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Zeev Maoz [a] & Errol A. Henderson [b]

[a] University of California, Davis, and Interdisciplinary Center , Herzliya , Israel

[b] Pennsylvania State University

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The World Religion Dataset, 1945–2010: Logic, Estimates, and Trends

ZEEV MAOZ
University of California, Davis, and Interdisciplinary Center, Herzliya, Israel

ERROL A. HENDERSON
Pennsylvania State University

This study introduces a new dataset on world religions. The World Religion Project consists of (a) a systematically developed classification of major world religions and religious families within major world religions, which enabled (b) the collection of data on the distribution of the population of all states in the international system across these religious categories, over the period of 1945–2010, and (c) a set of methods to reconcile among conflicting data from multiple sources, to deal with missing data, and to integrate multiple figures for a given observation. In the present study we discuss the significance of the World Religion Project, its internal logic and the development of the religion tree system of classification, and the data collection and data management process. We then provide a number of descriptive statistics about national, dyadic, regional, and global distributions of world religions, as well as some preliminary relationships between the religious similarity of states and their regime type, alliance patterns, and propensity to conflict. We discuss the potential contribution of this dataset to the study of the relationship between religion and international conflict and cooperation.

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Address correspondence to Zeev Maoz, Department of Political Science, University of California, Davis, One Shields Avenue, Davis, CA 95616, USA. E-mail: zmaoz@ucdavis.edu

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Religion has played a central role in social, political, economic, and international affairs for millennia. Even in recent times, and in the most advanced industrial societies, the prevalence of religious adherence is still substantial, as recent polls and censuses have revealed (ARDA 2012). Globally, over 71% of the respondents in the World Values Survey (WVS) in 2006 reported that religion is either very or rather important in their life, and as many as 51% ranked the importance of God in their life at level ten—the maximum rank allowed in that question (and nearly 73% responded to this question at level 7 or above on a 10-point scale—WVS 2012). Not only are there commonalities with respect to the prevalence of religious identification, religious differentiation seems also quite important. In fact, over 50% of the respondents of the 2006 WVS reported that they do not trust (very much or at all) people from a different religion.

Recognition of the role that religion plays both within societies and across different social groups and states led to a growing number of studies that have explored the connection between religion on the one hand and social, political, economic, and international processes, on the other. For example, a Google Scholar search with the "religion" and "conflict" Boolean combination yielded 15,800 entries over the period of 2002–2012; the combination "religion" and "political conflict" yielded 15,900 entries, the combination "religion" and "international conflict" yielded 8,330 entries; while the combination "religion" and "economic conflict" yielded 1,260 entries.

The role of religion in the study of conflict and cooperation has become a central topic of research in the last decade of the twentieth century and the first decade of the twenty-first century. This was due to scholarly arguments about the clash of civilizations (Huntington 1996), the meteoric rise in scholarly research about civil wars and the focus on religious and cultural social divides as a possible cause thereof (for example, Ellingsen 2000; Fearon and Laitin 2003; Hegre, Ellingsen, Gates, and Gleditsch 2001; Henderson and Singer 2000), and the rise of religious terrorism (Juergensmeyer 2003). Such arguments and speculations linking religion to conflict and cooperation have also become a central focus of policy discussion, especially since the terrorist attacks of September 2001 (Toft, Philpott, and Shah 2011). Not surprisingly, the growing focus on the religion-conflict/cooperation nexus led to a flurry of empirical investigations connecting religious and linguistic similarity to conflict (for example, Gartzke and Gleditsch, 2006; Henderson 1997, 1998; Henderson and Tucker 2001; Russett, Oneal, and Cox 2000), and a few linking religious similarity to international cooperation (Gibler 2008; Lai and Reiter 2000; Maoz 2010).

The quantitative studies of the religion-conflict/cooperation nexus were based on a number of data sets that examine religion in specific

domestic political contexts (for example, Putnam and Campbell 2010); or in international contexts (Fox and Sandler 2006; Pearce 2006; Vanhanen 2001). Other datasets offer a cross-national and longitudinal perspective on the distribution of religious adherents across time and space. These datasets formed the basis for many of the empirical studies discussed above (for example, Ellingsen 2000; Singer 1997). The Correlates of War (COW) data (Singer 1997) includes decennial observations on religious groups for states; but the observations end at 1990. The criteria for classifying and differentiating among major religions, religious families, and religious denominations are not clear in these datasets. Ellingsen (2000) provides annual estimates of the religious characteristics of states based on averaging values from three sources (that is, *The CIA World Factbook*, *Britannica Book of the Year* and the *Demographic Yearbook*) and interpolating missing years. These data go to 2000; they identify the largest and the second largest religious groups in the country; and they have a straightforward list of nine major religions (Animism, Atheism, Buddhism, Hinduism, Islam, Judaism, Christianity, Shintoism, and Syncretic).

The present project, the World Religion Project (WRP), provides data at five-year intervals to 2010 on the religious adherents of states coded for 14 major religions, and also data on several religious families. It draws from multiple sources, and also provides novel measures of the religious characteristics of states in terms of religious diversity and religious similarity. The WRP builds on existing datasets but also improves on them in several important ways. We document these below. As such, it opens new and expanded opportunities for the study of the role of religion in world politics.

Our aim in this study is to introduce the WRP. In the next section, we discuss the underlying logic of the project, and the process that we pursued prior to collecting the data. Next we explain the data collection and data aggregation methods. We then provide a series of descriptive statistics about world religions across space and over time, including some preliminary statistics on the relationship between religion and international conflict or cooperation. We conclude this study by discussing the possible uses and implications of the WRP.

THE GENERAL LOGIC OF THE WORLD RELIGION PROJECT

One of the distinguishing characteristics of the WRP is that our approach to the process of data collection was deductive in nature. Before collecting data on world religions, we had to come up with satisfactory answers to basic questions about the nature of religion and the classification of world religions. These answers were crucial in developing a "religion tree," that is, a systematic classification of major world religions and of religious families within each of these major religions. This, as we quickly noticed, was in stark

contrast to the common practice in the scholarly disciplines that deal with these matters. These generally lack an explicit set of principles for deciding what constitutes a religion or for classifying religions and religious families.

The first step was to come up with a definition of a religion that is both consistent across disciplines and also is most relevant to the process of generating a world religions dataset. The definition of religion has been a focus of intense debate not only among theologians and religious studies scholars, but also among sociologists, anthropologists, or philosophers. We had no pretention of developing yet another definition. Consequently, we conducted a comprehensive literature review designed to answer several questions that were essential to our enterprise.

1. What is a religion?
2. Can we find observable or tangible indicators that facilitate systematic identification of religions?
3. Are there tangible indicators that allow us to distinguish among different religions, and among religious families/denominations within a given religion?
4. How can we validate our criteria for a religion and/or religious families within a given religion?

Without going into too much detail, our literature review covered multiple fields of scholarship that focus on the study of religion such as history, religious studies, anthropology, sociology, law, political science, and philosophy, as well as specific regional studies.[1] The upshot of this review was that we could not find a consensus on any of the issues listed above. The definition of religion we adopted (Alston 1967:142) was one whose elements appeared most often in other definitions of religion, and which offered the clearest indications of tangible elements of religions. This definition states that a religion is *a belief system held by an individual or a group that contains the following elements*:

- Belief in supernatural being/s (god/s).
- A distinction between sacred and profane objects.
- Ritual acts focused on sacred objects.
- A moral code believed to be sanctioned by the supernatural being/s (god/s).
- Characteristically religious feelings (awe, sense of mystery, sense of guilt, obligation, duty, adoration), which tend to be aroused in the presence of sacred objects and during the practice of ritual, and which are ideationally connected to the gods.

[1]A list of sources is provided on the project's website at: http://www.correlatesofwar.org and http://www.thearda.com.

- Prayer and other forms of communication with gods.
- A worldview or a general picture of the world as a whole and the place of the individual therein. This picture contains some specification of an overall purpose or point of the world and an indication of how the individual fits into it.
- A more or less total organization of one's life based on the worldview.
- A social group bound together by the above.

Clearly, this is a very general, but also quite vague definition of religion. Other definitions are equally focused on beliefs, moral codes, and rituals. Empirically, one of the most important and commonly mentioned criteria for classification of religions and religious families or denomination is self-identification. This, however, has very limited application in the context of our project. Since we had to trace religions across time, surveys or census data were not available for most states and for most time points. Even when such data were available, the variation in the categories from which respondents had to select varied from one survey/census to another. In order to create a cross-sectionally and longitudinally stable definition of religion, we had to develop fairly observable or tangible criteria that can guide data collection. This required heavy reliance on secondary data. Given this state of the literature, our next objective was to derive a set of fairly tangible criteria that define religions and religious families independent of subjective identification of people with a given belief system. The review yielded a fourfold set of criteria.

a. *Scriptures.* A central text or a set of texts that—as a whole—encapsulate the general principles of the belief system of a given religion. The existence or type of scriptures is a key identifier of some, but not all religions. Some religions do not have major scriptures; others incorporate scriptures from other religions with scriptures that are exclusive to a particular belief system. But the absence of central scriptures is also an important distinguishing feature of a religion, provided it possesses the other characteristics.
b. *Institutions.* A set of formal or semiformal institutions that are responsible for interpreting the basic beliefs for adherents, modifying them or changing them over time, training and ordaining spiritual leaders of their communities—and determining who is a believer and who is not. The nature, size, and formality of institutions vary a great deal across religions. However, virtually every religion has a set of institutions or a group of individuals who interpret beliefs for adherents. In many cases, these institutions or priests have primary responsibility for leading the practice of collective rituals. This set of institutions must be unique to that belief system and distinct from the institutions of other belief systems.

c. *Historical evolution*. It is possible to trace the origin, evolution, and diffusion of religions in terms of historical turning points and/or identifiable processes. At these turning points or processes, an individual or a group have formed the basic principles of a new religion. This individual or group is also responsible for forming certain institutions that guide religious practices, ordain spiritual leaders, and define principles for inclusion or exclusion of believers. This criterion is an important identifier not only of major religions, but also of religious families and denominations. Since many religions evolved in connection with other religions, the historical context in which religions were formed helps identify their origins[2]
d. *A common class of beliefs, rituals, and practices*. This criterion allows identification of a broad set of religions that is characterized by polytheism. It also characterizes religions that contain identifiable rituals, which are followed without a clear set of institutions or historical evidence of how they were formed. Because such religions have developed or existed in areas that are geographically distinct and noncontiguous, they cover a wide variety of ritualistic elements. Yet there are some basic commonalities in the (rather weak) institutional structure of such religions and their rituals. These allow grouping of such religions into a separate category. However, this criterion does not offer a simple way of dividing such religions into denominations and sub-denominations.

Using these criteria we scanned the literature identifying major religions, religious families within major religions, and denominations within the religious families, which resulted in a three-level structure of the religion tree: major religions, religious families, and denominations. For example, Christianity contains several religious families such as Catholicism, Protestantism, Eastern Orthodox, and Anglican. Protestantism contains a number of denominations such as Presbyterian, Methodist, Mennonite, etc. It became clear very quickly that it would be unlikely to obtain systematic, consistent, and reliable data going back in time on the denominational level. Therefore, our project contains data only on the first two levels of the religion tree: major religions and religious families.

Once the concept of the religion tree was set, we surveyed the existing classifications of religions, focusing in particular on those that were consistent with our observable criteria. This process proved very difficult due to huge variation in classifications of religions across different sources and disciplines. While some classifications were extremely fine-tuned, going down to the level of ethnically or "tribally" specific rituals unique to some regions (or within a given country), other classifications were extremely general, subsuming broad categories of religious groups. Given this state of affairs,

[2]A useful example of how this criterion operates is available on the ARDA website with respect to Christian denominations in the United States. See http://www.thearda.com/Denoms/Families/trees.asp.

we decided to develop a "candidate" religion tree of the most plausible lists of religions/religious families in the literature.

Upon completion of the candidate religion tree, we devised a questionnaire that contains several sets of questions. One set requests that experts assess the validity of the criteria for identifying religions and religious families. The other set asked about whether a given candidate religion qualifies as one of the major world religions. Likewise, for each candidate for a major world religion that was derived from the literature search, we asked whether respondents consider this to be a "proper" religious family. Finally, the survey contained a set of open questions that asked respondents to specify additional criteria for identifying major religions or religious families, for adding or deleting religions or religious families. We conducted a survey among noted religion scholars from various disciplines, as a way of validating or modifying our religion tree. (Table A1 in the online appendix provides a summary of the survey responses to the key questions.)

The survey yielded a number of results. First, we received a strong confirmation of four of the five criteria we had thought to use in identifying major religions and religious families. In the open questions asking whether we had omitted any important criteria, we found no significant responses that would cause us to reconsider these criteria. Second, two-thirds of the 21 candidates to the position of "major world religious" received a validity score of 6 or higher. With respect to the remaining candidates, answers to open questions suggested collapsing them with the "surviving" candidates. Respondents also mentioned a very low number of adherents as an alternative reason for entering a low validity rank for certain religions. Some of the candidate religions were collapsed into a broader group; for example, various animist religions were collapsed into the animist group. Syncretic religions represent a wide array of belief systems, but they have some common underlying characteristics, so we decided to group them together. Also, the "other religions" category is a residual category that reflects either religions with relatively few adherents, religions that did not make it into the list, or a complement of a population that is known to practice some religion but there is no information about which religion/s they do (more below).

Third, with respect to religious families, we found also a substantial degree of agreement for most of the candidate families. In this case, low-validity religious families were grouped into "other" (for example, "other Christians," "other Muslims," etc.). Fourth, we found no relationship between the degrees of agreement across different disciplines of respondents. Finally, the number of responses to some questions varied significantly (range = 30 – 67), because many of the respondents had expertise that covered a specific region or a specific religion. This made some respondents hesitant to respond to questions or items that were outside of their professional purview.

Table 1 presents the major world religions and religious families included in the dataset. Thus, the overall logic of the WRP was based on

TABLE 1 Major World Religions and Religious Families in the WRP

Major Religion/Religious Family	Comments
Christianity	
Protestants	
Roman Catholics	
Orthodox	This includes all the Orthodox families (Greek, Russian, etc.)
Anglican	
Other Christians	Residual category
Judaism	
Orthodox	
Conservative	
Reform	
Other	Residual category
Islam	
Sunni	
Shi'a	
Ibadhi	
Nation of Islam	
Alawite	
Ahmadiyya	
Other Muslims	Residual category
Buddhism	
Mahayana	
Theravada	
Other Buddhists	Residual category
Zoroastrian	
Hinduism	
Bahai	
Sikh	
Shintoism	
Taoist	
Confucian	
Jain	
Syncretic	Afro/Christian Religions of Latin America–Santeria
Animists	
Nonreligious	

a deductive development of a religion tree, and its validation via expert polling. This enabled us to prepare the coding manual and engage in the training of coders. The process of data coding and management is the topic of the next section.

DATA COLLECTION AND DATA AGGREGATION

We started the data collection project by forming a religion data source.[3] These sources varied from census-based data, to specific estimates of

[3]For a complete list of sources, see the annotated bibliography on the project's website at http://www.correlatesofwar.org.

religious groups, or specific sources that focused on a given religion in a longitudinal manner (either within a given country or for several countries). Some of the sources contained multiple data points on global or regional levels, but most contained scattered data on specific countries at discrete points in time.

Our coding manual reflected the kind of issues that we anticipated, given the literature review and a general review of source content and quality. As new issues emerged during data collection, we modified our coding manual accordingly. First, we had to insure that denominational level data would be aggregated into the appropriate religious families. This proved to be a major challenge especially within the Christian Protestant family. For example, some sources coded Anglicans as Protestants. Others included multiple Protestant denominations, sometime under different labels. A related problem concerned aggregating the various Christian Orthodox denominations under the Eastern Orthodox family. Islamic denominations also presented a significant challenge. The coding instructions were not always sufficiently specific to handle the diversity of categories provided by different sources; hence we had to resolve multiple ambiguities in these sources.

Our initial strategy was to collect data from each source on a different record. We did that even if a given source listed only the number (or percent) adherents of a single religion. Each data point (or set of data points) was identified by the source from which it was taken, the date of the data, and the date this datum was coded within the given source. We ran a number of tests on the data collected from each of the sources (such as consistency over time, source of the data coded in each source—for example, census, secondary data, etc.—and comprehensiveness of coverage of different religions). We distributed a questionnaire among ARDA members to solicit reliability estimates for each of the sources used. We then ranked sources according to an estimate of reliability.

Before aggregating the data, we had to deal with a number of problems:

1. Adjusting source data to the categories of the religion tree. In quite a few cases the religious categories reported in a given source were not consistent with our religion tree. Here we had to make decisions about which specifically-labeled religious group matched which of the religions or religious families in our religion tree.
2. Eliminating double counting of religious categories. Several key sources had double counting of religious groups. For example, some sources with data going down to the denominational level counted Protestant adherents first by the number of Protestants and then by Protestant denomination. We had to make sure that the sum of the denominations matched the total number of Protestants. When discrepancies were observed specific adjustments had to be made.
3. There were also categories such as "doubly affiliated" Christian groups (for example, Protestants and Roman Catholics). Since we view these religious

families as mutually exclusive, we had to decide how to allocate doubly affiliated adherents into religious families.

4. Adherents of religions not under our religion tree categories. Here we had to distinguish between adherents of religions that were labeled differently but in practice were within our religion tree, and those religions that had been candidate religions but were eliminated in the validation process, or religions that we had deliberately grouped into other categories (for example, a variety of animist or syncretic religions).

This required us to review multiple sources and specific data points and make decisions about how to deal with these problems. We documented our decisions in the raw data files, with specific comments. These are available upon request.

Reconciling Data Points from Multiple Sources

We sorted the data by state, year, and source. There were two types of cases in which data existed in two or more sources for the same state and year. One was a case where two or more sources contained complete or near complete data for all major religions or religious groups within the state. The second consisted of cases where one source provided partial data on some of the religions and another source provided partial data that covered other religions, which were not documented in the previous source.

When two sources provided relatively comprehensive coverage of all or most religions and these data were very similar or identical, this did not present a major problem. The problem emerged when there were substantial differences across sources in terms of the number (or percentages) of adherents of certain religions. The strategy we applied for reconciliation was threefold. First, we checked for within-source consistency over time. The assumption here is that unless a dramatic political or natural event occurred between two time points (for example, a major population transfer or a genocide that eliminated a significant proportion of a given religious group), the percentage of a state's population that practiced a given religion did not change dramatically within a given 5-year interval. If a given source indicated dramatic shifts in the distribution of religious adherents without evidence of an event that would have caused such a shift, we concluded that there was a reliability problem. Second, if we had information about the source for this specific data point (for example, census, survey, estimate), we assigned a specific reliability score to this data point. This enabled us to make aggregation decisions later on.

When a given source contained only partial data on one or more religious groups, we compared these data to data on that religious group from other sources. We checked for over-time consistency as well as the origin

of the data for this source. Source reliability information is given in the data codebook.

The general strategy for all cases that were covered by multiple sources was to generate single records of religious groups via a reliability-weighted mean of all sources.

Interpolating Missing Data

Missing data were a more serious and more common problem. Our current dataset consists of 71,928 data points, organized in 1,998 records. We found complete data for only 382 (19.1%) records from a single or multiple sources. Another 25.6% of the data points were partial data from a single source or multiple sources covering only some religious groups within a given state. The remainder of the data were either interpolated or otherwise inferred according to the procedures detailed below. We confronted four types of missing data issues:

1. Missing data on the first data point.[4]
2. Missing data on a specific five-year point, but with data existing for adjacent years (for example, no data for 1955 but existing data for 1956 and 1957).
3. Missing data on a specific five-year point but with data existing for previous and subsequent five-year points (for example, no data for 1955 but data available for 1950 and 1960).
4. Missing data for 2010.

In the case of missing data on the first or last time point, we applied trend interpolation. We calculated a moving average rate of change coefficient for the series of that particular state and applied it to the first or last data point. In the case of missing data with adjacent data points available, we applied a two-step process. First, if we had data for more than one adjacent year before or after the data point for which data was missing, we calculated an expected distribution of religious groups based on the trend for these two or more years for which data were available. Second, we calculated an expected trend between the two time-points for which data were available before and after the date for which we needed data. Third, we calculated the average between the expected distribution of religious groups and the trend distribution. For cases included in No. 3 we interpolated a yearly distribution from the two time points in which data were available, and applied it to the year where data were needed.

[4]This would be 1945 for states that existed at that time, or the first half-decade year for states that were formed after this point.

In order to insure that users know how we obtained the data for a specific record, we created a variable labeled "DATA TYPE" that specifies whether the data for that country-year are from a single source, multiple sources, whether they are interpolated or trend-based.

Dual Religions

In general, religious adherence forms mutually exclusive groups. People typically practice one type of religion, or do not practice any religion at all. This means that when summing across all religious groups in a given state (including "nonreligious" and "other religion" categories) the total should equal the state's population—and the percentages of religious groups should sum up to 100%. There are, however, a few states in which dual religion is a common practice (for example, Haiti, Japan). In such cases, the sum of religious adherents exceeds the population, sometime by a wide margin. We therefore introduced a code for dual religions.

Final Cleaning of Data

We applied two additional tests in the process of final data cleaning: population adjustment and trend adjustment.

The first test was meant to insure that—with the exception of states with dual religions—the sum of the religious groups equaled the state's population. We used the COW (2008) total population data as the benchmark. There were, however, a few cases where population adjustments had to be made. First, the COW data covered all years up to 2007. Therefore, population data for 2010 had to be taken from other sources. Second, in some cases, the sources we used included data on total population that were dramatically different from those of COW (for example, one of the sources, Barrett, Kurian, and Johnson (2011) lists Afghanistan's population in 2005 at 27 million, whereas COW's total population for Afghanistan is only 22.66 million). In that case, we adjusted the number of religious adherents in that state to fit COW's total population, by first calculating the percentage adherents for each group based on the original source's population, and then re-multiplying the percentages by the COW total population to get the adjusted raw figures of adherents for each religious group.

Third, there were a few cases where the COW population figures reflected some break points over time. Specifically, there were some cases of significant dips in population figures for the same state over a single year period (for example, COW's data indicate that Jordan's population dipped by over 33 percent—from 6.669 million in 2000 to 4.978 million in 2001). Some of these cases are due to political changes. For example, the dissolution of Yugoslavia between 1991 and 1999 or of Pakistan in 1971 explains

dramatic declines in population. Thus, for each case of population decline, we investigated first whether any political shifts explain this trend. If we could not find such an explanation, we informed the COW host of these changes, and adjusted religion groups accordingly, while maintaining consistency with the COW data. These caused some breaks in the distribution of religious groups over time within a given country as is evident in the significant downward trend in Bulgarian population since 1991 and its effect on the distribution of Christians in the country.

The trend adjustment was designed to insure that—barring major events that caused dramatic population changes in a given state—the rates of change in the relative size of any given religious groups in a state would not exhibit dramatic changes from one 5-year point to another. This proved to be difficult to insure, as data for specific 5-year points were derived from different sources. However, whenever necessary, we applied an adjustment rule to insure that rates of change in the relative sizes of various religious groups are fairly smooth. This was the case especially if the data for a given 5-year time point exhibited a dramatic difference between a preceding set of five-year points and a subsequent set of 5-year points. However, in quite a few cases, such a smoothing operation was not possible because we lacked sufficient information enabling us to carry out a smoothing operation. In particular, this was the case when the data for that specific time-point were drawn from a high-reliability source. This implies that in several cases, there are significant changes in percent adherents of a given religious group across 5-year time-points. This is the case in particular with respect to two groups: "nonreligious" and "other religion." Both of these groups represent residual categories in many of the sources. We used the latter as an adjustment category to insure that the total number of adherents matched that of the total population.

TRENDS IN WORLD RELIGIONS, 1945–2010

Before presenting the data, some caveats about trends within nations and within religions over time are in order. First, our approach is state-reliant. We started our data collection of the distribution of religious adherents within a given territory when this territory became an independent state, following the COW definition of system membership. This means that the interpretation of the data presented below should reflect the changes in the size and character of the interstate system over the period of 1945–2010. Second, the availability and reliability of data has improved considerably over time. We have more sources and fewer missing data for later years compared to previous periods.[5] Therefore, the figures provided below may reflect some

[5]For example, average record reliability scores in 2010 is twice that of 1950.

temporal bias. Third, domestic political changes may have also affected reporting on religious affiliations.[6] With these caveats in mind, we turn to a discussion of some major trends in religious adherence from 1945–2010.

Global Patterns

Figure 1 describes the distribution of adherents of some of the key religions over time. For convenience of presentation, the figure does not include all of the major world religions in the data set. However, the discussion covers all of them. Several points are noteworthy here. First, the proportion of religious adherents has increased over time from a low of about 63.7% of the world's population in 1945 to a high of about 86.2% in 2010. Nonreligious percentages varied between 9% and 16% of the world's population over the same period (the highest level of nonreligious reporting was in 1980—16.7%). This is due to two statistical artifacts rather than to a major trend of increased religiosity. One concern, as noted above, the fact that a significant proportion

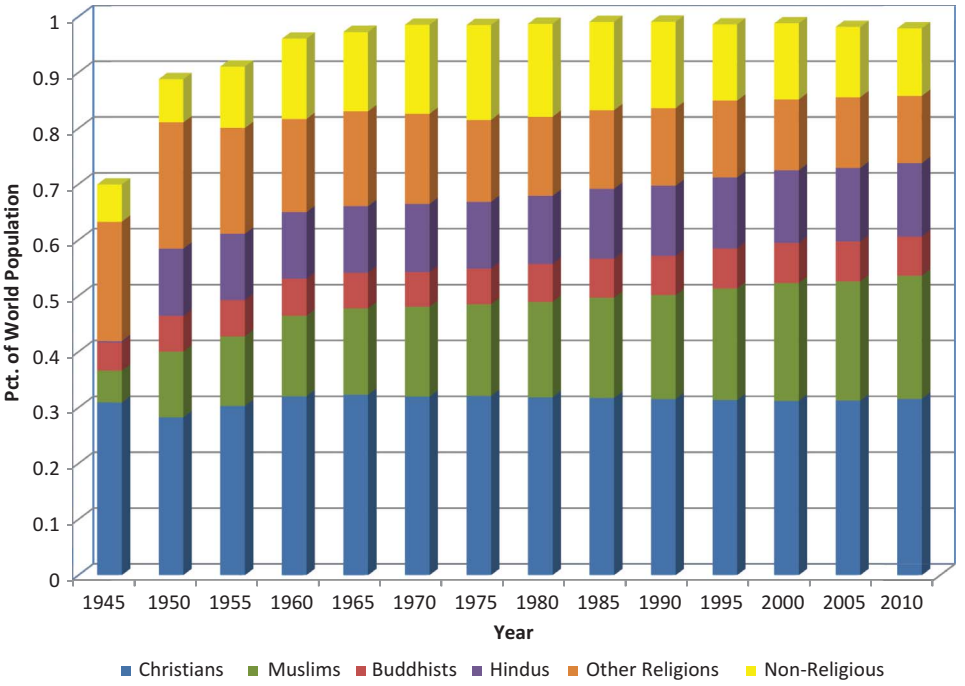

FIGURE 1 Major world religions as percentages of world population (color figure available online).

[6]For example, there was a 10% drop in the percentage of nonreligious people in Albania from 1990 to 1995 and a 12% increase in the number of Muslims during the same period. Likewise, Serbia shows a 13% increase in the percentage of Christians between 2000 and 2005.

(over 30%) of the world's population did not live in independent states in 1945. In contrast, by 2010, 98.3% of the world's population resides within independent states. Therefore, the increased trend in religiosity reflects the fact that many of the new states that emerged over the 1945–2010 period have an especially high proportion of religious adherents. Improved data quality over time may also affect these trends. One can argue, however, that since the mid-1970s, the changes in the size of the international system were relatively marginal, and these changes reflect more rearrangement of the system (secessions and partitions of multiethnic entities—for example, the Soviet Union, Czechoslovakia, Yugoslavia) into more ethnically homogenous states. So that at least some of the increase in religiosity reflects an actual trend rather than a combination of statistical artifacts. We leave this question open to future investigations.

Second, once we consider changes in the composition of the interstate system, Muslims are the only religious group that shows a consistent upward trend relative to the world population. (Hindus also have exhibited a growth trend but this has been rather modest and had stopped by 2010.) The other major religious groups capture a relatively stable proportion of the world's population (for example, Christians, nonreligious) or display a declining trend (for example, Jews, Animists, Syncretics). Figure 2 displays percent changes in the proportion of some of the major world religions over time.

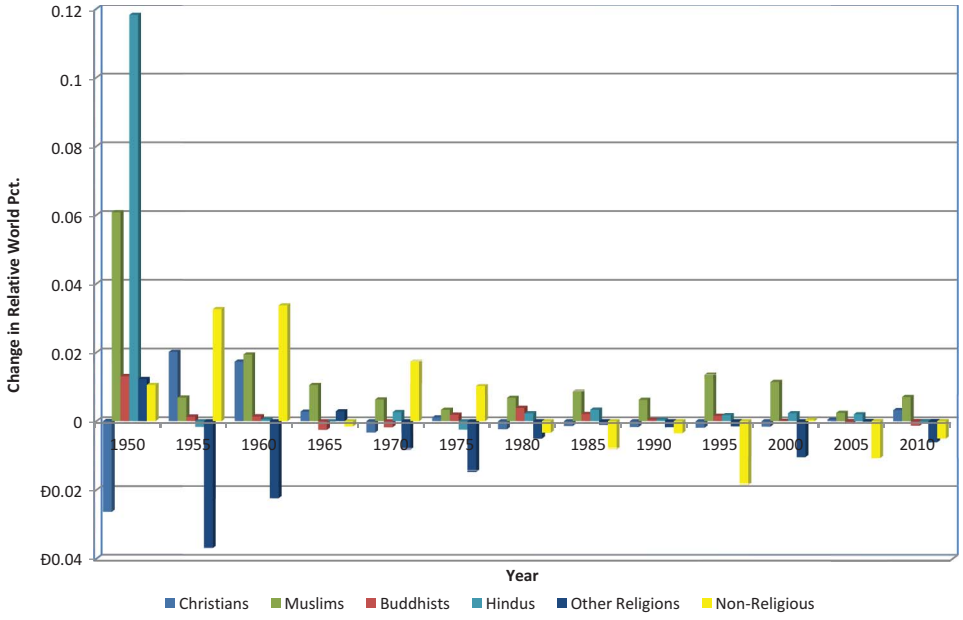

FIGURE 2 Change in relative percentages of major world religions (color figure available online).

As noted above, the general trend suggests that Christianity was and remains the single largest major world religion, accounting for slightly over 30% of the world's population. This proportion has remained fairly stable since 1945. Islam has become the second-largest religion in the world after Christianity, accounting for roughly 22% of the world's population by 2010.[7] This increasing trend is sustained even when we control for changes in the composition of the international system. Since the late 1960s, the number of independent states with a majority Muslim population has not changed significantly. However, the proportion of Muslims in existing states has been on the rise. The pace of growth in the proportion of Muslims has declined over time, however. The proportion of Buddhists in the world population has also increased over time, going from 4% of the world's population in 1950 to 7% in 2010. Other major world religions have captured an increasingly smaller percent of world population. The most significant decline is in the proportion of Jews, which has shrunk by 60%, from 0.5% of the world's population in 1950 to 0.2% by 2010.

A few words about the trends of the non-religious population are in order before we move on. This population exhibited a consistent pattern of growth from 1945 to 1980, and declined from then on, with the most substantial decline taking place in 1990—over 12%. The key reason for that is political: the collapse of Communism in Eastern Europe led many people who had declared atheism in the Communist world to now reclaim their religious identity. This increased the number of religious adherents throughout Eastern Europe and Central Asia.

The WRP disaggregates the major world religions into religious families. However, at this stage of the project we have a detailed and relatively reliable breakdown only for Christianity. The data for the three other major religions that are divided into identifiable religious families—Judaism, Islam, and Buddhism—lack for the most part a detailed breakdown into religious families. Further versions of the dataset will address this deficiency. Currently, however, it is useful to examine the distribution of religious families within the two religions for which we have fairly reliable data. This is done in Figure 3.

With respect to Christianity, several things stand out. First, the distribution of Christians over the major religious families is highly stable over time. The only marked change concerns a gradual decline in the proportion of Eastern Orthodox at the expense of nonaffiliated (or not-specified) category. We cannot credibly say whether these changes are due to actual changes in the belief systems of Christians, to demographic and political shifts, or to data-related issues (for example, different sources, aggregation or imputation of missing data). Second, Catholics have consistently been the single

[7]These data are highly consistent with the Pew survey of world religions of December 2012 (Pew 2012), although we differ significantly on some elements (for example, regional distributions).

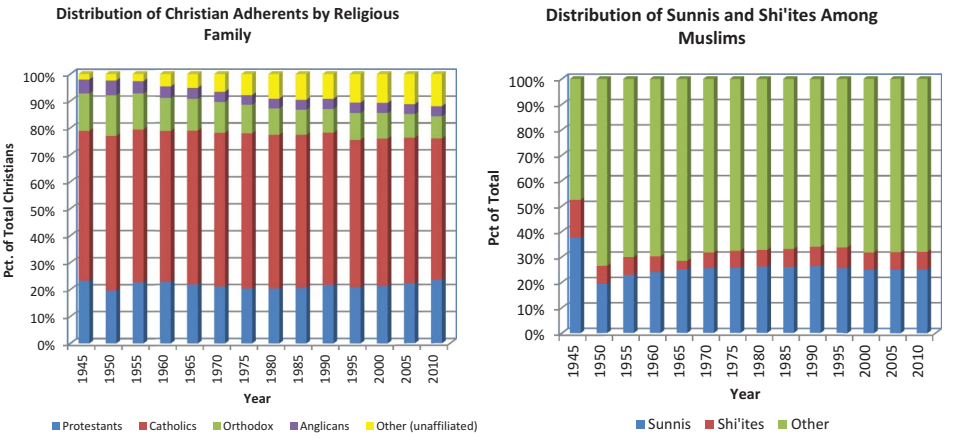

FIGURE 3 Religious families in Christianity (left) and Islam (right) over time (color figure available online).

largest religious family, accounting for roughly 55% of all Christians in the world. Protestants came in as a distant second, accounting for roughly 20% of Christians.

As can be seen from the right-hand side of this figure, we have denominational data for only about 30% of the Muslim population. Nevertheless, the ratio of Sunnis to Shi'ites reflects a generally accepted ratio by Muslim demographers, that is, a ratio of about 4:1. The general proportion of other Islamic religious families is significantly less than 10% of the population of most countries. Nevertheless, even these estimates need to be made with much caution given our data limitations.

Regional Patterns

We turn next to a regional distribution of religious adherence. This is given in Figure 4. The central take-away from the various parts of Figure 4 is not the overall percentages of various major religions across regions, but rather the trends over time. First, with respect to Christianity (Figure 4A), the proportion of Christians exhibited a marked decline in Europe—from an average of 90% in 1945 to an average of slightly less than 75% in 2010. European Christians constituted roughly 38% of the entire population of Christians in 1945. This percentage dropped to 30% by 2010. In contrast, two other groups increased their share over time. The proportion of Muslims in Europe went up from 4% to 10% over the 1945–2010 period. Likewise, the proportion of nonreligious people increased from 5% in 1945 to 14% in 2010. By 2010, European nonreligious population accounted for nearly 50% of the world's nonreligious people. Since the European data reflect only a minor change in the number of states over the period covered in this study, much of

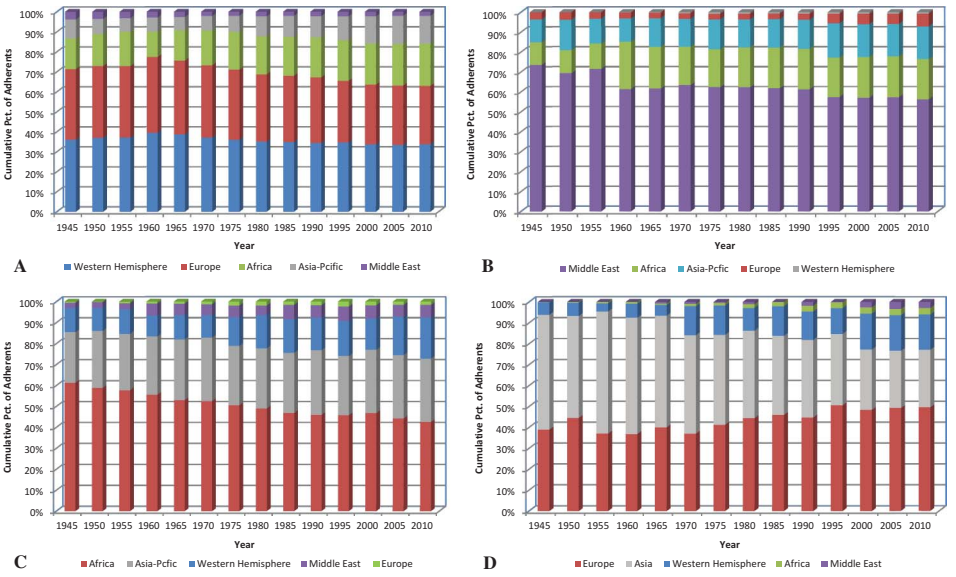

FIGURE 4 Distribution of major religions across regions: (A) Christianity; (B) Islam; (C) Animists, Syncretic, and other religions; (D) nonreligious groups (color figure available online).

this change is due to migration of Muslims into European states, and to secularization of the European population.

Second, the most remarkable change in Islamic representation across regions was in Asia where Muslims increased their share from 21% in 1950 (this reflects the independence of Pakistan in 1947) to 37% in 2010 (Figure 4B). The relative share of Middle Eastern Muslims of the world's Muslim population declined from 71% in 1945 to 55% in 2010. In contrast, the share of Asian Muslims nearly doubled over the same period (from 11% to 21%). The increase in the relative Muslim population in Africa is due primarily to the acquisition of independence of some African states with significant Islamic populations, rather than to demographic or religious trends. Changes in Islamic representation in Europe are due, as noted above, to migration.

We combined the Syncretic, Animist, and other religious groups in Figure 4C because these religious groups reflect—by and large—similar temporal trends. Here the patterns are quite clear: these religious groups exhibit a dramatic decline over time in Africa and (to a lesser extent) in Asia. They maintain a relative stability in other regions.

Nonreligious groups (Figure 4D) show a significant growth in Europe and in Oceania—primarily due to increased secularization of these regions. This, as some studies suggest, is a typical trend of modernization and value change in advanced industrial and technological societies (Bruce 1992; Carrol

2012; Meisenberg 2012). A similar process seems to be emerging in the Western Hemisphere, although there the absolute percentage of nonreligious groups is quite small.

We do not report the results for other major world religions in the charts, but a few words on trends are necessary. As noted above, the relative percentage of Jewish population has been in constant decline. There were three major regions of Jewish presence: the Western Hemisphere, where the relative percentage of Jews decline from 0.3% in 1950 to less than 0.2% in 2010; Europe, where the relative Jewish presence declined from 0.5% in 1945 to less than 0.2% in 2010; and in the Middle East, where Jewish presence peaked at 9% in 1950, but declined to a low of 3.7% in 2010. Clearly, an overwhelming majority of Buddhist, Hindus, Taoists, Jain, and Confucians are in Asia. However, the proportion of the former in Asia declined from 32% in 1945 to 23% in 2010. On the other hand, Hindus increased their presence in the Western Hemisphere and Africa, but their proportion remained fairly constant over time in Asia (roughly 8% of the world population).

The final aspect of our global analysis focuses on the degree of religious diversity in the international system. We use the Index of Qualitative Variation (IQV) to measure religious diversity. This index is given by:

$$IQV = \frac{k\left(1 - \sum_{i=1}^{k} p_i^2\right)}{k-1}$$

where k indexes the number of religious groups (in our case only major religions) and p_i is the percent of the state's population that practices a given religion. IQV varies from 0 when a given state's population practices a single religion, to 1 when the population of a state is uniformly split among k religions such that the percentage of adherents of any given religion is exactly $1/k$. We employ two versions of IQV. The first uses all possible religious groups as k ($k = 15$ for all states). The other uses a variable number of groups, such that for each state k represents the number of religious groups that actually exist in that state. Figure 5 shows the average IQV scores in the system over time. Note that the right-hand axis indexes the number of states in the interstate system.

The data shown in this figure suggest that the growth in the size of the international system over the period of 1945–1965 consisted of states with greater religious diversity than in the past. This, however, changed over the latter third of the twentieth century. The international system continued to grow, but the level of religious diversity remained relatively constant. Overall, the average state exhibits some religious diversity, but most states are fairly homogenous. Note, however, that these figures refer only to diversity in terms of major religions. IQV scores increase somewhat when we

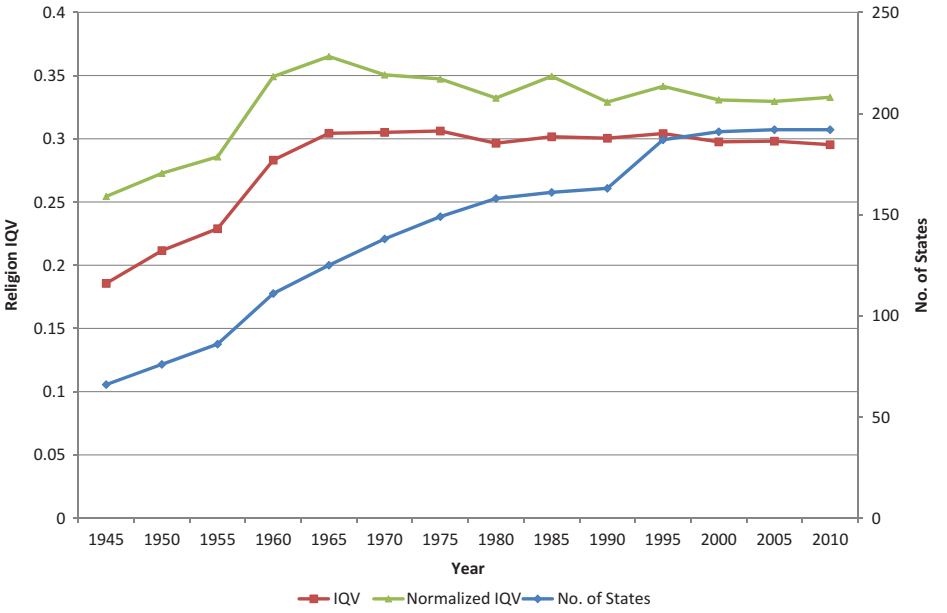

FIGURE 5 Average religious diversity in states, 1945–2010 (color figure available online).

include religious families within the major religions, but the trend is parallel to those displayed in Figure 5.

Religious Similarity

We now turn to an analysis of the degree of similarity between states in terms of the religious affiliation of their respective populations. The issue of religious similarity has become an important topic of research in the international relations literature on conflict and cooperation.[8] This suggests that a good understanding of some aspects of dyadic religious similarity is instructive before we go into analyses of the relationship between religious similarity/differences and dyadic conflict and cooperation. We discuss briefly the strategies for measuring dyadic religious similarity. A more extensive discussion of this methodology is given in subsequent papers.

The religion dataset is arranged as a set of $n \times k$ *affiliation* matrices, each for a given 5-year period. Each matrix has n rows representing the states that existed during that time-point and k religions (we use two sets of columns—one representing only major religions, and another set representing the religious families of Christianity, Judaism, Islam, and Buddhism).

[8]Most of the empirical studies on the relationship between religion and conflict cited above focus on the concept of religious similarity and its impact on conflict and cooperation.

These are Religious Affiliation (RA) matrices. Each entry in these matrices (ra_{im}) reflects the percentage of state's i population that practices religion m.

We employ three strategies to measure dyadic religious similarity. The first—commonly used by network analysts to convert affiliation networks to relational networks—employs a conversion process where the religious affiliation matrix is multiplied by its transpose (Maoz 2010:45–47). The result is an $n \times n$ matrix that has the following characteristics: (a) diagonal entries represent the religious homogeneity of each state (with entries ranging from zero when the state's population is equally distributed across a set of religions, to one when the entire state's population practices a single religion); (b) off-diagonal entries represent the degree of religious similarity between the population of the corresponding states (with entries ranging from 0, when the two states have populations that practice completely different religions, to 1, when both states' populations are distributed in the same way across the same religious categories); and (c) the matrix is symmetrical, such that the entry in a given *ij* cell is the same as the entry in the *ji*th cell.

The second and third methods are based on a set of pairwise comparisons of any two rows in the original religious affiliation matrix. The second method correlates any two rows. The resulting matrix has the following structure: (a) all diagonal entries are 1, reflecting a correlation of a state with itself; (b) off-diagonal entries reflect a correlation between the religious distribution of the corresponding states' population (with values ranging from −1, when the two states' populations are inversely related in terms of their religious practices, to +1, when the two states' populations are matched precisely in terms of the distribution of their religious practices; and (c) this matrix is also symmetrical. The third method is based on a similar comparison between sets of rows in the religious affiliation matrices, except that the comparison is based on a standardized Euclidean distance formula, which is given by:

$$SEU_{ij} = 1 - \frac{\sqrt{\sum_{m=1}^{k} \left(ra_{im} - ra_{jm}\right)^2}}{m}$$

Again, diagonal entries are all ones (reflecting a perfect homogeneity of the religious distribution of a given state with itself), and the off-diagonal entries in the resulting matrix range from zero when the populations of the two states practice entirely different religions to one when they are perfectly matched across the religious categories.

When we use only major religions as the elements of the RA matrices, the three methods produce highly similar results with correlations in the 0.84–0.95 range. When we employ religious families, the correlations between the results produced by these methods drop somewhat to the 0.73–0.92 range. In what follows, we report first some basic distributions

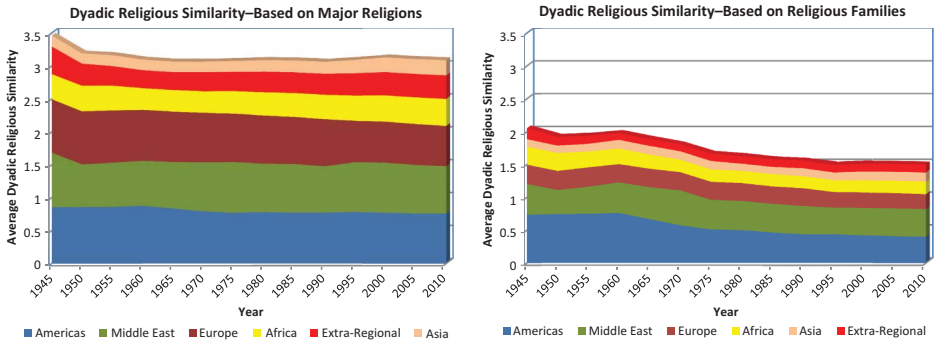

FIGURE 6 Average dyadic religious similarity by region and year (color figure available online).

of dyadic religious similarity, and then discuss some of the relationships between religious similarity and other dyadic characteristics.

Figure 6 displays two interpretations of religious similarity across regions and over time. The left-hand figure shows average levels of dyadic religious similarity based on major religions only. The right-hand figure shows average levels of dyadic religious similarity based on religious families.[9] Several trends are visible here. First, obviously levels of religious similarity are considerably higher when we focus only on major religions than when we measure similarity based on the distribution of religious adherents across religious families within some of the major religions. Second, the Americas and the Middle East represent considerably more homogenous regions in terms of religion than the other regions. Third, dyadic religious similarity has shown a considerable decline over time in the Americas, and a lesser decline in Europe, but has been generally stable in the other regions. Finally, when we consider only major religions, Asia exhibits a lower degree of dyadic religious similarity than extra-regional dyads, which is a surprising result. We do not have a clear explanation for that, except to note that most states in Asia contain a sizable Christian and Muslim population which makes the Asia-America, Asia-Europe and Asia-Middle East dyadic combinations somewhat more similar than the intra-Asian ones.

Figure 7 displays relationships between the degree of dyadic religious similarity and some key attributes of dyads that have served as important determinants of dyadic behavior in international relations. The figure shows some important relationships. First, not surprisingly, contiguous dyads tend to display a higher level of religious similarity than dyads that have indirect (colonial) contiguity, or those dyads that consist of one or more regional or major powers. Second, there seems to be a significant relationship between

[9]We do not have reliable figures for Judaism and Buddhism; therefore, we do not use the religious families for these religions.

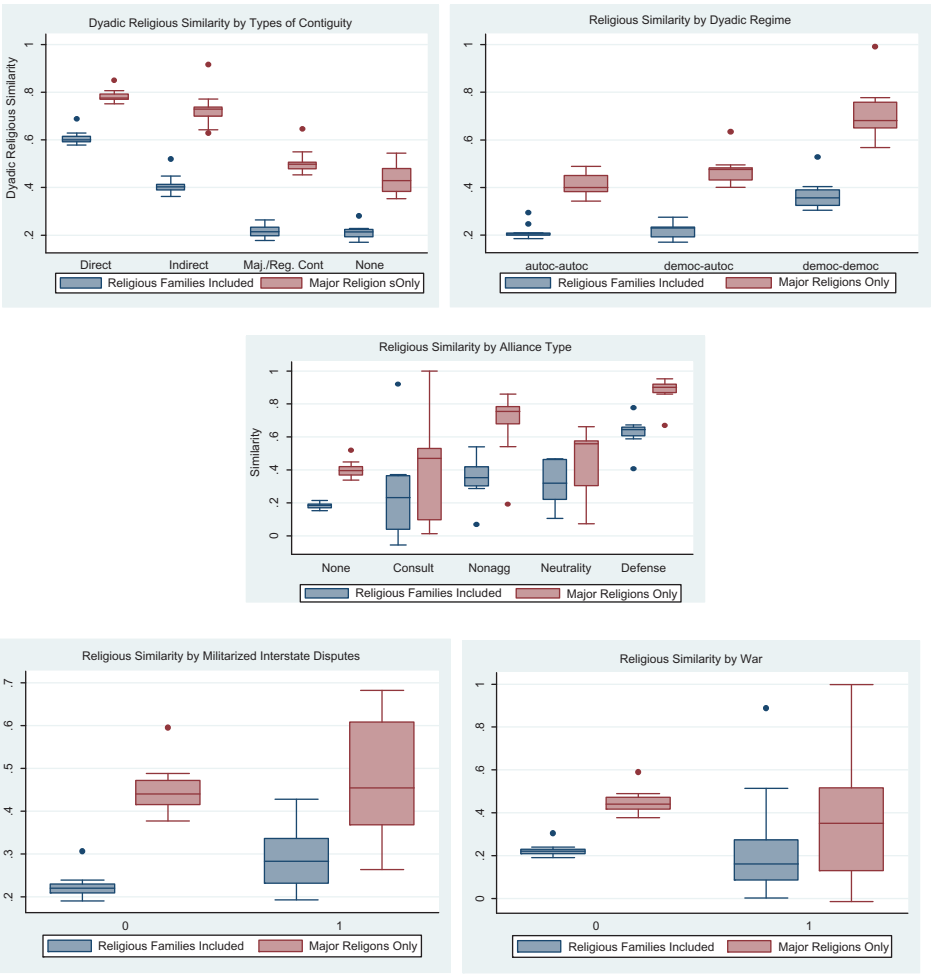

FIGURE 7 The relationship between religious similarity and various dyadic attributes. Data in figure are averages per 5-year period of religious similarity by category of the X variable. This is done for presentational purposes (color figure available online).

religious similarity and the regime type of the dyad. Jointly democratic dyads tend to have a significantly higher religious similarity than mixed dyads (that have one democracy and one nondemocratic member), and both types of dyads that contain at least one democracy tend to exhibit significantly higher religious similarity than dyads that are made up of autocratic states. Third, religiously similar dyads tend to have a significantly higher probability of sharing an alliance than religiously dissimilar dyads. Likewise, the level of commitment involved in alliances that contain religiously similar states is significantly higher than the level of commitment of religiously dissimilar dyads. Fourth, the probability of conflict between religiously similar dyads is not significantly different than the probability of conflict between religiously

dissimilar dyads. Finally, these results hold for various indices of religious similarity and for religious similarity measures based only on major religions or on the breakdown of Christians and Muslims into religious families.

Although these analyses are descriptive and should be taken only in anticipation of a more systematic set of studies on these relationships, they demonstrate how these data may be used to evaluate the linkages between religion and democracy, conflict, and cooperation. In light of this, the new data presented herein opens a window to a better understanding of religion in domestic politics and international relations.

CONCLUSION

This study presents a new dataset on religion in the international system. It offers several innovations and improvements over existing datasets. First, it is based on a systematic classification of world religions and religious families that emerged from a thorough review of the relevant scholarly literature on the nature of religion and its observable manifestations. This classification was validated by a multidisciplinary group of scholars through a survey. Second, we drew on a large number of sources to generate the dataset. Third, we used a number of methods to reconcile differences between sources and interpolated missing data. Fourth, the resultant data set provides higher-resolution data, including data on the major world religions, as well as data, albeit preliminary, on the religious families of the major world religions. Future iterations of these data will be carried out once we add sources that focus on the demographics of specific religions. These would enable us to provide a higher-resolution breakdown of the adherents of major religions into specific religious groups.

We also presented some descriptive statistics of world religions in the global system, across different regions, and in relation to several dyadic characteristics. The general picture that emerges from these statistics consists of several points:

1. The dramatic changes in the world's population over the period covered in this study have not, in general, been accompanied by major changes in the distribution of religious adherents within states. Some exceptions do exist, however. These include former Soviet republics (for example, Kyrgyzstan whose Muslim population increased by 37% between 1991 and 2010, and Kazakhstan whose Muslim population increased by 42.5% over the same period).[10] Nor have these changes resulted in dramatic changes

[10]Also, as mentioned above, post-Communist or post-Soviet states tended to report more religious affiliations than during the Soviet/Communist era. This accounts, to a large extent, for the growth in reporting of Islamic beliefs among post-Soviet republics.

in the distribution of major religions across the international system as a whole.
2. Most dramatic changes in the distribution of religious adherents globally were due to the changes in the number of states in the international system. This reflects an artifact in our dataset—the focus on religion within independent states—rather than a demographic trend or changes in the distribution of religious beliefs in the system.
3. There are several notable exceptions to the preceding points: Islam is the only major religion that has captured an increasingly larger share of the world's population over time. Other religions exhibited either significant fluctuations or a constant decline in terms of the relative share of their adherents from the world's population.
4. The impact of the growth of the Islamic population was noticeable primarily in Europe and Asia. In Europe the migration from Islamic countries into primarily Christian countries has had an important effect on the religious diversity of European societies. In Asia we see a trend of growing numbers of Muslims, who capture an increasingly large proportion of the region's population (about 17%, on average).
5. While globally, the proportion of the nonreligious population has maintained a fair degree of stability over time, this group increased its size in Europe and Oceania, largely a reflection of the modernization and secularization trends in these regions.
6. Religious diversity increased in the two decades following World War II, largely due to the dramatic changes in the composition of the state system. After the mid-1960s religious diversity has stabilized, and further changes in the size and composition of the state system did not have noticeable effects on this diversity.
7. The Americas and the Middle East exhibit consistently high levels of dyadic religious similarity, whereas Asia and Africa exhibited low levels of religious similarity. There was a relative decline in the level of dyadic religious similarity in the Americas, but other regions maintained a relatively stable level of dyadic religious similarity.
8. Levels of dyadic religious similarity seem to be related to (a) direct contiguity; (b) alliance commitments, especially defense pacts; (c) joint democracy; but less to (d) dyadic conflict or peace, at least not in any robust manner.

On the whole, these data facilitate new and innovative research on the role and impact of religion in domestic and international politics. They may help improve our understanding of these complex relations, by enabling more scientific investigations into these matters. As in the case of development of any dataset that offers to provide an image of the evolution of the international system over time, revisions of the current version will be necessary.

We invite users to raise questions, make comments and suggestions. These will be instrumental in carrying out updates, revisions and improvements in future iterations.[11]

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[11]The dataset is available in two different locations. First, it is part of the Association of Religion Data Archives (ARDA) at http://www.thearda.com. Second, it is part of the Correlates of War data hosting program at www.correlatesofwar.org. We thank these organizations for hosting and maintaining the data and documentation.

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