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Religion and Sexual Behaviors: Understanding the Influence of Islamic Cultures and Religious Affiliation for Explaining Sex Outside of Marriage

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Abstract

Social scientists have long been interested in how cultural and structural characteristics shape individuals' actions. We investigate this relationship by examining how macro- and micro-level religious effects shape individuals' reports of premarital and extramarital sex. We look at how identifying with one of the major world religions—Islam, Hinduism, Christianity, Buddhism, or Judaism—and living in a nation with a Muslim culture shape the likelihood of sex outside of marriage. Using hierarchical modeling techniques and cross-national data from the Demographic and Health Surveys, we find that ever married Hindus and Muslims are less likely to report having had premarital sex than are ever married Jews and Christians, and an earlier age at marriage does not appear to explain the relationship. Married Muslims are also less likely than affiliates of all other religions, except Buddhists, to report extramarital sex. The percentage Muslim within a nation decreases the odds of reports of premarital sex and this relationship is not explained by restrictions on women's mobility. These findings contribute to research on religion, culture, policy, and health, as well as our understanding of the macro-micro relationship.

Keywords

[culture](#), [health](#), [marriage](#), [religion](#), [sex](#)

 Since the founding of the discipline, sociologists have been interested in how cultural contexts shape individuals' actions. Whereas Marx and Durkheim were largely interested in how surrounding culture and structures shape actions, Weber focused on how

individuals' actions combine to shape the culture. In the past 30 years, much theoretical attention has been devoted to understanding the relationship between cultural or structural characteristics and individuals' actions (Blau 2002; Coleman 1986; Collins 1981; Ritzer 1990). This is known as the macro-micro link. To provide insight into the macro-micro relationship, contemporary researchers have focused on a variety of different types of cultures and structures, including inequality and economics (Collins 2000; Granovetter 1985; Huber 1990). After 9/11, religion received renewed attention as a potent micro belief system and macro cultural force that can powerfully shape individuals' attitudes (Finke and Adamczyk 2008; Inglehart and Norris 2003; Scheepers, Te Grotenhuis, and Van Der Slik 2002). Some of these research findings echo Huntington's (1993) controversial thesis that after the Cold War, the world's new dividing line is between Islam and the West (i.e., North America and Western Europe).

Despite the discourse about religious divisions, scholars have given limited attention to understanding differences in behaviors resulting from adherence to the major world religions, defined here as Islam, Hinduism, Christianity, Buddhism, and Judaism.¹ Although these religions' sacred texts proscribe some of the same behaviors, religious institutions are not equally effective in shaping individuals' actions. Additionally, when a substantial proportion of a population adheres to the same religious beliefs, adherents can influence the macro cultural climate and enact formal restrictions, which may shape the behavior of all residents within a nation. In this study, we use data from the Demographic and Health Surveys (Measure DHS 2012) and multilevel models to explore how micro religious beliefs and macro religious cultures shape individuals' sexual behaviors. We investigate whether individual and cultural religious beliefs influence behavior through micro (e.g., early age of first marriage) or macro (e.g., limits on women's mobility) processes, and we examine the role of religious diversity in shaping Muslims' sexual behaviors. In addition to providing insight into the macro-micro link and how religion and culture shape behaviors, our findings, which are based on a sample of mostly developing nations, have implications for researchers interested in health, family formation, gender equality, and policy.

Religious Divisions and the Macro-Micro Relationship

In 1993, Huntington (1993, 1996) put forth the controversial thesis that civilizations are defined, in part, on religious groupings. He argued that during the Cold War divisions between civilizations were largely based on political and economic ideologies, but since



then religion has become the key divider between nation-states. Subsequently, researchers have empirically investigated the idea that civilizations based on different religious ideologies, specifically Muslim majority nations versus Western Judeo-Christian societies, will clash with each other (Fox 2001; Neumayer and Pluemper 2009; Roeder 2003). Inglehart and Norris (2003), for example, examined the extent to which Muslims worldwide are divided over key public opinion issues such as democracy. Using the World Values Survey, they found that the key division between Muslims and other religious groups was not feelings about democracy, but attitudes about sex-related issues such as homosexuality and gender equality.

Inglehart and Norris (2003) provide some insight into issues that demarcate the boundaries between civilizations. Many questions remain, however, about how religious cultures are connected to individuals' actions and the extent to which religion is a dividing line. We know of no research to date that has investigated differences in behavior between adherents of the major religious groups or across national religious cultures. Part of the problem is that the easiest international data to obtain focus mainly on attitudes (i.e., the World Values Survey) or have been collected primarily in Europe and North America, where most people are Christian (i.e., the International Social Survey Programme). To assess how a dominant faith within a country shapes behaviors, we need cross-national data that have a number of countries with some variation in their religious culture (e.g., Muslim *and* Christian majority countries). Moreover, the correlation between attitudes and behaviors is quite weak (Bagozzi and Warshaw 1992; Kaiser and Schultz 2009; Wicker 1969), and all major religions have some proscriptions regarding sex. Hence, focusing on religious and cultural divisions based on attitudes offers limited insight into how religion and culture shape behavior.

If the world's major religions are experiencing growing divisions, this may be due to differences between individual believers or national differences based on a nation's dominant faith. Sociology's forefathers were all interested in the relationship between macro and micro units of analysis. Like Durkheim and Marx, we focus on how macro cultural influences shape individuals' behaviors and how different religious cultures lead to different outcomes. Durkheim ([1897] 1951, [1912] 1995) proposed that when religious individuals come together their attitudes and beliefs can strengthen and solidify the group, creating an influence that is *sui generis*; that is, an influence not reducible to its component parts. In the current study, we assess whether Islam has a *sui generis* national-level cultural effect; an effect that remains even after accounting for individuals' effects. We also look at whether Islamic culture is powerful enough to shape the behaviors of Muslims and non-Muslims alike. Although much theoretical discussion within sociology



explores the macro-micro relationship (Blau 2002; Coleman 1986; Collins 1981; Hazelrigg 1991), empirical research that clearly defines and tests these relationships has been lacking (Ritzer 1990).

Just as culture may shape individual actions, when cultural norms and values receive enough support, individuals may mobilize and create formal restrictions. Coleman (1986:1321) explains this as “the process through which individual preferences become collective choices; the process through which dissatisfaction becomes revolution.” Once created, laws, policies, and regulations can increase the likelihood that all residents will behave in ways consistent with larger cultural norms. Formal restrictions can remain even after the original cultural norms subside, making it difficult to discern whether individual behaviors are due to strong cultural norms or formal restrictions. If individuals’ actions are due to laws or policies, not the underlying culture, it may be easier to change individual behaviors by altering formal restrictions. If religious culture is the macro force responsible for behaviors, it is likely deep and wide-reaching, which could make changing behaviors through policy initiatives particularly difficult.

The current study attempts to disentangle macro cultural influences from formal restrictions, as well as from more micro-level processes for shaping individuals’ sexual behaviors. Macro typically refers to structural (Blau 2002; Sewell 1992) and cultural influences (Ritzer 1990) that may be written into laws, policies, and regulations. In our study, we focus on two macro-level factors: a nation’s religious culture and formal restrictions on women’s mobility. At the micro level, we are unable to empirically untangle individual from family religious influences because intergenerational transmission of religious belief is so strong (Myers 1996). Nevertheless, we test for two separate micro influences—religious affiliation and age of first marriage. Our research provides insight into whether cultural norms or personal religious beliefs are more powerful and how they might work in conjunction with formal constraints to shape individuals’ sexual behaviors. In addition to adding to our theoretical understanding of the macro-micro relationship, this study has implications for understanding the extent of divisions between major world religions, how religious cultures shape actions, the potential role of policy (e.g., restrictions on women’s mobility and laws that limit child marriages) for shaping sexual behaviors, and why Muslim individuals and Muslim-majority nations appear to have lower rates of HIV/AIDS.



Much research has been devoted to understanding religion's influence on sexual behaviors (Meier 2003; Rostosky et al. 2004). Researchers have found that individuals who believe religion is important and are religiously active are more likely to delay first sex (sometimes until marriage) (Chamrathirong et al. 2010; Gilbert 2008; Holder et al. 2000; Meier 2003; Rostosky et al. 2004; Shirazi and Morowatisharifabad 2009; Zaleski and Schiaffino 2000). While a lot of attention has been given to the relationship between generic measures of religion and sexual behaviors, few quantitative studies have examined differences between the major religions because most research has been collected in nations that have a single dominant faith (i.e., Christian). Some cross-national attitudinal studies find that Muslims and Hindus tend to have more conservative sex-related attitudes than do Christians (Finke and Adamczyk 2008). Likewise, in the few studies that survey people of different religions within the same nation, Muslims appear less likely than Christians to have premarital sex (Addai 2000; Agha 2009). Researchers have also found that Jews tend to have more liberal sex-related attitudes than do Christians (Regnerus and Uecker 2007). Finally, in the handful of studies that examine Buddhists, results are inconsistent (Adamczyk and Pitt 2009; de Visser et al. 2007; Finke and Adamczyk 2008; Lee et al. 2006). The current study looks at whether ever married individuals (i.e., currently married, widowed, or divorced people) report having had first sex within marriage and whether married individuals report having had sex outside of marriage. As we explain below, there is reason to expect that the developing world's ever married Hindus and Muslims will report more conservative sexual behaviors than will ever married Christians and Jews.

Religious Affiliation and Sex Outside of Marriage

Although the sacred texts of major religions proscribe premarital and extramarital sex, public opinion research suggests that Muslims place particular importance on virginity until marriage (Finke and Adamczyk 2008). For Muslims, religious participation and informal social interaction with other Muslims should increase exposure to religiously inspired norms that discourage premarital sex, limiting young people's interest in having sex before marriage. Due to social control mechanisms (Hirschi 1969), young people who are strongly bonded to their beliefs and Muslim parents, friends, and fellow religious adherents should be less likely to violate their faith's tenets because it could jeopardize their bonds. Finally, many Muslim communities strongly discourage informal interaction between the sexes (Muslim Women's League 1999). If teenage Muslim boys and girls cannot interact privately with each other, opportunities to have premarital sex are drastically reduced. Through processes of social learning, social control, and limited



opportunities, micro religious beliefs should limit sexual behaviors. These ideas lead to the first hypothesis, illustrated in [Figure 1](#).

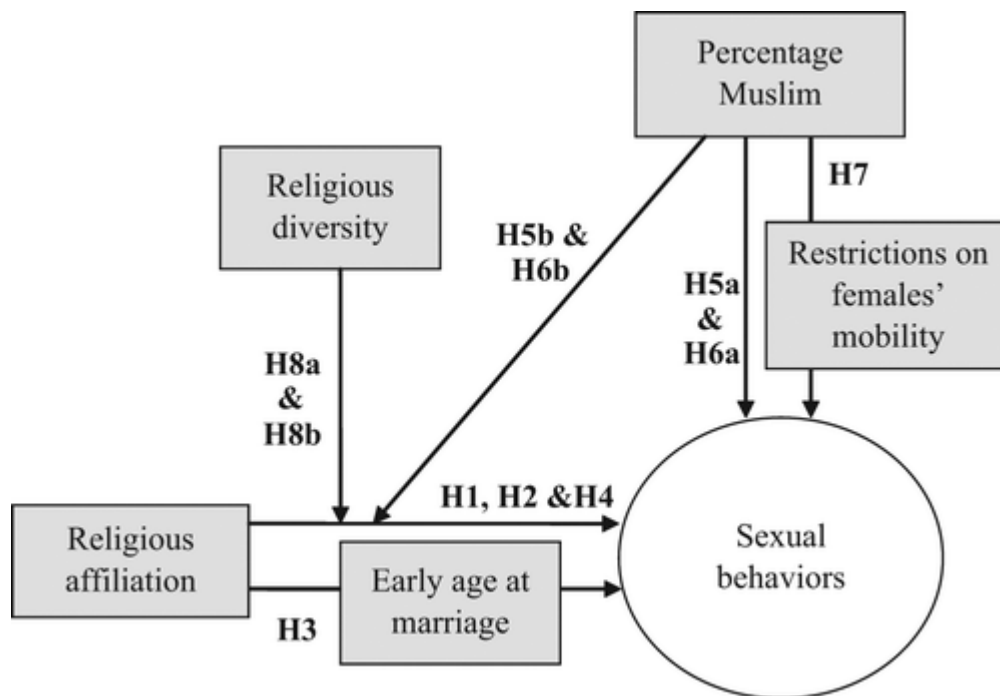


Figure 1. Hypothesized Paths of the Relationship between Religion and Sexual Behaviors

Hypothesis 1: Ever married Muslims will be less likely than ever married Jews and Christians to report having had premarital sex.

Many Hindu communities also discourage young men and women from regular private interaction ([Caldwell et al. 1998](#)). However, this may have more to do with cultural tradition and caste than with religious proscriptions regarding premarital sex. Some Hindu communities view social division by caste as religiously ordained. Additionally, in Asia, especially South Asia ([Jensen and Thornton 2003](#)), many Hindu families play a role in arranging their children's marriages (often with their children's permission) and a premarital pregnancy could be problematic for arranging a suitable match ([Fuller and Narasimhan 2008](#); [Ghimire et al. 2006](#)). Family background is likely significant in selecting a spouse. If family members play a role in selecting their children's marriage partner, they may discourage their children from informally interacting with potential partners whom they do not know or prefer ([Caldwell et al. 1998](#)). These ideas lead to the second hypothesis, which is also shown in [Figure 1](#):

Hypothesis 2: Ever married Hindus will be less likely than ever married Jews and Christians to report having had premarital sex.



In addition to informal restrictions, Muslim parents may be more likely than parents of other religious faiths to marry their children at very early ages. Early marriage (even before menarche) may be seen as protection against premarital sex ([Makinwa-Adebusoye 1992](#)). Consistent with these ideas, [Agha \(2009\)](#) examined two waves of data from the Nigerian Demographic and Health Surveys and found that 8 percent of Nigerian Christian women age 15 to 19 years were married in 2003, but 61 percent of Nigerian Muslim women of the same age were married.

Hindu parents may also marry their children at very young ages. Within middle-class and higher caste families, Hindu children are likely to marry after they complete their education ([Fuller and Narasimhan 2008](#)). For Hindus belonging to lower castes, however, marriage likely occurs much earlier, especially for girls, in part because of the group's lower socioeconomic status ([Sheela and Audinarayana 2003](#)). Indeed, according to the 2005 to 2006 Demographic and Health Survey, Hindus living in India and Nepal have an average age of first marriage of 17 years and 10 months. In contrast, Christians living in these countries have an average age of first marriage of 19 years and seven months. Compared to Hindus and Muslims, Christians and Jews are less likely to have arranged marriages, although it certainly happens. A family's Hindu or Islamic affiliation may result in formal micro constraints in which parents arrange for their children to marry at younger ages; as a result, Hindu and Muslim respondents are less likely to report having premarital sex, which leads to the third hypothesis, also shown in [Figure 1](#):

Hypothesis 3: Ever married Muslims and Hindus will be less likely than ever married Jews and Christians to report having had premarital sex, because, in part, they married at younger ages.

Along with premarital sex, many Muslim leaders place heavy importance on marital fidelity ([Muslim Women's League 1999](#)). Many Muslim communities discourage free mixing of the sexes, even among adults. Married Muslims should therefore have fewer opportunities to meet willing sex partners and find secluded places to have extramarital sex. These ideas lead us to the fourth hypothesis:

Hypothesis 4: Married Muslims will be less likely than married Jews and Christians to report having extramarital sex.

National Religious Cultures and Sex Outside of Marriage



In addition to religious affiliation, the macro religious culture may also shape the likelihood of sex outside of marriage. The current study uses Demographic and Health Surveys

(Measure DHS 2012) data from 31 primarily developing nations. Figure 2 shows that nations differ dramatically in the proportion of people who adhere to a given faith. Within the current sample and in the world more generally, only Christianity and Islam are prominent in a large number of countries.

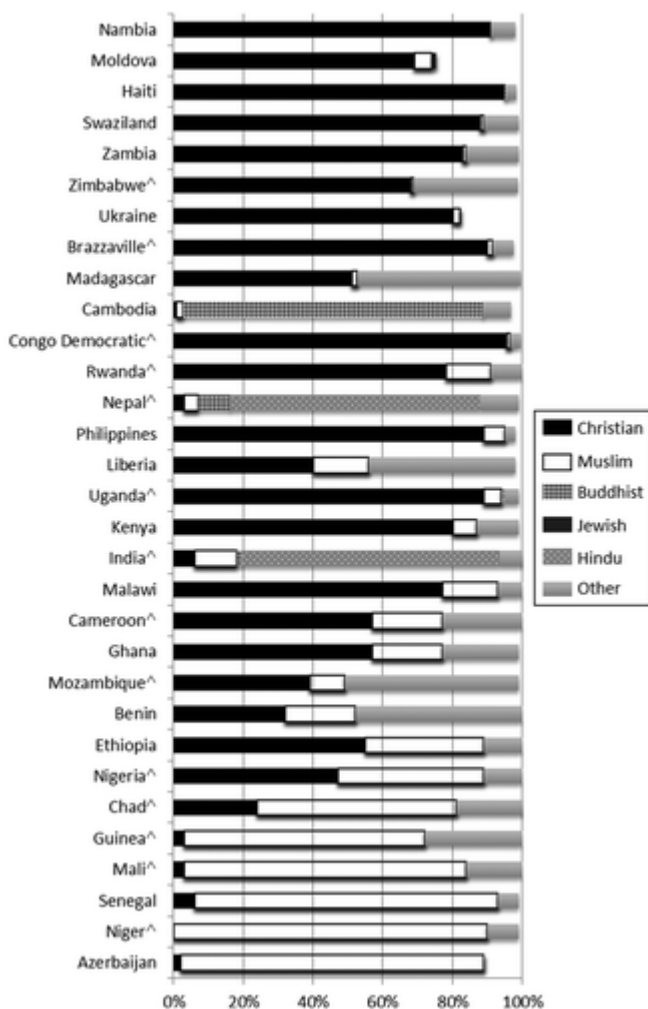


Figure 2. Religious Distribution for Countries Included in Study

Note: ^ = country has restrictions on women's mobility. Country-level estimates are taken from the [World Christian Database \(2005\)](#). Some countries do not total 100 percent because only major world religions are included in totals. Hence, people who adhere to traditional religions or are not religious are not included.

Because most countries are dominated by either Islam or Christianity, as the proportion Islam increases the proportion Christian decreases. Both Islam and Christianity proscribe sex outside of marriage, and some conservative Christian groups have been highly effective at persuading individuals to delay first sex (sometimes until marriage) ([Rostosky et al. 2004](#)). As a group, however, there is reason to believe the world's Christians have not been as effective or cohesive as the world's Muslims in discouraging premarital sex.

Indeed, the 2008 European Values Survey ([EVS 2010](#)) shows much greater variation in Christians' attitudes about the morality of casual sex than among Muslims.² A national Islamic religious culture will likely shape individuals' sexual behaviors; less clear is whether it will influence behaviors of all residents or only Muslims.

When a high proportion of people within a nation are Muslim, all residents may be subject to Islamic-inspired public discourse, norms, and customs. To preserve relationships with Muslims and maintain a self-image based on reference group expectations, residents of Muslim countries may adopt attitudes that support sex only within marriage. In his work on attitude change, [Kelman \(2006\)](#) argues that individuals may adopt others' attitudes without accepting the rationale to maintain their sense of self and increase the likelihood of desirable relationships, a process known as *identification*. Through identification, people living in countries with a high proportion of Muslims may adopt their fellow Muslim residents' more conservative sex attitudes. Additionally, informal cultural norms that limit interaction with the opposite sex could decrease access to potential romantic partners. These ideas lead to the next two hypotheses (see [Figure 1](#)):

Hypothesis 5a: As the percentage Muslim within a country increases, ever married residents will be less likely to report having had premarital sex.

Hypothesis 6a: As the percentage Muslim within a country increases, married residents will be less likely to report having extramarital sex.

Rather than shaping all residents' behaviors, there is reason to believe an Islamic religious culture will have a greater effect on Muslims than on other people living within a Muslim majority nation. [Durkheim \(\[1897\] 1951\)](#) posited that religion unites people into a moral community, enforcing their moral beliefs and group obligations. On the basis of this thesis, researchers have developed the moral communities argument ([Stark 1996](#); [Stark, Doyle, and Kent 1980](#); [Stark, Kent, and Doyle 1982](#)). The idea is that when religious individuals are around other religious people, "religion enters freely into everyday interactions and becomes a valid part of the normative system," strengthening the relation between personal religiosity and behavior ([Stark 1996](#):164). Conversely, when religious individuals are in the minority, religion becomes a compartmentalized part of one's life and is less likely to shape behavior. Our study is the first to test whether an Islamic religious culture heightens the influence of Islamic affiliation for shaping sexual behaviors.

Hypothesis 5b: As the percentage Muslim within a country increases, ever married Muslims will be less likely to report having had premarital sex.




Hypothesis 6b: As the percentage Muslim within a country increases, married Muslims will be less likely to report having extramarital sex.

Muslim religious culture could directly influence or moderate the relationship between Islamic affiliation and sexual behaviors, but it could also have an indirect influence through laws or policies that restrict women's mobility. A number of countries restrict women's abilities to physically move outside of their homes and engage in public life. As shown in [Figure 2](#), women's mobility is restricted in four of the six nations where at least 50 percent of the population is Muslim. By contrast, only six out of 18 Christian-majority nations restrict women's mobility. If women are unable to move freely, this macro-level formal constraint could drastically limit opportunities for men and women, regardless of their religious affiliation, to have sex outside of marriage. These ideas lead to the next hypothesis:

Hypothesis 7: Formal restrictions on women's mobility within a country will partially mediate the relationship between percentage Muslim and reports of sex outside of marriage.

Finally, level of religious diversity within a nation may also shape the likelihood that Muslims will abide by religious proscriptions regarding sex outside of marriage. With his [1969](#) book, *The Sacred Canopy*, Berger proposed that as the number of religious worldviews available increases, the less plausible each will seem and the less likely individuals will be to adhere to a given religion. Over time, this will result in secularization. In contrast, some religious economists, including [Finke and Stark \(1988\)](#), suggest that religious diversity increases the quantity and quality of religions available to potential adherents. If individuals are able to find a faith that is appealing, then they should be more committed and likely to abide by the precepts of their faith.

Berger's ideas suggest that religious diversity could introduce Muslims to alternative religions, undermining their Islamic worldview and decreasing the saliency of religious proscriptions. Conversely, religious economists suggest that religious diversity and competition could create "brands" of Islam that might be particularly appealing, increasing the likelihood people will adhere to religious proscriptions ([Finke and Stark 1988, 1992; Iannaccone 1991; Iannaccone, Finke, and Stark 1997](#)). The majority of research on religious diversity focuses on how diversity shapes religious involvement and commitment, rather than the likelihood of adhering to religious proscriptions. Although we do not have the measures needed to test how religious diversity shapes religious commitment, we can  whether religious diversity shapes the likelihood that Muslims will abide by religious proscriptions regarding sex outside of marriage. Because it is not clear from previous

research which perspective is most likely to be supported, we offer two contrasting hypotheses:

Hypothesis 8a: As religious diversity within a country increases, married Muslims will be less likely to report sex outside of marriage.

Hypothesis 8b: As religious diversity within a country increases, married Muslims will be more likely to report sex outside of marriage.

Additional Country-Level Factors

Along with the percentage Muslim and restrictions on females' mobility, the current study accounts for the influence of three other country-level factors. First, all nations in the study are undergoing processes of knowledge, health, and economic development, but some have higher levels of development than others. Researchers have found that with stability and development, nations tend to become more accepting of behaviors (e.g., premarital sex) that were once unfamiliar ([Adamczyk and Pitt 2009](#); [Inglehart 2006](#); [Inglehart and Baker 2000](#)). Moreover, some of the least developed countries in the sample have high proportions of Muslims. We therefore account for level of development. Additionally, we include population size because more populous nations can sustain larger numbers of religions ([Warf and Vincent 2007](#)). Finally, because knowledge and attitudes may shift over time, we account for the year of data collection.

Data and Methods

This study uses cross-sectional individual-level data from the Demographic and Health Survey (DHS) ([Measure DHS 2012](#)), which is funded by the U.S. Agency for International Development. Since 1984, the DHS has collected data in more than 90 mostly developing countries; these data are standardized across countries so that comparisons between nations can be made ([Boyle and Carbone-Lopez 2006](#)). The DHS includes women ages 15 to 49 years and men ages 15 to 59 years. Country-level samples are designed to be representative at the national, regional, and residential levels. Because of the difficulty of collecting population and health data in developing nations, the DHS and Demographic Surveillance System are some of the most commonly used, and in some cases the only available data sources.³ Results from the DHS are comparable to analyses using longitudinal Demographic Surveillance System data ([Hammer et al. 2006](#)).



Any household member could complete the household portion of the survey, which contains basic demographic information on individuals who slept there the previous night. Women and a subsample of men were then asked to complete an individual survey. Our study relies on data from the fourth and fifth waves, which are the latest available waves. We use survey years from 2000 to 2008, with the mean survey year being 2005. Our analysis includes all countries that collected data during this time period and have information on the key variables.⁴

The DHS encourages countries to use the model questionnaire, but country administrators can delete irrelevant questions or add additional pertinent questions. By using model questionnaires and manuals, similar field procedures, and DHS technical support, the survey attains standardization across countries ([Macro International Inc. 1996](#)). DHS manuals provide explicit instructions on how to consistently ask questions and probe for responses. Additionally, interviewers are given one month of full-time training in how to carry out the survey. Interviewers are the same gender as the respondent and are instructed to try and conduct interviews in private. If a female respondent cannot be interviewed in private, the interviewer is instructed to indicate the presence of others on the survey. The DHS discourages use of interpreters, but if it is unavoidable, the translator can be another woman for women’s interviews. However, neither a woman’s husband nor her children are allowed to act as interpreters.

To create the master file used in this study we saved the variables of interest from each of the datasets, which resulted in a total of 62 individual datasets, separated by country and gender.⁵ After merging data for the 31 countries we had a total sample of 621,753 respondents. To examine premarital sex, our analysis focuses on the 418,352 respondents who have ever been married. From this sample 212 (less than .005 percent) respondents were missing information on age of first marriage, resulting in a final sample size of 418,140 respondents. To examine extramarital sex we limited the ever married sample to married respondents who reported sexual intercourse in the past year. A total of 327,752 respondents in marital relationships indicated that they had sexual relations in the past year and were not missing information on key variables.⁶[Table 1](#) presents descriptive statistics for all variables included in the analysis.



Table 1. Descriptive Statistics for Ever Married Respondents

Key Individual-Level Variables

The first outcome of interest is whether ever married respondents (i.e., divorced, married, or widowed people) report having had premarital sex. We focus on ever married respondents because premarital sex implies the individual was married at some point. We coded ever married respondents who reported first sex after they got married as 0. Ever married respondents who reported premarital sex were coded 1.

Sex is a sensitive issue and we were concerned that Muslims and Hindus may be under greater pressure than others to respond in socially desirable ways to questions about sex. Research done in the United States, however, has *not* found that more religious individuals are more likely than others to respond in socially desirable ways ([Regnerus and Uecker 2007](#)). Nevertheless, we performed additional checks to see if these groups were more prone to social desirability bias. DHS interviewers were instructed to flag responses in which age at first sex was inconsistent with other information provided by the respondent (e.g., respondents said they were virgins at marriage but provided an age at intercourse younger than age when married). An inconsistent response might suggest that respondents were trying to respond in a socially desirable way. Six percent of all responses were flagged. Among affiliates of the major religions, Buddhists were the most likely to have a flagged response (16 percent), followed by Jews (8.9 percent), Christians (7.2 percent), Muslims (5.3 percent), and Hindus (3.5 percent). A two group mean-comparison test revealed that Muslims and Hindus were significantly *less* likely than others to have a flagged response. This information suggests that Muslims and Hindus should not be any more likely than other religious affiliates to respond in socially desirable ways to questions related to premarital sex.

The DHS also instructed interviewers to note if other individuals were present during the interviews with women, which could have made it difficult for them to respond truthfully. DHS interviewers collected this information for women in only 28 of the 31 countries surveyed.⁷ In a separate analysis, we looked at whether multivariate results for reporting premarital sex differed based on whether (1) anyone was present; (2) how many people were present; and (3) whether a female, child, husband, or other male were present. We found that the direction and significance of the religion affiliation coefficients were the same regardless of how many people were present or who they were.

The second variable of interest is age at first marriage, which we took from a question that asked ever married respondents how old they were when they first got married.



The third key variable is extramarital sex, which we took from a question that asked currently married respondents about their last sex partner. This question was asked only of men and women who were sexually active in the previous 12 months. Married respondents who reported their last sex partner was a spouse were coded as 0, and respondents who reported their last sex partner was not their spouse (e.g., boyfriend/girlfriend, fiancé, client, friend, casual acquaintance, or sex worker) were coded as 1.⁸

For reporting extramarital sex, we were especially concerned that Muslim women would respond in socially desirable ways. In a separate multivariate analysis, we found that regardless of how many people were present or who they were (e.g., husband), the direction and significance of the religious affiliation variables were the same. These findings suggest that when under pressure to respond in socially desirable ways, Muslim women do not appear to change their responses in such a way that would alter findings regarding sexual behaviors.

We took religious affiliation from a question that asked, "What is your religion?" followed by a series of country specific responses. We recoded these responses into a set of dummy variables:⁹ Muslim, Buddhist, Jewish, Hindu, traditional, other religions,¹⁰ no religion, and missing religion, with Christian as the reference. We wanted to make more fine-grained distinctions, but the data did not allow it. Additionally, the DHS does not include any questions about the strength of religious commitment.

Individual-Level Control Variables

Our analysis includes several control variables¹¹ found to be associated with either religious affiliation or sexual behaviors (Agha 2009; Cleary and Mechanic 1983; Do and Meekers 2009; Khan et al. 2006; Niehof 2005; Scheepers et al. 2002; Yuchtman-Yaar and Alkalay 2007). We measure education with a question that asked, "What is the highest level of school you attended—primary, secondary or higher," which was adjusted to the local educational system. In our study, education ranges from 1 = no education to 6 = higher education. We measure gender with a binary variable, in which females were coded 1 and males were coded 0. We include age, which indicates a respondent's age in years, as a continuous variable.

Respondents living in urban areas were coded 1 and respondents in rural areas were coded 0. We coded respondents who were not currently working as 0; 1 indicates respondents were working. Finally, in our analysis of premarital sex we control for marital



status with a set of dummy variables: divorced, widowed, and currently married, which is the reference category.

Country-Level Variables

The key country-level indicator is the percentage Muslim within each country, which we took from the 2005 World Christian Database (WCD) and accessed through the Association of Religion Data Archives ([ARDA 2005](#)). The WCD provides data on 18 different religious groups for a large number of countries. In a comparison [Hsu and colleagues \(2008\)](#) found the WCD was highly correlated with other datasets on cross-national religious affiliation (e.g., the World Values Survey, the Pew Global Attitudes Project, the U.S. CIA, and the U.S. State Department's International Religious Freedom Report). Data for the WCD are collected through field interviews and surveys, unpublished reports, private communications, government censuses, doctoral dissertations on religion, and interviews with religious leaders ([Hsu et al. 2008](#)). We created the percentage Muslim variable by taking the total number of Muslims within each country, dividing by the total population reported by the WCD in 2005, and multiplying by 100.

We measure religious diversity using a version of the Herfindahl index, which has been used to tap levels of religious concentration ([Iannaccone 1991](#)) and pluralism ([Finke, Guest, and Stark 1996](#); [Finke and Stark 1988](#)). This index represents the probability that any two people, selected randomly from the religious population, share the same religion. Higher numbers indicate less religious diversity and more monopoly. Data from the 2005 WCD provide the major religious groups (i.e., Muslim, Christian, Hindu, Buddhist, Jewish, and other religion) included in the measure. The formula for the Herfindahl index is $H_j = \sum S_{ij}^2$, where S represents each religion divided by the total number of religious members in each country. Each country is represented with j , and i is the index of summation that runs over all religious categories in each country. Each model also includes population, taken from the estimate provided by the 2005 WCD and measured in tens of millions.

To measure restrictions on females' mobility, we use a binary country-level variable created from measures found on the [Social Institutions and Gender Index \(2009\)](#) website. The mobility measure captures the extent of legal restrictions and other limitations on women's mobility in each country. Restriction of women's mobility is based on four dimensions: family code, physical integrity of women, ownership rights, and civil rights.¹²

A score of 1 indicates restrictions on females' mobility within a country along any one of these dimensions, even if there are laws protecting women's civil liberties. A score of 0 indicates a country does not restrict women's mobility.¹³



All models also include the United Nation's 2003 Human Development Index (HDI) ([ARDA 2005](#)). The HDI measures a country's achievement in health, knowledge, and standard of living ([Human Development Reports 2009](#)). For ease in interpretation, we standardized the measure so that one unit equals one standard deviation.

Theoretically, several other country-level control variables could shape the relationship between percentage Muslim and the outcomes. These include the extent of democracy (i.e., freedom of the press, civil liberties, and political rights), Gross Domestic Product (per person), whether women report being sexually harassed because of immodest dress, and percentage of adult female sex workers. In a separate analysis we found that none of these were significant or altered key relationships.

Methods

To assess the association between religion and sexual behaviors, we use generalized mixed models ([Breslow and Clayton 1993](#)). Unlike conventional regression models, hierarchical modeling correctly estimates standard errors of contextual variables ([Raudenbush and Bryk 2002](#)). This method adjusts for correlated errors among individuals within the same context (e.g., country) and uses the appropriate degrees of freedom for country-level units. As a result, coefficients at the individual and contextual levels are estimated simultaneously.

Our analysis begins by using hierarchical logistical models¹⁴ to examine whether ever married respondents reported premarital sex. We first examine contributions of individual- and country-level control variables. The second model includes age at marriage to see if it mediates the relationship between Islamic and Hindu religious affiliation and reports of premarital sex. Next, we include percentage Muslim, followed by the interaction between Islamic religious affiliation and percentage Muslim. We then examine the potential mediating role of restrictions on females' mobility. Finally, we examine the interaction between Islamic religious affiliation and religious diversity. When we test for an influence of religious diversity, we remove the percentage Muslim. Research on religious diversity has found that when the percentage of a dominant religion and religious diversity are both included, the proportion of the dominant religion is an arithmetic component of the religious diversity measure ([Chaves and Gorski 2001](#); [Olson 1999](#)), resulting in a misspecified model. Following these same steps, our second set of models focuses on whether married respondents had sex with their spouse or someone else in the previous months.



Aside from dummy variables, all variables are centered (mean = 0), which means the intercept term represents the odds of having premarital sex for people assigned the suppressed category for all dummy variables and the average on all other variables. The analysis uses the recommended weights, which account for the unequal probability of selection of persons within nations.

Premarital Sex for Ever Married Respondents

The first model includes control and individual-level religion variables. We hypothesized that ever married Muslims would be less likely than ever married Jews and Christians to report premarital sex (Hypothesis 1). In Model 1 of [Table 2](#), we find corroboration for this hypothesis, as the odds of ever married Muslims reporting premarital sex are 53 percent lower than they are for Christians. Likewise, Model 1 provides support for our second hypothesis that ever married Hindus are less likely than ever married Jews and Christians to report premarital sex (Hypothesis 2). The odds of ever married Hindus reporting premarital sex are 40 percent lower than they are for Christians. Buddhists, Jews, and people of other religious faiths have higher odds of reporting premarital sex than do Christians. Conversely, ever married people with no religion and adherents of traditional faiths have lower odds than Christians of reporting premarital sex. Model 1 of [Table 2](#) also shows that ever married people, individuals from urban areas, and respondents with higher levels of education have higher odds of reporting premarital sex. Women, people with more children, and residence in a more populous nation are associated with lower odds of reporting premarital sex.

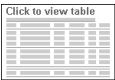


Table 2. Religion’s Role in Explaining Premarital Sexual Behavior among Ever Married Men and Women (age 15 to 64 years); Hierarchical Logistic Regression Models (Odds Ratios Are Reported)

[Figure 3](#) presents predicted probabilities of reporting premarital sex by religious affiliation for ever married females who live in a rural area, are not currently working, and have been assigned the mean on all other variables in Model 1 of [Table 2](#). The probability of an ever married Muslim woman reporting premarital sex is the lowest at .61, followed by an ever married Hindu woman (.67). Of the major religious groups, Buddhists (.84) have the highest predicted probability of reporting premarital sex, followed by Jews and Christians.



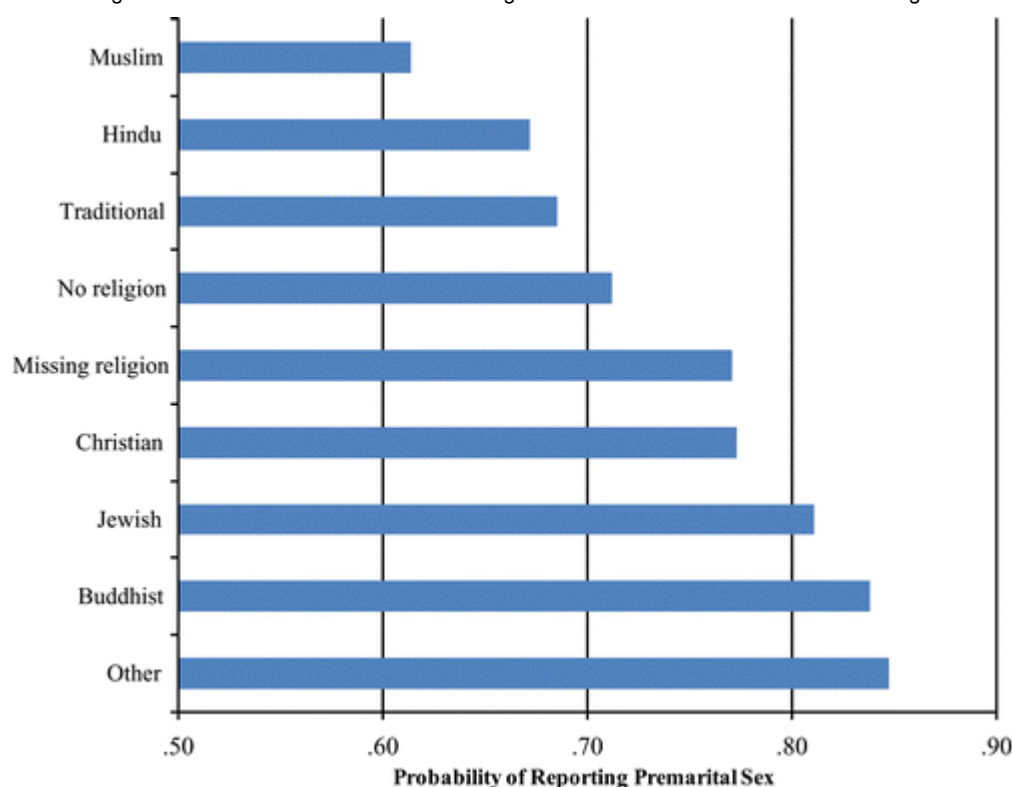


Figure 3. Predicted Probability of Reporting Premarital Sex for Married Respondents by Religious Affiliation

Note: Predicted probabilities presented for women who are not currently working, live in a rural area, and have been assigned the mean on all other variables in Model 1 of [Table 2](#).

Model 2 includes age at marriage and tests the hypothesis that ever married Muslims and Hindus will be less likely than ever married Jews and Christians to report premarital sex because, in part, they married at younger ages (Hypothesis 3). Age at marriage is significant. We do not, however, find support for the third hypothesis: age at marriage does not significantly mediate the relationship between Muslim and Hindu religious affiliation and reports of premarital sex. For every additional year respondents waited to get married, their odds of reporting premarital sex increase by 4 percent. When age at marriage is included, the coefficients for Muslim and Hindu religious affiliations are reduced slightly but remain highly significant.

Model 3 includes the percentage Muslim and tests the hypothesis that as the percentage Muslim within a country increases, ever married residents will be less likely to report premarital sex (Hypothesis 5a). In support of this hypothesis Model 3 shows that a 1 percent increase in the percentage Muslim is associated with a 2 percent decrease in the odds of reporting premarital sex. To better understand the magnitude of the effect, we produced predicted values for a married Muslim woman who is not working, lives in a rural area, and has been assigned the mean on all other variables included in Model 3. If this

woman lives in a nation where 1 percent of residents are Muslim, her predicted probability of reporting premarital sex would be .72. In a nation where 23 percent of residents are Muslim, which is the sample mean, the woman's predicted probability would be .61. Finally, in a nation where 90 percent of residents are Muslim, which is the sample maximum, the woman's predicted probability of reporting premarital sex would tumble to .28.

Model 4 includes the interaction between Muslim affiliation and the percentage Muslim to test the hypothesis that as the percentage Muslim increases, ever married Muslims will be less likely to report premarital sex (Hypothesis 5b). The interaction is not significant; therefore, the hypothesis is not supported. The percentage Muslim appears to reduce the odds of reporting premarital sex for all ever married residents, regardless of religious affiliation.

Model 5 includes restrictions on women's mobility to examine the hypothesis that formal restrictions on women's mobility will, in part, mediate the relationship between percentage Muslim and reports of sex outside of marriage (Hypothesis 7). Restrictions on females' mobility are not significant, offering little support for this hypothesis. Islamic culture does not appear to shape reports of premarital sex through restrictions that limit women's mobility.

Model 6 examines the final two hypotheses (Hypotheses 8a and 8b): religious diversity will shape the relationship between Islamic religious affiliation and the odds of reporting sex outside of marriage. The interaction between Muslim affiliation and religious diversity is not significant, offering little support for either of the last two hypotheses.¹⁵

Extramarital Sex for Married Respondents

[Table 3](#) examines the influence of religion on the odds of extramarital sex. We hypothesized that married Muslims would be less likely than married Christians and Jews to report extramarital sex (Hypothesis 4). In Model 1 of [Table 3](#) we find corroboration for this hypothesis: the odds of married Muslims reporting extramarital sex are 45 percent lower than the odds for Christians. In a separate analysis, we switched the comparison group to Muslims and found that married Muslims are less likely than all other major religious groups, except Buddhists, to report extramarital sex. This finding shows that Muslims are distinct from almost all other religious groups in being less likely to report sex outside of marriage.

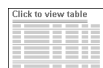


Table 3. Religion's Role in Explaining Extramarital Sexual Behavior among Married Men and Women (age 15 to 64 years) who Reported Sex in the Past 12 Months; Hierarchical Logistic Regression Models (Odds Ratios Are Reported)

In a separate analysis, we produced predicted probabilities of reporting extramarital sex by religious affiliation for married females who live in a rural area, are not currently working, and have been assigned the mean on all other variables in Model 1 of [Table 3](#). The probability of reporting extramarital sex in the past 12 months is lowest for married Muslim women (.003), followed by married Hindu women (.004). Of the major religious groups, Jews (.006), followed by Buddhists and then Christians, have the highest predicted probabilities. Model 1 also shows that older people and women are less likely to report extramarital sex. Conversely, married people in urban areas have higher odds of reporting extramarital sex than do people living in rural areas. At the country level later years of data collection are associated with higher odds of reporting extramarital sex, and married people and individuals in more populous nations have lower odds of reporting extramarital sex.

Model 2 includes the percentage Muslim to test the hypothesis that as the percentage Muslim increases, married residents will be less likely to report extramarital sex (Hypothesis 6a). The coefficient for percentage Muslim is not significant, providing little support for this hypothesis.

Model 3 includes the interaction between Muslim affiliation and percentage Muslim to test the hypothesis that as the percentage Muslim increases, married Muslims will be less likely to report extramarital sex (Hypothesis 6b). The interaction term is not significant, offering little support for this hypothesis. Model 4 includes the coefficient for restrictions on females' mobility, which is also not significant. In this study formal restrictions on women's mobility do not have any effect on the odds of reporting sex outside of marriage.

Finally, Model 5 includes the interaction between Muslim religious affiliation and religious diversity to test the final hypotheses (Hypotheses 8a and 8b): religious diversity will shape the relationship between Islamic religious affiliation and reports of sex outside of marriage. The interaction between Muslim affiliation and religious diversity is not significant, offering little support for either of these hypotheses.



Discussion and Conclusions

This study investigated effects of micro religious beliefs and macro religious cultures on reports of extramarital and premarital sex. We found that ever married Muslims and Hindus were less likely than ever married Christians and Jews to report premarital sex. Married Muslims were also less likely than all other adherents of major religions, except Buddhists, to report extramarital sex. Most major religions discourage sex outside of marriage, but some religions appear more effective than others at curtailing this behavior. Some cross-national studies have found that Muslims report more conservative attitudes about sex than do most other religious adherents ([Adamczyk and Pitt 2009](#); [Finke and Adamczyk 2008](#); [Scheepers et al. 2002](#)). Much less research compares Hindus to Christians and Jews. The current study is the first to show that across the developing world, ever married Muslims and Hindus appear less likely than Jews and Christians to report premarital sex.

Because Muslims and Christians can be found in a number of different countries, there is a body of research on attitudinal differences between these groups. Much less research has been done on Buddhists. The few studies that compare Buddhists to affiliates of other religions report inconsistent findings in their sex-related attitudes ([Adamczyk and Pitt 2009](#); [Finke and Adamczyk 2008](#)) and behaviors ([de Visser et al. 2007](#); [Lee et al. 2006](#)). In contrast to Christianity, Judaism, and Islam, which are monotheistic, Buddhism does not have similarly strict rules about specific behaviors, although observation of Buddhism's four ethical precepts would preclude sex outside of marriage ([de Visser et al. 2007](#)). Somewhat consistent with these ideas, we found that Buddhists were significantly more likely than Muslims, Christians, Hindus, and people of traditional faiths to report premarital sex. However, they did not differ from Jews in their odds of reporting premarital sex, nor did they differ from other religious groups (even Muslims) in their reports of extramarital sex.

One of this study's major contributions is showing that across the developing world, there are clear intergroup religious differences in ever married individuals' sexual behaviors. Countries are typically dominated by a single religion; therefore, researchers tend to focus on differences within a single religious group. Because vast differences exist among adherents within the same religion, it was unclear whether we would find significant differences between adherents of different world religions. Our findings offer support for [Huntington's \(1993, 1996\)](#) thesis that clear divisions exist between the world's major religions, at least with regard to sexual behaviors. Moreover, these divisions extend beyond individual believers to entire nations where the majority of residents are Muslim.



Our study makes some important theoretical contributions. Our findings provide evidence for the Durkheimian idea that effects of religious culture are not reducible to the collective impact of personal religious affiliations. In theorizing the influence of various religious contexts, it is important to understand whether they are reducible to micro-level interactions or have a *sui generis* effect. The former perspective is characteristic of Collins's work on the macro-micro link (for other research on this perspective, see [Knorr-Cetina and Cicourel 1981](#)). [Collins \(1981, 1988\)](#) advocates micro translating macro events. He explains that because more macro phenomena are created from the micro, the "ultimate empirical validation of sociological statements depends upon their micro translation" ([Collins 1981:988](#)). In contrast to this perspective, [Durkheim \(\[1897\] 1951, \[1912\] 1995\)](#) sees societal forces, such as the collective conscience, as *sui generis*. As [Durkheim \(\[1897\] 1951:309\)](#) explains, "Collective tendencies have an existence of their own; they are forces as real as cosmic forces, though of another sort; they, likewise, affect the individual from without, through other channels." Our findings extend Durkheim's ideas by showing that national Islamic religious culture has an influence on premarital sexual behaviors that is not reducible to individual Muslims' beliefs. Moreover, our findings make clear the power that culture can have in shaping individuals' behaviors.

When enough support exists for certain cultural values, individual preferences can lead to macro-level changes ([Coleman 1986](#)) that may manifest in laws, policies, and restrictions. Once created, formal restrictions can take on a life of their own and shape all residents' behaviors. Because formal restrictions can remain even after the saliency of cultural norms subsides, it can be difficult to discern whether formal restrictions or the culture *per se* is shaping individuals' actions. In the current study, we tried to disentangle these macro-level influences; we found that restrictions on females' mobility had neither a direct effect nor mediated the relationship between religious culture and sexual behaviors. These results suggest that in terms of women's rights, informal beliefs appear to have a greater influence on sexual behaviors than do more formal restrictions.

Policymakers often develop laws, policies, and regulations with the hope of changing individuals' behaviors. For example, shortly after the United States began to occupy Afghanistan, women were granted the right to vote. In Afghanistan's 2009 presidential election, however, a small proportion of women appear to have voted ([Gall 2009](#)). Women's right to vote in Afghanistan may not have arisen internally from what [Coleman \(1986:1321\)](#) would describe as "the process through which individual preferences become collective choices." In many Muslim nations, however, restrictions on women's mobility appear to have sprung from shared religious preferences. Nevertheless, we found that these restrictions have little influence on behavior. The current study makes salient the



power of informal cultural norms, values, and beliefs in contrast to formal restrictions for shaping individuals' behaviors.

This study also tested hypotheses about religious diversity. We thought that Muslims would have the most conservative sexual behaviors and religious diversity would have the greatest influence on them. Yet, religious diversity did not alter the relationship between Islamic affiliation and religious diversity. Indeed, religious diversity did not alter the relationship between any of the major religious affiliations and the outcomes examined, which raises the question: Why did religious diversity have no effect? Researchers studying religious diversity have focused on how it shapes religious commitment, which the DHS did not measure. It could be that religious diversity primarily influences religious commitment and does not have much of an influence on adherence to religious behavioral proscriptions. Additionally, most studies on religious diversity focus on different brands of Christianity in the United States and Europe and not on different major religions (e.g., Islam, Christianity, and Hinduism) (Finke and Stark 1988, 1992; Froese 2001; Iannaccone 1991). The major world religions may be so distinct from each other that they do not present a major threat to each other's religious world views. Finally, we were able to analyze data from only 31 developing countries, which may not have provided the power needed to detect a weaker, yet theoretically important, effect of religious diversity.

Our findings have some practical insights for health and family researchers, perhaps most clearly for understanding the transmission and spread of HIV/AIDS. At the macro level researchers have found that nations with a higher proportion of Muslims appear to have lower rates of HIV/AIDS (Abu-Raddad et al. 2010; Adamczyk 2010; Drain et al. 2006; Gray 2004; McIntosh and Thomas 2004; Velayati et al. 2007). Likewise, at the micro level, researchers have found that Muslims may be less likely than other religious adherents to contract HIV/AIDS (Abebe et al. 2003), but it is not clear whether this is due to circumcision (Drain et al. 2006), fewer riskier sexual behaviors (Agha 2009), or other factors. Although we could not directly examine HIV/AIDS transmission, our findings suggest that at the macro level, a high proportion of Muslims in a country may limit the spread of HIV/AIDS by reducing the odds of all residents having premarital sex. Likewise, our findings show that across the developing world, where HIV/AIDS is primarily spread through heterosexual sex (Piot et al. 2001), ever married Muslims report more conservative sex-related behaviors than do adherents of other religions, bolstering support for the idea that differences in religious affiliates' sexual behaviors could explain lower rates of HIV/AIDS for Muslims.



The data for this study were drawn from a very large sample of individuals in nations that vary substantially in their proportion Muslim. The majority of research on national religious contexts relies almost exclusively on either the World Values Survey or the International Social Survey Program (Adamczyk and Pitt 2009; Finke and Adamczyk 2008; Scheepers et al. 2002). Neither of these studies includes measures of sexual behaviors, and only the World Values Survey includes less developed and Muslim-majority countries. The DHS provides information on sexual behaviors, and its website provides aggregate country-level statistics, but it does not provide a fully merged individual-level data file. Creating a complete dataset with all countries from a specific survey period is labor intensive, which may be why relatively few studies examine country contextual influences with DHS data.

While the DHS may be the only publicly available dataset that includes developing countries and measures of sexual behaviors, it has limitations. The questionnaire is lengthy and researchers have found it may lead to recall bias (Boerma and Sommerfelt 1993). Indeed, researchers found recall bias on child morality in the DHS (Manesh et al. 2007). Additionally, the only religion question it includes is about religious affiliation. Much of the research on religion and sex-related attitudes includes measures of religious affiliation *and* saliency of religious belief (e.g., religious importance and frequency of religious attendance) (Adamczyk and Pitt 2009; Finke and Adamczyk 2008; Scheepers et al. 2002). There is good reason to believe that religiously active Muslims and people living in nations with a high proportion of practicing Muslims will be particularly likely to abide by religious proscriptions. Hence, the micro- and macro-level effects of Islam in this study are likely underestimated.

Another limitation is that the available sample did not include Middle Eastern countries, such as Libya, Tunisia, and Egypt, which are economically stable and part of the Arab Spring. We therefore do not know if these countries, too, would display the Islamic contextual effect we found. Even the nations we examined have many differences in their level of development, political stability, laws, and the extent to which Islam has been formally and informally incorporated into their societies. We considered several other country-level influences and included ones that were statistically significant or theoretically important. With a larger set of countries or better measures, other country-level variables may also be significant.

This cross-national multilevel study is one of the first to look at micro- and macro-level effects of religion on sex outside of marriage. For assessing the influence of culture more generally, there are some benefits to focusing on religion as opposed to other cultural characteristics. Religion is based on belief in gods who make demands that are outlined in



systematic sets of writings that provide guidelines for actions (Stark and Finke 2000). Because religious proscriptions are stated in teachings and routinely affirmed, religious beliefs, behaviors, and affiliation are often associated with actions. Additionally, religions make and enforce demands for a wide range of behaviors. This study focused on sexual behaviors, but similar religious divisions likely exist for other behaviors. Finally, although many studies have found an influence of religion on attitudes (Finke and Adamczyk 2008; Inglehart and Norris 2003; Scheepers et al. 2002), religious leaders and communities differ in the extent to which they advocate for and enforce religious proscriptions. This study found that in contrast to other major world religions, Islam has the greatest influence on premarital and extramarital sex, and the percentage Muslim in a country shapes the likelihood of premarital sex. All major world religions discourage sex outside of marriage, but they are not all equally effective in shaping behavior.

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Notes

1. We focus on these five groups because they tend to have relatively large populations, appear in a number of different countries, are well-known, and data on them are easily accessible.
2. The 2008 European Values Survey, which surveyed 47 European nations, asked respondents whether casual sex was ever justified (1 = never justified and 10 = always justified). Christians (mean = 3, SD = 2.6) surveyed were not only more likely to approve of casual sex than were Muslims (mean = 1.8, SD = 1.9), but there was also more variation in their attitudes.
3. Using the search engine SCOPUS, we found more than 13,000 articles published between 2000 and 2011 that include the phrase “Demographic and Health Surveys” in the abstract.
4. Of the countries in which DHS conducted surveys between 2000 and 2008, 24 countries did not have key information on respondents’ religion or sexual behaviors.
5. Coding syntax is available at <http://www.AmyAdamczyk.com>.

6. Some of the country surveys did not have separate marital and cohabitating categories, likely because separate options did not make sense. In some nations, marriage requires an official license; in other nations, people may be considered married when they live together and define it as marriage. If a country's survey distinguished between married and cohabitating, we used these categories; if it did not, we could not distinguish between them and we considered all respondents in the married/cohabitating category to be married.
7. This information was not collected for Malawi, Chad, and Cambodia.
8. In a separate analysis, we considered further dividing the nonspouse category. However, only 1.46 percent of married respondents reported having sex with someone other than their spouse in the previous 12 months. With such a small cell size, we were unable to further divide this group and get the models to converge.
9. Specific information about the religions included in each category can be found at <http://www.AmyAdamczyk.com>.
10. The "other religions" category includes Confucian, Jain, Sikh, "do not know," and other religions that could not be classified into the other groups.
11. Unfortunately, the DHS does not include a variable that captures respondents' income or expenditures in a universal metric.
12. The family code encompasses forced marriages, lack of equal rights among spouses, and lack of inheritance rights. The physical integrity dimension includes prevalence of domestic violence, sexual harassment, and the practice of female genital mutilation. Some countries also impose laws restricting women's ability to own land or obtain bank loans. Finally, civil liberties highlight women's inability to move freely.
13. In a separate analysis, we looked at the influence of an interval measure of the mobility variable before it was converted into a dichotomous measure. In the multivariate context, results did not change when we used the interval measure. Haiti did not have an SIGI measure and we assigned it a score of 0 based on the lack of restrictions along these four dimensions.
14. We considered conducting a multilevel event-history analysis for premarital sex that included right-censoring for age at marriage or date of interview. Because of our large sample size and need to use probability weights, we had a lot of difficulty producing these models. In a separate analysis we used a multinomial logistic multilevel model to examine

current virginity, premarital sex (regardless of current marital status), and first sex within a marital relationship. Results for the full sample are very similar to the ones presented here, which focus on ever married people. Specifically, Muslims were more likely than Christians to report currently being a virgin or having first sex within a marital relationship, rather than premarital sex. Likewise, as the percentage Muslim increased, the odds of reporting currently being a virgin or having first sex within marriage, rather than premarital sex, increased.

15. We considered looking at the direct effect of religious diversity, but theoretically we were not sure why diversity would shape the odds of first sex of all people within a nation, regardless of religious affiliation. Nevertheless, in a separate analysis we tested for this effect and it was not significant.

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