

Religious Attendance, Age, and U.S. Adult Mortality
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A growing body of research in the social and medical sciences demonstrates that religious involvement influences adult mortality risk. Though a handful of studies rely upon denominational classifications, private religious practices, and religious coping in studying mortality and survival, the vast majority of the religion and mortality literature uses frequency of attendance at religious services as an indicator of religious involvement. There are several benefits to using religious service attendance as an indicator of religious involvement. One, a large portion (at least 25% and up to 40% in some estimates) of Americans report attending services during any given week (Hadaway et al. 1993). Thus, religion is a prominent fixture in the lives of many Americans today. Second, religious attendance is related to a number of factors that protect against mortality risk, including diet and health habits, social support and integration, and lower stress (Koenig et al. 2001). As such, religious attendance may serve to limit behavior that jeopardizes health, and influence other forms of behavior and support that prolongs survival. Overall, religious attendance helps capture the multifaceted nature of religious involvement in a single quantitative measure.

Though the use of attendance at religious services as a proxy of religious involvement is prevalent, there are important limitations in much of the existing literature that relates this measure to mortality risk. Undoubtedly, the most common limitation is the very heavy reliance upon community-based samples of the elderly in the study of religious involvement and mortality risk. Indeed, a great deal of the religion-mortality literature looks only at elderly adults, thus failing to consider that religious involvement may confer its greatest benefits for survival among younger persons at risk of premature mortality from behaviorally-related causes of death. One exception to this is the recent study of Hummer et al (1999). These authors, using a nationally-representative sample of approximately 22,000 U.S. adults, find that those who never attend religious services are more likely to die in a subsequent 8-year follow-up period than those who attend frequently. Moreover, some of the greatest effects were found among causes of death that are important during young adulthood and during middle ages.

Despite the contributions made to the religious involvement/mortality literature by Hummer et al (1999) and others, virtually no study to date has examined how religious involvement may influence mortality risk across different age groups of the life-course. Indeed, most literature in this area has focused upon community-specific samples of the elderly. This absence leaves the following research question as yet unanswered: does religious involvement benefit individuals in terms of protection from mortality risk across the life-course, or are these benefits specific to only certain age groups? The present analysis seeks to shed light on this question. To do so, we rely upon a nationally representative supplement of the 1987 National Health Interview Survey (NHIS), entitled

the Cancer Risk Supplement – Epidemiological Study. The sample includes 22,080 U.S. adults who were originally interviewed in 1987. Respondents to this baseline survey have been matched to the National Center for Health Statistics (NCHS) Multiple Cause of Death File through 1997 (with additional death matches through the end of 2000 expected later this fall). This matching procedure allows us to test the relationship between religious involvement, age, and mortality risk through the examination of 2628 deaths that occurred among this sample between 1987 and 1997, with another 1200 deaths expected when the additional matches become available.

Preliminary findings generated through proportional hazards modeling are presented in Table 2 below. (Descriptive statistics are presented in Table 1). Across all models, religious involvement offers no statistically significant protection against all-cause mortality for adults age 44 years and younger. However, the additional deaths that will be added to this data file later this year will surely help the stability of estimates within this age group. Among respondents at the oldest ages (65+), those who never attend religious services are at increase risk of death through Model 3, but this elevated mortality risk disappears upon the inclusion of health behaviors (smoking and drinking). The age group that appears to benefit most from religious involvement are middle aged respondents. Those in this age group who never attend religious services experience a 63% increase in mortality risk, net of the effects of socioeconomic, demographic, health, and health behavior variables. Thus, our preliminary findings show some support that religious involvement may effect mortality risk quite differently across the life-course.

References:

Hadaway, C. Kirk, Penny L. Marler, and Mark Chaves. 1993. "What the Polls Don't Show: A Closer Look at US Church Attendance." *American Sociological Review*. 63: 122-130.

Hummer, Robert A., Richard G. Rogers, Charles B. Nam, and Christopher G. Ellison. 1999. "Religious Involvement and U.S. Adult Mortality." *Demography*. 36: 273-285.

Koenig, Harold G., Michael E. McCullough, and David B. Larson. 2001. *Handbook of Religion and Health*. Oxford.

Table 1: Weighted Means and Descriptive Statistics for Included Covariates for Entire Sample and Deaths, by Age Group

Covariates	Ages 18-44		Ages 45-64		Ages 65+	
	Alive (n=11,776)	Dead (n=221)	Alive (n=4,448)	Dead (n=621)	Alive (n=2228)	Dead (n=1786)
<u>Religious Attendance (%)</u>						
Never	32.5	34.6	29.4	41	27	38.9
< Once per Week	36.4	34.4	25.7	26	22.5	19.1
Weekly	23.5	26.9	34.2	26.2	40.4	33.9
> Once per Week	7.6	4.1	10.8	6.7	10.1	8.1
<u>Demographics</u>						
Mean Age	30.4	33.4	53.9	56.4	71.5	75.7
Sex (%)						
Male	48.6	62.3	45.6	57	37.8	49.4
Female	51.4	37.7	54.4	43	62.2	50.6
Race (%)						
Black	11.6	24.3	9	16	7.8	9.4
Non-Black	88.4	75.7	91	84	92.2	90.6
Region (%)						
Northeast	20.6	17.1	22.5	22.7	25.1	24.5
Midwest	24.8	21.1	25	23.9	23.7	25.2
South	33.4	39.1	33.6	35.2	33.2	34.5
West (ref)	21.2	22.7	18.9	18.2	18	15.8
<u>Health</u>						
Activity Limitations (%)						
Limited	7.6	24	19.7	45.5	30.7	45.6
Not Limited (ref)	92.4	76	80.3	54.5	69.3	54.4
Self-Reported Health (%)						
Poor	.8	7.4	4	17.5	5	12.6
Fair	4.5	8.9	10.7	21.9	16.8	25.5
Good	20.8	27.7	29	27.2	35.3	32
Very Good	31	27.6	27.6	17.4	23.6	18.9
Excellent (ref)	43	28.4	28.6	15.9	19.1	11
<u>Health Behaviors</u>						
Smoking (%)						
Never	53	37.3	42.4	30.9	55	47.6
Former	15.8	14.9	28.8	26.5	32	35.4
Current Light	13.7	24.9	9.9	12.2	6.3	7.4
Current Heavy	17.5	22.9	18.9	30.4	6.7	9.5
Alcohol Use (%)						
Non-Drinker	36.9	42.7	49.7	55	63.9	68.3
< 4 Drinks When Drink	57.5	50.6	45.5	40.2	33.5	28.6
> 4 Drinks When Drink	5.5	6.8	4.8	4.8	2.6	3
<u>Marital Status (%)</u>						
Currently Married (1987)	61.5	28.4	78.8	71.4	61.3	53.1
<u>Socioeconomic Indicators</u>						
Education (%)						
11 Years or Less	14.7	27.8	25	38.1	41.3	51.3
12 Years	40.2	36.7	41.2	40.8	34.5	28.5
1-3 Years College	24.4	22.5	15.5	10.1	13.4	9.2
4+ Years College	20.7	13	18.3	11	10.9	11
Inc. Equivalence (Mean) (in 10 thousands)	1.86	1.69	2.17	1.71	1.53	1.34

Table 2: Proportional Hazard Models of Adult Mortality, by Age Group: United States, 1987-1995

Covariate	Model 1			Model 2			Model 3		
	18-44	45-64	65+	18-44	45-64	65+	18-44	45-64	65+
<u>Religious Attendance</u>									
Never	1.75	2.06***	1.57***	1.96	2.15***	1.36***	1.81	1.82***	1.26*
< Once per Week	1.35	1.54*	1.10	1.49	1.51*	1.07	1.53	1.46*	1.05
Weekly	1.61	1.27	1.04	1.73	1.29	.97	1.78	1.29	1.01
> Once per Week (ref)	-	-	-	-	-	-	-	-	-
<u>Demographics</u>									
Age				1.07***	1.08***	1.08***	1.06***	1.06***	1.08***
Sex									
Male				1.97***	1.65***	1.63***	2.08***	1.75***	1.69***
Female (ref)				-	-	-	-	-	-
Race									
Black				3.06***	1.79***	1.19*	2.57***	1.35**	1.01
Non-Black (ref)				-	-	-	-	-	-
Region									
Northeast				.96	1.24	1.15	1.00	1.28	1.13
Midwest				.73	1.28	1.17	.70	1.26	1.15
South				.91	1.32*	1.21	.88	1.24	1.14
West (ref)				-	-	-	-	-	-
<u>Health</u>									
<u>Activity Limitations</u>									
Limited							2.00***	1.65***	1.35***
Not Limited (ref)							-	-	-
<u>Self-Reported Health</u>									
Poor							4.35***	3.32***	2.13***
Fair							2.12**	2.08***	1.79***
Good							1.79**	1.53**	1.35***
Very Good							1.35	1.20	1.20*
Excellent (ref)							-	-	-
<u>Health Behaviors</u>									
<u>Smoking</u>									
Former									
Current Light									
Current Heavy									
Never (ref)									
<u>Drinking</u>									
< 4 Drinks When Drink									
> 4 Drinks When Drink									
Never (ref)									
<u>Marital Status (1987)</u>									
Currently Married									
<u>Socioeconomic Indicators</u>									
<u>Education</u>									
11 yrs or less									
12 years									
1-3 years college									
4+ years college									
<u>Inc. Equivalence</u>									
-2 Log-Likelihood	4130.6	10447.8	28572.1	4006.3	10269.8	28052.7	3946.1	10095.0	27879.3

***p<.001 **p<.01 *p<.05 (two-tailed)

Table 2 (cont)

Covariate	Model 4			Model 5			Model 6		
	18-44	45-64	65+	18-44	45-64	65+	18-44	45-64	65+
<u>Religious Attendance</u>									
Never	1.58	1.66**	1.19	1.49	1.64**	1.18	1.45	1.63**	1.18
< Once per Week	1.40	1.40	1.02	1.35	1.39	1.02	1.36	1.41	1.03
Weekly	1.74	1.29	1.00	1.73	1.29	.99	1.76	1.30	1.00
> Once per Week (ref)	-	-	-	-	-	-	-	-	-
<u>Demographics</u>									
Age	1.06***	1.06***	1.08***	1.07***	1.06***	1.08***	1.07***	1.06***	1.08***
Sex									
Male	2.03***	1.73***	1.61***	2.08***	1.77***	1.72***	2.11***	1.80***	1.73***
Female (ref)	-	-	-	-	-	-	-	-	-
Race									
Black	2.40***	1.38**	1.01	2.18***	1.34**	.99	2.06***	1.29*	.98
Non-Black (ref)	-	-	-	-	-	-	-	-	-
Region									
Northeast	.96	1.28	1.11	.96	1.28	1.10	.95	1.27	1.10
Midwest	.68	1.24	1.15	.68	1.25	1.14	.68	1.22	1.14
South	.84	1.17	1.11	.87	1.17	1.10	.84	1.16	1.09
West (ref)	-	-	-	-	-	-	-	-	-
<u>Health</u>									
<u>Activity Limitations</u>									
Limited	1.95***	1.58***	1.33***	1.87***	1.56***	1.32***	1.86***	1.52***	1.32***
Not Limited (ref)	-	-	-	-	-	-	-	-	-
<u>Self-Reported Health</u>									
Poor	3.90***	3.06***	2.07***	3.95***	3.08***	2.10***	3.35***	2.85***	2.09***
Fair	2.02**	1.91***	1.74***	2.01**	1.93***	1.76***	1.78*	1.81***	1.74***
Good	1.68**	1.49**	1.33***	1.68**	1.50**	1.34***	1.59*	1.46**	1.34***
Very Good	1.31	1.18	1.19	1.31	1.19	1.19	1.30	1.18	1.18
Excellent (ref)	-	-	-	-	-	-	-	-	-
<u>Health Behaviors</u>									
<u>Smoking</u>									
Former	1.05	1.11	1.21***	1.08	1.12	1.22***	1.07	1.14	1.22***
Current Light	1.86***	1.47**	1.41***	1.84***	1.47**	1.40***	1.71	1.44**	1.40***
Current Heavy	1.44	1.94***	1.81	1.42	1.92***	1.76***	1.34	1.92***	1.77***
Never (ref)	-	-	-	-	-	-	-	-	-
<u>Drinking</u>									
< 4 Drinks When Drink	.84	.84	.89*	.84	.85	.89*	.89	.89	.90*
> 4 Drinks When Drink	1.03	.70*	1.01	1.00	.70*	1.01	1.01	.73*	1.01
Never (ref)	-	-	-	-	-	-	-	-	-
<u>Marital Status (1987)</u>									
Currently Married				.69**	.90	.84**	.68**	.94	.85**
<u>Socioeconomic Indicators</u>									
<u>Education</u>									
11 yrs or less							1.68*	.90	.88
12 years							1.21	.95	.98
1-3 years college							1.24	.90	.86
4+ years college							-	-	-
<u>Inc. Equivalence</u>									
							.97	.88**	.94

-2 Log-Likelihood 3931.0 10050.3 27830.3 3924.1 10049.0 27821.0 3918.4 10040.2 27813.6

***p<.001 **p<.01 *p<.05 (two-tailed)