Students in countries with higher levels of religiosity perform lower in science and mathematics

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Highlights

- Countries with higher levels of religiosity had lower educational performance
- Women were more religious, but this was unrelated to educational performance
- Levels of national development and time spent on religious education played a role

Abstract

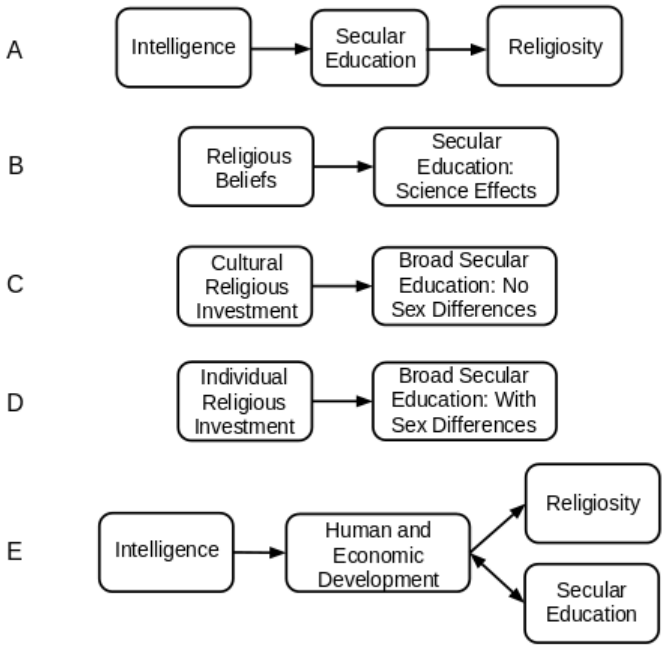
We compared the relation between educational performance scores in the *Programme for International Student Assessment* (PISA) and *Trends in International Mathematics and Science Study* (TIMSS) on the one hand, and religiosity, as measured with the *World Values Survey* and the *European Social Survey*, on the other hand. We found that higher levels of religiosity (at national level) were associated with lower educational performance in science and mathematics (r_s ranging from -.65 to -.74). One of the unique contributions of our data set is the ability to examine these trends by sex. Interestingly, even though women reported considerably higher levels of religiosity than men, this gap was not related to sex differences in educational performance. This latter finding constrains conclusions about the possible causal pathways between education, religiosity, and intelligence. Further, the mediating role of human development and time spent on religious education appear to account for the relation between education and religiosity. One possibility is that the relation between education and religiosity at the national level is related to overall levels of economic and human development, including investment in secular education.

1. Introduction

Psychologists have investigated the relation between religion and intellectual abilities for at least a century, beginning with Leuba's (1916) studies of belief in a personal God and belief in immortality. Zuckerman, Silberman, and Hall's (2013) recent meta-analysis revealed a reliable negative relation between religiosity and intelligence (*r* ranged between -.20 to -.25). Webster and Duffy (2016) reanalyzed these same data and concluded this link "is weaker and less generalizable than believed" (Webster & Duffy, 2016, p. 25) due to correlated variables, such as life-quality. Despite these arguments there is general agreement that the negative relation between religious beliefs and intelligence holds true, but that more precise estimates of the strength of the relation would require a better understanding of related variables. Here we investigated the role of several such variables.

1.1 Variables related to the link between religiosity and IQ

There appear to be a number of variables related to religious beliefs and intelligence, including sex, education, and overall quality of life (Webster & Duffy, 2016). Level of education has been proposed as a mediating variable by a number of researchers (Webster & Duffy, 2016; Meisenberg et al., 2012; Hoge, 1974; Reeve & Basalik, 2011). As shown in Figure 1 (A), Reeve and Basalik (2011), for instance, suggested that individuals with higher IQs might benefit more from higher levels of education, which strengthen rational thinking and enable individuals to develop ways to understand the world without reference to supernatural forces. Meisenberg et al. found that the relation between education and religiosity is moderated by national levels of intelligence, with the relation being positive in lower-performing countries and generally negative in higher performing ones.



Caption Figure 1: Schematic depiction of various models of relations between mediating variables. See text for details.

It should also be noted that school education can influence performance on measures of intelligence (Ceci, 1991; Cliffordson & Gustafsson, 2008; Lund & Thrane, 1983; Stelzl et al., 1995), whether or not it influences the underlying fluid intelligence (Ritchie, Bates, & Deary, 2015). National IQs predict national educational performance as measured in the *Programme of International Student Assessment* (PISA) (Lynn & Mikk, 2009), and in the *Trends in International Mathematics and Science Study* (TIMSS) (Lynn & Mikk, 2007). Within-country measures of intelligence and education correlate strongly as well (Deary et al., 2007). Indeed, intelligence and school performance are closely related concepts. In the current paper, we primarily focus on the relation between national levels of educational performance and religiosity.

1.2 Hypotheses

Given the previously observed link between intelligence and religiosity, we predict that there is a link between national levels of religiosity and educational performance. We hypothesize, however, that this is not only because of the generally negative but nuanced relation between intelligence and religiosity (Meisenberg et al., 2012). Instead, we suggest that the influence of religion on educational policies might be a factor as well. For example and as represented in Figure 1 (B), due to the incompatibility between evolution and traditional religious beliefs about the origin of our species, some teachers may be biased in their presentation of the theory of evolution (Athanasiou, Katakos, & Papadopoulou, 2012) or not even support the teaching of evolution at all (Abrie, 2010). Further, in the more general biological domain, the study of abiogenesis (origin of life) and reproduction may conflict with religious beliefs and views on morality. In geoscience, tectonic plate movement may be incompatible with the biblical or quranic accounts of creation, and disbelief about radiometric dating may affect the interpretation of many scientific findings, including those in archaeology and paleontology. In short, a negative effect of religion on teachers and educational policy makers may influence the breadth and strength of educational systems (e.g., conservatively religious school boards may limit the teaching of evolutionary theory, not only in Western countries; Edis, 2009). We call this the "watering down" hypothesis; that is, an indirect effect of religion on the quality of educational outcomes, especially in science.

Apart from the conflict between religious texts and science education, we argue that there is another reason for assuming that religion affects educational policies and outcomes: Investment in learning religious doctrine might have the opportunity cost of less time for secular education (Figure 1, C). We are not aware of systematic reviews on the relation between levels of religiosity and the effort and time spent on religious teaching (by parents and/or schools). In the context of this lack of empirical data, we propose that religiosity requires time and effort because religious beliefs are based on cultural narratives and rituals which have to be attended to, practised, memorized, and accepted.

In other words, it is not necessarily the *content* of the religious beliefs that might influence educational growth (or lack thereof), but that investment of intellectual abilities that support educational development are *displaced* by other (religious) activities (*displacement hypothesis*). This follows from Cattell's (1987) investment theory, with investment shifting from secular education to religious materials rather than shifts from one secular domain (e.g., mathematics) to another (e.g., literature). This hypothesis might help to explain part of the variation in educational performance broadly (i.e., across academic domains), not just in science literacy.

1.3 Using sex differences to understand the link between religion and intelligence

Previous research has reported that women are more religious than men (for a concise review see Miller & Hoffmann, 1995). This is a reliable sex difference, yet seems not to have received as much attention in psychology as other reliable sex differences.

We do not seek to explain why women are more religious, which is a complex question in and of itself. Proposed explanations range from those related to personality traits (e.g., women are less likely to risk supernatural punishment or miss out on heavenly rewards; Miller & Hoffmann, 1995; Collett & Lizardo, 2009) to sociological (e.g., women might be forced to act religiously through social, economic, or political oppression; for a review of this and other hypothesized sociological factors see Walter & Davie, 1998), although sociological models have been challenged (Miller & Stark, 2002).

If women invest more in religion than do men, then we would predict that sex differences in educational performance should relate to sex differences in religiosity (Figure 1, D). This could manifest because of individual-level displacement (larger in girls than boys) of intellectual capital from secular education to religious learning or if religious beliefs directly conflict with secular education, as noted above. In the latter case, the relation should emerge more strongly for some aspects of science than mathematics, but unfortunately we do not have item level performance (e.g., items related to evolution vs. the Krebs cycle) on the science measures to directly assess this. On the other hand, if religiosity in nations affects the school system as a whole (e.g., because of conflicts between religion and the curriculum, or because of time needed to teach religious beliefs), we would predict that the gender gaps in religiosity are less likely related to those in educational performance. And, that national levels of religiosity would be negatively related to national achievement levels, in keeping with the *watering down* hypothesis.

It is also possible that any relation between religiosity and educational achievement is related to factors that affect both of them. General human and economic development, perhaps influenced by national levels of intelligence and dynamic relations with secular education and human capital development, is one possibility (Meisenberg et al., 2012). Accordingly, we also included the Human Development Index (below) as a potential mediator of the relation between national levels of religiosity and national achievement levels (Figure 1, E).

1.4 Methodological approach

For our analyses, we used data from the *Programme for International Student Assessment* (PISA) and *Trends in International Mathematics and Science Study* (TIMSS). The reason for combining the data from these two sets is because of (the possible problem of) range restriction in the available data sets of educational performance if we used only one of them. For example, wealthier countries are more likely to participate in international educational surveys but most of them are at the lower end of the religiosity spectrum, while poorer highly religious countries may be less likely to participate. While PISA focuses on the Organisation for Economic Co-operation and Development (OECD) and partners, TIMSS covers a somewhat broader range of countries, including constitutional theocracies such as Iran and Saudi Arabia (Hirschl, 2010). Otherwise, PISA and TIMSS are comparable in terms of studied subjects (both contain Science and Mathematics test results), underlying methodology (e.g., representative sampling and a Rasch model), and included age groups (PISA studies 15 year olds whereas TIMSS includes both 9 and 14 year olds -- we did not include the 9 year olds in our analyses).

Another challenge is that these large educational data sets contain no information about religious beliefs or religious affiliations. To deal with this, we studied the link between religiosity and education on a national level (and not individual student level), using separate databases, namely the *World Values Survey* and the *European Social Survey* (see Methods for details). Because each of these surveys are carried out every so many years (i.e., PISA every 3 years, TIMSS every 4 years, World Values Survey covers a period of 5 years, and the European Social Survey every 2 years), we analyzed three different periods, namely 2000-2004, 2005-2009, and 2010-2015. We believe that this helps to show the consistency of the relation between educational performance and religiosity.

Further we have taken a number of related variables into account, such as general measures of economic and social development and time spent on religion in school. For the latter variable, the data set is unfortunately so limited that we had to combine available data points from period from 2000-2015.

In summary, in this study we address the following main questions: 1) Is there a negative link between national levels of educational performance and national levels of religiosity? 2) Are sex differences in educational performance related to sex differences in religiosity? 3) Can societal development and time spent on religion explain the link between educational performance and religiosity?

2. Methods

In our analyses, we used the *World Values Survey* (Esmer & Pettersson, 2007) and the *European Social Survey* (Davidov, Schmidt & Schwartz, 2008) for information about religious attitudes, and data from PISA (OECD, 2003) and TIMSS (Mullis et al., 2009) for information about educational performance (Mathematics and Science literacy). As general measures of economic and social development and opportunity, we used the *Human Development Index* (HDI) as published in the *Human Development Trends* report. In short, the HDI is considered a "measure of progress", and is calculated as a score between 0 and 1 based on data around income, health, and years of schooling (United Nations Development Programme, 2014, p.33). We list included countries in Appendix A.

In our analyses, we distinguish between three different periods, namely 2000-2004, 2005-2009, and 2010-2015 (Table 1) that correspond to waves 4, 5, and 6 of the *World Values Survey*. For each time period, we combined the data from the *World Values Survey* with the data from the *European Social Survey* (we used the data from all rounds, which were carried out bi-annually between 2002 and 2014).

	Period 1: 2000-2004	*Period 2: 2005-2009*	*Period 3: 2010-2015*
World Values Survey	Round 4	Round 5	Round 6
European Social Survey	2002, 2004	2006, 2008	2010, 2012, 2014
PISA	2000, 2003	2006, 2009	2012, 2015
TIMSS	2003	2007	2011

Caption Table 1: Overview of the datasets used for measures of educational performance and religiosity. See Appendix A for a list of country names.

We combined the question from the *World Values Survey* "How important is religion?" (on a 4 point Likert scale) with the *European Social Survey* question "How religious are you?" (on an 11 point Likert scale). We mapped the 4-point scale onto the 11-point scale of the ESS and then calculated the national averages with this one scale for each country. Arguably, these two questions measure the same concept of the importance of religion, and indeed they are highly correlated across countries for which both measures are available. For period 1, there were only 3 countries in both datasets; period 2, r_s=.71, n=18, p<.01; period 3, r_s=.82, n=10, p<.001. In the remainder of this article, we will refer to this concept as "religiosity".

For educational achievement in mathematics and science, we used the data from TIMSS (assessments in 2003, 2007, and 2011) and PISA (assessments in 2000, 2003, 2006, 2009, 2012, and 2015). One of the relevant differences for this study is that the age of students in PISA are on average 15 years and in TIMSS 14-years (we did not include the 4th grade data of TIMSS), and that PISA and TIMSS include different sets of countries (37% of countries participated in both). We combined the z-scores of the national averages of TIMSS and PISA scores. By including both measures, we substantially increased the number of countries available for our analyses.

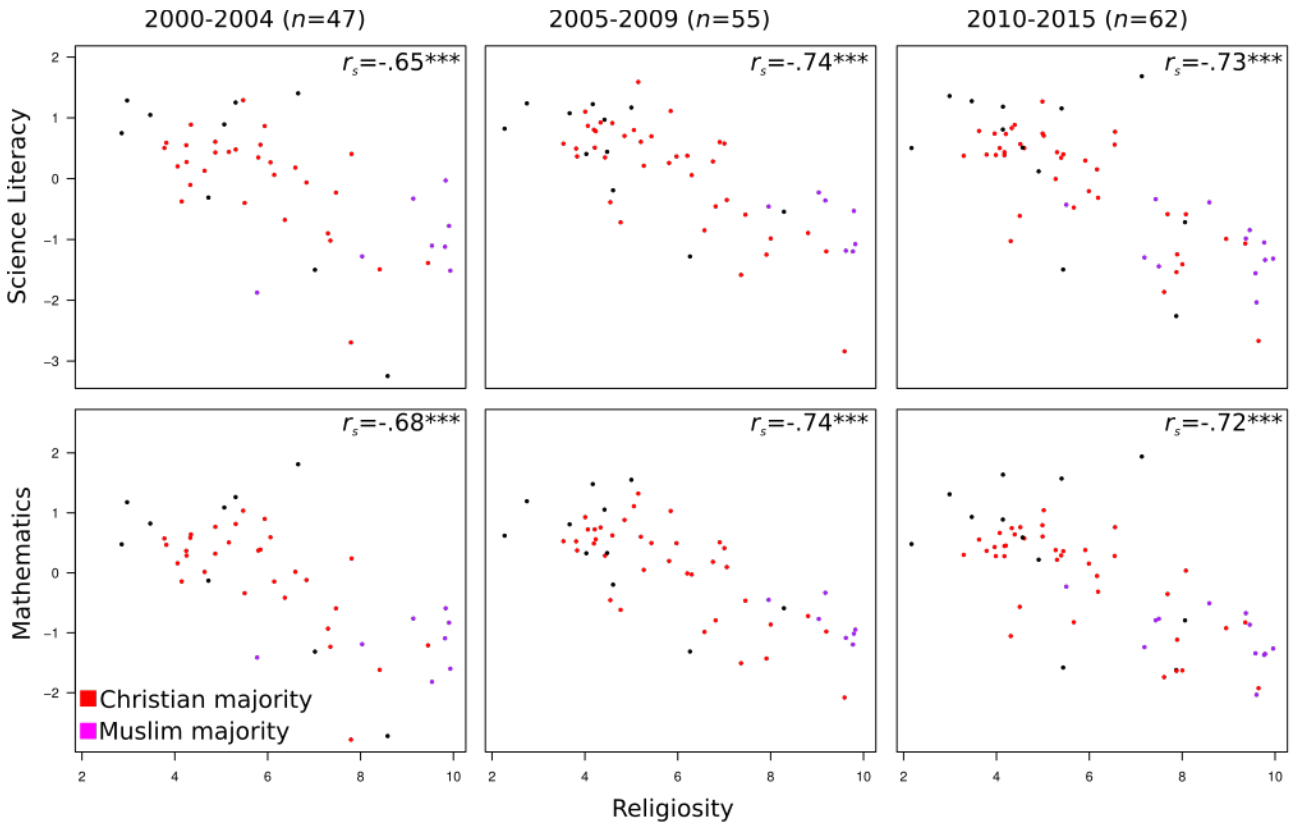
For time spent on religious education, we took data from the *Education at a Glance* (OECD, 2002) reports covering the period 2000 to 2014. Compared to the PISA and TIMSS data sets, available data in regard to time spent on religious education (measured as a percentage of total compulsory instruction time) in secondary education are limited to a relatively small number of countries (when we combine the data from 2000 to 2014, we have these data only for 32 countries in our educational datasets). Therefore, we collated the data of the whole period 2000-2014 instead of dividing data up into three separate periods.

We used data from the World Factbook (Central Intelligence Agency, 2015) for color coding in figures by majority religion (majority Christian, majority Muslim, or otherwise). We counted a country as Christian if the majority of the population counted as Christian irrespective of denomination (e.g., catholic, protestant). It should be noted that this was not further considered in our analyses, but merely used for illustrative purposes. This because there can, for obvious reasons, be a large difference between actual religiosity (our main variable of interest) and religious classification. Note that Israel, Japan, and Thailand each have a majority religion (Judaism, Shintoism, and Buddhism, respectively) but are colored black in Figures 2 and 3.

In our statistical analyses, we used either Pearson (r) or Spearman (r_s) correlation depending on whether (r) or not (r_s) the samples were not distinguishable from a normal distribution (Shapiro-Wilk test at p>.05, Shapiro & Wilk, 1965).

3. Results

For each of the three periods, we found that higher levels of religiosity were associated with lower levels of science performance (Fig 2, top panels). A similar relation was found between religiosity and performance in mathematics (Fig. 2, bottom panels).



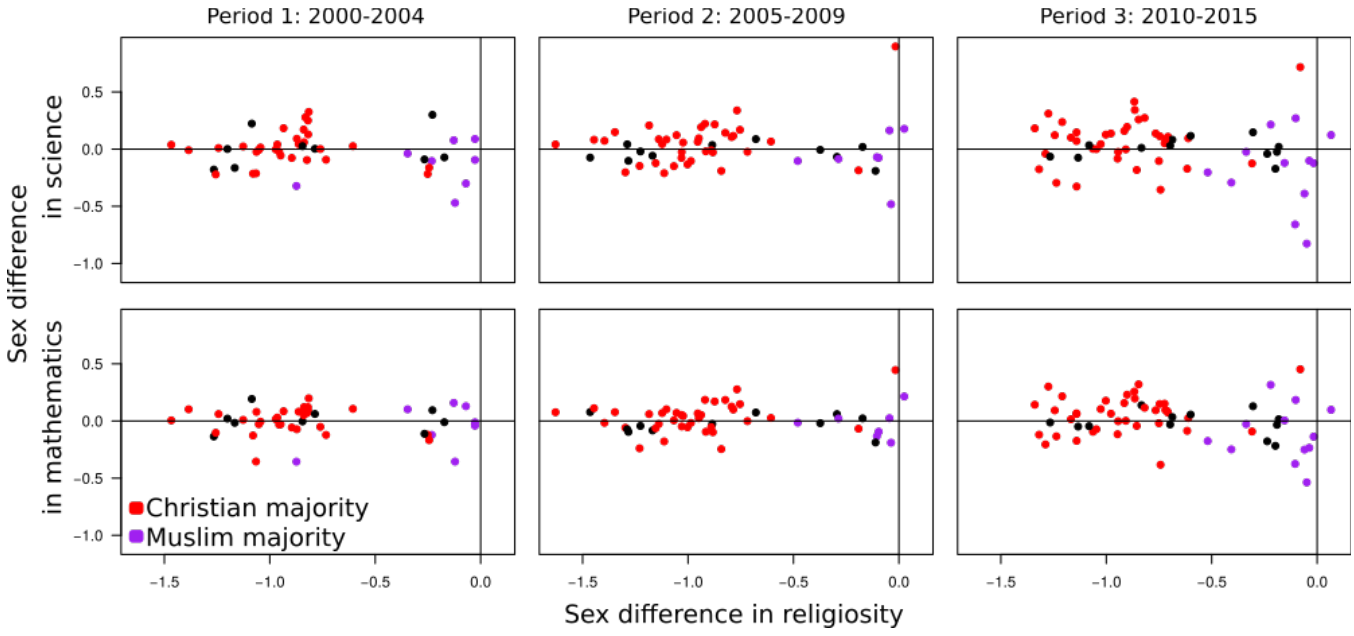
Caption Figure 2: Relation between religiosity (x-axes) and school children's performance in science (y-axes top) and mathematics (y-axes bottom). For each panel, we indicated the Spearman correlation (*** indicates p<.001). See methods for details on color coding.

The same pattern emerges for science and mathematics, because of the very strong correlation between these two variables (2000-2004: r_s=.95, n=79, 2005-2009: r_s=.97, n=55, 2010-2015: r_s=.97, n=62); the correlations between religiosity and science literacy did not differ from the correlations between religiosity and mathematics (William's tests, ps>.41).

Next, we report the relation between sex and religiosity, and how this might play into the relation between religiosity and academic performance. For the same countries for which we have TIMSS/PISA results, we found that for period 1 (n=47), women reported higher religiosity in 85% of countries (for cases in which we have more than one data point, for example data from both WVS and ESS, if at least in one of those was statistically significant at p<.05). In period 2 (n=55), the percentage was the same (85%). In period 3 (n=60), however, this dropped to 40%. The drop in period 3 could be due to the use of a different set of countries. Indeed, if we apply the above analyses to the countries with data for each of the 3 periods (n=24), the percentages are 92%, 92%, and 83%. Note that we found no countries where men reported a higher level of religiosity than women, as found by the Pew Research Center (2016).

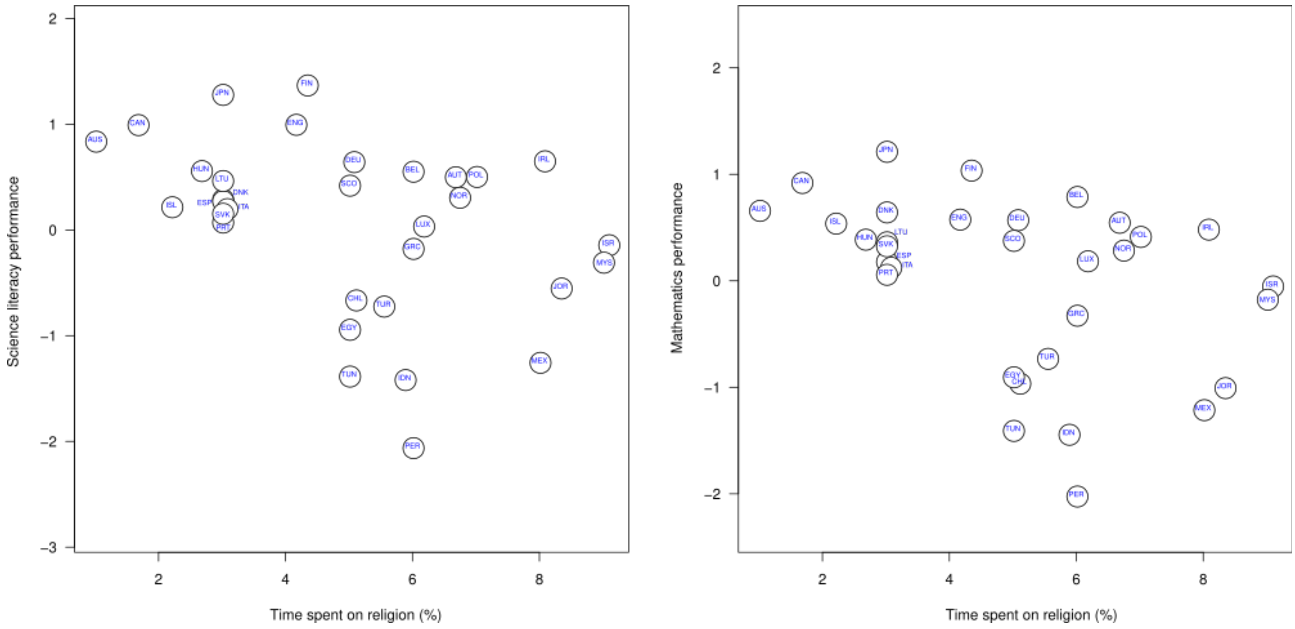
Of interest is that countries with higher overall levels of religiosity have smaller sex differences in religiosity (for all periods, for 2010-2014, r_s=.56, n=82, p<.001). This is, however, likely a ceiling effect.

Relevant to hypotheses about the within-country correlation between educational abilities and religiosity are our analyses of the sex differences in religiosity and the sex differences in mathematics or science performance. For each of the three periods, we found no relation between these variables (Fig. 3).



Caption Figure 3: Relation between sex differences in religiosity (x-axes) and sex differences in Science (top panels) and Mathematics (bottom panels). Note that negative values indicate higher scores for women. See methods for details about color coding. As noted (text), women were more religious, with nearly all points left of zero, with a less consistent pattern of sex differences in science and mathematics. In no period was there a statistically significant correlation between these variables, consistent with the displacement hypothesis.

We found a negative relation between the time spent on religion and science literacy, $r(30)=-.40$, $p=.023$, and mathematics, $r_s=-.44$, $n=32$, $p=.012$ (Figure 4). These correlations are not statistically different from one another, William's test $p=.42$.



Caption Figure 4: Relation between time spent on religion (% of compulsory instruction time) and normalised science literacy (left) and mathematics (right) for the period 2000-2015. AUS: Australia; AUT: Austria; BEL: Belgium; CAN: Canada; CHL: Chile; DEU: Germany; DNK: Denmark; EGY: Egypt; ENG: England; ESP: Spain; FIN: Finland; GRC: Greece; HUN: Hungary; IDN: Indonesia; IRL: Ireland; ISL: Iceland; ISR: Israel; ITA: Italy; JOR: Jordan; JPN: Japan; LTU: Lithuania; LUX: Luxembourg; MEX: Mexico; MYS: Malaysia; NOR: Norway; PER: Peru; POL: Poland; PRT: Portugal; SCO: Scotland; SVK: Slovak Republic; TUN: Tunisia; TUR: Turkey.

3.1 Mediation model

We tested if the strong link between national levels of educational performance and religiosity can be accounted for by mediating variables. Using partial correlation, we tested for each of the three periods if general human development (Table 2) could account for the link. For each period, HDI partially accounted for the relation between educational performance and religiosity (Table 3).

	Period 1: 2000-2004	*Period 2: 2005-2009*	*Period 3: 2010-2015*
Human Development Index x Religiosity	-.68***	-.70***	-.72***
n	46	55	61

Caption Table 2: Religiosity was strongly related with HDI. *** indicates Spearman correlation $p<.001$.

Next, we tested the extent to which time spent on religious education added to this model. To do so, we calculated the partial correlation between religiosity and education with both the mediating variables HDI and time spent on religion, $r_s = -.21$, $p = .28$. The reduction needs to be interpreted with caution, however, because it is based on only 30 countries and covariation of HDI alone reduces the relation to non-significance, albeit the absolute magnitude of the effect is larger before controlling for time (Table 3).

Period	EDU*RELI	EDU*RELI | HDI	EDU*RELI | HDI,TIME
2000-2004	-.63*** (47)	-.35* (46)	--
2005-2009	-.76*** (55)	-.43*** (55)	--
2010-2015	-.75*** (62)	-.35** (61)	--
2000-2015	-.71*** (80)	-.48*** (78)	
2000-2015	-.77*** (30)	-.27 (30, p=.14)	-.21 (30, p=.28)

Caption Table 3: Column 2: The correlation between educational performance (EDU) in science literacy on the one hand and religiosity on the other hand (RELI). Column 3: The same correlation after accounting for human development (HDI). Column 4: The same correlation after accounting for both HDI and the time spent on religion in school (TIME). Note that far fewer data points were available for TIME. For comparability, in the last row (grey) we have calculated the same correlations of columns 2 and 3 with the 30 countries for which we have data points.

4. Discussion

Our data analyses reveal a strong relation between national levels of religiosity and adolescents' educational performance. In three time periods between 2000 and 2015, higher national levels of religiosity were consistently associated with lower national levels of science and mathematics achievement. This is consistent with previous links between performance on intelligence measures and measures of religiosity, given the strong relation between intelligence and educational outcomes (Walberg, 1984; Lynn & Mikk, 2007, 2009). Further, we found that although women scored higher on religiosity in the majority of countries in the first two periods, this was not related to the sex differences in science and mathematics. Therefore, it might be the case that women's higher religiosity had no effect on the relative performance of women and men in mathematics or science (although we are cautious drawing conclusions based on the lack of an effect). We also found a negative relation between time spent on religious education during school time and educational performance. Finally, we found that the level of development of nations and the time spent on religion in school can statistically explain the link between educational performance and religiosity (although there are limitations, discussed below, due to low statistical power). Altogether, these patterns have implications for better understanding the relation between religiosity and educational development, as we will elaborate on below.

4.1 Implications for hypotheses

Our findings are consistent with earlier reports of a negative correlation between national intelligence and religiosity (Zuckerman et al., 2013), with reports showing the important role of mediating variables (Meisenberg et al., 2012; Webster & Duffy, 2016), and with reports that women score higher on religiosity (reviewed in Miller & Hoffman, 1995). Note that our data analyses were not intended to address why women show stronger forms of religiosity than men (see Collett & Lizardo, 2009; Miller & Hoffman, 1995; Pew Research Center, 2016).

If we assume that within-country variation in religiosity relates strongly to within-country variation in educational performance, then the sex differences in achievement and especially science literacy should parallel the sex differences in religiosity. This was, however, not at all the case, inconsistent with the watering down hypothesis. The result also has implications for models of how religiosity and educational performance may relate to one another. Given our findings, one possibility is that national levels of education and even within-country variation in educational performance are not directly influenced by national levels of religiosity. Instead, it is possible that religious belief systems influence educational policies that in turn affect the secular education of *all* students (i.e., of boys and girls equally) and across academic domains. This is in line with the displacement hypothesis.

Of possible importance to this is that the relation between religiosity and *science* literacy is as strong as the relation between religiosity and *mathematics* performance. This is of interest, given that mathematics is religiously neutral. One could argue that this is consistent with general intelligence as the best explanatory cause of the relation between educational performance and levels of religiosity. Equally, it might be that it is not so much the specific content of religious teaching (e.g., limited or alternative teaching in regard to evolutionary theory), but that it is that average levels of national religiosity simply affect all educational domains equally; specifically, intellectual capital is displaced from secular education to religious education.

We found that the strong correlations between religiosity and educational performance were mediated by both the level of human development and time spent on teaching religion. It could be that all of these relations are due to a third variable, such as general intelligence, or to more subtle and dynamic effects. For instance, high levels of religiosity may contribute to lower HDI (e.g., restricted women's rights) and lower investment in secular education. Or, lower levels of HDI drive higher levels of religiosity, due to more difficult life circumstances, or some combination of effects. The available data do not allow us to fully explore these alternatives, given that the number of countries for which we had all variables was 30, thus much smaller than for the main analyses. Although inconclusive here, the finding that time spent on religion in school was negatively related to academic achievement is directly related to the displacement hypothesis and merits further study.

4.2 Implications for further research

The strong relation between national levels of religiosity and educational performance is striking. Given this strong effect and given previous findings of a link between religiosity and IQ, it is surprising that this relation has not received more attention from educational researchers and policy makers. If this has merely been an oversight, we hope that our findings might change this.

A first step for educational researchers and policy makers would be to collect more data on this subject to get a better understanding of within-country relations between religiosity and educational performance. For example, we recommend the inclusion of measures of religiosity, religious family values, and religious education in PISA, TIMSS, and other educational surveys. After all, this variable can explain a good deal of variance in educational performance, and likely more strongly than many other variables that data are collected on (e.g., children's confidence or parental attitudes).

Related to this, we recommend that educational tests would distinguish science literacy questions related to religious beliefs (e.g., about evolution, carbon dating, etc) from those not related to religious beliefs (e.g., about gravity). This would allow us to more directly relate the effects of religiosity to relevant science knowledge. Right now, the science literacy score includes many questions unrelated to religious beliefs, and this combined with the high correlation between national science literacy and national mathematics scores, results in a limited opportunity to determine if science literacy is affected by religiosity differently than mathematics (and hence limited opportunity to properly test the watering down hypothesis).

4.3 Limitations

First, our data are correlational in nature, which limits conclusions about causal pathways. Second, we used adult surveys about religiosity and cannot be sure that the measures can be generalized to the age group in question (there are very few reports on the development of religiosity across the lifespan, but see Bengtson et al., 2015). Third, religiosity measures might suffer from a ceiling effect, given that sex differences in high scoring countries were smaller. Fourth, the subset of nations for which we have a measure on all relevant variables is small, and relevant variables are strongly correlated, which both complicate multivariate regression, and make use of more sophisticated methods, such as structural equation modelling, inappropriate. Fifth, conclusions in regard to the mediating role of HDI depend to some extent on the number of countries analyzed. Because we had limited data on time spent on religion, the conclusions on the role of HDI as a mediating variable vary between being a partial to a complete mediator. More detailed data will be able to resolve this issue in the future.

4.4 Conclusions

National levels of religiosity are strongly related to national levels of educational performance. While we cannot draw firm causal conclusions, our results suggest that limited human development factors and more time spent on religious education may affect the quality of a country's secular education.

5. Appendices

5.1 Appendix A

List of countries for which we have educational performance and religiosity data for each of the three periods as well for the time spent on religion in any of the three periods. The average religiosity, science, mathematics, HDI scores, and time spent on religious education for the periods 2000-2004, 2005-2009, 2010-2015, as well as 2000-2015 are listed.

	Religiosity				Science Literacy				Mathematics					
country	2000-2004	2005-2009	2010-2015	2000-2015	2000-2004	2005-2009	2010-2015	2000-2015	2000-2004	2005-2009	2010-2015	2000-2015	HDI	Time
Albania	5.77		7.18	6.48	-1.87	-1.22	-1.29	-1.46	-1.41	-1.3	-1.23	-1.31	0.7	
Algeria	9.67		9.6	9.64		-1.07	-2.03	-1.55		-0.99	-2.03	-1.51	0.69	
Argentina	7.01	6.26	5.43	6.24	-1.49	-1.27	-1.49	-1.42	-1.31	-1.31	-1.57	-1.4	0.79	
Armenia			8.08	8.08	-0.21	0.27	-0.58	-0.17	0.13	0.57	0.04	0.25	0.7	
Australia		4.33	3.62	3.98	0.85	0.93	0.79	0.86	0.71	0.76	0.56	0.68	0.92	1
Austria	5.16	5.2	4.6	4.99	0.45	0.61	0.51	0.52	0.51	0.61	0.58	0.57	0.86	6.67
Bahrain			7.43	7.43	-0.53	-0.08	-0.33	-0.31	-0.89	-0.84	-0.79	-0.84	0.81	
Belgium	4.87	4.85	4.51	4.74	0.44	0.71	0.57	0.57	0.77	0.89	0.77	0.81	0.88	6
Brazil		7.91	7.87	7.89	-2.1	-1.24	-1.53	-1.63	-2.3	-1.42	-1.63	-1.78	0.72	
Bulgaria		4.54	4.5	4.52	-0.24	-0.38	-0.61	-0.41	-0.28	-0.45	-0.56	-0.43	0.76	
Canada	5.93	5.84		5.89	0.87	1.12	1.05	1.01	0.91	1.04	0.88	0.94	0.89	1.67
Chile	7.35	6.81	5.66	6.61	-1.01	-0.45	-0.47	-0.64	-1.23	-0.79	-0.82	-0.94	0.8	5.1
Colombia			8	8		-1.17	-1.4	-1.29		-1.34	-1.62	-1.48	0.69	
Croatia		6.2	6.16	6.18		0.38	0.16	0.27		0	-0.05	-0.02	0.79	
Cyprus		7.05	7.22	7.14	-0.49	-0.34		-0.42	-0.12	0.1		-0.01	0.83	
Czech Republic	2.85	2.27	2.17	2.43	0.75	0.83	0.51	0.7	0.48	0.63	0.49	0.53	0.85	
Denmark	4.33	4.21	4.07	4.2	-0.1	0.52	0.51	0.31	0.59	0.73	0.67	0.67	0.9	3
Egypt	9.9	9.82	9.79	9.84	-0.77	-1.07		-0.92	-0.83	-0.94		-0.88	0.66	5
England					0.94	1.16	0.95	1.02	0.4	0.77	0.62	0.6		4.15
Estonia	3.47	3.67	3.46	3.53	1.05	1.08	1.28	1.14	0.83	0.82	0.94	0.86	0.83	
Finland	5.47	5.15	4.99	5.2	1.3	1.6	1.28	1.39	1.04	1.33	0.8	1.06	0.87	4.33
France	3.77	3.81	4.17	3.92	0.51	0.5	0.44	0.48	0.58	0.53	0.45	0.52	0.87	
Georgia		9.19	9.36	9.28		-1.19	-1.06	-1.13		-0.97	-0.82	-0.9	0.73	
Germany	4.25	4.06	4.33	4.21	0.28	0.88	0.84	0.66	0.29	0.73	0.75	0.59	0.89	5.07
Ghana		9.59	9.64	9.61	-3.08	-2.83	-2.66	-2.86	-2.55	-2.07	-1.92	-2.18	0.53	
Greece	7.47	6.3	6.18	6.65	-0.22	0.06	-0.31	-0.16	-0.59	-0.02	-0.31	-0.31	0.85	6
Hong Kong		4.17	4.14	4.15	1.15	1.23	1.19	1.19	1.39	1.49	1.64	1.51	0.87	
Hungary	4.24	4.23	3.98	4.15	0.56	0.79	0.4	0.58	0.37	0.57	0.29	0.41	0.81	2.67
Iceland	6.06		5.27	5.66	0.27	0.44	0	0.24	0.6	0.7	0.39	0.56	0.88	2.2
Indonesia	9.93	9.77		9.85	-1.51	-1.19	-1.49	-1.4	-1.59	-1.19	-1.49	-1.42	0.65	5.88
Iran, Islamic Rep.	9.13	9.03		9.08	-0.32	-0.22	0.02	-0.18	-0.76	-0.76	-0.7	-0.74	0.71	
Ireland	5.84	5.43	4.99	5.42	0.56	0.7	0.75	0.67	0.39	0.5	0.61	0.5	0.89	8.07
Israel	4.72	4.6	4.91	4.74	-0.31	-0.19	0.13	-0.12	-0.12	-0.19	0.23	-0.03	0.87	9.08
Italy	6.14	6.75	5.91	6.27	0.07	0.29	0.3	0.22	-0.14	0.19	0.39	0.15	0.86	3.07
Japan	2.97	2.75	2.99	2.9	1.29	1.24	1.37	1.3	1.18	1.2	1.32	1.23	0.88	3
Jordan	9.83	9.79	9.76	9.79	-0.02	-0.53	-1.04	-0.53	-0.58	-1.01	-1.36	-0.98	0.74	8.33

Kazakhstan			5.5	5.5		-1.05	-0.42	-0.74		-0.86	-0.22	-0.54	0.74	
Korea	5.31	5	5.4	5.23	1.26	1.18	1.16	1.2	1.27	1.56	1.58	1.47	0.87	
Latvia (LSS)		4.03		4.03	0.08	0.41	0.43	0.31	0.11	0.33	0.3	0.25	0.79	
Lebanon			7.49	7.49	-1.16	-0.98	-1.44	-1.19	-0.47	-0.13	-0.76	-0.45	0.75	
Lithuania			5.39	5.39	0.6	0.51	0.35	0.49	0.44	0.42	0.3	0.38	0.81	3
Luxembourg	4.15			4.15	-0.37	0.3	0.24	0.06	-0.14	0.42	0.33	0.21	0.88	6.17
Macedonia	7.29			7.29	-0.89		-1.45	-1.17	-0.92		-1.17	-1.05	0.73	
Malaysia		9.17	9.37	9.27	0.47	-0.35	-0.98	-0.29	0.53	-0.33	-0.67	-0.15	0.75	9
Mexico	8.41	8	7.89	8.1	-1.49	-0.98	-1.24	-1.23	-1.61	-0.86	-1.11	-1.19	0.73	8
Moldova	6.83	6.57		6.7	-0.06	-0.84	-0.91	-0.6	-0.11	-0.98	-0.87	-0.66	0.65	
Morocco	9.82	9.62	9.58	9.67	-1.11	-1.18	-1.55	-1.28	-1.09	-1.08	-1.34	-1.17	0.58	
Netherlands	5.06	4.42	4.13	4.54	0.9	0.97	0.81	0.9	1.1	1.06	0.9	1.02	0.9	
New Zealand		4	4.2	4.1	0.79	1.11	0.74	0.88	0.68	0.94	0.46	0.69	0.9	
Norway	4.06	3.83	3.78	3.89	0.21	0.37	0.4	0.33	0.17	0.38	0.37	0.31	0.93	6.73
Palestinian Nat'l Auth.			9.45	9.45	-0.57	-1.14	-0.84	-0.85	-1.03	-1.27	-0.86	-1.05		
Peru	7.79	7.36	7.61	7.58	-2.69	-1.58	-1.86	-2.04	-2.78	-1.5	-1.73	-2	0.71	6
Philippines	9.45		9.44	9.45	-1.38			-1.38	-1.2			-1.2	0.64	
Poland	6.59	6.9	6.55	6.68	0.19	0.61	0.78	0.52	0.02	0.51	0.77	0.43	0.81	7
Portugal	5.5	5.81	5.44	5.58	-0.39	0.26	0.41	0.09	-0.33	0.2	0.37	0.08	0.8	3
Qatar			9.96	9.96		-2.08	-1.31	-1.7		-2.04	-1.26	-1.65	0.84	
Romania		7.45	7.68	7.57	-0.37	-0.59	-0.58	-0.51	-0.32	-0.46	-0.35	-0.37	0.76	
Russian Federation		4.47	4.56	4.52	0.09	0.45	0.52	0.35	0.09	0.34	0.6	0.34	0.76	
Saudi Arabia	9.53			9.53	-1.1	-1.16	-0.59	-0.95	-1.81	-1.8	-1.01	-1.54	0.79	
Scotland					0.49	0.4		0.44	0.39	0.41		0.4		5
Serbia	6.37			6.37	-0.67	-0.35	-0.71	-0.58	-0.41	-0.15	-0.47	-0.34	0.74	
Singapore	6.65		7.13	6.89	1.41	1.46	1.69	1.52	1.82	1.77	1.95	1.84	0.86	
Slovak Republic	5.79	5.97	5.99	5.92	0.35	0.37	-0.2	0.18	0.38	0.5	0.16	0.35	0.81	3
Slovenia	4.87	4.59	4.39	4.61	0.61	0.92	0.89	0.81	0.33	0.63	0.65	0.53	0.86	
South Africa	8.58	8.57	7.87	8.34	-3.24		-2.25	-2.75	-2.71		-1.61	-2.16	0.63	
Spain	4.64	4.43	4.17	4.41	0.14	0.35	0.39	0.29	0.02	0.29	0.28	0.2	0.85	3
Sweden	3.81	3.53	3.29	3.55	0.6	0.58	0.38	0.52	0.47	0.53	0.31	0.44	0.89	
Switzerland	5.31	5.05	5.01	5.12	0.48	0.81	0.71	0.67	0.82	1.12	1.05	1	0.91	
Thailand		8.28	8.06	8.17	-1.06	-0.54	-0.71	-0.77	-0.96	-0.58	-0.79	-0.78	0.7	
Trinidad and Tobago		8.8	8.94	8.87		-0.89	-0.98	-0.94		-0.71	-0.92	-0.82	0.75	
Tunisia			9.78	9.78	-1.72	-1.04	-1.33	-1.36	-1.59	-1.22	-1.35	-1.39	0.7	5
Turkey	8.03	7.95	8.58	8.19	-1.27	-0.45	-0.38	-0.7	-1.18	-0.45	-0.5	-0.71	0.71	5.54
Ukraine	5.22	5.26	5.3	5.26		0.22	0.44	0.33		0.06	0.22	0.14	0.72	
United Kingdom	4.34	4.19	3.96	4.16	0.89	0.81	0.75	0.82	0.65	0.5	0.44	0.53	0.89	
United States	7.8	7	6.54	7.11	0.41	0.58	0.57	0.52	0.25	0.42	0.29	0.32	0.9	
Uruguay		4.77	4.3	4.53	-1.17	-0.71	-1.02	-0.97	-1.21	-0.61	-1.05	-0.96	0.77	

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