Religious Attendance and Cognitive Functioning Among Older Mexican Americans

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Research shows that social engagement reduces the probability of cognitive decline in late life. The purpose of this study was to test whether religious attendance, a major source of social engagement for many older individuals, is associated with slower rates of cognitive decline among older Mexican Americans. Using four waves of data collected from a sample of 3,080 older Mexican-origin individuals, we estimated a series of linear growth curve models to assess the effects of religious attendance on cognitive functioning trajectories. We used the Mini-Mental State Examination to measure cognitive functioning. Our central finding is that religious attendance is associated with slower rates of cognitive decline among older Mexican Americans. Specifically, respondents who attend church monthly, weekly, and more than weekly tend to exhibit slower rates of cognitive decline than those who do not attend church.

Over the past two decades, the association between religion and health has received a great deal of scholarly attention (see Ellison & Levin, 1998; Koenig, McCullough, & Larson, 2001, for recent reviews). Studies show that church attendance is associated with better mental health, including fewer symptoms of depression (Ellison, 1994; Strawbridge, Shema, Cohen, Roberts, & Kaplan, 1998) and anxiety (Hertsgaard & Light, 1984; Koenig, Ford, George, Blazer, & Meador, 1993) and better physical health, including lower blood pressure (Koenig et al., 1998a; Livingston, Levine, & Moore, 1991), boosted immune function (Koenig, Cohen, George, Hays, & Blazer, 1997), enhanced physical functioning (Idler & Kasl, 1992, 1997), and better subjective health (Drevenstedt, 2002; Levin & Markides, 1985; Musick, 1996). Given that church attendance has been shown to benefit health in so many different ways, it is not at all surprising to find that religious involvement may also predict slower rates of cognitive decline in late life (Van Ness & Kasl, 2003).

The idea that church attendance might slow the rate of cognitive decline is generally consistent with a growing body of research on social activities and cognitive functioning in late life. For example, several studies show that active, stimulating, and socially engaged lifestyles are fundamental prerequisites for healthy cognitive aging (Arbuckle, Gold, & Andres, 1986; Holtzman et al., 2004; Hultsch, Hertzog, Small, & Dixon, 1999; Newson & Kemps, 2005; Scarmeas & Stern, 2003; Schaie, 1983; Schooler, Mulatu, & Oates, 1999). Although religious activities are sometimes included in global lifestyle assessments, researchers have only begun to consider the unique influence of religious attendance.

Research on religion and cognitive functioning is largely based on the theory of social engagement put forth by Bassuk, Glass, and Berkman (1999). The theory of social engagement proposes that social connections and activities provide a dynamic environment that requires the mobilization of cognitive faculties, which, in turn, inhibits the deterioration of cognitive performance in old age, presumably through the maintenance of dense neocortical synapses in the brain. Bassuk and colleagues tested their theory by using data from the New Haven site of the Established Populations for the Epidemiologic Studies of the Elderly (EPESE), a sample of men and women 65 years of age and older. They found that social disengagement, a composite index measuring marital status, monthly contact with family and friends, church attendance, secular group memberships, and participation in recreational activities, increases the odds of cognitive decline over 3 years, 6 years, and 12 years.

Drawing primarily on the work of Bassuk and colleagues (1999), Van Ness and Kasl (2003) proposed that church attendance is a unique form of social engagement that may influence cognitive functioning over and above other aspects of social engagement. These investigators argued that attendance at religious services is likely to involve a number of activities that presumably stimulate the mobilization of cognitive faculties. These activities might include engaging sermons, reciting prayers, reading scripture, singing hymns, contemplating and discussing religious doctrine, and general socializing. Van Ness and Kasl also used data from the New Haven EPESE to test their hypothesis. They found that, compared with those who attended church less than once per week, those who attended church once per week or more exhibited reduced odds of cognitive dysfunction over 3 years.

Despite recent advances in research on religion, aging, and health, scholars have only begun to explore the relationship between religious involvement and cognitive functioning. Although there is some evidence to suggest that religious involvement is associated with better cognitive functioning among elderly non-Hispanic Whites and Blacks in New Haven, Connecticut (Van Ness & Kasl, 2003), it is unclear whether this general pattern extends to elderly Hispanics. To the best of our knowledge, there have been no analyses of the relationship between religious attendance and cognitive functioning among Hispanics living in the United States.

The health-protective effects of religious involvement in the lives of older adults are well documented (Taylor, Chatters, & Levin, 2004). However, little is known about the association between religious involvement and cognitive functioning. Because education and cognitive capacity are positively...
Table 1. Baseline Descriptive Statistics

<table>
<thead>
<tr>
<th>Variable</th>
<th>Range</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Religious attendance</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Never</td>
<td>0–1</td>
<td>407</td>
<td>17.00</td>
</tr>
<tr>
<td>Yearly</td>
<td>0–1</td>
<td>448</td>
<td>18.00</td>
</tr>
<tr>
<td>Monthly</td>
<td>0–1</td>
<td>309</td>
<td>13.00</td>
</tr>
<tr>
<td>Once per week</td>
<td>0–1</td>
<td>1,050</td>
<td>42.00</td>
</tr>
<tr>
<td>&gt; Once per week</td>
<td>0–1</td>
<td>258</td>
<td>10.00</td>
</tr>
<tr>
<td>Cognitive functioning</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MMSE</td>
<td>0–30</td>
<td>(25.46)</td>
<td>[3.69]</td>
</tr>
<tr>
<td>Functional disability</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ADLs (≥ 1)</td>
<td>0–1</td>
<td>225</td>
<td>9.00</td>
</tr>
<tr>
<td>Sensory impairments</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hearing</td>
<td>0–1</td>
<td>504</td>
<td>20.00</td>
</tr>
<tr>
<td>Vision</td>
<td>0–1</td>
<td>252</td>
<td>10.00</td>
</tr>
<tr>
<td>Health behaviors</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Current smoker</td>
<td>0–1</td>
<td>317</td>
<td>13.00</td>
</tr>
<tr>
<td>Current drinker</td>
<td>0–1</td>
<td>421</td>
<td>17.00</td>
</tr>
<tr>
<td>Psychological distress</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CES-D</td>
<td>0–54</td>
<td>(14.73)</td>
<td>[7.44]</td>
</tr>
<tr>
<td>Chronic disease</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diabetic</td>
<td>0–1</td>
<td>671</td>
<td>27.00</td>
</tr>
<tr>
<td>Hypertensive</td>
<td>0–1</td>
<td>1,051</td>
<td>43.00</td>
</tr>
<tr>
<td>History of stroke</td>
<td>0–1</td>
<td>123</td>
<td>5.00</td>
</tr>
<tr>
<td>History of heart attack</td>
<td>0–1</td>
<td>245</td>
<td>10.00</td>
</tr>
<tr>
<td>Sociodemographics</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>65–107</td>
<td>(72.25)</td>
<td>[6.13]</td>
</tr>
<tr>
<td>Female</td>
<td>0–1</td>
<td>1,421</td>
<td>58.00</td>
</tr>
<tr>
<td>Education (≥ HS diploma)</td>
<td>0–1</td>
<td>255</td>
<td>10.00</td>
</tr>
<tr>
<td>English proficiency</td>
<td>1–4</td>
<td>(2.32)</td>
<td>[1.13]</td>
</tr>
<tr>
<td>Social disengagement</td>
<td>0–4</td>
<td>(1.71)</td>
<td>[0.98]</td>
</tr>
</tbody>
</table>

Notes: MMSE = Mini-Mental State Exam; ADLs = activities of daily living; CES-D = Center for Epidemiologic Studies–Depression scale; HS = high school. Table data are taken from the Hispanic Established Populations for Epidemiologic Studies of the Elderly (1993–1994). N = 2,472. For continuous variables, means appear in parentheses, and standard deviations appear in brackets.

Building on prior research, we considered whether the health-protective effects of religious involvement extend to the cognitive capacity of older Mexican Americans, a highly traditional group for whom religion is generally quite salient (Hill, Angel, Ellison, & Angel, 2005). More specifically, we hypothesized that religious attendance will predict slower rates of cognitive decline among older Mexican Americans. To test this hypothesis formally, we used four waves of data collected from a large probability sample of older Mexican Americans who reside in the southwestern United States. With these data, we used linear growth curve modeling to assess the effect of church attendance on cognitive functioning trajectories over 8 years.

METHODS

Study Sample

Subsequent analyses employed all four waves of the Hispanic EPESE (H-EPESE). This survey consists of a probability sample of 3,050 Mexican-origin individuals aged 65 and older who reside in Texas, California, New Mexico, Arizona, and Colorado. The baseline survey was conducted in 1993–1994 and contains extensive demographic and health information. The response rate at baseline was 86%. The original panel was recontacted three times, in 1995–1996, 1998–1999, and 2000–2001. Note that we have omitted proxy respondents (n = 316) from the study sample because of missing or invalid responses on the dependent variable. Table 1 provides baseline descriptive statistics for the study sample.

Measurement of Cognitive Functioning

We used the Mini-Mental State Examination (MMSE) to assess cognitive functioning. The MMSE is one of the most commonly used cognitive screening devices in studies of older adults. The MMSE represents a brief, standardized method by which to grade cognitive mental status (see Folstein, Folstein, & McHugh, 1975). It measures responses to a standard battery of memory and reasoning items. It assesses orientation, attention, immediate and short-term recall, language, and the ability to follow simple verbal and written commands. The MMSE provides correct classification rates between 80% and 90% when compared with physician diagnoses of cognitive impairment and dementia (Tombaugh & McIntyre, 1992). The English and Spanish versions of the MMSE were drawn from the Diagnostic Interview Scale (see Bird, Canino, Rubio-Stipec, & Shrout, 1987). The Spanish version of the MMSE conforms to standard criteria, including formal translation, backtranslation, and consensus by committee for final content. The Spanish version of the MMSE has been used in several studies of older Mexican Americans (Black et al., 1999; Haan & Weldon, 1996; Nguyen, Black, Ray, Espino, & Markides, 2002; Wu et al., 2003). We acknowledge that most studies make use of conventional thresholds in the measurement of cognitive functioning. For example, Black and colleagues used MMSE scores below 18 and between 18 and 23 to reflect severe cognitive impairment and mild cognitive impairment, respectively. In the present study, we used the continuous specification of MMSE scores to directly assess cognitive functioning trajectories.

correlated, this association should be particularly strong for the older Mexican-origin population, a group for whom educational attainment is generally low. Given their low levels of education, we might expect older Mexican-origin individuals to exhibit an elevated risk of cognitive decline. If religious involvement plays a protective role in preserving cognitive capacity, that protective effect may be especially pronounced among older Mexican-origin individuals.

It is clear that religion plays an important role in the lives of the vast majority of older Mexican Americans and other Hispanics (Harris, 2000). In the United States, approximately 56% of Hispanics belong to the Catholic Church (Harris, 2002), and nearly 25% of Hispanics identify themselves as Protestant (Kosmin, Mayer, & Keysar, 2001). Prayer is a routine activity for a large fraction of elderly Hispanics, and, as for other groups, religious involvement is beneficial to their health and well-being (Maldonado, 1994). Clinical studies have shown that rich religious traditions combined with routine religious activities and a strong religious identity greatly benefit the health of older Hispanics (Stolley & Koenig, 1997). The more private aspects of religiosity, including personal prayer, Bible reading, meditation, self-expressions of spirituality, and the use of faith as a healing strategy, also help older Hispanics to cope effectively with illness (Maldonado, 1995).
Measurement of Religious Attendance

As in many other studies in the area of religion and health, in our study we were limited to using religious attendance as our primary measure of religious involvement. Although we would prefer to use multiple measures of religious practice, religious attendance provides substantial compatibility with other studies on social engagement, religious involvement, and cognitive functioning (Bassuk et al., 1999; Van Ness & Kasl, 2003). Respondents were asked, “About how often do you go to mass or services?” Following the work of Bassuk and colleagues (1999), we coded religious attendance into five dummy variables: (a) more than once a week, (b) almost every week, (c) once or twice a month, (d) several times a year, and (e) never or almost never. In our main analysis, nonattendance (i.e., never or almost never) is the reference value against which all other levels of church attendance are compared.

Measurement of Functional Disability

Research shows that elderly individuals may attend religious services sparingly or not at all as a result of problems attributed to functional limitations (Ainlay, Singleton, & Swigert, 1992; Bertera & Bailey-Etta, 2001). Of course, these same people are likely to exhibit worse cognitive functioning (Zarit, Johansson, & Malmberg, 1995). With this concern in mind, our subsequent analyses control for activities of daily living (ADLs) at baseline (see Katz, Ford, Moskowitz, Jackson, & Jaffe, 1963). We measure ADLs with seven items. Respondents were asked to indicate whether they could do any of the following activities by themselves or without any help from anyone else: (a) walk across a small room, (b) take a bath or shower, (c) perform personal grooming, (d) dress, (e) eat, (f) get from a bed to a chair, and (g) use the toilet. We coded respondents as (1) if they needed help or were unable to accomplish any of the seven activities, and as (0) otherwise.

Measurement of Sensory Impairments

Studies also show that sensory impairments may limit routine activities and social participation, including church attendance (Crews & Campbell, 2004). Like functional limitations, vision and hearing impairments are also significant risk factors for poor cognitive functioning (Lindenberger & Baltes, 1994; Nguyen et al., 2002). We measured visual acuity with a modified Snellen test (Salive et al., 1994). This method categorizes distance vision into three levels of acuity: adequate vision (≤ 20/40), visual impairment (> 20/40 to ≤ 20/200), and functional blindness (> 20/200). Once we deleted proxy respondents from the sample, very few respondents could be classified as functionally blind (n = 94). As a result, we coded respondents as (1) for visual impairment or functional blindness and as (0) for adequate vision. We measured hearing problems with the screening version of the Hearing Handicap Inventory for the Elderly (HHIE-S; Lichtenstein, Bess, & Logan, 1988). The 10-item HHIE-S measures self-perceived functional, social, and emotional difficulties associated with hearing loss. In addition to the HHIE-S, we considered whether the respondent wore a hearing aid, as well as interviewer ratings of hearing difficulties. Following the work of Davanipour, Lichtenstein, & Markides (2000), we coded respondents as (1) for hearing impaired if they ever wore a hearing aid, have difficulty hearing as perceived by the interviewer, or scored higher than 8 on the HHIE-S, and as (0) for adequate hearing.

Measurement of Health Behaviors

Research shows that smoking and drinking are significant correlates of cognitive functioning (Haan & Wallace, 2004; Herbert et al., 1993; Kalmijn, van Boxtel, Verschuren, Jolles, & Launer, 2002). We measured smoking behavior with a single item. Respondents were asked, “Do you smoke cigarettes now?” We measured drinking behavior with a single item. Respondents were asked, “In the past month, have you had any beer, wine, or liquor?” We coded response categories for these items as (1) for yes and as (0) otherwise.

Measurement of Psychological Distress

Research also show that depression is a risk factor for cognitive decline (Black et al., 1999; Nguyen et al., 2002; Wu et al., 2003). We used the Center for Epidemiologic Studies Depression scale (CES-D) to measure depressive symptoms. The CES-D measures responses to 20 items (see Radloff, 1977). Respondents were asked to indicate the frequency of depressive symptoms experienced in the past week. We coded the original response categories for these items as (1) rarely or none of the time, (2) some of the time, (3) occasionally, and (4) most or all of the time. The final CES-D measure represents a summed index of the 20 items.

Measurement of Chronic Disease

A number of chronic medical conditions have been identified as significant risk factors for cognitive decline, including diabetes (Nguyen et al., 2002; Wu et al., 2003), hypertension (Swan, Carmelli, & Larue, 1998; Birkenhager, Forette, Seux, Wang, & Staessen, 2001), stroke (Black et al., 1999; Nguyen et al.), and heart attack (Tilvis et al., 2004). Our measures of these conditions are based on self-reports. Respondents were asked to indicate whether they had ever been told by a doctor that they had any of the aforementioned conditions. We coded response categories for these items as (1) for yes and as (0) otherwise.

Measurement of Sociodemographic Characteristics

Several sociodemographic characteristics have been identified as significant correlates of cognitive functioning (Black et al., 1999; Nguyen et al., 2002). In accordance with this research, our subsequent analyses included controls for age, sex, and education. Age is a continuous variable, ranging from (65) to (107). We coded sex as (1) for females and (0) for males. We coded education as (1) for high school diploma or greater and as (0) otherwise.

Research also shows that English-language proficiency is a significant predictor of cognitive functioning among elderly Hispanics (Mulgrew et al., 1999). We measured English language proficiency with three items. Respondents were asked, “In your opinion, how well do you (a) understand spoken English, (b) speak English, and (c) read English?” The original response categories for these items ranged from (1) not at all to (4) very well. The final language proficiency measure represented a mean index of these three items.

Following the work of Bassuk and colleagues (1999), we measured several aspects of social disengagement, including
marital status, monthly contact with family and friends, secular group memberships, and living arrangements. We coded marital status as (1) for unmarried and as (0) otherwise. We coded monthly contact as (1) for no monthly contact and as (0) otherwise. We coded secular group membership as (1) for no memberships and as (0) otherwise. Finally, we coded living arrangements as (1) for living alone and as (0) otherwise. Our final measure of social disengagement represents a summed index of these four items.

Statistical Procedures

We used linear growth curve modeling to describe and predict cognitive functioning trajectories over time. Standard lagged endogenous dependent variables are well suited to predict change in cognitive functioning over two points in time; however, these kinds of models are limited to indirect assessments of change across three or more points in time. In contrast, growth curve analysis may directly describe and explain individual change over multiple waves of data (Bryk & Raudenbush, 1987; Raudenbush & Bryk, 2002). In the present study, we used hierarchical linear modeling (HLM) to estimate and predict individual growth curves. Growth curve analysis represents a two-stage model of change. In the first stage, an individual’s repeated measures (e.g., MMSE scores) are modeled as a function of an individual growth trajectory. In the second stage, individual growth trajectories are permitted to vary as a function of individual background characteristics (e.g., frequency of church attendance).

To aid in the interpretation of our models, we provided unstandardized regression coefficients, effect sizes, and the proportion of variance explained. Unstandardized regression coefficients allow for the interpretation of statistical significance. Effect sizes measure the strength of associations. In order to calculate effect sizes, we standardized all of the continuous independent and dependent measures. The results of this analysis yield effect sizes, which represent the proportion of 1 SD change in the dependent variable for every 1 unit of change in the independent variable. The larger the effect size, the bigger the difference between units or groups. Following the work of Rosenthal and Rosnow (1991), we considered effect sizes between 0.10 and 0.30 small, between 0.30 and 0.50 moderate, and greater than 0.50 large. We also computed the proportion of variance explained to observe the difference between the total parameter variance in growth rates (estimated from the unconditional model) and the residual parameter variance (based on the conditional models) relative to the total parameter variance (Raudenbush & Bryk, 2002). These estimates describe the percentage of the parameter variance in growth rates that is accounted for or explained by the corresponding model.

Functional Form and Sample Attrition

It is standard in any growth curve analysis to consider the functional form of the individual growth trajectories and the possibility of bias caused by sample attrition (Raudenbush & Bryk, 2002). We first considered whether the rate of change in cognitive functioning was nonlinear. We plotted MMSE scores against time, and, for the most part, we observed linear declines. We also tested the quadratic specification of time, which was not statistically significant \( (p > .05) \). We then estimated a logistic regression model predicting the odds of sample attrition. In this case we dummy coded the dependent variable such that respondents who completed questionnaires at all four waves were given a value of zero, and those respondents who were missing at any point over the final three waves were given a value of one. The independent variables include all of the predictors included in our main analysis. The results of this analysis indicated that baseline social disengagement, trouble with performing ADLs, depression, diabetes, and hearing impairments significantly increased the odds of attrition \( (p < .05) \). However, because our main analysis controlled for these factors and used full maximum likelihood estimation, sample attrition is unlikely to bias our regression coefficients (Raudenbush & Bryk).

RESULTS

Main Analysis

Our main analysis began with the standard unconditional model, which estimates the average growth rate and tests whether there is significant variation in individual growth rates. Model 1 of Table 2 presents the results of the unconditional model. The results for the mean growth rate indicate that, on average, cognitive functioning declined by 1.71 points about every 2 years or 5.13 points over the course of the study. Although it is difficult to compare average growth rates from sample to sample and study to study, prior research shows that the rate of MMSE decline may range from 0.13 to 3.4 points per year (Wilson, Gilley, Bennett, Beckett, & Evans, 2001; Doody, Massman, & Dunn, 2001; Mungas, Reed, Ellis, & Jagust, 2001; Royall, Palmer, Chiodo, & Polk, 2004). It should be emphasized, however, that the random effect estimate for the individual growth parameters (i.e., growth rate variance) suggests that there is significant variability in individual rates of cognitive decline. In other words, many respondents declined either faster or slower than the average growth rate.

Next, we estimated two conditional models predicting variation in the individual growth rates. Model 2 tests for the total association between religious attendance and the individual growth rates. Although the cognitive functioning trajectories of yearly churchgoers resemble those of individuals who never attend church, respondents who attend church monthly, weekly, and more than weekly tend to exhibit slower rates of cognitive decline than those who do not attend church.

Although we observe statistically significant results for church attendance alone, the coefficient for the presence of 1 SD change in the independent variable. The larger the effect size, the bigger the difference between units or groups. Following the work of Rosenthal and Rosnow (1991), we considered effect sizes between 0.10 and 0.30 small, between 0.30 and 0.50 moderate, and greater than 0.50 large. We also computed the proportion of variance explained to observe the difference between the total parameter variance in growth rates (estimated from the unconditional model) and the residual parameter variance (based on the conditional models) relative to the total parameter variance (Raudenbush & Bryk, 2002). These estimates describe the percentage of the parameter variance in growth rates that is accounted for or explained by the corresponding model.

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Model 3 adds controls for baseline cognitive functioning, physical functioning, sensory impairments, health behaviors, psychological distress, chronic conditions, and sociodemographic characteristics. The results for Model 3 indicate that respondents who attend church monthly, weekly, and more than weekly continue to exhibit slower rates of cognitive decline than those who do not attend church. The coefficient for the difference between more than weekly attendance and no attendance implies that the cognitive functioning scores of people who attend church more than weekly declined, on
average, at a rate of 0.75 units slower than those of people who never attend church. This works out to a difference of 2.25 units over the study period. To appreciate the practical significance of this difference, recall that the average rate of cognitive decline was approximately 5.13 points over the course of the study.

With the addition of controls in Model 3, the effects of monthly, weekly, and more than weekly attendance are reduced from Model 2 by 36%, 24%, and 29%, respectively. This pattern of attenuation suggests that a significant portion of the total association between church attendance and cognitive functioning trajectories may be attributed to other significant factors that are likely to limit church attendance in the first place, mainly poor baseline cognitive functioning, functional disability, sensory impairments, and advanced age.

Although the effect sizes for church attendance in Model 3 continue to range from trivial to small (0.07–0.10), it should be noted that corresponding effect sizes for functional disability, sensory impairments, and age are characterized by a similar range of values (0.05–0.11). Only baseline MMSE approaches a moderate effect size (0.25). In the end, Model 3 explains about 24% of the parameter variance in the MMSE growth rates, a substantial improvement over Model 2. Figure 1 provides a graphical illustration of the full model.

Ancillary Analysis

In addition to our main analysis, we conducted a series of ancillary analyses (not shown). First, we tested whether religious affiliation (Protestant vs Catholic) was a significant predictor of the growth rate. This was not the case ($p > .05$). Second, given that smoking, drinking, and being depressed are known correlates of church attendance and cognitive functioning, we considered these factors to be potential mediators. Unfortunately, for these data, smoking, drinking, and being depressed failed to predict the individual growth rates. Finally, we tested whether the effect of religious attendance on the individual growth rates was the same for men and women (Attendance × Sex) and across all ages (Attendance × Age). Both sets of interaction terms were not statistically significant ($p > .05$).

DISCUSSION

Despite recent advances in research on religion and health, scholars have only begun to explore the relationship between religious involvement and cognitive functioning. Although there is some evidence to suggest that religious involvement is associated with better cognitive functioning among White and Black elders, to our knowledge there have been no analyses of the relationship among Hispanics living in the United States. Building on prior research, we examined the association between religious attendance and cognitive functioning trajectories among older Mexican Americans.

Our central finding is that religious attendance is associated with slower rates of cognitive decline among older Mexican Americans. We find that the cognitive functioning trajectories of yearly churchgoers resemble those of individuals who never attend church; however, respondents who attend church monthly, weekly, and more than weekly tend to exhibit slower rates of cognitive decline than those who do not attend church. Although age, baseline cognitive functioning, functional disability, and sensory impairments partially account for this general pattern, the effects of monthly, weekly, and more than weekly attendance persist in the full model.
The results of our study are generally consistent with prior research, such as that by Van Ness and Kasl (2003). Although our observed effect sizes are generally small, church attendance does seem to benefit cognitive functioning in late life. Our results add some detail to what we already know about this association. First, monthly attendance is associated with slower rates of cognitive decline. Second, people who attend church more than once per week appear to exhibit the slowest rates of decline. Because Van Ness and Kasl compared those who attend church once per week or more with those who attend church less than once per week, it is unclear whether these patterns are consistent with prior research.

One key observation made by Bassuk and colleagues (1999) is that global assessments of social engagement may be more strongly and consistently related to cognitive functioning than any particular form of social engagement (e.g., church attendance). That is, although being socially engaged is generally important for maintaining healthy cognitive functioning in late life, no single indicator of social engagement is essential. Although this contention is important to the development of social engagement theory, it tends to obscure the effects of specific forms of social engagement. The results of our study provide additional support for the idea that church attendance is a unique form of social engagement that may influence cognitive functioning over and above other types of social engagement.

Earlier in this article we suggested that, because older Mexican Americans tend to be of low socioeconomic status, the effects of church attendance on cognitive functioning trajectories may be especially pronounced. Although H-EPESE data do not permit comparisons across racial or ethnic groups, we find some evidence to support this general assertion. In the present study, we observe that the cognitive functioning trajectories of older Mexican Americans benefit more from religious involvement than educational attainment (i.e., having a high school diploma or greater), which is not statistically significant in our analysis. This pattern could simply reflect a lack of variation in educational attainment, or it might reflect the importance of religious involvement in the lives of older Mexican Americans.

Although our study shows that religious attendance predicts slower rates of cognitive decline, much remains to be investigated. Future research might consider possible differences between public and private forms of religiousness. Church attendance is one major public form. Other public forms might include attendance at religious discussion groups or informal gatherings. Measures such as these would provide a more comprehensive assessment of social engagement than church attendance measures alone. Frequency of reading religious texts is one promising form of private religiousness. Additional private forms might include frequency of prayer as well as listening to or viewing various kinds of religious media. Measures like these would also offer more precise accounts of the cognitive demands and complexities associated with religious involvement. In any event, research along these lines may lead us to a better understanding of how religious activities may stimulate the mobilization of cognitive faculties and, as a consequence, slow the rate of cognitive decline in late life.

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REFERENCES


Holtzman, R., Rebok, G., Saczynski, J., Kouzis, A., Doyle, K., & Eaton, W.


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