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Are high levels of religiosity inconsistent with a high valuation of science? Evidence from the United States, China and Iran

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We asked whether high levels of religiosity are inconsistent with a high valuation of science. We explored this possibility in three countries that diverge markedly in the relation between the state and religion. Parents in the United States ($n = 126$), China ($n = 234$) and Iran ($n = 77$) completed a survey about their personal and parental stance towards science. The relation between religiosity and the valuation of science varied sharply by country. In the U.S. sample, greater religiosity was associated with a lower valuation of science. A similar but weaker negative relation was found in the Chinese sample. Parents in the Iranian sample, by contrast, valued science highly, despite high levels of religiosity. Given the small size of our United States and Iranian samples, and the non-probabilistic nature of our samples in general, we caution readers not to generalise our findings beyond the current samples. Despite this caveat, these findings qualify the assumption that religiosity is inconsistent with the valuation of science and highlight the role of sociocultural context in shaping adults' perception of the relation between religion and science.

Keywords: Science and religion conflict; Science valuation; Religiosity; Cross-cultural research.

The relation between science and religion is often portrayed as a conflict (Evans, 2018; Evans & Evans, 2008; Weldon, 2017). Indeed, some proponents of this *conflict thesis* asserted that the "antagonism" between science and religion is inevitable, and based on important historical cases, such as the conflict between Galileo and the Catholic church, they have framed the history of science as "a narrative of the conflict of two contending powers, the expansive force of the human intellect on one side, and the compression arising from traditionary faith and human interests on the other" (Draper, 1874, p. vi). Endorsed by the secularisation thesis, which proposes that scientific beliefs will eventually replace religious beliefs (Norris & Inglehart, 2004; Schnabel & Bock, 2017), this epistemological conflict narrative has influenced much of the academic work on the relation between science and religion (Evans & Evans, 2008). Although historians of science have challenged this narrative in recent decades (Brooke, 1991; Harrison, 2015; Russell, 2002; Weldon, 2017), the perception of warfare between science and religion has remained widespread in the public domain (Dixon, 2008; Ecklund & Park, 2009) and is fueled by polemical atheists, on the one hand (e.g., Dawkins, 2006) and the anti-science campaigns of religious groups, on the other (Alumkal, 2019).

At the core of the conflict thesis is the belief that science and religion are two fixed categories with distinct knowledge systems. The thesis implies that: "there are discrete human activities, 'science' and 'religion', which have had some unitary and enduring essence that persists over time" (Harrison, 2015, p. 6). On this view, "an increase in science mechanically leads to a decline in

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religion" (Evans & Evans, 2008, p. 99). In his recent analysis, Harrison (2015) provided strong historical evidence against this essentialist claim by showing that science and religion were originally conceptualised as moral values within the individual (i.e., *religio* and *scientia*), rather than distinct knowledge systems, until they underwent a transformation during the sixteenth and seventeenth centuries. Recent sociological phenomena, notably the persistence of religious beliefs in the United States despite its dominance in science and technology, also challenge the claim that science and religion are fixed categories that compete with or displace each other. Indeed, scholars increasingly view such phenomena as problematic for standard theories of secularisation (Casanova, 1994; Schnabel & Bock, 2017) and argue that the supposed dichotomy between the religious and the secular is no longer plausible (Göle, 2015).

Interestingly, the alleged mental compartmentalization of science and religion as discrete systems has rarely been tested empirically. Note that this compartmentalization implies that science and religion cannot coexist within an individual insofar as humans strive for logical coherence and consistency. For instance, it implies that individuals cannot simultaneously believe that God created humans and believe in evolution (Evans, 2018), and that religious individuals will be suspicious of science (Chan, 2018). However, recent discussion and research have provided evidence for *cognitive polyphasia*, which proposes that different types of knowledge with different rationalities coexist in the same individual or group (Jovchelovitch, 2002).

For example, in their survey of research focusing on ideas about core biological concepts across various cultures (i.e., the origin of species, illness and death), Legare and colleagues (Legare, Evans, Rosengren, & Harris, 2012) showed that individuals from diverse cultural contexts often invoke both natural and supernatural explanations for the same phenomenon (e.g., South Africans invoke both unprotected sexual practices as well as witchcraft as a cause of AIDS). Consistent with these findings, Harris and colleagues (Harris, Pasquini, Duke, Asscher, & Pons, 2006) found that children justify their belief in the existence of unobservable scientific (e.g., germs) and religious (e.g., the soul) entities with similar patterns of reasoning. Similarly, Shtulman (2013) found that many college students in the U.S. invoke parallel types of explanations as evidence for the existence of both supernatural and scientific entities. Lastly, Shein, Li, and Huang (2014) found a positive relation between scientific knowledge and engagement in fortune-telling in Taiwan. By implication, as argued by Legare et al. (2012), "coexistence thinking is a pervasive feature of human cognition" (p. 782).

If scientific and religious ideas can coexist, what drives the science and religion conflict in the public sphere? Based on an analysis of laypeople's knowledge systems, including some of the findings above regarding coexistence, Evans (2018) argued that when there is a conflict between science and religion, it is not based on conflicting knowledge claims. According to him, if there is a conflict between science and religion over knowledge, it is likely to be confined to the elites of the two institutions (i.e., practicing scientists and theologians), because their members are strongly committed to the basic claims of their domain of expertise (i.e., science or religion). By contrast, laypeople have neither the motivation nor the time to build coherent knowledge structures. Accordingly, they are likely to combine scientific and religious knowledge with little concern for over-arching consistency. Based on this analysis, Evans (2018) concluded that when conflict does occur it has a different focus, notably on which institution should shape public morality. For instance, religious opponents of stem cell research do not disagree with scientists about the structure of an embryo. Nevertheless, they disagree with them about how to act on the basis of such knowledge: Because religious beliefs equate embryos with humans, for religious individuals, cloning or destroying an embryo is morally unacceptable as it violates God's power as a creator.

Other recent sociological data support Evans' *moral conflict thesis* and challenge the prototypical definitions of religious people as strongly opposed to science. For instance, Ecklund and Scheitle (2017) have shown that religious individuals do not reject scientific knowledge per se, but are dubious about research that threatens to undermine God's role in today's society. In her survey of social and natural scientists from elite universities in the United States, Ecklund (2010) also found that although these scientists are less religious than the U.S. general public, there is considerable variation among scientists in terms of religiosity, contrary to the assumption that they are generally atheists. There is also increasing acknowledgement that a purely epistemological approach is too narrow to capture individuals' orientation to science (Bauer, Durant, & Evans, 1994; Evans & Durant, 1995), and that cultural indicators of this orientation should also be explored (Bauer, Allum, & Miller, 2007).

In light of these recent analyses, we investigated the relation between self-reported religiosity and the valuation of science by drawing on data from a large survey, which focused on the similarities and differences between participants' values and beliefs in the domains of religion and science. Because the survey was part of a larger project which aimed to examine the role of parental influence on children's religious and scientific cognition across seemingly different cultures, we specifically targeted parents of school-age children. This allowed us to collect data not only on participants' valuation of science in their own lives, but their valuation of science in the lives of their children as well. The data were collected in three countries that diverge markedly with

respect to religious orientation as well as the relation between the state and religion: The United States, where church and state are separate institutions, even if many adults are religious (Norris & Inglehart, 2004), China, an atheist state where religious believers are in a minority, and Iran, a Muslim majority country governed by an Islamic theocracy, where the majority of citizens view religion as a fundamental aspect of their lives (Inglehart et al., 2014).

The valuation of science measure included a set of items assessing how the participants value science both in their own lives and in the lives of their children. Because one would expect a positive relation between religiosity and the valuation of religion, we also measured how our participants value religion in their own lives as well as in the lives of their children.

If there is an inherent clash between science and religion as implied by the conflict thesis, there should be a negative relation between religiosity and the valuation of science in all three countries. Moreover, the most religious adults—in our case, the Iranian participants—should value science the least, whereas the least religious group of adults—Chinese participants—should value science the most. Alternatively, if there is no inherent conflict between science and religion as suggested by the cognitive polyphasia, or coexistence hypothesis, then religiosity should be unrelated to the valuation of science across the three countries.

Yet, a third possibility is that the relation between religiosity and the valuation of science depends on the specific cultural and political context. The two domains may or may not be in conflict, depending on whether they are pitted against each other. This hypothesis is derived from the proposal that science and religion are not merely knowledge claims; rather they are powerful social institutions that carry meaning and thereby influence norms and attitudes (Evans, 2018; Evans & Evans, 2008). On this view, the history of these institutions and their relation may display a unique path in a given country, so that the way that individuals perceive the relation between religion and science cannot be understood independent of the cultural and political context in that country.

METHOD

Participants

Four hundred and thirty-seven parents of 4- to 11-year-old children living in the United States ($n = 126$; 61% mothers), Iran ($n = 77$; 95% mothers) and China ($n = 234$; 80% mothers) participated. The study was planned as a part of a larger project which aimed to examine the role of parental transmission in children's religious and scientific cognition across diverse societies. The sample size for a relatively small effect size ($f^2 = .05$) with .80 power at a significance level of $p = .05$ was found to be 196 in total using G*Power 3.1 (Faul, Erdfelder, Buchner, & Lang, 2009). However, because it was not possible to determine each participant's level of religiosity before participation, and the countries included in the study vary sharply in terms of the distribution of religiosity in population, we attempted to maximise participation at each site in order to have sufficient diversity within each sample in terms of religiosity. We intentionally oversampled the Christian participants in China to have a diverse sample in terms of religious affiliation. Thus, it should be acknowledged that our Chinese sample is not representative of the country as a whole in terms of the distribution of religious affiliation.

The U.S. parents were recruited via Amazon Mechanical Turk (see Levay, Freese, & Druckman, 2016, for the discussion that Amazon Mechanical Turk respondents do not differ from a national sample in unmeasurable ways). Due to the sensitive nature of conducting research on religious beliefs and values in China and Iran, participants in these countries were recruited via local research assistants and a waiver of consent was approved by the local ethical committee of Boston University for these participants. Also, in these two countries, we collected data from adults living in urban cities to have samples comparable with each other. The Iranian parents were recruited in Tehran and the Chinese parents were recruited from Beijing and Shandong province. None of the participants were excluded from the analyses. Table 1 shows participants' level of education and religious affiliation in each country.

Procedure

The data for this study were drawn from a large anonymous survey conducted as part of a larger project investigating the parental transmission of scientific and religious beliefs in diverse cultures. Specific and local portions of these survey data have been reported in Payir, Davoodi, Sianaki, Harris, and Corriveau (2018), Davoodi et al. (2018) and Clegg, Cui, Harris, and Corriveau (2019). Here, we compare the findings gathered across all three countries.

In Iran and China, the survey questions were presented to participants in their native language after being translated from English to Persian and Chinese, and back-translated to English by native speakers of Persian and Chinese. We also conducted pilot work with samples of adults in all three countries to ensure that key terms (e.g., "science") were interpreted similarly in the three countries. This study was approved by the Human Subjects Institutional Review Board at the second author's institution. All of our measures and conditions included in this study are reported below.

TABLE 1
Summary of factor analysis results for the valuation of science and religion items

Item	*Science valuation*	*Religion valuation*
To me, it is important to have a scientific outlook in life	**.60**	−.17
*It is not very important to visit a science museum regularly	**.45**	−.02
*It is not very important to discuss scientific matters with other adults	**.56**	.05
*It is not very important to read and understand scientific texts	**.68**	−.01
It is important to be open to the guidance of people with scientific expertise	**.54**	.06
I turn to science for key questions in life	**.64**	−.18
It is important for children to be raised with a scientific outlook in life	**.65**	.12
*It is not very important for children to visit a science museum regularly with their parents	**.58**	−.01
*It is not very helpful to discuss scientific topics with children	**.61**	.09
*It is not very important for children to read and understand scientific texts	**.63**	.06
It is important for children be open to the guidance of people with scientific expertise	**.55**	.09
To me, it is important to have a religious outlook in life	−.14	**.80**
*It is not very important to visit a place of worship regularly	.03	**.64**
*It is not very important to discuss religious matters with other adults	.09	**.64**
*It is not very important to read and understand religious texts	.07	**.77**
*It is important to be open to the guidance of people with religious expertise	.04	**.74**
I turn to religion for key questions in life	−.23	**.59**
It is important for children to be raised with a scientific outlook in life	−.11	**.81**
*It is not very important for children to visit a place of worship regularly with their parents	.04	**.73**
*It is not very helpful to discuss religious topics with children	.01	**.80**
* It is not very important for children to read and understand religious texts	.01	**.81**
It is important for children be open to the guidance of people with religious expertise	.04	**.71**

Note: Bolded values represent strongest factor loadings for Science Valuation and Religion Valuation.

Measures

Highest level of education

Participants indicated their highest level of education among the options provided. The options were adjusted slightly in each country in order to account for the differences between the three countries in terms of the education system. In the United States, the options were: some high school, high school, some college, college degree and graduate school or professional degree. In Iran, they were: middle school, high school, associate's degree, college degree, master's degree and doctoral degree. Lastly in China, the options were: elementary school, some high school, high school, some college, college degree and graduate school or professional degree.

Self-reported socioeconomic status

The MacArthur Self-reported Socioeconomic Status Scale (see Adler, Epel, Castellazzo, & Ickovics, 2000) was used to measure socioeconomic status. Participants were shown a picture of a ladder and instructed to put an "X" on the rung that best represented their standing compared to other residents in their town in terms of money, education and job. They were told that the bottom rung ("10") represented people who are worst off and the higher they go, the closer they get to the people at the very top ("1").

Level of religiosity

Religiosity was measured using two items that capture the public and private practice of religion (Huber & Huber, 2012; Rohrbaugh & Jessor, 1975) and an additional item that captures self-assessed religiosity (Orathinkal & Vansteenwegen, 2006). Parents were asked to indicate how frequently they attend religious services and how frequently they privately worship on a scale from 1 (almost never) to 7 (more than once a week). They were also asked whether they self-identify as a religious person. Parents received 1 point for self-identifying as religious, 1 point if they claimed to engage in private worship more than once a week and 1 point for attending religious services more than once a month. Scores ranged from 0 to 3.

Valuation of science and religion

Participants rated their level of agreement with 11 items that aimed to measure valuation of science and parallel 11 items that aimed to measure valuation of religion using a 5-point Likert-scale, ranging from "strongly disagree" (coded as 1) to "strongly agree" (coded as 5). Because this study was part of a larger project that aimed to examine the role of parental transmission in children's religious and scientific cognition, we included items that measure the valuation of science and religion both at personal (e.g., "To me, it is important to have a scientific[religious] outlook in life") and parental (e.g., "It is important for children to be raised with a scientific[religious] outlook in life") level.

In our results section, we provided the results of the exploratory factor analysis conducted on these 22 items. As also seen in Table 1, the 11 items about personal and parental valuation of science clustered on one factor. Also, these items had high internal consistency for all three samples: United States (Cronbach's alpha = .87), Iran (Cronbach's alpha = .80) and China (Cronbach's alpha = .84). When all three samples were combined, Cronbach's alpha = .85. Therefore, we summed the scores across these 11 items to have an overall score for valuation of science, which ranged from 11 to 55.

As can be seen in Table 1, the parallel 11 items about personal and parental valuation of religion also clustered on a single factor. These items also had high internal consistency for all three samples: United States (Cronbach's alpha = .93), Iran (Cronbach's alpha = .87) and China (Cronbach's alpha = .92) samples. When all three samples were combined, Cronbach's alpha = .92. Therefore, we summed the scores across these 11 items to have an overall score for valuation of religion, which ranged from 11 to 55.

Lastly, we conducted a measurement invariance analysis of these valuation items using confirmatory factor analysis (CFA), based on the guidelines of Fischer and Karl (2019). However, the results of this CFA did not enable us to confidently establish the measurement invariance of our items across the three samples (please see the supplemental materials for the results and discussion of this measurement invariance analysis).

RESULTS

Factor analyses for the valuation of science and religion items

We conducted a principal factor analysis on the 22 items with oblique rotation (direct oblimin). In order to have a large enough sample to run a factor analysis, the data from the three countries were pooled. The Kaiser-Mayer-Olkin measure verified that the sample size was adequate (KMO = .89). An initial analysis was run to obtain two factors which explained 50.33% of the variance. These factors had eigenvalues greater than 1 (Kaiser's criterion; Field 2013). Table 1 shows the factor loadings after the rotation. The items that cluster on Factor 1 suggest that this factor represents valuation of science and the items that cluster on Factor 2 suggest that this factor represents valuation of religion.

Distribution of level of education and religious affiliation

Table 2 presents participants' level of education and religious affiliation by country. Education levels were binned into three categories: high school education or less, college/bachelor's degree and graduate education. A Kruskal-Wallis test revealed that the level of education significantly differed among the samples from the three countries, $H\ (2,\ 434) = 17.37$, $p < .001$. Pairwise comparisons with adjusted p-values showed that there was a significant difference between the United States and Iran ($p = .028$) and between the United States and China, ($p < .001$), but not between Iran and China ($p = 1.000$). As also seen in Table 2, our samples diverged markedly in terms of religious affiliation.

TABLE 2
Distribution of participants' highest level of education and religious affiliation by country

	United States (%)	*China (%)*	*Iran (%)*
Highest level of education			
High school or less	8.7	32.9	26
Some college/Bachelor's degree	74.6	54.1	58.8
Graduate degree	16.7	13	15.2
Total	100	100	100
Religious affiliation			
Buddhism	1.6	7.3	0
Islam	0.8	0.4	96.1
Judaism	2.4	0	0
Protestantism	29.4	25.4	0
Roman Catholicism	23	1.7	0
Taoism	0	2.2	0
Ancient Cults	1.6	0	0
Other	6.3	0.4	0
None	34.9	62.5	3.9
Total	100	100	100
Perceived SES			
High income	15.1	8.9	13.5
Middle income	76.2	82.2	73
Low income	8.7	8.9	13.5
Total	100	100	100

Self-reported socioeconomic status

We reverse coded the scores so that the lowest score on the scale (1) represented the lowest perceived SES whereas the highest score (10) represented the highest perceived SES. A one-way ANOVA revealed that the level of perceived SES was very similar across the U.S. ($M = 5.60$, $SD = 1.71$), Iranian ($M = 5.64$, $SD = 1.60$) and Chinese ($M = 5.52$, $SD = 1.56$) samples, $F\ (2,\ 412) = .19$, $p > .05$. As represented in Table 1, the majority of the participants in each country reported belonging to the mid SES.

Level of religiosity

A one-way ANOVA revealed that the overall level of religiosity differed significantly between the samples, $F(2,\ 432) = 21.45$, $p < .001$, $\eta^2 = .09$. Bonferroni corrected comparisons showed that the Iranian sample

TABLE 3
Results of the regression analysis predicting the valuation of science by country (United States as the reference) and religiosity

	Model 1			*Model 2*		
Predictor	*B*	*t*	*CI*	*B*	*t*	*CI*
Intercept	42.32	35.06***	[39.95, 44.69]	44.02	35.74***	[41.61, 46.45]
Religiosity	−1.81	−8.07***	[−2.25, −1.37]	−3.37	−8.60***	[−4.14, −2.60]
Country						
Iran	5.35	6.12***	[3.63, 7.07]	−0.36	−0.23	[−3.36, 2.64]
China	1.57	2.46**	[0.32, 2.82]	−0.66	−0.80	[−2.28, 0.96]
Country × Religiosity						
Iran × Religiosity				3.60	4.82***	[2.13, 5.07]
China × Religiosity				1.97	4.08***	[1.02, 2.93]
F	29.16			15.33		
Adjusted R^2	0.19***			0.26***		

Note: Reference category for country is United States. CI = confidence interval.
*$p < .05$. **$p < .01$. ***$p < .001$.

($M = 1.97$; $SD = 0.99$) was more religious as compared to the U.S. sample ($M = 1.19$; $SD = 1.19$), $p < .001$, 95% CI [0.36, 1.19], as well as compared to the Chinese sample ($M = 0.94$; $SD = 1.25$), $p < .001$, 95% CI [0.65, 1.41]. The Chinese and U.S. samples did not differ on this measure, $p = .668$, 95% CI [−0.56, 0.7].

Valuation of science

Overall, participants valued science at high levels. Nevertheless, a one-way ANOVA revealed that science valuation scores differed significantly between the countries, $F(2, 427) = 14.80$, $p < .001$, $\eta^2 = .06$. Bonferroni corrected comparisons showed that the Iranian participants ($M = 45.23$; $SD = 4.93$) valued science more than the Chinese participants ($M = 42.84$; $SD = 4.59$), $p = .005$, 95% CI [0.57, 4.21]. In addition, the Chinese participants valued science more than the U.S. participants ($M = 40.73$; $SD = 7.62$), $p = .003$, 95% CI = [0.59, 3.63].

Valuation of religion

Overall, participants valued religion also at high levels. Nevertheless, a one-way ANOVA revealed a significant difference between the three countries, $F(2, 422) = 14.84$, $p < .001$, $\eta^2 = .07$. Bonferroni corrected comparisons showed that the Iranian participants ($M = 40.54$; $SD = 7.22$) valued religion more than the Chinese ($M = 34.15$; $SD = 7.85$), $p < .001$, 95% CI [3.54, 9.23] and U.S. participants ($M = 35.02$; $SD = 11.09$), $p < .001$, 95% CI [2.40, 8.63]. Religiosity levels did not differ between the Chinese and U.S. participants, $p = 1.000$, 95% CI [−3.24, 1.50].

Relation between religiosity and valuation of science

To examine the relation between participants' level of religiosity and their valuation of science, as well as whether country moderated this relation, we conducted a hierarchical multiple regression analysis with valuation of science scores as the dependent variable. Table 3 displays the results of the regression analysis. As indicated in Table 3, in Model 1, we included Country (with the United States as the reference category) and Religiosity as predictors and observed main effects of Religiosity, $b = -1.81$, $SE = 0.22$, $p < .001$, 95% CI [−2.25, −1.37], and Country, $b_{\text{Iran}} = 5.35$, $SE = 0.87$, $p < .001$, 95% CI [3.63, 7.07]; $b_{\text{China}} = 1.57$, $SE = 0.64$, $p = .01$, 95% CI [0.32, 2.82], after controlling for the effects of gender, education and perceived SES.

To explore the effect of Religiosity by Country, in Model 2 we included the two Country × Religiosity interaction terms, which significantly improved the fit of the model, $\Delta R^2 = .05$, $\Delta F(2, 395) = 14.19$, $p < .001$. Country by itself was not a significant predictor of science valuation, but both of the Country × Religiosity interaction terms were significant, indicating that the effect of religiosity on the valuation of science differs in the United States as compared to China, $b = 1.98$, $SE = 0.48$, $p < .001$, 95% CI [1.02, 2.93], and as compared to Iran, $b = 3.60$, $SE = 0.75$, $p < .001$, 95% CI [2.13, 5.07].

Finally, to explore relative differences between Iran and China, we re-ran Model 2 with Iran as the reference category (Table 4). Inspection of Table 4 indicates no main effects of Country or Religiosity, but significant Country × Religiosity interaction terms, indicating that the effect of religiosity on the valuation of science is different in Iran compared to China, $b = -1.63$, $SE = 0.70$, 95% CI [−3.00, −0.25], $p = .008$, and the United States, $b = -3.60$, $SE = 0.75$, $p < .001$, 95% CI [−5.07, −2.13].

Taken together, these findings demonstrate that the relation between religiosity and the valuation of science is moderated by country; all countries differed from each

TABLE 4
Results of the regression analysis predicting the valuation of science by country (Iran as the reference) and religiosity

	Model 3		
Predictor	*B*	*t*	*CI*
Intercept	43.67	25.86***	[40.35, 46.99]
Religiosity	0.23	0.36	[−1.02, 1.48]
Country			
United States	0.36	0.23	[−2.64, 3.36]
China	−0.30	−0.21	[−3.13, 2.52]
Country × Religiosity			
United States × Religiosity	−3.60	−4.82***	[−5.07, −2.13]
China × Religiosity	−1.63	−2.33*	[−3.00, −0.25]
F	26.79		
Adjusted R^2	0.24***		

Note: Reference category for country is Iran. CI = confidence interval. *$p < .05$. **$p < .01$. ***$p < .001$.

other significantly in terms of this relation.[1] As indicated in Figure 1, religiosity was negatively associated with the valuation of science in the United States, $b = -3.37$, $SE = 0.39$, $p < .001$, 95% CI [−4.14, −2.60]. Religiosity was also negatively associated with the valuation of science in China, $b = -1.40$, $SE = 0.29$, $p < .001$, 95% CI [−1.96, −0.84], but this negative association was not as strong as in the United States, as confirmed by the significant interaction coefficients reported above. In sharp contrast with the United States and to a lesser degree with China, there was no association between religiosity and the valuation of science in Iran, $b = .23$, $p = .73$, 95% CI [−0.02, 1.48]. Thus, in contrast to parents in the United States and China, parents in Iran reported a high valuation of science irrespective of their level of religiosity.

Relation between religiosity and valuation of religion

We adopted a similar analytic approach with respect to the valuation of religion. Thus, to examine the relation between individuals' religiosity and their valuation of religion, and to assess whether country moderated this relation, we conducted hierarchical multiple regression analyses with valuation of religion scores as the dependent variable. As indicated in Table 5, in Model 4, we included Country (with the United States as the reference category) and Religiosity as predictors. Results indicated a main effect of Religiosity, $b = 5.47$, $SE = 0.25$, $p < .001$, 95% CI [4.97, 5.97], but no main effect of Country, $b_{\text{Iran}} = 0.64$, $SE = 0.99$, $p = .52$, 95% CI [−1.31, 2.60]; $b_{\text{China}} = 0.19$, $SE = 0.72$, $p = .80$, 95% CI

[1]The same pattern of variation held when we re-ran the models with each individual component of our religiosity measure (i.e., frequency of private worship, frequency of public worship, and the dichotomous "are you religious or not" variable).

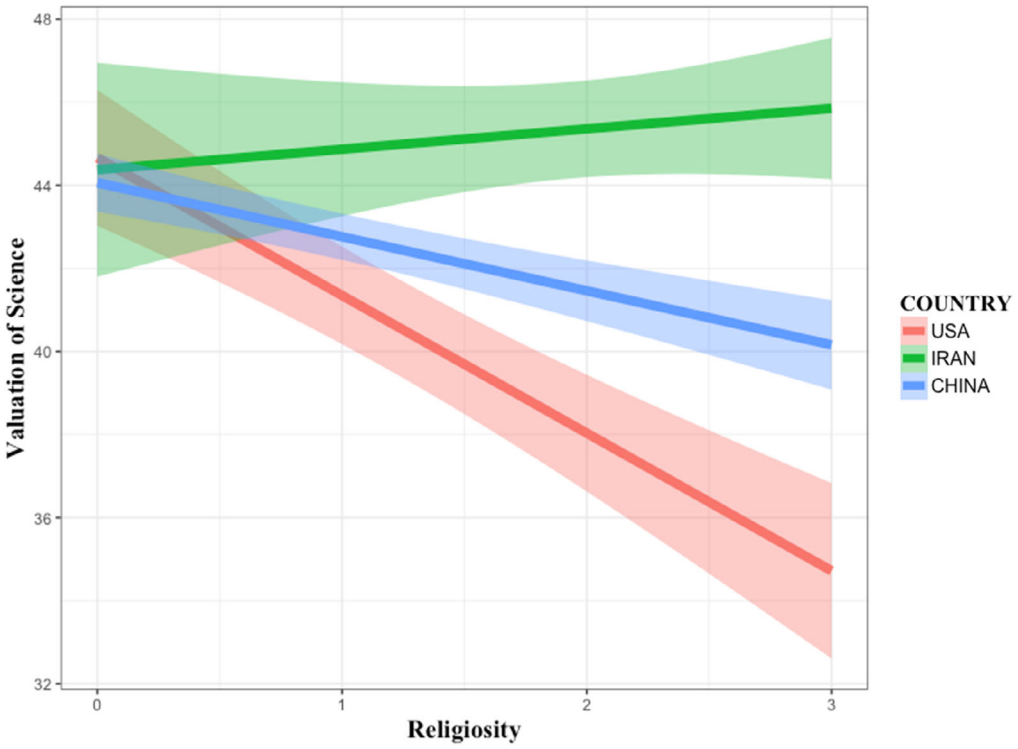

Figure 1. Valuation of science as a function of religiosity and country. The shaded areas indicate 95% confidence intervals.

TABLE 5
Results of the regression analysis predicting the valuation of religion by country (United States as the reference) and religiosity

	Model 4			*Model 5*		
Predictor	*B*	*t*	*CI*	*B*	*t*	*CI*
Intercept	28.70	21.03***	[26.01, 31.38]	26.77	19.04***	[24.00, 29.53]
Religiosity	5.47	21.50***	[4.97, 5.97]	7.15	16.00***	[6.27, 8.03]
Country						
Iran	0.64	0.64	[−1.31, 2.60]	5.54	3.10**	[2.03, 9.06]
China	0.19	0.26	[−1.23, 1.61]	2.81	2.96**	[0.94, 4.67]
Country × Religiosity						
Iran × Religiosity				−3.16	−3.66***	[−3.38, −1.20]
China × Religiosity				−2.29	−4.15***	[−3.38, −1.20]
F	168.78			64.12		
Adjusted R^2	0.57***			0.60***		

Note: Reference category for country is United States. CI = confidence interval.
*$p < .05$. **$p < .01$. ***$p < .001$.

[−1.23, 1.61], after controlling for gender, education and perceived SES.

To explore whether countries differed in the effect of religiosity on parents' valuation of religion, in Model 5, we included the two Country × Religiosity interaction terms. Including the interactions improved the fit of the model, $\Delta R^2 = .02$, ΔF (2, 392) = 10.88, $p < .001$. As shown in Table 4, this model yielded significant main effects of Country, when comparing China to the United States, $b = 2.81$, $SE = .95$, 95% CI [0.94, 4.67], $p < .01$, and when comparing Iran to the United States, $b = 5.54$, $SE = 1.79$, 95% CI [2.03, 9.06], $p < .01$. The interaction term between Country and Religiosity, when comparing Iran to the United States was also significant, $b = -3.16$, $SE = 0.86$, $p < .001$, 95% CI [−4.86, −1.47], as was the interaction term between Country and Religiosity when comparing China to the United States, $b = -2.29$, $SE = 0.55$, $p < .001$, 95% CI [−3.38, −1.20].

To compare these associations in Iran and China, we re-ran the model including all main effects and interactions, with Iran as the reference category (Table 6). Inspection of Table 6 indicates a main effect of Country when comparing Iran and the United States, $b = -5.54$, $SE = 1.79$, 95% CI [−9.06, −2.03], $p < .01$, but no main effect of Country when comparing Iran and China, $b = -2.74$, $SE = 1.69$, $p = .11$, 95% CI [−6.06, 0.58]. When comparing Iran and China, the Country × Religiosity interaction term was not significant, $b = 0.87$, $SE = .81$, $p = .28$, 95% CI [−.72, 2.46], suggesting that the effect of religiosity on parents' valuation of religion was similar in Iran and China.

Taken together, the results reported in Tables 5 and 6 indicate that the relation between religiosity and the valuation of religion is also moderated by country; although China and Iran did not differ from each other in terms of this relation, the United States differed significantly from both countries (see Figure 2).[2]

TABLE 6
Results of the regression analysis predicting the valuation of religion by country (Iran as the reference) and religiosity

	Model 6		
Predictor	*B*	*t*	*CI*
Intercept	32.31	16.50***	[28.46, 36.16]
Religiosity	3.99	5.40***	[2.54, 5.44]
Country			
United States	−5.54	−3.10**	[−9.06, −2.03]
China	−2.73	−1.62	[−6.06, 0.58]
Country × Religiosity			
United States × Religiosity	3.16	3.66***	[1.47, 4.86]
China × Religiosity	.87	1.08	[−0.72, 2.46]
F	64.12		
Adjusted R^2	0.60***		

Note: Reference category for country is Iran. CI = confidence interval.
*$p < .05$. **$p < .01$. ***$p < .001$.

As a further check on these conclusions, we analysed the effect of religiosity on the valuation of religion in each country separately. Religiosity was positively associated with the valuation of religion in all countries, United States: $b = 7.15$, $SE = .45$, $p < .001$, 95% CI [6.27, 8.03]; China: $b = 4.86$, $SE = .33$, $p < .001$, 95% CI [4.22, 5.50] and Iran: $b = 3.99$, $SE = 0.74$, $p < .001$, 95% CI [2.54, 5.44]. However, as shown in Figure 2, and confirmed by the coefficients from Models 4 and 5, there is a stronger relation between religiosity and the valuation of religion in the United States as compared to China and Iran.

DISCUSSION

It is often assumed that religiosity is negatively associated with the valuation of science, so that an increase in religiosity will lead to a devaluation of science. In the current study, we checked this assumption by examining adults'

[2]The same pattern of variation held when we re-ran the models with each individual component of our religiosity measure (i.e., frequency of private worship, frequency of public worship, and the dichotomous "are you religious or not" variable).

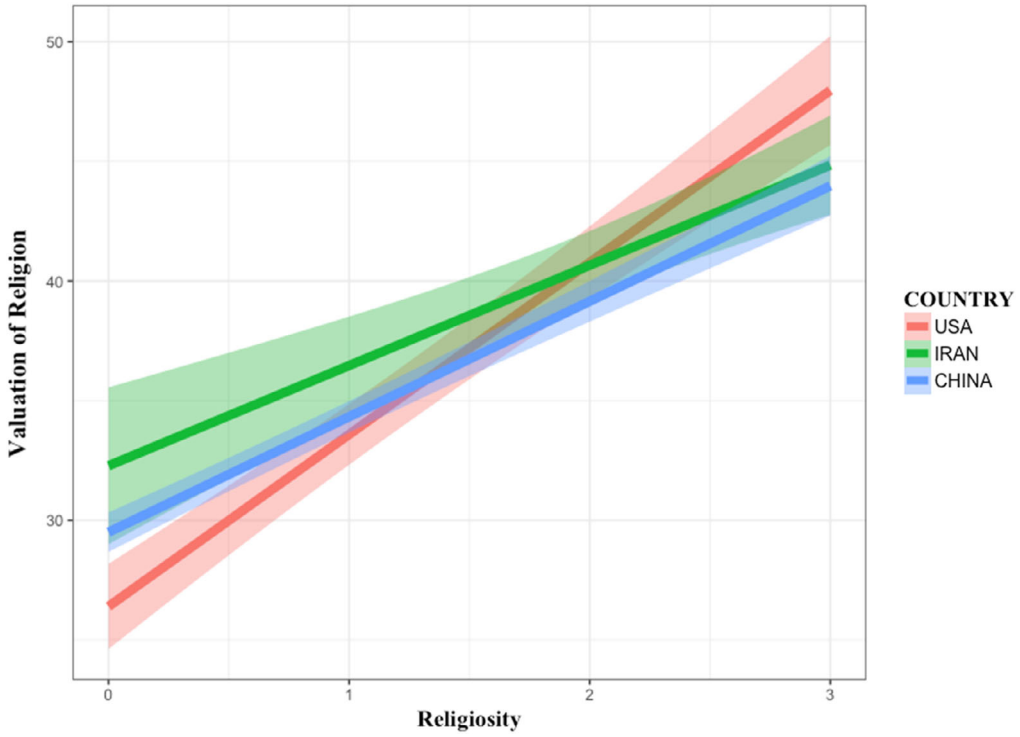

Figure 2. Valuation of religion as a function of religiosity and country. The shaded areas indicate 95% confidence intervals.

stance towards science in three societies that diverge in the status and role associated with religion: The United States, Iran and China.

Our results revealed that the relation between religiosity and the valuation of science differed sharply across the three samples. Despite their high religiosity scores, the Iranian parents valued science more than did the Chinese parents, with the U.S. parents valuing science the least. For the samples from the United States and China, religiosity negatively predicted the valuation of science, whereas religiosity did not predict the valuation of science in the sample from Iran.

Taken together, the findings from the three samples do not support the conflict hypothesis, if that hypothesis is taken to imply that an "antagonism" between science and religion is inevitable. On the contrary, we found that our most religious sample—the Iranian adults—valued science the most, even more than the Chinese sample, where the majority have no religious affiliation. These findings are in line with a recent analysis by Chan (2018) which focused on religiosity and different orientations towards science (i.e., confidence in science, faith in science, moral views of science, interest in science and trust in scientific authority) in 52 nations. Although the overall analysis revealed a negative relation between religiosity and orientations towards science, there were significant differences among the countries in the nature of this relation. In non-western countries, a negative relation was not consistently found. For instance, higher religiosity was related to higher confidence in science in Thailand and Lebanon, and to higher faith in science in Pakistan and Iraq. Only in western countries—with the United States being the most extreme—and in countries where the religious are a minority group, such as China, did greater religiosity display a consistently negatively relation to various orientations towards science.

Note that these results are also in line with recent findings showing that religious and scientific knowledge coexist in individuals' minds without an apparent conflict, even in very religious societies. For instance, Davoodi et al. (2018) have shown that adults in Iran are highly confident of the existence of both scientific (e.g., electricity, atoms) and religious (i.e., soul, God) phenomena. Similarly, Falade and Bauer (2018) showed that in Nigeria, where religion is very powerful in the public sphere, the majority hold seemingly conflicting scientific and religious rationalities without experiencing cognitive dissonance (e.g., Eighty-two percent of the respondents who endorsed the statement that "father's gene decides sex of child" also subscribed to the statement that "God decides sex of the child"). If there is no inherent conflict between religion and science in individuals' minds, as highlighted by the Iranian parents in our study, how can the negative association between religiosity and the valuation of science in the Chinese and especially in the U.S. sample be explained? In our introduction, we entertained the possibility that religiosity would be negatively related to the valuation of science only when the sociocultural

context pits the two domains against each other, based on Evans' (2018) speculation that the tension between science and religion originates from a power struggle to govern public morality, rather than a clash between scientific and religious knowledge.

Consistent with this speculation, the negative relation between religiosity and the valuation of science in our Chinese sample can be explained by the historical opposition between science and religion promulgated in the May Fourth movement (also known as the New Culture movement) in 1919. It was argued by leading intellectuals of the time that religious beliefs were superstition and should be replace by science (Yang, 2011). During the Chinese Cultural Revolution (1966–1976), an eradication policy was executed such that all religious organisations were banned, resulting in the closing of religious venues and the destruction of religious artefacts. Although citizens have the freedom to believe in any religion nowadays, being an "unyielding atheist" continues to be a fundamental tenet for membership of the Communist Party, the ruling party in China (Campbell, 2016). Thus, although more research is warranted, the tendency of religious parents in our Chinese sample to value science less is likely to reflect a reaction to restrictions on religious practices, rather than any *epistemic* clash between science and religion (see also Chan, 2018, who makes a similar argument to explain the negative association between religiosity and orientations towards science in countries dominated by the religiously unaffiliated).

In the United States, there is evidence that resistance to scientific knowledge by some fundamental religious groups is rooted in division over specific issues which have been politicised (e.g., the teaching of evolution, climate change), rather than an overall rejection of scientific knowledge. For instance, Miller, Scott, and Okamoto (2006) argued that the low level of belief in evolution among members of the U.S. public compared to Europe and Japan is due to the politicisation of the science of evolution in the United States. Also, Evans and Feng (2013) found that when separated from covariates such as age, political conservatism, and Republican tendencies, fundamental Protestantism has no relation with the tendency to underestimate factual claims of climate science, but instead with an unwillingness to allow scientists to have power over public policy on climate change. Taken together, these diverse findings support the argument that conflict between science and religion originates from a struggle over public morality (also see Washburn & Skitka, 2018, for a related, but slightly different argument).

Although the pattern observed in our Iranian sample, notably the combination of marked religiosity and a high valuation of science, may seem surprising at first, especially considering the pervasive role of religion in public life under a theocratic regime following the Iranian revolution (Kazemipur & Rezaei, 2003), it is less surprising once the impact of the sociocultural context is taken into account. First, it should be emphasised that the factors that gave rise to Iranian Revolution were "predominantly social, economic, and political" even if the revolution itself took a religious form (Abrahamian, 1982, p. 531). Thus, the revolution was a widespread reaction to the Shah's submission to Western imperialism rather than an attempt to uphold religious traditions and values, despite the course of events following the revolution. Moreover, even in the sociocultural context established after the revolution, which emphasises a religious way of life, religious scholars have successfully integrated Islamic philosophy and practices with modern science (Bahari, 2009), and major political figures have, for the most part, supported advances in technology and science. For example, the current president emphasised the role of science and "scientific evolution" in Iran's foreign relations (Ashtarian, 2015) and the supreme leader, the highest-ranking religious figure, is supportive of scientific advances such as those achieved by the Rooyan Institute (Bahari, 2009), a research institute for biomedical and clinical research (Miremadi, 2013). Indeed, the economic sanctions on Iran have led to the introduction of an economic plan by the supreme leader, termed "economy of resistance" in 2014, emphasising the development of a comprehensive scientific plan for economic sustainability (Ashtarian, 2015).

A recent set of findings from the United States, China and Iran further support the hypothesis that the relation between religion and science depends on the sociocultural and political context in a given country. In a study by Clegg et al. (2019), adults in the United States and China were asked to rate their confidence in the existence of both scientific and religious unobservable phenomena; some of these phenomena elicited a high societal consensus (e.g., God, electricity) whereas others did not (e.g., evolution, creation). The results revealed that religiosity did not affect participants' judgements of high consensus scientific items in both countries. However, it was negatively associated with endorsement of low consensus scientific items. On the other hand, in a similar study conducted in Iran, Davoodi et al. (2018) found no relation between the level of religiosity and endorsement of scientific and religious unobservable phenomena, even for the controversial religious and scientific items such as *evolution* and *creation*, both of which were highly endorsed.

This study has some limitations which should be taken into account when interpreting the findings. First and foremost, as noted throughout the manuscript, it examined the association between religiosity and the valuation of science across three markedly different socio-cultural contexts. Therefore, no causal claims can be made regarding this relation because some factors other than religiosity might explain the cross-cultural variation observed. Second, somewhat different sampling procedures were used

across the countries: Due to the sensitive nature of some of our questions, the participants in Iran and China were recruited via snowball sampling whereas participants in the United States were recruited via Amazon Mechanical Turk. Because our samples are not probability based, hence, may not be representative of the populations they are drawn from (Cornesse et al., 2020), caution is needed when making generalisations about the countries considered as a whole. Lastly, we failed to establish the measurement invariance of our valuation items across the three samples, particularly due to the small *N* of our samples (see Data S1). Therefore, we cannot firmly establish that these items are interpreted the same way across the United States, Iranian and Chinese samples.

Despite these caveats, our findings confirm and extend recent evidence calling into question the tenability of the conflict thesis. Instead, the findings indicate that the so-called science and religion conflict does not have a pervasive or systematic epistemological basis. They highlight the importance of considering the role of the sociocultural and political context in shaping the relation between individuals' religiosity and their valuation of science.

COMPLIANCE WITH ETHICAL STANDARDS

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards.

INFORMED CONSENT

Informed consent was obtained from all individual adult participants residing in the United States. The IRB at Boston University waived the informed consent requirement for the participants residing in Iran and China. These participants were provided with an "adult information sheet" that described the study in detail.

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SUPPORTING INFORMATION

Additional supporting information may be found online in the Supporting Information section at the end of the article.

Data S1. Confirmatory factor analysis and measurement invariance testing for valuation of Science and Religion Items.

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