Health, and Aging Project (2005/2006). Shown are unstandardized coefficients with standardized coefficients in parentheses. Model 1 is unadjusted. Models 2–4 adjust for age, gender, race and ethnicity, education, employment status, relative income, marital status, and number of children/grandchildren. $N = 2,165$. *$p < .05$, **$p < .01$, ***$p < .001$ (two-tailed tests).

high levels of attractiveness and sporadic secular meeting attendance (several times a year). In terms of characteristics related to health selection, respondents report varying levels of health status, including low levels of depression and approximately two chronic conditions. Half of the sample has at least one activity limitation, and nearly half have normal vision and hearing.

In terms of racial/ethnic composition, the sample includes non-Hispanic Whites (75%), Blacks (13%), Hispanics (9%), and respondents of other races and ethnicities (3%). The average respondent is 69 years of age. Education levels include college degrees (24%), some college (31%), high school degrees (26%), and less than high school (19%). Most respondents are unemployed (68%) and married or living with a partner (65%). With respect to relative income, the average respondent views their income as similar to people they know and to American families in general.

Mediation Analysis

Table 2 presents our regression of social integration. These estimates indicate that religious attendance is positively associated with social integration (A→B). In other words, older adults who attend religious services more frequently also tend to report larger social networks and more contact with network members than older adults who attend religious services less frequently or not at all.

It is also important to note that this association is consistent across models, without controls (Model 1) and with controls for background variables (Model 2) and factors related to health and personality selection (Model 3).

Table 3 provides our regression of social support. These results show that religious attendance is positively associated with social support (A→C). This association is consistent across models, without controls (Model 1) and with controls for background variables (Model 2), factors related to health and personality selection (Model 3), and social integration (Model 4). Model 4 directly tests the next link in our theoretical model. Specifically, we observe that social integration is positively associated with social support (B→C). These patterns suggest that older adults who attend religious services more frequently and report larger social networks and more contact with network members also tend to report being able to rely on friends for support more often than older adults who report less frequent religious attendance and lower levels of social integration.

Table 4 presents our regression of loneliness. These estimates suggest that religious attendance is less consistently associated with loneliness than it is with social integration and social support. Although religious attendance is inversely associated with loneliness without controls (Model 1) and with controls for background variables (Model 2), this association is attenuated to insignificance with

adjustments for factors related to health selection (Model 3). Models 4 and 5 directly test the final links in our theoretical model. Model 4 shows that social integration is inversely associated with loneliness (B→D), whereas Model 5 indicates that social support is inversely associated with loneliness (C→D). These patterns suggest that those older adults who report larger social networks and more contact with network members and being able to rely on friends for support more often also tend to report lower levels of feeling lonely, isolated, left out, and lacking in companionship than older adults who report lower levels of social integration and social support.

Finally, we formally assess our proposed indirect effects by calculating a series of Sobel tests. In support our theoretical model, we observe statistically significant indirect effects for: religious attendance on loneliness through social integration (A→B→D, $z = -2.16$, $p < .05$), religious attendance on social support through social integration (A→B→C, $z = 2.11$, $p < .05$), religious attendance on loneliness through social support (A→C→D, $z = -3.23$, $p < .01$), and social integration on loneliness through social support (B→C→D, $z = -3.44$, $p < .001$).

Discussion

Although research suggests that religious involvement can protect against loneliness, explanations for this general pattern are underdeveloped and undertested. Building on previous research, we proposed and tested a theoretical model, which suggests that social integration and social support are key mechanisms that link religious attendance and loneliness.

Our results indicate that religious attendance is associated with higher levels of social integration and social support and that social integration and social support are associated with lower levels of loneliness. Importantly, these results persist with controls for health and personality selection and a range of relevant covariates. Our mediation tests confirm our theoretical model, showing that religious attendance may protect against loneliness in later life by integrating older adults into larger and more supportive social networks.

Our findings are generally consistent with previous studies of the effects of religious involvement on social integration (Bradley, 1995; Ellison & George, 1994; Idler & Kasl, 1997a; Krause, 2006; McIntosh et al., 2002) and social support (Bradley,

1995; Ellison & George, 1994; Ellison & Levin, 1998; Krause, 2008). To the best of our knowledge, we are among the first to formally test any mechanisms linking religious attendance and loneliness.

The present study is limited in several respects. First, because our data are cross-sectional, we cannot establish the causal order of our focal relationships. Although we assume that factors like social integration, social support, and depression predict loneliness, loneliness might also undermine social integration and social support by increasing symptoms of depression. Social ties with family and friends could also facilitate or even motivate involvement in a religious community. People who are embedded in larger social networks may feel especially comfortable around larger groups of people. They could also be presented with more opportunities to attend religious services and experience greater social pressure to attend. In supplemental analyses (not shown), we find that respondents with larger social networks (one dimension of social integration) and higher levels of social support attend religious services more frequently than those with smaller social networks and lower levels of social support. Second, our analysis is limited to a single item indicator of religious involvement—religious attendance. Because the present study omits measurements for other religious activities like Bible study, prayer groups, choir, formal church roles, and church-sponsored volunteering, our analysis clearly underestimates the integrative function of religious participation in later life. Finally, our indicators of personality are limited to interviewer ratings of attractiveness and attendance at secular meetings. These measures may loosely indicate prosocial personality types, but they are less than ideal. Formal assessments through established personality inventories are needed to truly eliminate the possibility of personality selection.

Despite these limitations, our results demonstrate that religious attendance can be an important social resource for older adults. In addition to addressing the limitations of our study, future research should consider whether our theoretical model or elements of our model hold for men and women and different ages, social classes, and racial groups. For example, different racial groups may have different cultural values that shape the maintenance of relationships (Krause, 2006) and expressions of loneliness. Krause (2002b) finds that African American adults give and receive more support in the church than Whites. This example suggests that religious involvement may be especially important for some of the more

disadvantaged groups in society. Research along these lines would surely contribute to our understanding of the role of religious involvement in process related to social well-being in later life.

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