

A Project Summary:
Linking Spirituality and Religiosity to Life and Health Expectancy,
A Global Comparative Study,
Funded by the John Templeton Foundation

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Summary: Linking Spirituality and Religiosity to Life and Health Expectancy, A Global Comparative Study, is a research project addressing the big question: Regardless of nationality, culture, or religion, do people with greater religious and spiritual involvement live longer, healthier lives? We use health expectancy and other statistical analyses to answer that question. Health expectancy combines life expectancy and health information, revealing the number of years individuals can expect to live free of disability. While most religiosity and health research uses data only from the United States, we utilize national surveys from 100 countries, including individuals who identify with each of the major world religions, as well as no religion. The project has several stages: (a) describing secondary survey data that exists around the world that is available to outside researchers for the study of religiosity and health, with a particular focus on datasets that revolve around older adults; (b) collecting primary religiosity survey data from older persons in Singapore, in Kerala, India, and in the United States; (c) analyzing and presenting results from studies around the world on spirituality, religiosity, health, and longevity. In Part I of this paper, we describe existing data, providing detailed information on population datasets available for analysis. In Part II, we offer a sample of the findings from analyses conducted for this project. Our results indicate that different aspects of spirituality and religiosity are associated with health and longevity in different ways, some positively, as expected, but some negatively. In addition, we found that associations between health, spirituality, and religiosity are not consistent around the world; they depend on the social and political contexts in which people live. In Part III of this paper, we speculate on the next big questions. These encompass describing the limits of the effect on health, of spirituality and religiosity; refining measurement of spirituality and religiosity; and modeling how, why, and where spirituality and religiosity influence health expectancy.

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PART I. The Scope of the Project

1. Introduction

Linking Spirituality and Religiosity to Life and Health Expectancy, A Global Comparative Study, is a research project involving an international team of scholars, led by Zachary Zimmer of Mount Saint Vincent University in Halifax, Canada. The big question addressed by this project is: Regardless of nationality, culture, or religion, do people with greater religious and spiritual involvement live longer, healthier lives?

While a great deal of research has linked religiosity to good health, it has not focused on global health expectancy. Health expectancy combines life expectancy and health information, revealing whether extra years are lived in good health. Almost all countries have experienced gains in life expectancy in recent decades, yet it is unclear whether added years are healthy years. Further, the preponderance of religiosity and health research utilizes data only from the United States. In contrast, our study examines nationally representative surveys from 100 countries, using state of the art demographic statistical methods, to compare the relationships between spirituality, religiosity, health, and longevity, across the globe.

The project involves three main activities.

1. The identification of secondary survey data that exists around the world that is suitable for the study of spirituality/religiosity and health, particularly datasets focused on older adults. Our project began with a set of surveys we planned to use. We dropped several due to data quality issues and identified others for future analysis.

2. The collection of primary survey data. Three data collections were part of the project. Two added religiosity questions to an ongoing survey of older persons, one in Singapore and one in Kerala, India. The third was a set of questions on life course religiosity, added to the longitudinal US Health and Retirement Study.

3. The analysis and presentation of data on spirituality, religiosity, and health, across countries, cultural contexts, and religions, with a focus on older adults and health expectancy.

In Part I of this paper, we briefly summarize the background on the science of religion and health, and we describe existing global data on spirituality, religiosity and health. Researchers, including student researchers, will find detailed information on global population datasets available for analysis. In Part II, we offer a sample of the findings from analyses conducted for this project. Our results indicate that different aspects of spirituality and religiosity are associated with health and longevity in different ways, some positively, as expected, but some negatively. We also found that associations between health, spirituality, and religiosity were not consistent around the world. In Part III of this paper, we speculate on the next big questions. These encompass (a) refining measurement of spirituality and religiosity, (b) modeling how, why, and where spirituality and religiosity influence health expectancy, and (c) describing limits of the effect on health of spirituality and religiosity.

So, do people with greater spiritual and religious involvement live longer, healthier lives? As this project summary explains, the answer depends on how spirituality/religiosity is measured, and on the social and political contexts in which people live.

2. A Brief Background on Religiosity and Health Among Older Persons

This section touches very briefly on the science of religiosity and health, providing context for Linking Spirituality and Religiosity to Life and Health Expectancy, A Global Comparative Study. There are comprehensive reviews of health and religiosity (e.g., Ellison and Levin 1998). For a review of the research literature focused on older persons, we point to our own publication (Zimmer et al. 2016).

Population aging, an increase in the number and proportion of a population that is in old age, is occurring throughout the world (Zimmer and McDaniel 2013). Over the next several decades, this will be a major influence on population health, increasing informal and formal health care needs, and related health care costs (Mayhew 1999). Given the global nature of population aging (Vaupel and Kistowski 2005), promotion of health in old age is being explored internationally by scientists and policy makers alike (Beard 2016; Powell 2010; Schoeni and Ofstedal 2010; UNFPA and HelpAge International 2012).

Older individuals, on average, are more religious than younger ones (Levin, Taylor and Chatters 1994). This may be true for people in general, not just those who are old today, as there is longitudinal evidence that people tend to become more religious with increasing age. Therefore, as the world grows older, it may grow more religious (Moberg 2005; Wink and Dillon 2001).

Most research reviews have found positive associations between religious involvement and a variety of health outcomes (e.g., Hummer, Ellison, Rogers, Moulton, and Romero 2004; Koenig, King, and Carson 2012). There is a growing body of evidence for a health benefit from religion among old people in particular (Dupre, Franzese, and Parrado 2006; Hummer, Benjamins, Ellison, and Rogers 2010; Krause and Booth 2004; Lavretsky 2010; Sullivan 2010; Zhang 2008). However, the science is far from settled. For instance, attendance at religious services is the most common measure of religiosity in health research. Yet, attendance requires a certain level of physical ability, making it unclear if attendance supports health or if health is simply required to attend. This means that attendance cannot be the only aspect of spirituality we examine if we are to clarify these relationships (George, Ellison, and Larson 2002).

As Hummer and colleagues (2010) noted, the field will advance when we understand better the potential moderating effects of demographics on the associations between religiosity and health, and the causal mechanisms leading from religiosity to health. Most religiosity and health research has been conducted in the United States or Europe (Hank and Schaan 2008; Krause and Booth 2004; Lalive d'Epinay and Spini 2004). However, with religious practices differing widely across countries, only cross-cultural research can determine if particular manifestations have differing influences on health. For instance, those who practice Christianity often do so in large groups. In contrast, Buddhism commonly is practiced with individual contemplation (Batchelor 1987; Lutz, Slagter, Dunne, and Davidson 2008).

Global population aging is not proof of healthier old age (Fries 2003; Jagger 2000; Nusselder 2003). There are regions where longer life has not brought about a healthier old age. Health expectancy, the average number of years of life lived with good health, can be used to compare across populations (Chiu 2013; Jagger et al. 2009; Saito, Qiao, and Jitapunkul 2003). Health expectancy analysis can determine whether religiosity is correlated with extra years of life lived in good or poor health, a key question for health policy (Beard et al. 2016).

3. Data for Our Project

In order to assess whether religiosity is associated with longer, healthier lives across religious, national, and cultural boundaries, we employed specific types of data and specific types of questions.

Global Population Samples

We identified population-level datasets available worldwide that allow for the study of religion and health in middle-aged and older adults. Much of the research on religion and health has not utilized representative samples, so the results are not necessarily generalizable. We sought data collected from population-based, nationally representative samples from around the world. We identified 26 such datasets. Across these, there are half a million individuals in over 100 countries representing 90% of the world's population (World Values Survey 2018). Most of these datasets are longitudinal, following the same people over time, which provides some of the best opportunities to assess scientific evidence on population health.

Some datasets of very high quality on religion and health are restricted, that is, not generally available to outside researchers to conduct their own analyses. Some datasets are available only conditionally, upon having an approved research plan or a collaborator from the original study group. A primary contribution of our project is that it mainly draws on datasets that are publicly available or conditionally available for analysis by any researcher. We did analyze two datasets with restricted access, noted in Table 1, and we will analyze a third restricted dataset, noted in Table 2.

Spirituality and Religiosity Questions

Even among scholars, there is no consensus on definitions for the words spirituality and religion (Park et al. 2017). We use *religion* to mean beliefs, feelings, and traditional practices related to the divine. We use *spirituality* more broadly, to encompass personal beliefs, feelings, and practices related to the divine that are either embedded in or independent of tradition. Included in our data are only surveys and interviews that have at least one question on an individual's *level* of spirituality, such as the frequency of prayer, whether religion is or is not important, or the frequency of attendance at religious services. Databases that include only affiliation, or the name of a person's religion, were excluded.

Health Questions

We include datasets with any measurement of physical health. The simple question, "How would you rate your health?" is remarkably good at predicting mortality (Benyamini 2011; Benyamini and Idler 1999; Idler and Benyamini 1997) and is the only health data available in the World Values Survey. Any broad, reliable health question, or set of questions, that could be linked to mortality data in order to compute health expectancy was considered. We excluded surveys with only mental health or psychological well-being questions, such as surveys on depression or satisfaction with life.

4. Descriptions of Global Spirituality and Religiosity

The most common spirituality question, on surveys around the world, concerns the frequency of attendance at religious services. Almost as common are inquiries on the frequency of prayer and the importance of religion in a person's life. Questions on belief in God and belief in an afterlife are included in some surveys. Other questions cover finding strength and comfort from religion, using religion to cope with life stress, participation in religious organizations separate from attendance at religious services, and adherence to religious food laws. Each survey included in this report asked about religious affiliation, except the Mexican Health and Aging Study.

Using data from the 2010-2014 World Values Survey, we compared the levels of spirituality among individuals over 50 years old in 57 countries. Descriptions are below, with illustrations on the following pages.

Frequency of Attendance

Figure 1 is a large graph in two parts. It depicts the percentage of people who reported attending religious services at least weekly (the black columns on the bottom), at least yearly but less than weekly (the gray columns in the middle), and less than yearly (the white columns at the top). The exact percentage is labeled inside each column. Weekly attendance at religious services varied enormously by country, from 3% to 95% of the total number of persons surveyed.

Frequency of Prayer

Figure 2 depicts the percentage of people who reported praying or meditating, outside of formal services, at least weekly (the black columns on the bottom), sometimes but less than weekly (the gray columns in the middle), and never (the white columns at the top). Labels inside each column show the exact percentages. Again, there is enormous variation, as the frequency of weekly prayer ranged from 4% to 99%.

Importance of Religion

Figure 3 shows that the percentage of individuals reporting that religion is important in their lives ranged from 16% to 100% by country. Among respondents in the United States, 75% reported that religion was important to them. In only 11 out of 59 countries did less than 50% say that religion was important in their lives.

Figure 1. Frequency of Attendance at Religious Services: World Values Survey, 2010-2014

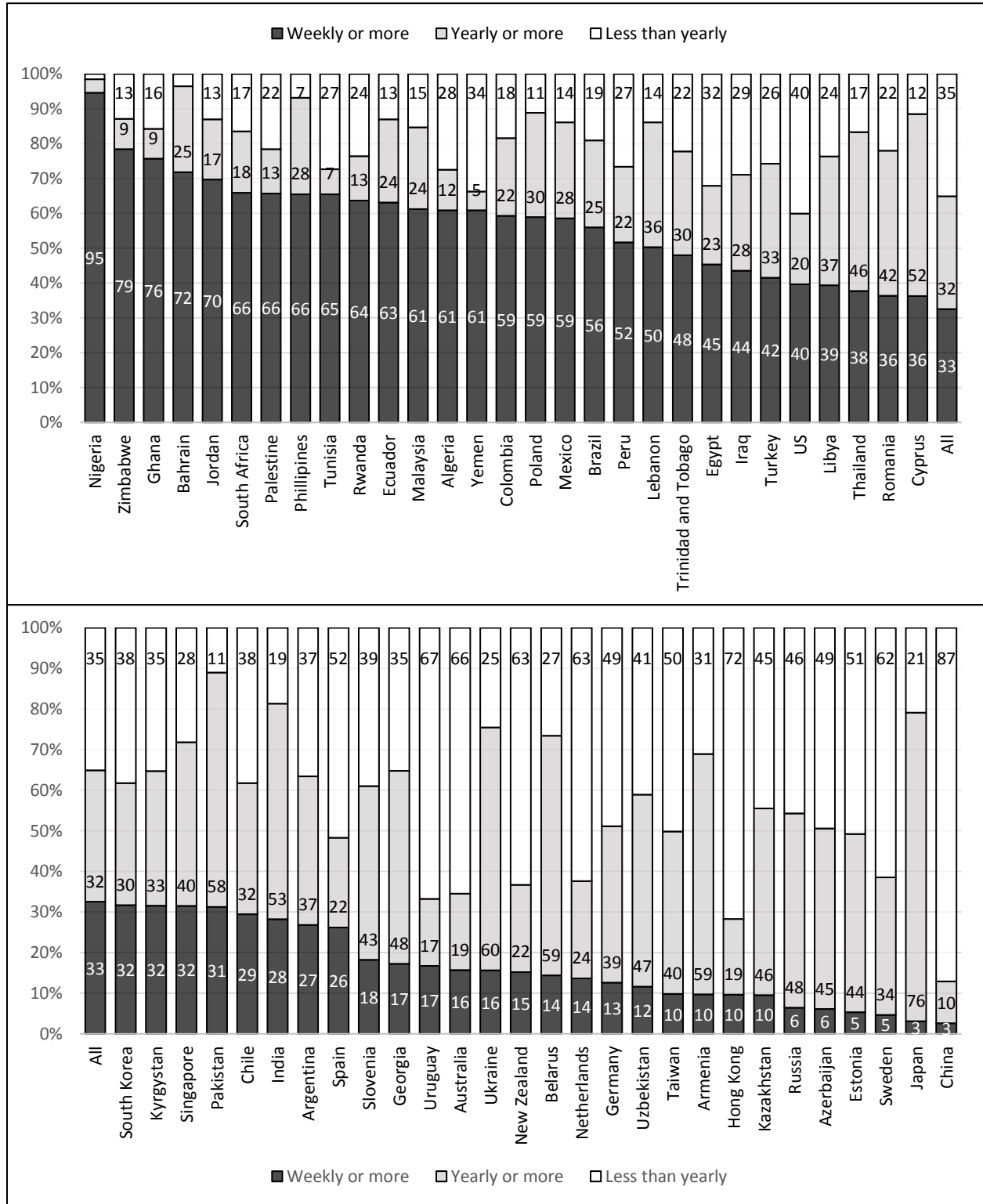


Figure 2. Frequency of Prayer or Meditation: World Values Survey, 2010-2014

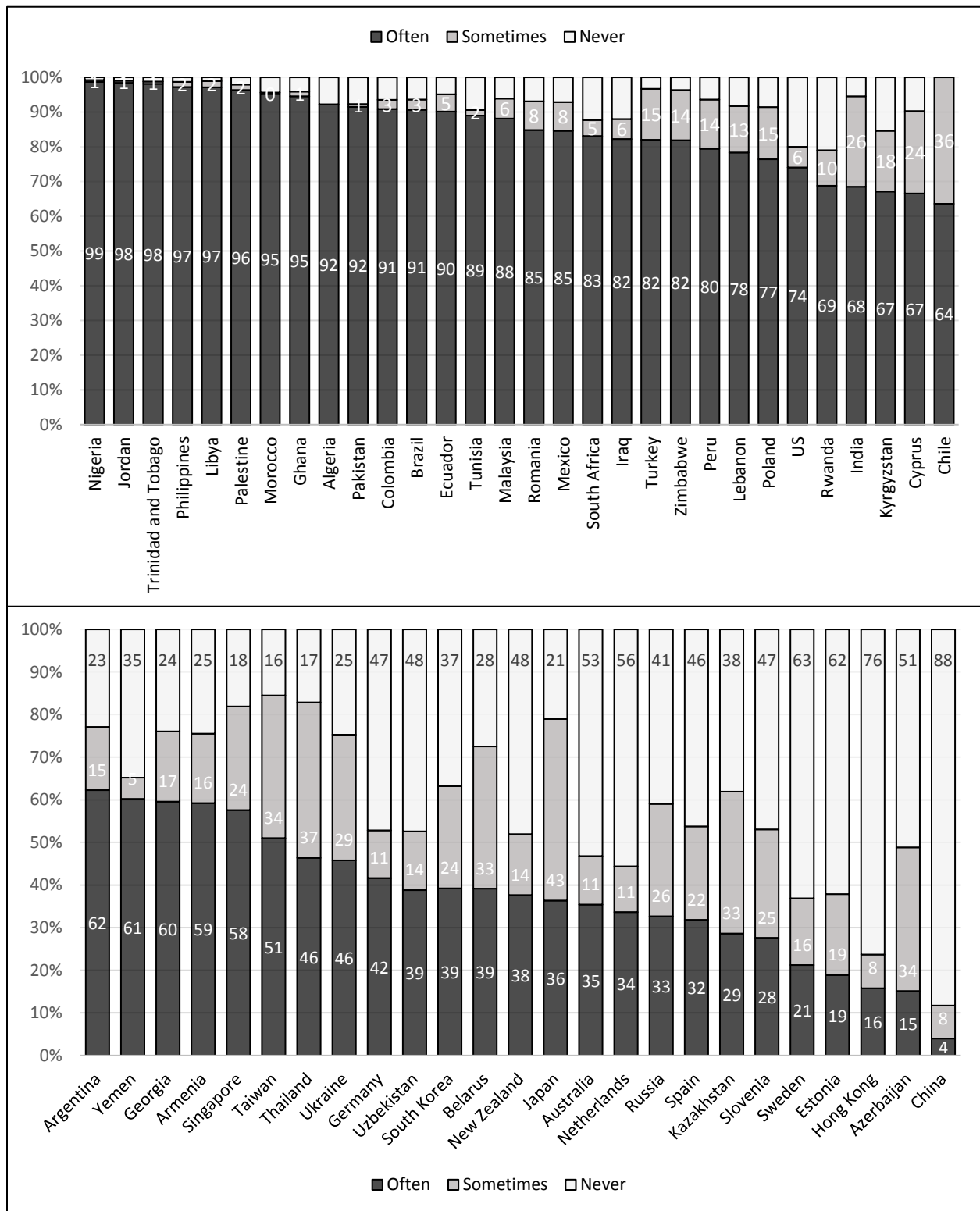
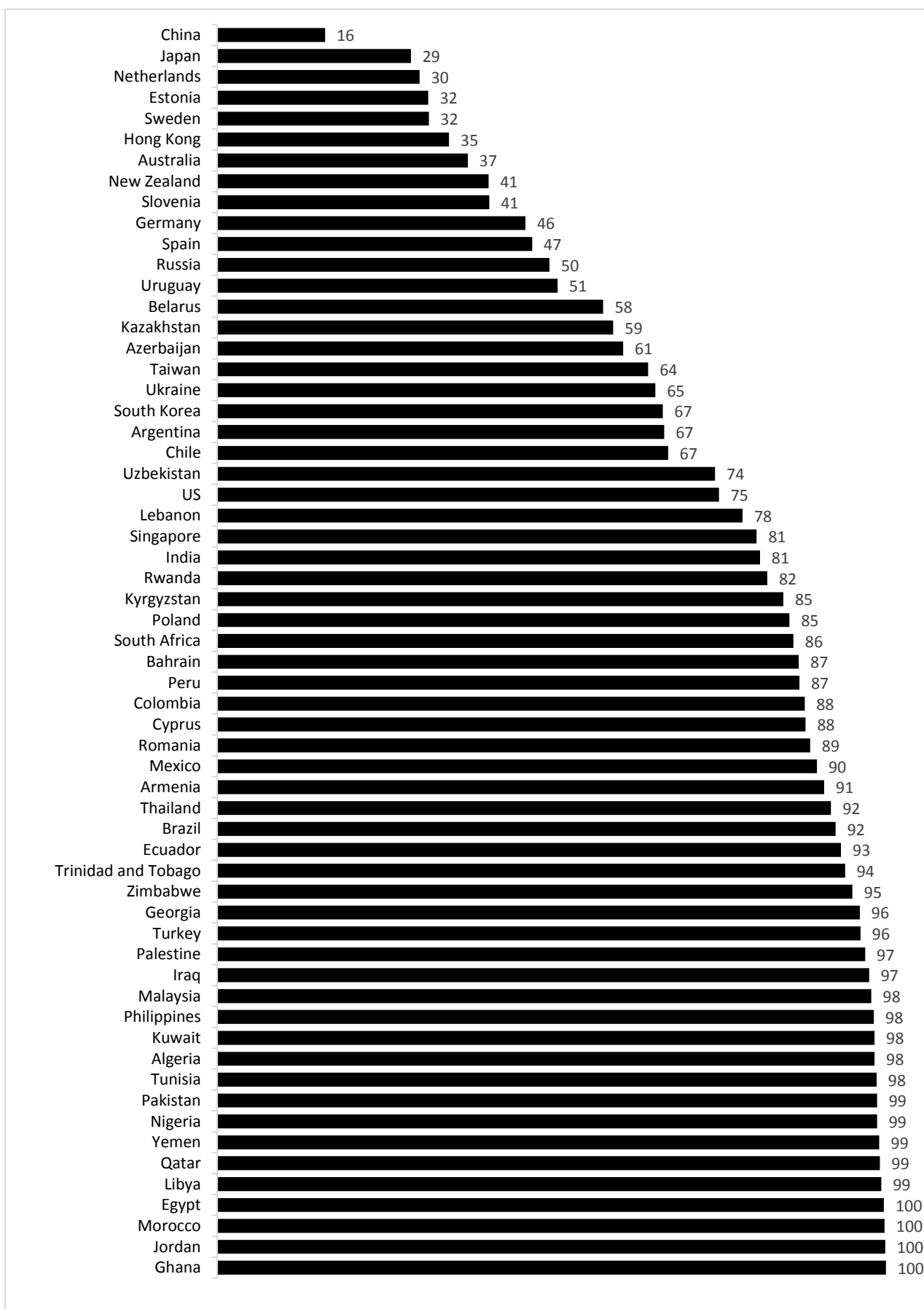


Figure 3. **Percent Endorsing Personal Importance of Religion: World Values Survey**

5. Global Health Data

The health information available in datasets with spirituality data is described below.

Self-Rated Health (SRH)

Self-rated health is available for almost all datasets. The only health data in the World Values Survey (WVS) and the European Values Survey is a single self-rated health question. The WVS question was, “All in all, how would you describe your state of health these days? Would you say it was: Very good, Good, Fair, Poor, or Very poor?”

Activities of Daily Living (ADLs) and Instrumental Activities of Daily Living (IADLs)

Many datasets contain questions about disability, measured as reported difficulty with activities of daily living (ADLs), such as dressing, bathing, eating, walking across a room, getting in/out of bed, using a toilet, and instrumental activities of daily living (IADLs), such as shopping, using a telephone, taking medications, managing money, and using a map. Disability-free life expectancy is a common way to conceptualize healthy life expectancy, which uses this type of data.

Other Health Data

Most surveys asked about chronic diseases; some asked about additional realms, such as the use of health care services. Some objective data was collected, including walking speed, and tests of cognition, vision, hearing, or lung function. Blood samples allowed measurements such as blood glucose and hormone levels. Bone density, heart function, blood vessel health, and eye health sometimes were tested. Some datasets were linked directly with mortality data.

6. Population Datasets on Spirituality, Religiosity, and Health

An important aspect of Linking Spirituality and Religiosity to Life and Health Expectancy, A Global Comparative Study, is identification of datasets with information on spirituality, religiosity, and health of older individuals. Table 1, on the next page, contains details on the eight datasets we used in our analysis. Results of the analyses appear on pages 18-28 of this paper. Table 2 describes other datasets containing spirituality and health variables that are available for analysis.

Tables of Population Datasets on Spirituality, Religiosity, and Health

Reading across the tables, left to right, first you will find the countries in the study, in alphabetical order, with multi-country studies at the top. The name of the study is in the next column. All datasets are longitudinal unless labeled cross-sectional in this column. The following column lists the topics of the spirituality questions. For example, “Attend” means that there is data on the frequency of attendance. “Pray” means that there was a question on the frequency of prayer. If this section does not end with “etc.,” all spirituality questions that were asked are noted. A list of health topics follows in the next column, including mortality, self-rated health (SRH), instrumental activities of daily living (IADL), and activities of daily living (ADL; together: I/ADL). Again, if this section does not end with “etc.,” the list describes the full scope of the data. The following column notes the age range. The sample size is next. The right-most column in each table lists the years of data collection.

Data Available for Analysis But Not Used by Our Project

Table 2 covers 18 datasets on 2 pages. It describes the Survey on Health, Well-being, and Aging in Latin America and the Caribbean (SABE), which includes seven countries (Argentina, Barbados, Brazil, Chile, Cuba, Mexico, and Uruguay). The WHO Study on Global Ageing and Adult Health (SAGE) comprises China, Ghana, India, Mexico, Russia, and South Africa. The European Social Survey (ESS) includes Israel and 21 European countries. Each of the other databases in Table 2 is drawn from a single country. These are Brazil, Canada (two databases), China, England, Hungary, India, Indonesia, Ireland, Japan, Korea, Mexico, the Netherlands, Singapore, and Taiwan. Five of these include young adults; the others gather data only from middle-aged and/or older adults. Data has been collected between 1984 and 2018. Four studies are cross-sectional, the others longitudinal. The smallest number of participants per country is 1,000, the largest is 60,000. Combined, these datasets contain information on approximately 300,000 people.

Some of these datasets contain data on spirituality beyond the usual prayer and attendance questions. These include participation in religious organizations separate from attendance at religious services, how intensely religious one is, as well as beliefs in demonic possession and supernatural causes of illness, in Taiwan. Most of the datasets collect health information beyond the usual checklists of chronic illnesses, functional disabilities, and self-rated health. Respondents are asked about their medications, pain, history of accident or assault, and sick leave taken. Additionally, rich objective data is available in many of the studies: Trained interviewers test cognition, walking speed, grip strength, balance, vision, hearing, and lung function. Blood and urine are tested for glucose, inflammatory chemicals, and hormones. Sophisticated tests measure bone density, heart function (ECG), blood vessel health (carotid artery thickening), and eye health (ocular pressure and retinal structure).

Table 1. Population Datasets on Spirituality, Religiosity, and Health That We Have Analyzed

Countries	Study name	Spirituality questions	Health measurements	Ages	Sample size	Years
59 countries	World Values Survey (WVS), Wave 6 (cross-sectional)	Attend, pray, importance, belief in God & afterlife, etc.	Self-rated health (SRH).	18+	1,000 - 3,500 per country	2010-2014
47 European countries	European Values Survey (EVS) (cross-sectional)	Attend, pray, importance, beliefs, comfort, etc.	SRH.	18+	1,500 per country	2008
27 European countries & Israel	Study of Health & Aging in Europe (SHARE)	Attend, pray, satisfaction with participation.	Mortality, grip, lung function, blood sugar, SRH, I/ADL (instrumental activities of daily living and/or activities of daily living), chronic illness, cognition, etc.	50+	120,500	2004, 2006, 2008, 2011, 2013, 2015
Costa Rica	Costa Rican Longevity & Healthy Aging Study (CRELES)	Attend.	Mortality, SRH, I/ADL, chronic illness, cognition, etc.	60+	2,825	2005, 2007, 2009
India (only the state of Kerala)*	Kerala Aging Survey II (KAS)	Attend, attended when age 20-25, pray, importance.	Mortality, grip, I/ADL, SRH, chronic illness, cognition, etc.	60+	7,750	2013, 2016
Singapore*	Panel on Health & Aging of Singaporean Elderly (PHASE)	Attend.	Mortality, grip, I/ADL, SRH, chronic illness, cognition, BMI, etc.	60+	4,675	2009, 2011, 2015
Taiwan	Taiwan Longitudinal Study on Aging (TLSA)	Attend, pray, importance, belief in afterlife, etc.	Mortality, SRH, I/ADL, chronic illness, cognition, etc.	50+	8,100	1989, 1993, 1996, 1999, 2003, 2007, 2011
United States	Health and Retirement Study (HRS)	Attend, pray, importance, belief in God, comfort, etc.	Mortality, SRH, I/ADL, chronic illness, cognition, etc.	51+	20,000	1992, every 2 years

*Note that the data is not available to outside researchers for these studies.

Table 2. Country-level, Representative Data on Spirituality, Religion, and Health We Have Not Analyzed

Countries	Study name	Spirituality questions	Health measurements	Ages	Sample size	Years
Argentina, Barbados, Brazil, Chile, Cuba, Mexico, Uruguay	Survey on Health, Well-being, & Aging in Latin America & the Caribbean (SABE) (cross-sectional)	Importance	Medications, standing, glucose, Self-rated health (SRH), I/ADL (instrumental activities of daily living and/or activities of daily living), chronic illness, cognition, etc.	60+	1000-2000 per country	1999-2000
China, Ghana, India, Mexico, Russia, S. Africa	WHO Study on Global Ageing & Adult Health (SAGE)	Attend, etc.	Mortality, SRH, I/ADL cognition, etc.	50+	19,000	2002-2004, 2007-2010, 2014-2015
Israel & 21 European countries	European Social Survey (ESS)	Attend, pray, etc.	SRH, limited by illness or disability.	15+	42,000	2004-2005 for religion
Brazil	Brazilian Longitudinal Study of Aging (ELSI-Brazil)	Attend, coping, meaning in life, etc.	Grip, balance, SRH, I/ADL, hearing, sight, chronic illness, teeth, cognition, utilization, childhood health, etc.	50+	10,000	2015
Canada	Canadian Longitudinal Study on Aging (CLSA)	Attend, etc.	Urinalysis, pulse, bone density, walk, grip, balance, ECG, carotid, hearing, retinal images, ocular pressure, lung function, SRH, I/ADL, cognition, etc.	45-85	50,000	2011-2015, every 3 years
Canada	General Social Survey (GSS) (cross-sectional)	Attend, pray, importance, etc.	SRH.	18+	25,000	2013 for religion & health
China	Chinese Longitudinal Healthy Longevity Study (CLHLS)	Participate.	Mortality, vision, SRH, I/ADL, chronic illness, cognition, etc.	65+	16,000	1998-2014
England	English Longitudinal Study on Aging (ELSA)	Attend, pray, importance, meaning.	Mortality, SRH, I/ADL, chronic illness, cognition.	50+	11,400	2002, every 2 years

(Continued on the next page)

(Table 2 continued)

Countries	Study name	Spirituality questions	Health measurements	Ages	Sample size	Years
Hungary	Hungarian Epidemiological Panel (HEP) (cross-sectional)	Attend, importance.	SRH, sick leave, etc.	18+	12,700	2002
India	Longitudinal Study in India (LASI)	Attend.	Pulse, grip, balance, lung function, vision, blood sugar, etc.	45+	60,250	2016, every 2 years
Indonesia	Indonesian Family Life Surveys (IFLS)	Pray, participate, how religious, food, etc.	Mortality, stand, SRH, I/ADL, utilization, pain, chronic illness, assault, accident, etc.	18+	7,500	1993, 1997, 2000, 2007, 2014
Ireland	The Irish Longitudinal Study on Ageing (TILDA)	Attend, comfort.	Mortality, SRH, I/ADL, chronic illness, cognition.	50+	8,500	2009-2011, ~every 3 years
Japan	Japanese Study of Aging and Retirement (JSTAR)	Participate.	Walk, grip, SRH, I/ADL, utilization, hearing, sight, chronic illness, etc.	50-75	4,200	2007, every 2 years
South Korea	Korean Longitudinal Study of Aging (KLoSA)	Attend.	Grip, SRH, I/ADL, utilization, chronic illness, cognition, etc.	45+	10,000	2006, every 2 years
Mexico	Mexican Health & Aging Study (MHAS)	Attend, importance.	Mortality, SRH, I/ADL, chronic illness, etc.	50+	15,400	2001, 2003, 2012, 2015
Netherlands	Longitudinal Aging Study Amsterdam (LASA)	Attend, pray, belief in afterlife / heaven, etc.	Mortality, hormones, glucose, hearing, grip, medication, utilization, SRH, etc.	55-84	3,000	1992, 2002, 2012, 2015
Singapore	Transitions in Health, Employment, Social engagement & InterGeneration-al transfers in Singapore (THE SIGNS)	Attend, pray, importance (pray & importance asked of only half the cases).	Mortality, grip, SRH, I/ADL, chronic illness, cognition, etc. (Note that the data in this study is not available to outside researchers.)	60+	4,550	2015, 2018
Taiwan	Taiwan Social Change Survey (cross-sectional)	Attend, pray, belief in heaven / hell, etc.	SRH, etc.	18+	2,000	1984-1985, every 5 years

Supplemental Datasets Available for Analysis

We identified four additional datasets available for religion-health analysis that are not nationally representative, but are unique and worthwhile resources.

Australian Longitudinal Study of Ageing (ALSA). The ALSA is based on a stratified random sample of 2,100 people over age 65 in the city of Adelaide. Data collection started in 1992 and is ongoing. Religious attendance and importance questions are asked. Mortality data is collected, along with tests of grip, walking, vision, hearing, glucose, and lung function. Surveys cover self-rated health, disability, chronic illness, and cognition. An unusual aspect of this study is that institutionalized elders are included.

Wisconsin Longitudinal Study. All 10,000 high school graduates in the US state of Wisconsin in the year 1957 have been followed for half a century. The sixth wave of data collection occurred in 2011. Wisconsin is not representative of the United States population ethnically, and 25% of the cohort's age peers did not graduate from high school. From a public health perspective, less educated individuals are often of greater concern. Yet, this is the longest longitudinal survey that we are aware of with religiosity and health data, and it incorporated the entire population of graduates, not just a sample of them. Religiosity questions include attendance at five time points, importance of religion, use of religious coping, practical assistance received from a religious community, and volunteering with religious and other organizations. Health data includes testing of vision, hearing, cognition, grip, walking, and lung function. Surveys cover medical conditions, utilization of health care, disability, consent to access medical records, and a DNA sample.

Marital Instability Over the Life Course. This United States study followed a nationally representative sample of 2,000 married people, aged 18 to 55, from 1980 to the year 2000. The dataset includes self-rated health, medical conditions, and disability information. Religiosity data covers frequency of religious attendance, prayer, social contact with religious groups, tuning in to religious broadcasts, reading the bible, as well as the influence of religion on life, change in religion, religious differences in marriage, and the influence of religious disapproval of divorce, among young and middle-aged adults as they transitioned into mid- and later life.

Established Populations for Epidemiologic Studies of the Elderly (EPESE). Finally, EPESE used a variety of sampling methods in four regions in the eastern half of the United States. EPESE recruited 14,000 people over 65 years of age in 1981 and followed them until 1993. They were asked about religion as a source of strength, private religious activity, attendance at religious services, and how religious they were. Health measures included mortality, self-rated health, blood pressure, and need for hospitalization and nursing home care. EPESE oversampled men and African Americans, making it an excellent resource for studying effects of religiosity on these two groups. HEPESSE, the Hispanic sister study, followed a representative sample of 3,000 Mexican Americans who were over 65 and living in the southwest United States. Data collected from 1993 to 2013 from the Latino elders included questions on religion and stress, frequency of attendance, and how religious they were.

7. Findings and Study Accomplishments

The main accomplishments of our project involve data collection, data analysis, scholarly presentations, and papers written for peer reviewed journals.

Data Collection

In Singapore. We were able to add religiosity questions in 2015, for 4,550 people over age 60, in the Transitions in Health, Employment, Social engagement & InterGenerational transfers in Singapore (THE SIGNS) Study. More information on the study can be found in Table 2, on page 15 of this paper.

In India. We are collaborating on a study in Kerala, a state in India, with data on 7,750 people over age 60. Questions include importance of religion, frequency of prayer, current attendance, and attendance earlier in life, along with a large number of health items. Results of analysis of this data are reported on page 22 of this paper.

In the United States. We developed a survey module for the Health and Retirement Study, to measure religiosity and spirituality from childhood through old age. Data collection, from 1,700 people over 51 years old, ended in April 2018. Analysis of an early release of partial data shows that over 50% of the people experienced a significant gain in faith in their lifetimes, while 20% had a significant loss in faith. Over 40% reported having a life-changing spiritual experience, at an average age of 32. The complete data file, which can be linked with a wealth of health data, should be available for analysis in September 2018. More results can be found on page 27 of this paper.

Presentations

We presented our analyses at the following national and international conferences:

Pew Research Center's Advancing the Demographic Study of Religion Conference, Washington, DC, March 29, 2016

Annual Meeting of the Population Association of America, Washington, DC, March 31, 2016

Annual Meeting of the International Network on Health Expectancy and the Disability Process, Vienna, Austria, June 10, 2016; and Santiago, Chile, May 19, 2017

21st International Association of Gerontological Societies World Congress of Gerontology and Geriatrics, San Francisco, California, July 24, 2017

International Union for the Scientific Study of Population's International Population Conference, Cape Town, South Africa, October 29, 2017

Annual Meeting of the Population Association of America, Denver, Colorado, April 26, 2018

Results

Part II of this report offers an excerpt from the results section of each of the 10 papers produced by our project. This is not an exhaustive review, but it provides, in lay language, a summary of some of the interesting findings.

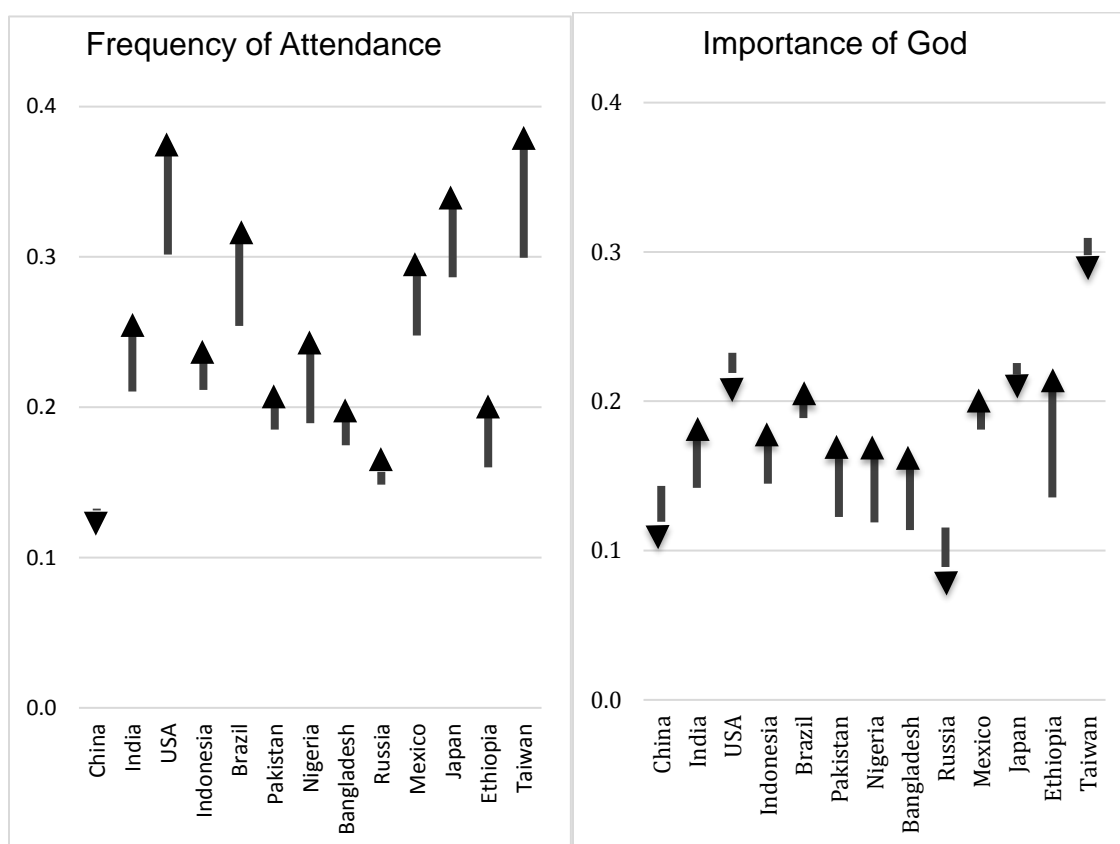
PART II. A Sample of the Findings of Our Studies

8. Religiosity and Health: A Global Comparative Study

Using the World Values Survey, we analyzed data from over 90 countries, with 1,000 to 3,500 adults per country. The association between religiosity and health varied greatly across countries. On balance, religious participation is beneficial for health. At a country level, there are differences, which may provide clues about how religion and health are related. For instance, religious attendance and health tend to be positively correlated in countries with greater religious diversity, while they tend to be negatively correlated in communist and former communist countries. In addition, the relationship of health with the importance of God differs from the relationship between health and religious attendance.

Figure 4, below, compares the chance of very good health for the lowest versus the highest levels of religiosity for selected countries. More frequent attendance is generally associated with better self-rated health, represented by the arrows pointing upward, but this varies. In the United States, a country with high religious diversity, frequent attenders have a 23% greater chance of reporting very good health, represented with a longer arrow. In countries with low religious diversity, participation does not have much impact. In Pakistan, the chance of reporting very good health increases only 8% for low to high attendance, shown with a shorter arrow. The influence of communist governance is seen in China, where greater attendance is associated with a slight reduction in reporting very good health, shown with a short downward arrow. Turning from attendance to the importance of God, associations are neutral or negative in wealthier countries, such as Taiwan, but positive in poor countries like Bangladesh.

Figure 4. **Probability of Reporting Very Good Health, for Highest vs. Lowest Level of Religiosity**



9. Religiosity and Spirituality Across Europe

Using the European Values Survey, we analyzed year 2008 data from 47 countries, with approximately 1,500 adults, over age 20, per country. For most countries, none of the four ways we measured spirituality or religiosity were significantly associated with self-reported health. The top row of Table 3, below, shows each country where spirituality was associated with better health. Attendance was positively associated with health in 11 countries, while in only 3 countries each did frequency of prayer, the personal importance of religion, or belief in God have a positive relationship with health. There were almost as many countries where spirituality was associated with worse health, seen in the bottom row, where frequent prayer was most likely to be associated with poor health.

Only a few countries showed consistency across spirituality measures. In Germany, increases in all four spirituality measures were associated with better health. In Bosnia Herzegovina and Iceland, this was true for three out of the four measures. Consistent negative associations were found only in the Czech Republic.

Table 3. Countries With Significant Associations Between Self-Rated Health and Each Dimension of Spirituality (Ordinal Logistic Regression Models Adjusted for Age, Sex, and Education)

Association with health	Attendance	Private prayer	Importance of religion	Belief in God
Positive: Odds ratios > 1, Greater spirituality = better self-rated health	Azerbaijan, Austria, Bosnia Herzegovina, Croatia, Finland, Georgia, Germany, Great Britain, Greece, Ireland, Poland	Bosnia Herzegovina, Germany, Turkey	Austria, Bosnia Herzegovina, Germany	Germany, Iceland, Macedonia
Negative: Odds ratios < 1, Greater spirituality = poorer self-rated health	Albania	Azerbaijan, Belgium, Belarus, Czech Republic, Estonia, France, Latvia, Moldova, Russian Federation, Slovak Republic, Switzerland	Belarus, Czech Republic, Denmark, Slovak Republic	Czech Republic, Norway

10. The Impact of Religious Activity on Life and Active Life Expectancy in the European Union

We used Survey of Health And Retirement in Europe (SHARE) data of 22,300 people, from five countries, collected from 2004 to 2015. (The quality of the mortality data was not high enough in the other countries for valid health expectancy calculation.) As seen in Table 4, below, men who attended religious services in the last month are expected to live 4 years longer (total life expectancy), compared with men who had not attended in the last month. About 3.4 of those years are expected to be lived in good health (healthy life expectancy), and about 1 of the years is expected to be lived with difficulty with an activity of daily living (unhealthy life expectancy). There were no statistically significant findings for women. At least for men, this consistent positive association between attendance and health is quite a different pattern from that found in the European Values Survey results described above, where most countries had no significant association.

Table 4. Increase in Years of Total, Healthy, and Unhealthy Life Expectancy, for Men at Age 50, Attending Religious Services in the Last Month

Country	Total life expectancy	Healthy life expectancy	Unhealthy life expectancy
Sweden	4.2	3.4	0.7
Spain	4.2*	3.5*	0.7
Italy	4.2*	3.5*	0.8
Israel	4.4*	3.3*	1.2
Poland	4.1*	3.3*	0.8

* $p < .05$

11. Total and Disability-Free Life Expectancy in Costa Rica

Costa Rican Longevity and Healthy Aging Study (CRELES) data, from 2,800 Costa Ricans over age 55, show that men who attend religious services at least weekly can expect to live 4 years longer than men who attend less often, and 3 of those extra years should be in good health. Women who attend religious services at least weekly can expect to live 7 years longer, 5 of those years in good health, compared with women who attend less often. For men, this is similar to the European SHARE data reported above. For women, the results are vastly different.

Table 5. Total and Disability-Free Life Expectancy in Costa Rica, According to Attendance at Religious Services, at Least Weekly

	Total life expectancy	Disability-free life expectancy	% disability-free life expectancy
Men			
Attended less	20	14*	70
Attended more	24	17*	69
Women			
Attended less	20*	11*	54
Attended more	27*	16*	59

* $p < .05$ for attending less versus more

12. Differentials in Active Life Expectancy by Religiosity, Among Older Adults in Kerala, India

The Kerala Ageing Survey II is regionally representative, not nationally representative. The state of Kerala is of interest based on the unusual number of old people living there, contrasted with the rest of India. This is the largest religion and health dataset on old people in one geographic area outside the United States. More than 7,700 people over the age of 60 were interviewed in 2013, 61% of them Hindu, 21% Christian, and 18% Muslim. Religion was very important in the lives of 70% of them and somewhat important for 20%. They reported their frequency of attendance at religious services when they were 20-25 years old and also in the last year. Reports of attending weekly went up to 24% from 16%, in last year compared to earlier in life.

We estimated total and active life expectancy by four measures of religiosity: religious service attendance in the last year, religious service attendance at age 20-25, frequency of private prayer, and importance of religion. While there are differences in life expectancy according to religiosity, the differences are all too small to be statistically significant. For both measures of attendance and private prayer, those who are more religious have a longer estimated life and active life expectancy. For importance of religion, those who are more religious have a shorter active life expectancy. These results may change after controlling for socioeconomic variables.

Table 6. Total, Active, and Inactive Life Expectancy at Age 60, According to Religiosity

Sex	Religiosity measure	Level of religiosity	Total life expectancy	Active life expectancy	*Inactive life expectancy
Male	Attendance	More	21.8	17.9	3.9
		Less	20.5	17.4	3.1
	Attendance at age 20	More	21.1	17.6	3.4
		Less	20.8	17.3	3.5
	Praying	More	21.5	17.7	3.8
		Less	20.1	17.4	2.7
	Importance	More	21.3	17.4	3.9
		Less	20.5	17.6	2.9
	Attendance	More	24.0	18.1	5.9
		Less	22.5	17.8	4.7
Female	Attendance at age 20	More	23.2	18.1	5.2
		Less	23.0	17.9	5.1
	Praying	More	23.7	18.0	5.7
		Less	21.9	17.8	4.1
	Importance	More	23.4	17.8	5.6
		Less	22.3	18.1	4.2

*Difficulty with at least one activity of daily living

13. Differentials in Active Life Expectancy by Religiosity, Among Older Adults in Singapore

The Panel on Health and Aging of Singaporean Elderly Survey (PHASE), a longitudinal survey conducted from 2009 to 2015, provided data on functional disability and mortality, for Buddhists and Taoists (57% of the total), Christians (16%), Muslims (12%), practitioners of other religions (5%) and no religion (11%). Attendance at religious services occurred weekly for 30% of those surveyed, monthly for 16%, less than monthly for 22%, and not at all for 32%. Table 7, below, shows unadjusted differences in estimated total, active, and inactive life expectancies, by at least monthly versus less than monthly attendance. People who are more religious have greater life expectancies, although the differences are not statistically significant for men, or for women when adjusted for years of education.

Table 7. Total, Active, and Inactive Life Expectancy, at Age 60 by Attendance, in Singapore

Sex	Attendance	Total life expectancy	Active life expectancy	*Inactive life expectancy
Male	More	21.5	18.2	3.3
	Less	20.2	17.3	2.9
Female	More	28.3	20.3	8.0
	Less	24.7	18.1	6.6

*Difficulty with at least one instrumental / activity of daily living

14. Multiple Dimensions of Religiosity Among Older Adults in Taiwan

We used data from 3,740 elders in the Taiwan Longitudinal Study on Aging, collected from 1999 to 2007, to examine multiple dimensions of religiosity and how they relate to total and disability-free life expectancy. Religious beliefs did not predict disability or death. Using religion to cope with life stresses was associated with better health only for those with disability at baseline. However, the elders who participated more in public and private religious practices (attending services and praying at home alone) lived longer, with more disability-free years, than those participating less. In this study, the relationship between health and religiosity depended completely on the aspect of religiosity and on demographics (disability at baseline).

As seen in Table 8, below, men lived a total of 4.8 years longer with greater religious participation, 3.1 of those years disability-free. Women gained 4.3 years, 3.7 of them disability-free. Greater social support explained only part of the religious benefit, as shown in the adjusted model: Statistically removing the influence of social support, from religious practice, left men with 1.4 extra years of life and left women with an additional 2 years.

Table 8. Gain in Years in Total, Disability-Free, and Disabled Life Expectancy, At Age 70, Comparing Highest Versus Lowest Religious Practice

	Life Expectancy	Unadjusted	Adjusted*
Men	Total	4.8	1.4
	Disability-Free	3.1	1.1
	Disabled	1.7	0.3
Women	Total	4.3	2.0
	Disability-Free	3.7	1.9
	Disabled	0.6	0.1

*Adjusted for age, education, friends, relatives, marital status, emotional support, social involvement, tobacco, betel nut, alcohol, diet, exercise, life satisfaction, depression, self-rated health

15. How Religious Activity Distinguishes the Mortality Experiences of Older Taiwanese

Taiwanese people over age 60 were interviewed in 1989, with mortality information collected until 2007. Our analysis showed that being involved in any religious worship was a robust predictor of total life expectancy. In this sample of 3,800 individuals, a 60-year-old religiously active man could expect 1.3 more years of life than his non-religiously active counterpart. A 60-year-old woman could expect 1.4 extra years. Table 9, below, shows that adjusting the model for known predictors of mortality reduces but does not eliminate the religious advantage: The 60-year-old man and woman retain an advantage of almost a year (0.9 years) from their religious worship.

Table 9. Life Expectancy Estimates by Religious Activity, Sex, and Age, for Unadjusted and Adjusted Models

Model	Sex	Age	No religious activity	Religious activity
Unadjusted	Men	60	18.5	19.8
		70	12.3	13.3
		80	8.2	8.9
		90	4.1	4.5
	Women	60	21.5	22.9
		70	14.7	15.8
		80	9.2	10.0
		90	5.1	5.5
Adjusted*	Men	60	19.1	20.0
		70	13.1	13.8
		80	8.4	8.9
		90	4.9	5.2
	Women	60	22.6	23.5
		70	15.9	16.7
		80	10.4	11.0
		90	6.0	6.2

*Adjusted model controls for marital status, rural residence, socioeconomic status, health, behaviors, social support, and psychological health.

16. Religion, Life Expectancy, and Active Life Expectancy in the United States

Using 1998-2014 data from the Health and Retirement Study, we found that people who attend religious services at least once a week have longer total and active life expectancy than less frequent or never attenders. Men who attend services at least once per week live about 4 years longer than those who do not attend services at all. Most of these gains are disability-free. The differentials for women are larger. Controlling for other factors reduces these differentials, but they remain statistically significant.

Importance of religion is also related to total and active life expectancy, but the differences are less consistent or pronounced than for attendance. We found no significant association between religious affiliation and life expectancy. Table 10, below, shows the minimal advantage of religious affiliation, which is too small to reach statistical significance. These findings suggest that behavior may be more important than affiliation and importance of religion, when it comes to influencing the health of older adults in the US.

Table 10. **Estimated Total, Disability-Free, and Disabled Life Expectancy at Age 65, by Sex and Religious Affiliation (1998-2014)**

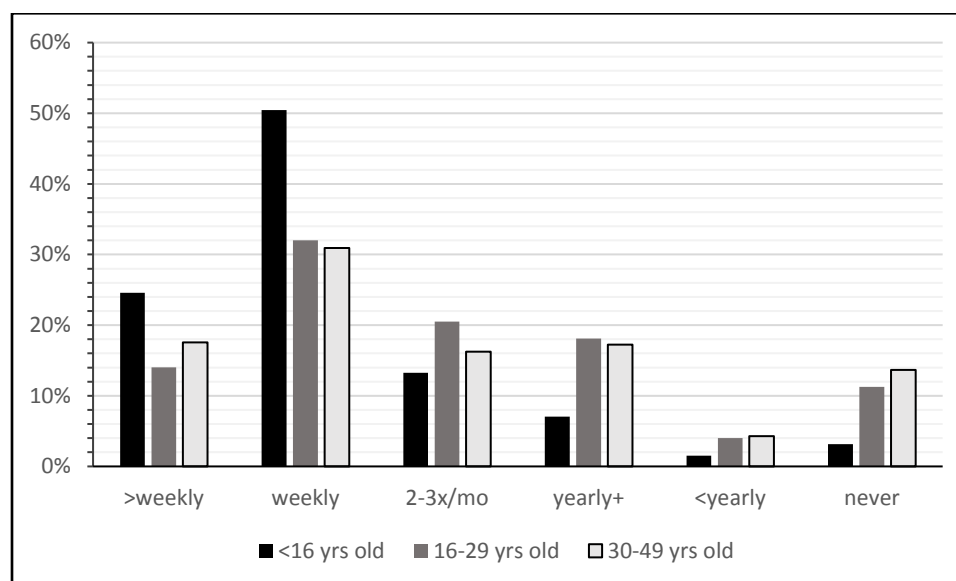
	Any religious affiliation	No religious affiliation
Female		
Unadjusted		
Total Life Expectancy	19.6	18.9
Disability-free Life Expectancy	13.1	12.6
Disabled Life Expectancy	6.6	6.2
Adjusted*		
Total Life Expectancy	19.5	18.9
Disability-free Life Expectancy	13.2	12.7
Disabled Life Expectancy	6.3	6.2
Male		
Unadjusted		
Total Life Expectancy	16.7	16.3
Disability-free Life Expectancy	12.3	12.3
Disabled Life Expectancy	4.4	4.1
Adjusted*		
Total Life Expectancy	16.7	16.3
Disability-free Life Expectancy	12.3	12.0
Disabled Life Expectancy	4.4	4.3

* Adjusted for ethnicity, household composition, education, chronic conditions, and smoking.
Note: None of the differences are statistically significant.

17. Attendance at Religious Services Over the Life Course in the United States

Complete data for the survey module we added to the Health and Retirement Study, on religiosity over the life course, is expected to be released by September 2018. For now, we compared early release data, from persons born before 1960, on how frequently they attended religious services during three periods of their lives. The black bars, in Figure 5 below, show that, as children, about 25% attended more than weekly and another 50% attended weekly. Attendance went down after that, with the gray and pale gray bars showing that, from age 16 to 49, about 16% attended more than weekly and about 31% attended weekly. In total, under age 16, 88% attended at least twice a month and only 3% never attended. From ages 16 to 49, about 66% attended at least twice monthly, and those never attending rose to 14%.

Figure 5. Percentage of Persons Over 57 Years Old Reporting Attendance at Religious Services at <16, 16-29, and 30-49 Years Old



18. Summarizing the Findings

Linking Spirituality and Religiosity to Life and Health Expectancy, A Global Comparative Study, began with the big question: Regardless of nationality, culture, or religion, do people with greater religious and spiritual involvement live longer, healthier lives? Thus far, our answer is: No. In a number of countries, across a number of traditions, spirituality/religiosity conceptualized in some ways is correlated with longer and healthier life. On the other hand, there are many countries, and some ways of measuring spirituality, where there is no correlation. Additionally, there are some ways of measuring spirituality, and some types of countries, where spirituality is more likely to be correlated with worse health.

Attendance is the aspect of religiosity most consistently associated with better health. This is true when examined globally, in the World Values Survey; in Europe in the European Values Survey and SHARE; and in Costa Rica, Taiwan, and the United States. In Europe men benefit more from attendance, while in Costa Rica women benefit more. In Singapore and Kerala, India, the benefit is not statistically significant.

Religiosity measured as “the importance of religion in one’s life” is less important to health than attendance is, in the United States. In Europe and in Kerala, India, importance tends toward negative associations with health. In the World Values Survey, importance of God is correlated with worse health in wealthy countries and better health in poor countries. Similarly, religiosity measured as belief in God is not associated with better health in Taiwan or Europe, and religious affiliation is not associated with health in the US.

In Europe, the association between frequency of prayer and health is negative in more countries than it is positive. One possible interpretation is that prayer is not bad for health, but that the association between prayer and worse health is due to ill people praying more as a way to try to feel better. Disabled people in Taiwan are helped by using religious coping, in a way that able-bodied people are not.

As far as context is concerned, in the World Values Survey, attendance is associated with better health in countries with religious diversity, where being religious is a choice, neither coerced nor stigmatized. In contrast, countries that were communist tend toward attendance being associated with worse health, suggesting that, where religiosity is newly accepted, adherents may be from the least healthy parts of society. In wealthy countries, there is less benefit from religious involvement, perhaps because there is less room for improvement in health.

Our results, showing that attendance has the most consistent relationship with better health, and that prayer has the most consistent relationship with worse health, are in alignment with previous research. However, our research underscores the complexity in the patterns of associations, highlighting that there is no one relationship between spirituality or religiosity and health, and that global research is necessary to clarify the interacting influences.

PART III. The Way Forward in Global Research on Spirituality, Religiosity, and Health

The analyses conducted as part of the project Linking Spirituality and Religiosity to Life and Health Expectancy, A Global Comparative Study, established that the association between spirituality and health differs substantially depending on the measure of spirituality that is used and the setting in which it is examined. The association between spirituality and health is complicated, but the availability of rich survey data across many countries provides an opportunity to clarify this complex relationship. Our map of the path forward includes refining the measurement of spirituality, testing potential causal mechanisms of the spirituality-health relationship, and describing the limits of spirituality's influence on health. We outline these as three critical questions to be addressed in future research:

1. What is the best way to measure spirituality for health research? Factor analysis of spiritual survey questions, compared across countries, can tell us if the inconsistent associations of aspects of spirituality and health are a function of different relationships among the aspects of spirituality themselves. For instance, in some countries, believers may be attenders who also pray frequently when alone. In other countries, attendance may serve a more purely social function, and attenders may not believe deeply or pray often when alone. Factor analysis shows how different questions do or do not converge on a single concept. Using factor analysis and other statistical procedures, country by country, we can clarify the interrelationships of spirituality and health.
2. What are the causal mechanisms that link spirituality, religiosity, and health, and how do these mechanisms differ across contexts? Attendance is the aspect of religiosity with the strongest and most consistent association with better health and longevity. One explanation for this is that the source of health is the congregants, in which case social support may be the mechanism that explains the association. Yet, social support has been tested repeatedly (Snibbe and Markus 2002), and it explains only part of the influence of religion on health. This may be because other causal influences, such as personality, may be the source of both religious activity and health (Haviva 2018). For instance, people who are more social may be both healthier and more drawn to attending services. The World Values Survey, the Health and Retirement Study, and the English Longitudinal Study on Aging datasets contain personality data, so this hypothesis can be tested. Better health behaviors, such as refraining from smoking and heavy drinking, have been found as causes of better health among religious people in the US. Testing different causal models will allow examination of the chain of connections linking spirituality, religiosity, and health, potentially explaining the variation in results.
3. What are the limits of the influence of spirituality on health? Our research shows that spirituality tends to be associated with better health only in regions with religious diversity and a history of religious practice (Zimmer et al. 2018). This finding is consistent with previous research showing the importance of regional context in the religiosity-health association (Stavrova 2015). Another possibility is that collectivist societies are not as reliant on religious institutions for social support, and therefore religiosity has a stronger influence on health in individualistic societies. These hypotheses regarding broad societal influences are critical to test if we are to understand why associations vary globally.

Taking the global perspective on spirituality, religion and health research has revealed that there is much more for us to learn. The research team behind the Global Comparative Study, Linking Spirituality and Religiosity to Life and Health Expectancy, looks forward to testing the above hypotheses, in pursuit of a deeper understanding of these complex relationships.

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