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Religiousness and Longitudinal Trajectories in Elders' Functional Status

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Abstract

The purpose of this study was to examine the effects of religiousness on the trajectories of difficulties with activities of daily living (ADLs) and instrumental ADLs (IADLs) in community-dwelling older adults over a three-year period. Seven waves of data from the University of Alabama at Birmingham Study of Aging were analyzed using a hierarchical linear modeling method. The study was based on the 784 participants who completed interviews every six months between December 1999 and February 2004. Frequent religious service attendance was associated with fewer ADL difficulties and IADL difficulties at baseline. Furthermore, religious service attendance predicted slower increases for frequent churchgoers and steeper increases for less frequent churchgoers in IADL difficulties, controlling for variables related to demographics and resources. Religious service attendance was independently associated with ADL and IADL difficulties cross-sectionally. However, significant protective effects of religious service attendance were identified longitudinally only for the IADL trajectory.

Keywords

religiousness; elderly; functional status; HLM

The aim of this study was to examine the effect of religious involvement on the trajectories of community-dwelling elders' functional status. Factors that affect the trajectory of functional decline in community-dwelling elders are important because nearly 20% of older adults in the United States have one or more functional limitations (Federal Interagency Forum on Aging-Related Statistics 2004), and there are serious negative consequences from functional limitations for older adults and their families, including loss of independence and increased need for care. With the anticipated growth in the older population, the number of elders with limitations is expected to rise to 21 million by 2030 and 25 million by 2050 (Shirey and Summer 2000). Such increases will result in greater costs for Medicare and Medicaid and other publicly funded programs.

Recent studies have demonstrated health benefits of religious involvement for older adults (Benjamins 2004; George, Ellison, and Larson 2002; Hill et al. 2005), with some studies

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suggesting that religious involvement may delay the onset and/or slow the progression of functional limitations (e.g., Idler and Kasl 1997). A better understanding of the role that religious involvement plays in the disability process may thus have implications for the quality of life for older adults and their families and for reducing health care costs.

The possible mechanisms in which religious involvement produces beneficial effects on the disability process may include several components (Koenig 2008; Koenig, McCullough, and Larson 2001). Taylor, Chatters, and Levin (2004), writing on religion in the lives of African Americans, cited a number of theoretical explanations for relationships between religious participation and good health. One is that religious teachings and beliefs are often consonant with good health habits that can prevent disease and disability (Roff et al. 2005).

Religious participation also tends to build relationships with supportive resources. Individuals are more socially integrated with people and their communities by attending religious services and activities (Idler and Kasl 1997; Strawbridge et al. 2001). Religious communities provide opportunities to develop important social ties and support. Also, people who attend religious services regularly are likely to have larger social networks than those who do not (Idler 2002). Religious involvement provides older adults with regular opportunities to see friends and demonstrate to others that they are physically well. It also provides opportunities to hold positions of responsibility and respect. Attending religious services may thus increase older adults' levels of physical activities as well as social activities. Both social support and physical engagement are associated with slowing onset and worsening of disability (Koenig 2008).

Taylor et al. (2004) also noted that attendance at religious services tends to engender positive feelings. These may in turn reduce psychological stressors that can impinge on physical health. Religious involvement typically emphasizes optimism, connectedness to others, and the sense that one is loved and valued (Parker et al. 2002). In particular, the attitude of faith sustained and encouraged by religious participation may be particularly helpful in maintaining functioning (Snyder 2000).

The aim of the current study was to determine whether an individual's religious involvement contributes to the prediction of trajectories of difficulties with activities of daily living (ADLs) and instrumental ADLs (IADLs) when factors traditionally used to predict ADL and IADL trajectories are controlled. Specifically, we examined the relationship of each of three dimensions of religiousness measured at baseline to the trajectories of ADL and IADL difficulties at seven points over a three-year period using hierarchical linear modeling (HLM) techniques.

A number of researchers have examined the progression of functional limitations among older adults longitudinally (Avlund et al. 2004; de Leon et al. 1999, 2001; Deeg 2005; Gill, Hardy, and Williams 2002; Hardy and Gill 2004, 2005), with some using HLM to describe the extent and range of changes (de Leon et al. 2002; Li 2005a, 2005b). Prior research has identified demographic and social-psychological predictors of disability onset and functional change over time. Among those most frequently mentioned are social participation (Avlund et al. 2004; de Leon et al. 1999, 2001; de Leon, Glass, and Berkman 2003; Stuck et al. 1999), age (Deeg 2005; Hardy and Gill 2005; Li 2005a), education (Deeg 2005; Nusselder, Looman, and Mackenback 2005), race (Li 2005a), depression (Deeg 2005; Stuck et al. 1999), and self-efficacy (Hardy and Gill 2005).

Only a few studies have considered religiousness as a predictor of functional change over time (Benjamins 2004; Idler and Kasl 1997; Kelley-Moore and Ferraro 2001). The most widely cited is Idler and Kasl's (1997) examination of the effect of religious service attendance at baseline on functional disability over a 12-year period using a sample of older adults in New Haven. They found that attendance predicted higher levels of functional ability even when the

effects of a variety of other health and psychosocial factors were controlled. Kelley-Moore and Ferraro (2001), by contrast, found no relationship between religious service attendance at baseline and functional limitations three years later in a national sample of adults aged 60 years and older. More recently, Benjamins (2004) compared two waves of a national, longitudinal study of older adults and found a statistically significant relationship between religious service attendance at baseline and lower levels of functional limitations five years later.

The present study differs from these prior longitudinal examinations of religiousness and changes in physical difficulties in several ways. First, we measured functional difficulties at seven points in time over a three-year period. Second, unlike the prior three researchers, we used HLM techniques. This allowed us to examine predictors of both change and rates of change in functional difficulties over time. Like Li (2005a, 2005b), we established an equation describing the pattern of ADL difficulties over time. Third, we considered changes in ADL and IADL functions separately. Finally, the sample, although limited to one geographic area, overrepresented Blacks, men, and rural residents.

On the basis of the limited previous literature in this area, we expected frequent religious service attendance at baseline to make an independent contribution to slowing the rate of increase in reported ADL and IADL difficulties. Although we are aware of no previous work examining the relationship of private religious activities to the course of disability, we note that Helm et al. (2000) found that prayer was related to longer survival in those who were not functionally impaired. Thus, we hypothesized that high levels of private religious activity might contribute to slowing the rate of decline in ADL and IADL functioning. Although no previous work has linked intrinsic religiousness with trajectories of ADL and IADL change, we hypothesized that intrinsic religiousness at baseline would make an independent contribution to slowing declines in functional status over time.

Method

Participants

This study was based on secondary data analysis of the University of Alabama at Birmingham Study of Aging, a population-based, prospective, observational study of community-dwelling adults. The initial sample consisted of 1,000 adults aged 65 years and older selected from a list of Medicare beneficiaries in five central Alabama counties (three classified as rural and two classified as urban). The designation of counties as rural was based on the Alabama Rural Health Association's (1998) classification, a coding system involving the percentage employed within a county, the dollar value of agricultural products, the population per square mile, and the size of the largest city within the county. All counties designated as rural had more than 50% of their population residing in rural areas. The sample was stratified by county, race, and sex and included balanced numbers of Black men and women and White men and women (for details on participation recruitment, see Allman et al. 2004; Allman, Sawyer, and Roseman 2006). All baseline interviews were conducted in person and lasted approximately two hours. Follow-up interviews were conducted by telephone. The present study was based on the 784 participants who completed interviews every six months between December 1999 and February 2004. Of these participants, 53.7% were female and 52.4% were White. Table 1 presents additional characteristics of participants in the present study.

Measures

Functional difficulties—Participants reported whether they had difficulties with each of nine common ADLs (Kovar and Lawton 1994): turning from side to side in bed, going up and down stairs, getting out of bed or a chair, bathing or showering, dressing or undressing, eating, walking, getting outside, and getting to or using the toilet. We coded the number of activities

with which a participant had difficulty (zero to nine). Similarly, participants indicated whether they had difficulties performing six IADLs: using the telephone, doing light housework, doing heavy housework, preparing meals, shopping, and managing money. We coded the number of activities with which the participant had difficulty (zero to six).

Religiousness—To measure religiousness, we used a slightly modified version of the Duke University Religion Index (Koenig, Meador, and Parkerson 1997). This is a 5-item measure of the three major dimensions recommended by Koenig and Futterman (1995). A single item scored from 1 (never) to 6 (more than once a week) measured attendance at religious services or other religious meetings. Another item measured the frequency of private religious activities such as prayer, medication, or Bible study. Scores were coded from 1 (never) to 6 (more than once a week). Scores on 3 additional items were summed to measure intrinsic religiousness. Koenig et al. (1997) selected these items on the basis of their loading on the intrinsic religiousness factor of a principal-components factor analysis of the Hoge 10-item scale of intrinsic religiousness. Participants indicated how true each of the following statements was for them using a 5-point scale: “In my life, I experience the presence of the Divine” (i.e., God); “My religious beliefs are really what lie behind my whole approach to life”; and “I try hard to carry my religion over into all other dealings in life.” Scores on the intrinsic religiousness variable could range from 3 (low intrinsic religiousness) to 15 (high intrinsic religiousness). Cronbach's α for the intrinsic religiousness index was .83.

Sociodemographic characteristics—Measures were age in years, ethnicity (0 = White, 1 = Black), gender (0 = male, 1 = female), and residence (0 = urban, 1 = rural).

Resources—We included a number of variables considered to be resources to individuals in maintaining functional ability. Marital status was coded (1 = currently married, 0 = not currently married). Perceived social support was measured using the subscale of the Arthritis Impact Measure 2 (Ren, Kasix, and Meenan 1999). This subscale ranges from 4 to 20, with a higher score representing greater social support, and includes items asking respondents to indicate perceived availability of, sensitivity to, interest in, and understanding of friends and family in providing assistance. Cronbach's a with these participants was .70. This coefficient was smaller than expected, probably due to a ceiling effect (49% of the respondents scored at the top of the scale). Participants were also asked whether they received help from anyone (1 = yes, 0 = no). Income adequacy was measured on a scale ranging from 1 (is not enough to make ends meet) to 4 (allows you to do more or less what you want), and education was measured on a scale ranging from 6 or fewer years of school completed to 17 or more years. We measured physical health using a participant's score on the Charlson comorbidity measure (Charlson et al. 1986) giving one point for each disease category, without consideration of the severity of the conditions, and we assessed cognitive functioning using the Mini Mental State Examination (MMSE; Folstein, Folstein, and McHugh 1975).

Analysis Plan

The HLM procedure (also known as multilevel analysis, random-effects growth curve modeling, or mixed modeling) was used to estimate the trajectory of ADL and IADL difficulties over a three-year period. HLM has the capacity to analyze information about the rate and the pattern of change in targeted variables over multiple time points, taking into account inter-and intraindividual variability in change and cross-level interactions of time with predictors (Raudenbush and Bryk 2002; Singer 1998; Snijders and Bosker 1999). The hierarchical linear models were run separately for ADL and IADL difficulties using the HLM software (version 6.02; Raudenbush, Bryk, and Congdon 2005).

We used a two-level hierarchical linear model to predict individual change in ADL and IADL difficulties (Raudenbush and Bryk 2002; Raudenbush et al. 2005). The level 1 model specified the shape of individual change parameters (i.e., intercept, linear growth rate, and acceleration) over time. The level 2 models tested the effects of measures of baseline religiousness on the individual change parameters when controlling for the effects of demographic characteristics and resources available to an individual at baseline. These models assumed that individuals have different growth parameters. The two models are represented by the following equations:

$$\text{Level 1 model: } Y_{ij}=\beta_{0j}+\beta_{1j}(\text{Time})_{ij}+\beta_{2j}(\text{Time})_{ij}^{2}+\varepsilon_{ij}. \quad (1)$$

$$\text{Level 2 model: } \beta_{0j}= \gamma_{00}+\gamma_{01}\,(\text{Religiousness Measures})+\gamma_{02}\,(\text{Demographic Characteristics})+\gamma_{03}\,(\text{Resources})+u_{0j}, \quad (2)$$

$$\beta_{1j}= \gamma_{10}+\gamma_{11}\,(\text{Religiousness Measures})+\gamma_{12}\,(\text{Demographic Characteristics})+\gamma_{13}\,(\text{Resources})+u_{1j}, \quad (3)$$

$$\beta_{2j}= \gamma_{20}+\gamma_{21}\,(\text{Religiousness Measures})+\gamma_{22}\,(\text{Demographic Characteristics})+\gamma_{23}\,(\text{Resources})+u_{2j}. \quad (4)$$

Y_{ij} is the ADL or IADL difficulty scale score of subject j at time i; β_{0j} is the intercept or ADL or IADL difficulty level at baseline for subject j; β_{1j} is the linear rate of change at baseline; and β_{2j} represents the acceleration of the linear rate of change. The level 2 model predicted the individual change parameters (β_{0j}, β_{1j}, β_{2j}). The γ terms represent intercepts and the expected effects of the covariates on the individual change parameters.

To determine the appropriate level 1 model (i.e., intercept, linear effect, quadratic effect), we examined the graphs of ADL and IADL difficulties over time to ascertain whether a quadratic function might be appropriate. To verify the decision on the basis of the visual information, we also examined the statistical significance of the individual change parameters in the fixed- and random-effects unconstrained models. The continuous predictors (i.e., religiousness-related variables, age, perceived income sufficiency, and comorbidity) were modeled in the mean deviation form to reduce multi-collinearity concerns (Raudenbush and Bryk 2002).

Results

Descriptive Findings

Table 1 presents baseline sample characteristics for the original sample as well as for the sample used in this study. As expected, women (n = 499 to 421) were more likely than men (n = 501 to 363) and Whites (n = 500 to 411) more likely than Blacks (n = 500 to 373) to participate in all waves of the study. Compared with the original sample, participants in the study sample were slightly younger, healthier, had fewer ADL and IADL difficulties, reported lower perceived social support, received less help from others, and perceived income as slightly more adequate. The study sample did not differ from the original sample on the measures of religiousness, location of living, marital status, education, and MMSE.

Table 2 shows means and standard deviations for ADL and IADL difficulties over the three-year period. ADL function changed little between baseline (M = 1.7, SD = 2.3) and the third-year point (M = 1.7, SD = 2.4), while IADL difficulties increased from baseline measurement (M = 1.0, SD = 1.4) to the third-year assessment (M = 1.52, SD = 2.0).

Unconditional Models

We examined the linear and quadratic unconditional hierarchical linear models to determine which best described the trajectories of ADL and IADL functional difficulties.

Table 3 shows fixed effects, random effects, and deviance scores for ADL and IADL difficulties, respectively. Overall, quadratic models were preferred to linear models on the basis of the deviance score (the smaller the score, the better fit) for both ADL, $\chi^2(3) = 115$, $p = .001$, and IADL, $\chi^2(3) = 348$, $p = .001$, difficulties. There were significant fixed effects for the intercept (1.69), linear effect (−0.31), and curvilinear effect (0.11) in the quadratic model for ADL difficulties, indicating that the trajectory of ADL difficulties had a decreasing trend and a rate of increase that accelerated over time (see Figure 1). Similar to ADL difficulties, the rate of IADL difficulties showed a curvilinear trajectory over the three-year period. The IADL fixed effects, intercept (0.96), linear effect (−0.35), and quadratic effect (0.18) were all statistically significant. For both ADL and IADL difficulties, there was statistically significant variability in intercepts, linear slopes, and quadratic function, indicating that variability around those trajectories could be explained by level 2 predictors.

Predictors of Trajectories of ADL Difficulties

The only statistically significant relationship among the measures of religiousness and ADL difficulties occurred between level of service attendance and number of ADL difficulties at baseline ($\beta = -.168$, $SE = .048$, $p = .001$; see Table 4). Those who attended religious services more often had fewer baseline ADL difficulties. This baseline difference continued over the three-year period (see Figure 2). Frequency of prayer and level of intrinsic religiousness were unrelated to ADL trajectories.

Although none of the measures of religiousness was related to the ADL trajectories, four of the resource measures were statistically significant predictors of the linear trajectory. Two of the demographic and three of the resource measures were also statistically significant predictors of the quadratic trajectory (see Table 4). Participants who were older, White, and received help from others were more likely to experience accelerating numbers of ADL difficulties over time than participants who were younger, Black, and had not received help from others. Although those whose incomes were more adequate were more likely to experience accelerating numbers of ADL difficulties over time than those whose incomes were less adequate, they also reached an asymptote at approximately two years from baseline. Those whose incomes were less adequate continued to increase in the number of ADL difficulties they experienced. Those with lower MMSE scores tended to increase slowly in the number of ADL difficulties they experienced over time, while those with higher MMSE scores were more likely to experience decreases followed by increases in the number of ADL difficulties they experienced. Finally, comorbidity scores at baseline were negatively related to the increase in the number of ADL difficulties individuals experienced over time.

Predictors of Trajectories of IADL Difficulties

Level of service attendance was also the only measure of religiousness to be related to IADL difficulties (see Table 5). Participants who attended services more frequently had fewer IADL difficulties at baseline than those who attended services less frequently ($\beta = -.071$, $SE = .029$, $p = .05$). Level of service attendance was also related to the quadratic relationship between time and number of IADL difficulties ($\beta = -.028$, $SE = .014$, $p = .05$; see Table 5 and Figure

3). The relationship between time and the number of IADL difficulties for those who attended religious services most frequently was basically flat. As service attendance at baseline declined, the rate of increase in the number of IADL difficulties increased. This relationship occurred, even though we controlled for four demographic characteristics (age, ethnicity, gender, and rural residence), the interaction of ethnicity with gender, and seven different types of resources (being married, perceived social support, receipt of help from others, perceived adequacy of one's income to meet one's needs, level of educational attainment, comorbidity, and MMSE score). Frequency of prayer and level of intrinsic religiousness were not related to IADL difficulties.

As with the trajectory of ADL difficulties, several control variables had statistically significant relationships with the trajectory of IADL difficulties. Those who were older, had received help, perceived their incomes to be inadequate to their needs, had higher comorbidity scores, and had lower MMSE scores were more likely to have accelerating rates of increase in the number of IADL difficulties (see Table 5).

Discussion

We examined the role of religiousness in predicting trajectories of ADL and IADL difficulties in community-dwelling older adults over a three-year period. Of three religious domains (attendance, private religious activities, and intrinsic religiosity), only religious service attendance was associated with lower levels of ADL difficulties at baseline. Higher religious service attendance was related to lower levels of IADL difficulties at baseline and lower rates of increase in the number of IADL difficulties over time. The results of the study thus support only part of the first hypothesis. Frequent religious service attendance at baseline predicted a slower rate of increase in IADL difficulties but not ADL difficulties.

The hypotheses related to private religious activities and intrinsic religiousness were not supported. Our study is consistent with that of Idler and Kasl (1997), who found no significant relationships between subjective religiosity and functional difficulties.

The finding that religious attendance predicted the subsequent rate of change for IADL but not for ADL difficulties is probably due to the fact that older adults in our baseline sample were fairly healthy, and they might not have experienced as significant a change in ADL function during the three-year period. There is evidence in the literature that IADL scales are more sensitive to early changes in functional limitations, whereas ADL scales are likely to have floor effects for community-dwelling older adults (Morris and Morris 1997; Pearson 2000). Pearson (2000), using hierarchical models of ADLs and IADLs, found that more complex IADLs, such as shopping and managing money, were lost earlier than more basic ADLs, such as eating or transferring.

We found protective effects of religious service attendance on the trajectory of IADL impairment when adjusting for demographic characteristics and important social, economic, educational, and health resources. The beneficial effect of religious service attendance on inhibiting the rate of IADL difficulties may indicate that religious participation benefits persons in keeping their functional capacities. The salutary effect of service attendance may work through other mechanisms, such as social support in the congregation (Idler and Kasl 1997; Strawbridge et al. 2001). However, our finding suggests that religious service attendance has an effect on functional health independent of social support.

Some might argue that only those with fewer ADL or IADL difficulties are able to attend church frequently, and thus church attendance is simply a surrogate for having fewer ADL or IADL difficulties. These data, however, are not consistent with such an interpretation. The ADL and IADL trajectories were measured subsequent to the measurement of service

attendance and thus could not be the cause of service attendance. Additionally, our baseline control variables included measures of social support, health, and cognitive functioning. We thus controlled statistically for the factors often suggested to account for positive relationships between service attendance and findings such as ours.

The religious teachings emphasized in the churches these participants attend may encourage older adults to define their objective health situations more positively than less frequent attendees. In keeping with the model of successful aging (Crowther et al. 2002; Rowe and Kahn 1998), regular attendees may thus push themselves to remain more actively engaged than they might without such reinforcement. Similarly, frequent religious service attendance is often linked to significant responsibilities and obligations within the church. To fulfill their responsibilities, older adults may refuse to “give in” to chronic health problems and maintain active lifestyles longer than less frequent attendees.

This study is, to our knowledge, the first to examine the effects of multiple domains of religiousness on the dynamic, longitudinal patterns of both ADL and IADL difficulties. It had several limitations, however. First, we studied community-dwelling older adults in a southern state, limiting the study's generalizability to persons in other areas of the country. Second, the older adults in our study were highly religious; more than half of the sample attended religious services once a week or more, and a majority of people were engaged in private religious activities and intrinsically oriented to religious beliefs. In a nationwide study or one conducted in another region of the country, there would likely have been more dispersion in the distribution on the religious items, potentially affecting the relationship between religiousness and other variables. Third, questions concerning ADL and IADL difficulties in our study measured the presence or absence of difficulties in performing activities. Although these questions provide information on functional change, questions measuring degree of difficulty might have detected subtler changes. Fourth, the measures of functional abilities were based on self-report data. Different findings may have resulted if performance-based measures had been used (Angel et al. 2000). It is possible that religious elders are more likely to be health optimists (Boardman 2004) when reporting on their functional abilities. Fifth, 216 of the original 1,000 older adults did not participate in all waves of the study. Although we found that the study sample was reasonably comparable with the original sample in important characteristics, we do not know how religiousness might have exerted its effects on the functional health of persons who did not complete all waves of the study. All five of these limitations serve to reduce variance on the measures of interest and thus are likely to result in an underestimation of the relationships between service attendance and IADL trajectories.

The study is one of the few studies to demonstrate the salutary effect of religious service attendance on functional status. Furthermore, the study is unique in that ADL function and IADL function were examined separately and that trajectories of functional status were analyzed using HLM procedures. On the basis of our findings, we argue that religious service attendance has a protective effect on slowing the rate of functional deterioration among older adults. By helping slow the progression of functional limitations, religious service attendance appears to contribute to older adults' quality of life and may result in health care cost savings.

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Biographies

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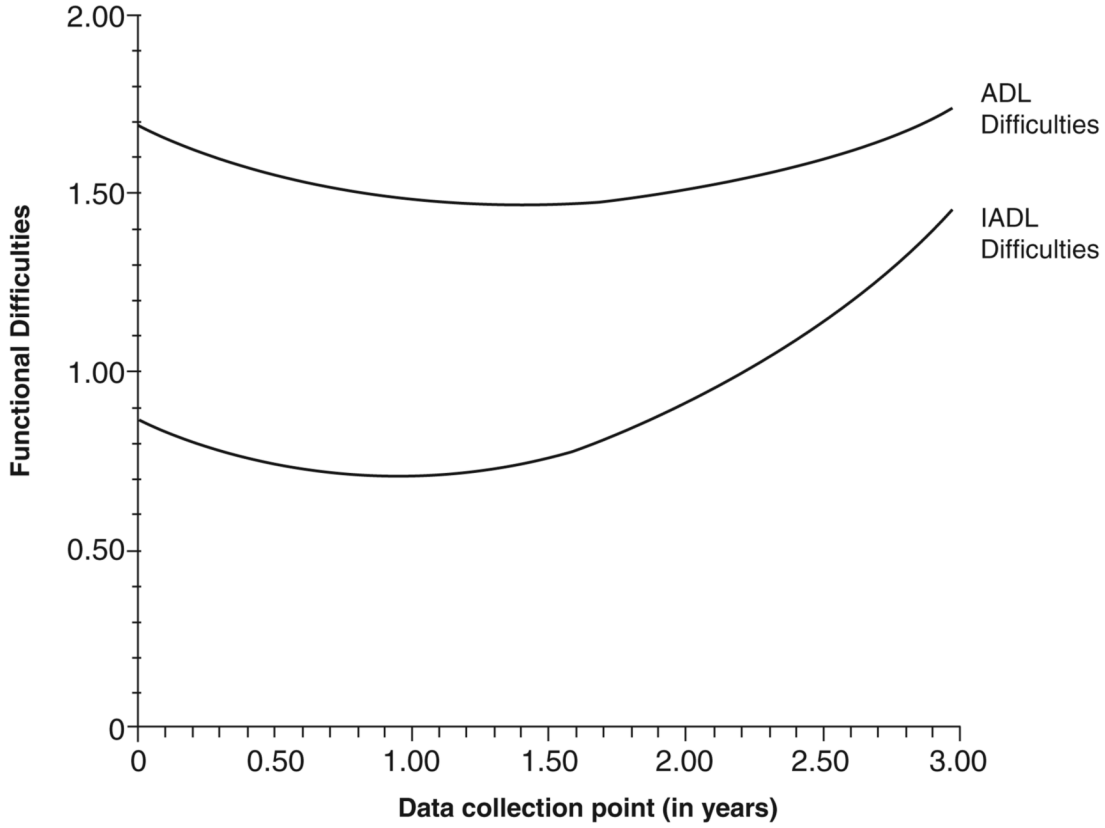

Figure 1.
Number of Difficulties in Activities of Daily Living (ADLs) and Instrumental ADLs (IADLs) by Data Collection Point (baseline to three years)

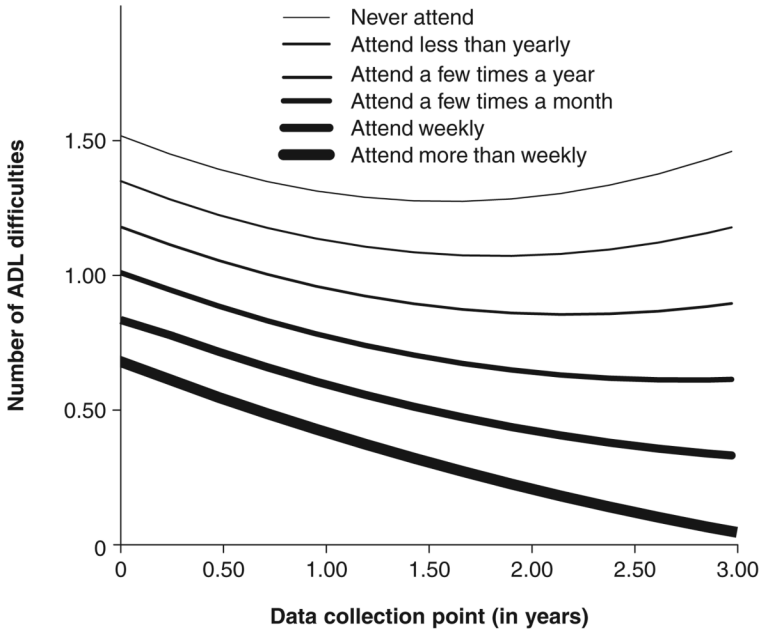

Figure 2.
Difficulties in Activities of Daily Living (ADLs) by Level of Religious Service Attendance Controlling for Other Measures of Religiousness, Demographic Characteristics, and Resources

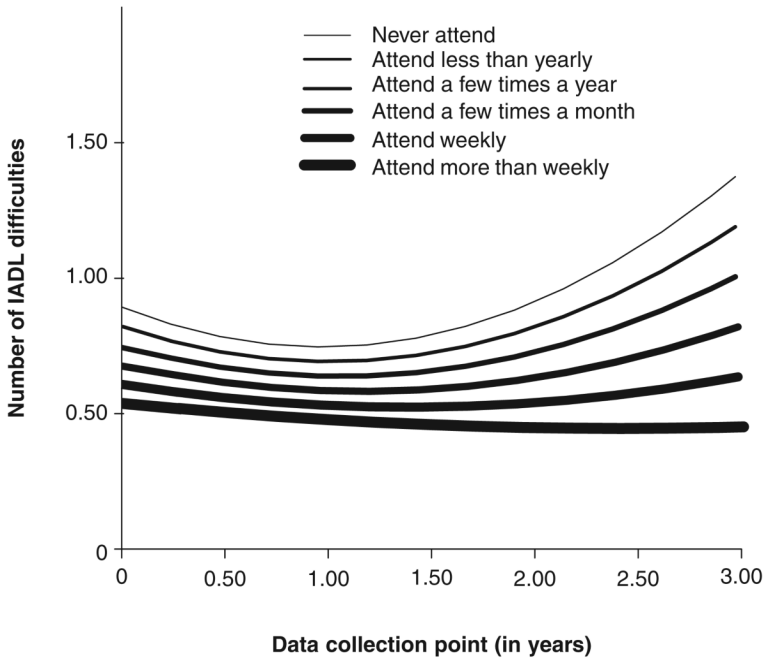

Figure 3.
Difficulties With Instrumental Activities of Daily Living (IADLs) by Level of Religious Service Attendance Controlling for Other Measures of Religiousness, Demographic Characteristics, and Resources

Table 1

Sample Characteristics

	Original Sample (*N* = 1,000)		Longitudinal Sample (*n* = 784)	
Variable	***M***	***SD***	***M***	***SD***
Religiousness				
Attendance	4.31	1.71	4.43	1.68
Prayer	5.38	1.40	5.46	1.29
Intrinsic	14.11	2.00	14.16	1.92
Demographics				
Age	75.31	6.72	74.74	6.38
Black	50.0%	0.50	49.5%	0.50
Female	49.9%	0.50	53.7%	0.50
Rural	51.0%	0.50	52.2%	0.50
Resources				
Married	51.3%	0.50	52.0%	0.50
Perceived social support	13.90	3.06	17.92	2.95
Receive help	30.0%	0.46	26.5%	0.44
Income adequacy	2.75	0.96	2.80	0.96
Education	10.60	3.26	10.71	3.30
Comorbidity	2.48	1.65	2.34	1.59
MMSE score	25.00	4.86	25.51	4.42
Functional difficulties				
ADL difficulties	1.97	2.42	1.73	2.29
IADL difficulties	1.11	1.49	1.00	1.44

Note: MMSE = Mini Mental State Examination; ADL = activity of daily living; IADL = instrumental ADL.

Table 2

Means and Standard Deviations for ADL and IADL Difficulties by Data Collection Point

	ADL Difficulties	IADL Difficulties
Wave	***M* (*SD*)**	***M* (*SD*)**
Baseline	1.73 (2.29)	1.00 (1.44)
6 months	1.48 (2.01)	0.78 (1.31)
12 months	1.40 (1.94)	0.73 (1.29)
18 months	1.55 (2.06)	0.99 (1.54)
24 months	1.48 (2.11)	0.89 (1.48)
30 months	1.63 (2.31)	1.35 (1.86)
36 months	1.71 (2.36)	1.52 (1.95)

Note: ADL = activity of daily living; IADL = instrumental ADL.

Table 3

Unconstrained Linear and Quadratic Functions of Time With ADL and IADL Functional Difficulties

	ADL Difficulties				IADL Difficulties			
Variable	**Linear Model**		**Quadratic Model**		**Linear Model**		**Quadratic Model**	
Fixed effects	***B***	***SE*(*B*)**	***B***	***SE*(*B*)**	***B***	***SE*(*B*)**	***B***	***SE*(*B*)**
Intercept	1.548	0.071***	1.686	0.080***	0.736	0.040***	0.965	0.049***
Linear effect	0.022	0.025	−0.312	0.065***	0.205	0.019***	−0.350	0.062***
Quadratic effect			0.111	0.019***			0.185	0.022***
Random effects	*SD*	χ^2	*SD*	χ^2	*SD*	χ^2	*SD*	χ^2
Intercept	1.844	5,646***	2.032	4,784***	0.815	1,683***	1.043	1,895***
Linear effect	0.549	2,176***	1.141	1,289***	0.344	1,303***	1.074	1,258***
Quadratic effect			0.302	1,122***			0.402	1,495***
Level 1 error	1.069		1.017		1.093		0.986	
Deviance (*df*)	18,995 (4)		18,880 (7)		17,970 (4)		17,622 (7)	

Note: ADL = activity of daily living; IADL = instrumental ADL.

*** $p \leq .001$.

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Table 4

Relationship of Measures of Religiousness, Demographic Characteristics, and Resources on ADL Functional Difficulties Over Time

	Intercept		Linear Effect		Quadratic Effect	
	B	***SE***	***B***	***SE***	***B***	***SE***
Intercept	1.139	0.226***	−0.152	0.211	0.085	0.063
Religiousness						
Attendance	−0.168	0.048***	0.005	0.045	−0.014	0.013
Prayer	0.043	0.063	0.003	0.058	0.007	0.017
Intrinsic	0.026	0.045	−0.008	0.042	0.001	0.012
Demographics						
Age	0.037	0.012**	−0.012	0.011	0.009	0.003**
Black	−0.151	0.229	0.279	0.214	−0.136	0.060*
Female	0.402	0.204*	0.003	0.191	−0.020	0.057
Ethnicity × Gender	0.468	0.275	−0.318	0.256	0.132	0.076
Rural	0.375	0.145**	−0.185	0.135	0.045	0.040
Resources						
Married	−0.248	0.161	−0.016	0.150	0.007	0.045
Perceived social support	−0.014	0.024	−0.003	0.022	−0.001	0.006
Receive help	0.789	0.163***	−0.410	0.153**	0.154	0.045***
Income adequacy	−0.381	0.088***	0.236	0.082**	−0.059	0.024*
Education	0.002	0.029	0.049	0.027	−0.012	0.008
Comorbidity	0.384	0.045***	−0.097	0.041*	0.023	0.012
MMSE score	−0.027	0.021	−0.068	0.020***	0.012	0.006*
SD	1.662		1.076		0.274	
χ^2	3,386		1,208		1,040	
df	755		755		755	
p	.000		.000		.000	

Note: Error *SD* = 1.01, deviance = 18,654, parameters estimated = 7. ADL = activity of daily living; MMSE = Mini Mental State Examination.

*$p < .05$.

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** $p < .01$.

*** $p < .001$.

Table 5

Relationship of Measures of Religiousness, Demographic Characteristics, and Resources on IADL Functional Difficulties Over Time

	Intercept		Linear Effect		Quadratic Effect	
	B	***SE***	***B***	***SE***	***B***	***SE***
Intercept	0.675	0.135***	−0.382	0.195*	0.214	0.067**
Religiousness						
Attendance	−0.071	0.029*	0.046	0.041	−0.028	0.014*
Prayer	0.053	0.037	−0.060	0.054	0.025	0.018
Intrinsic	−0.014	0.027	0.034	0.039	−0.009	0.013
Demographics						
Age	0.022	0.007**	−0.014	0.010	0.010	0.003**
Black	−0.070	0.137	0.104	0.197	−0.076	0.067
Female	0.352	0.122**	0.153	0.176	−0.065	0.060
Ethnicity × Gender	0.000	0.164	0.179	0.237	−0.008	0.081
Rural	0.116	0.086	0.072	0.125	−0.021	0.043
Resources						
Married	−0.158	0.096	−0.018	0.139	−0.016	0.047
Perceived social support	−0.012	0.014	0.011	0.020	−0.006	0.007
Receive help	0.579	0.097***	−0.660	0.141***	0.239	0.048***
Income adequacy	−0.217	0.052***	0.234	0.076**	−0.072	0.026**
Education	−0.005	0.017	−0.033	0.025	0.015	0.008
Comorbidity	0.244	0.027***	−0.104	0.038**	0.037	0.013**
MMSE score	−0.047	0.013***	0.072	0.018***	−0.031	0.006***
SD	0.720		0.905		0.348	
χ^2	1,282		1,094		1,244	
df	755		755		755	
p	.000		.000		.000	

Note: Error SD = 0.99, deviance = 17,400, parameters estimated = 7. IADL = instrumental activity of daily living; MMSE = Mini Mental State Examination.

*$p < .05$.

**$p < .01$.

***$p < .001$.