

Examining Links Between Religion, Evolution Views, and Climate Change Skepticism

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Abstract

Recent media portrayals link climate change skepticism to evolution skepticism, often as part of a larger “antiscience” tendency related to membership in conservative religious groups. Using national survey data, we examine the link between evolution skepticism and climate change skepticism, and consider religion’s association with both. Our analysis shows a modest association between the two forms of skepticism along with some shared predictors, such as political conservatism, a lack of confidence in science, and lower levels of education. Evangelical Protestants also show more skepticism toward both evolution and climate change compared with the religiously unaffiliated. On the whole, however, religion has a much stronger and clearer association with evolution skepticism than with climate change skepticism. Results contribute to scholarly discussions on how different science issues may or may not interact, the role of religion in shaping perceptions of science, and how science policy makers might better channel their efforts to address environmental care and climate change in particular.

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Skepticism toward scientific claims is not a new phenomenon. The target of skepticism, however, has changed. For much of the past century, evolution has been the primary target of science skepticism, symbolically and legally bracketed by the Scopes Monkey trial in 1925 and the Dover Intelligent Design trial in 2005. While skepticism of evolution is still prominent among the American public (Newport, 2014), in the past decade climate change has potentially overtaken evolution as the scientific claim most targeted by skeptics. Is this simply a shift in attention and priorities among a single population of science skeptics, or is climate change skepticism driven by a different group?

The science journalist Chris Mooney (2013, para. 1-3) suggests that climate skepticism is closely related to other forms of science skepticism, in particular, evolution skepticism:

All across the country—most recently, in the state of Texas—local battles over the teaching of evolution are taking on a new complexion. More and more, it isn't just evolution under attack, it's also the teaching of climate science . . . How did these issues get wrapped up together? On its face, there isn't a clear reason—other than a marriage of convenience—why attacks on evolution and attacks on climate change ought to travel side by side . . . And yet clearly there's a relationship between the two issue stances.

Other media portrayals implicitly or explicitly make connections between evolution skepticism and climate change skepticism, often as part of a larger antiscience narrative. A 2012 article in *Scientific American* appeared with the headline “Antiscience Beliefs Jeopardize U.S. Democracy” (Otto, 2012). The article linked both forms of skepticism as part of an underlying antiscience tendency. Similarly, the cover story for a 2015 issue of *National Geographic* focused on an alleged “War on Science,” and the first two issues in this war—as indicated on the cover—surrounded the claim that “climate change does not exist” and “evolution never happened” (Achenbach, 2015).

Here we analyze data from a new nationally representative survey of U.S. adults to examine whether Mooney and others (e.g., Nyhan, 2014) are correct in linking evolution skepticism and climate change skepticism. In particular, we examine and compare the predictors of each form of science disbelief and the extent to which the evolution skeptic population overlaps with the climate change skeptic population. Below we provide an overview of these two issues.

Evolution, Religion, and Skepticism

Evolution skepticism has typically been linked to religious beliefs and communities (Binder, 2002; Campbell & Curtis, 1996). In fact, research demonstrates that, when compared with educational attainment, religiosity plays a more prominent role in how individuals view evolution (Haider-Markel & Joslyn, 2008; Hill, 2014). Researchers argue that religious people—and evangelicals specifically—oppose the scientific theory of evolution and support biblically-based creationism in its place (Plutzer & Berkman, 2008; Woodrum & Hoban, 1992). A central finding of this research is that as science advances and becomes increasingly well-regarded in contemporary society (Evans & Evans, 2008), evolution skeptics incorporate an increasing amount of scientific data in their efforts to justify creationist tenets. Evans (2011) argues that ultimately religious conservatives are not opposed to science itself, but rather are opposed to the perceived moral agenda of scientists. Over time, as the scientific outlook became more central, leading evolution skeptics promoted the idea of creationism couched in scientific terms, such as “scientific creationism” (Morris, 1974). In more recent years, the evolution issue has remained important to religious people but morphed into a discussion of “Intelligent Design” (Binder, 2002; Dembski, 2010; Evans & Evans, 2008), whose proponents accept religiously controversial issues such as an old earth while maintaining that God (or an intelligent designer of some sort) is detectable in observations not yet explained by science.

Given the links between religion and views on evolution, the question of whether there is a connection between evolution skepticism and climate change skepticism becomes in part a question of whether religion drives climate change attitudes in the same way it drives evolution attitudes. While the role of religion in driving evolution skepticism is well explored, less understood is how religious people’s views on evolution connect to their views on other scientific issues, such as climate change. At first glance climate change might not seem to raise obvious theological issues in the same way that evolution does, but climate change could potentially raise theological questions about eschatology, God’s involvement or lack thereof in the world, and about humanity’s ability to alter God’s creation.

Climate Change, Religion, and Skepticism

A recent Intergovernmental Panel on Climate Change (2013) stressed that the state of the natural environment is a pressing public concern, although members of the public demonstrate little knowledge of the potential consequences of climate change (Sundblad, Biel, & Gärling, 2009). In the American public,

there is a strident debate swirling around these claims. Religion seems to have an ambiguous role in this debate: A growing body of research links religion to both environmental apathy and concern (Boyd, 1999; Djupe & Hunt, 2009; Eckberg & Blocker, 1996; Ellingson, Woodley, & Paik, 2012; Hand & Van Liere, 1984; Kanagy & Nelsen, 1995; Sherkat & Ellison, 2007; Truelove & Joireman, 2009). Still other research finds that religious identification is only weakly related to environmental attitudes and behaviors (Hayes & Marangudakis, 2000), and actually does not relate to beliefs about the seriousness of environmental issues, including the dangers of global warming and car pollution (Sherkat & Ellison, 2007). Evans and Feng (2013) specifically find that while conservative Protestantism does not directly lead to suspicion of climate change that it does lead to some religious individuals being less trusting of scientists' policy recommendations. This is reinforced by the fact that conservatives have largely opposed changes in policy that would have the potential to alleviate climate change (McCright & Dunlap, 2003, 2010), perhaps due to the fact that many deny the reality of climate change itself (McCright & Dunlap, 2011a).

According to recent media reports, however, much public controversy and some of the most vocal critics of climate change are Evangelical Christians (Bennett-Smith, 2013; Goodstein, 2007; Markoe, 2011). Smith and Leiserowitz (2013) find those who self-identify as Evangelical are less likely to believe global warming is happening and that it is caused by human activity, and are less worried about it. For instance, they find 61% of Evangelicals think global warming is happening, while 78% of non-Evangelicals think so. Even so, they recognize that Evangelicals are not homogenous with respect to climate change skepticism and that such attitudes may be mediated by socio-political factors. And a recent report from the Public Religion Research Institute found that Evangelicals are more skeptical of climate change than any other religious group (Jones et al., 2014). Yet, researchers also show that climate change skepticism is contested by some pro-environment Evangelicals. McCammack (2007) focuses on Evangelical environmentalists and argues that, although they face a sizable challenge from other Evangelicals who reject climate change, Evangelical environmentalists might prove an important mobilizing force for climate change legislation. Wilkinson (2010, 2012) argues that a sizable portion of Evangelicals is emerging in favor of efforts to alleviate climate change (see, for example, Hayhoe & Farley, 2009). As a consequence of this ambiguity, it is unclear if religion, or evangelicalism in particular, is really the main force behind climate change skepticism.

One cause of this ambiguity is the likely overlap between religion and other factors that could be related to science skepticism in general or climate change skepticism specifically. For example, some scholars (McCright, 2010) have

pointed to gender as a predictor of environmental concern while others have suggested any gender differences are mediated through other factors, like political ideology (Davidson & Haan, 2012). Indeed, political ideology is likely a particularly important factor to consider (Lacasse, 2015; McCrea, Leviston, & Walker, 2015). Recent research argues that religious effects on environmental attitudes are only indirect, as they are primarily mediated through political and economic ideologies (Longo & Baker, 2014). Numerous studies find that the more “liberal” an individual’s political ideology, the more environmental concern he or she displays (Coan & Holman, 2008; Dietz, Dan, & Shwom, 2007; Hornsey, Harris, Bain, & Fielding, 2016; Jacques, Dunlap, & Freeman, 2008; Konisky, Milyo, & Richardson, 2008; McCright & Dunlap, 2011b; Mohai & Bryant, 1998). The particular connection between politics and climate change was perhaps spurred by former Democratic Vice President Al Gore, who starred in the documentary film *An Inconvenient Truth* (Gore & Guggenheim, 2006). In addition to dire environmental warnings, Gore tends to politicize the documentary by showing clips of Ronald Reagan, George H. W. Bush, and Republican Senator James Inhofe making claims that dispute the assertions of climate scientists and other types of environmentalists. At the same time, the correlation between religiosity and Republican Party identification has only grown stronger over the past 30 years (Putnam & Campbell, 2010). This makes sorting out the effects of religion, politics, and climate views challenging.

An analysis of links between religion, evolution skepticism, and climate change skepticism could identify several potential scenarios. First, it is possible that evolution skepticism does not predict climate change skepticism at all and that the two populations of skeptics are entirely distinct. Another possibility is that there is a significant link between the two but only before taking other factors into account, such as religion or political ideology. This would mean that there is overlap in the group of evolution skeptics and climate change skeptics but only because those people tend to be, for example, Evangelical Protestants. Yet another possibility is that there is a significant link between the two forms of skepticism that cannot be explained away by other factors. This would suggest that science skepticism is its own unique phenomenon, and there are people whose views cross religious and political divides and who tend to be skeptical of scientific claims regardless of their nature.

Method

Data

The data used for this analysis come from a survey conducted by the firm GFK using its KnowledgePanel, a probability-based online panel.¹ This is the

same group that also collects data for the National Election Studies and the Time Sharing Experiences funded by the National Science Foundation. The survey produced 10,241 total valid respondents from 16,746 invited panelists in the United States. Included in the survey was an oversample of 341 individuals employed in science-related fields. Because these individuals are likely different than the general population, we utilize a post-stratification weight that adjusts for this oversample and non-response patterns based on population benchmarks from the October 2012 Current Population Survey.²

Measures

We focus on two questions in the survey. The first asked respondents, “Which of the following statements best represents your opinion about climate change?” The statements were as follows:

1. The climate is changing and human actions are a significant cause of the change.
2. The climate is changing but human actions are only partly causing the change.
3. The climate is changing but not because of human actions.
4. The climate is not changing.

The second outcome comes from a series of questions offering six views on “the origin and development of the universe and life on Earth.” We gave respondents the following answer options: (a) definitely false, (b) probably false, (c) not at all sure, (d) probably true, or (e) definitely true. The item we focus on here asked for respondents’ views on the following statement:

Natural Evolution—the universe and Earth came into being billions of years ago; all life, including humans, evolved over millions of years from earlier life forms due to environmental pressures to adapt; there was no God or Intelligent Force involved in either the creation or evolution of life.

We reverse coded the responses so that the “false” responses were higher, indicating more skepticism toward the natural evolution statement.

Religion of Respondents

We measure respondents’ religious characteristics along several dimensions. We first include a measure of the respondent’s religious tradition. The survey first asked for a broad religious affiliation. Protestant respondents were asked

a series of follow-up questions directed at identifying a specific denomination. We then used this information to classify Protestants into an Evangelical, Mainline, or Black Protestant category, using common classification guidelines (Steenland et al., 2000). Other religious tradition categories in our analyses are Catholic, Jewish, Mormon, Eastern (e.g., Hindu, Muslim), Other, and Unaffiliated. We also include a measure assessing respondents' frequency of religious service attendance. This is measured on a 9-point scale ranging from "never" to "several times a week."

Other Predictors

We include a variety of other measures that could be related to science skepticism. Research has shown that attitudes about science are increasingly politicized (Gauchat, 2012; Hornsey et al., 2016), so we include a measure of political ideology. Our measure consists of one item that asked, "Would you describe your political views as extremely liberal, liberal, slightly liberal, moderate, slightly conservative, conservative, or extremely conservative?" We would ideally also have a measure of political party affiliation or voting behavior, but our data unfortunately do not have such measures.

We use two measures to assess respondents' interest and confidence in science. The first asked individuals, "If you saw a headline on a newspaper or website about a new scientific discovery, how likely are you to read the full story?" The four potential responses ranged from "not at all likely" to "very likely." The second item asked, "As far as the people running these institutions are concerned, how much confidence do you have in? The scientific community." Possible responses were "hardly any," "some," or "a great deal."³ On the face of it there may be concern that skepticism toward scientific claims will be equivalent to or at least too highly correlated with this confidence measure. As we will see below, though, the correlations between the confidence measure and the skepticism measures are significant and positive but relatively modest ($-.20$ with climate change skepticism and $-.18$ with evolution skepticism). It is important to keep in mind that our survey question asked about confidence in "the scientific community." It is possible that people might not have confidence in the individuals and institutions of contemporary science when it comes to, say, ethics in research (e.g., stem cells, genetic engineering), but this might not translate into questioning basic scientific claims. Similarly, some might have respect and confidence in scientists and scientific institutions while being skeptical of particular scientific claims based on some other criteria (e.g., theology).

Finally, we include several measures representing the respondents' demographics, a measure of their age that is represented continuously, their gender,

and their race. The latter is coded into four categories: White, Black, Hispanic, and other race. We also account for the respondent's education measured on a 7-point scale representing the respondent's highest received degree and ranging from "less than a high school degree" to "professional or doctorate degree."

Descriptive statistics for all measures are shown in Table 1. The sample size for analysis, after omitting respondents with missing data (i.e., listwise deletion), is 9,636.

Results

We begin by examining overall responses to our two outcome measures. As seen in Table 1, 42% of individuals responded that the climate is changing and that humans are a significant cause of the change. Another 39% chose the option that humans are only partly causing the climate to change. Thirteen percent believe the climate is changing but not because of human actions, while about 6% do not believe that the climate is changing at all. Overall, then, most Americans acknowledge at least some human-caused climate change. We see that the public is much more split on the issue of evolution. Thirty-two percent of respondents said that the natural evolution statement is definitely false while 14% said that it is probably false. Twenty-eight percent of respondents said that the evolution statement was definitely or probably true, while 26% said that they were not at all sure.

Table 2 shows the percentage of the public in each evolution response category that holds a particular climate view. For example, we find that 35% of those stating that natural evolution is definitely false believe that the climate is changing and humans are a significant cause of the change. Based on this alone, we can see that not all evolution skeptics are climate change skeptics. Only 8% of those definitely rejecting natural evolution took the most skeptical stance toward climate change. Nonetheless, we do see a pattern that the more a person accepts the natural evolution claim, the more likely she is to accept the claim that humans have a significant role in climate change, corroborated by the positive correlation coefficient of 0.17 reported in Table 1, when both variables are treated as continuous variables. Sixty-three percent of those stating that natural evolution is definitely true stated that humans are a significant cause of climate change compared with 35% of those who said that natural evolution is definitely false. Both percentages are significantly different, the first higher and the second lower, from the overall percentage for that response. While this suggests that there is some overlap between evolution and climate change skepticism, it does not address other important questions. Do these skeptical positions overlap because of some

Table 1. Descriptive Statistics ($N = 9,636$).

	%	M	Minimum	Maximum	Correlation with climate change skepticism	Correlation with evolution skepticism
Climate change skepticism		1.83	1	4	—	.17**
The climate is changing and human actions are a significant cause of the change	42%	—	—	—	—	—
The climate is changing but human actions are only partly causing the change	39%	—	—	—	—	—
The climate is changing but not because of human actions	13%	—	—	—	—	—
The climate is not changing	6%	—	—	—	—	—
Evolution skepticism (“Natural Evolution—the universe and Earth came into being billions of years ago; all life, including humans, evolved over millions of years due to environmental pressures to adapt; there was no God or Intelligent Force involved in either the creation or evolution of life.”)		3.41	1	5	.17**	—
Definitely true	10%	—	—	—	—	—
Probably true	18%	—	—	—	—	—
Not at all sure	26%	—	—	—	—	—
Probably false	14%	—	—	—	—	—
Definitely false	32%	—	—	—	—	—
Religious tradition						
Evangelical Protestant	26%	—	—	—	.16**	.32**
Black Protestant	5%	—	—	—	.02	.05**
Mainline Protestant	14%	—	—	—	-.01	.04**

(continued)

Table 1. (continued)

	%	M	Minimum	Maximum	Correlation with climate change skepticism	Correlation with evolution skepticism
Catholic	24%	—	—	—	-.04**	-.02
Jewish	2%	—	—	—	-.01	-.08**
Mormon	2%	—	—	—	.02**	.09**
Muslim, Hindu, Buddhist, Other non-Western	2%	—	—	—	-.05**	-.06**
Other religion	9%	—	—	—	-.03**	-.02*
Unaffiliated	16%	—	—	—	-.12**	-.41**
Religious service attendance	—	4.14	1	9	.13**	.47**
Confidence in scientific community	—	2.03	1	3	-.20**	-.18**
Likelihood of reading science news article	—	2.90	1	4	-.14**	-.06**
Political conservatism	—	4.11	1	7	.38**	.34**
Race						
White	68%	—	—	—	.07**	.01
Black	11%	—	—	—	.00	.06**
Hispanic	14%	—	—	—	-.08**	-.03**
Other	7%	—	—	—	-.02*	-.05**
Age	—	47.4	18	93	.04**	.11**
Female	52%	—	—	—	-.05**	.11**
Education	—	3.29	1	7	-.10**	-.10**

Source. 2014 Religious Understandings of Science Survey.

* $p < .05$. ** $p < .01$.

Table 2. Comparing Climate Change Views Across Evolution Views ($N = 9,636$).

	“Natural Evolution—the universe and Earth came into being billions of years ago; all life, including humans, evolved over millions of years from earlier life forms due to environmental pressures to adapt; there was no God or Intelligent Force involved in either the creation or evolution of life.”				Overall	
	Definitely true	Probably true	Not at all sure	Probably false	Definitely false	
“Which of the following statements best represent your opinion about climate change?” The climate is changing and human actions are a significant cause of the change	63% ^a	52% ^a	39%	38%	35% ^a	42%
The climate is changing but human actions are only partly causing the change	28% ^a	36%	39%	47% ^a	39%	39%
The climate is changing but not because of human actions	8% ^a	8% ^a	13%	11%	17% ^a	13%
The climate is not changing	2% ^a	3% ^a	10% ^a	4%	8%	6%
	100%	100%	100%	100%	100%	100%

Source. 2014 Religious Understandings of Science Survey.

^aCell significantly different ($p < .05$) from overall column percentage within the same row; Pearson's chi-square = 455.65, $df = 12$, $p < .0001$; Pearson's correlation coefficient = .17.

other characteristic of individuals? Is that characteristic religion? Or does the association between these two forms of science skepticism remain after accounting for other characteristics, which could suggest some latent “science skepticism” characteristic?

Predicting Climate Change

To examine these initial patterns further, we conducted ordinary least squares regression analyses on our two outcome variables.⁴ These models are shown in Table 3, which presents standardized coefficients for the purpose of comparing effect sizes. We begin our discussion of these results by focusing on the climate change skepticism outcome. In Model 1, we simply include the evolution skepticism predictor. As we saw in Table 2, evolution skepticism is positively associated with climate change skepticism. Looking at the bottom of the table we see, however, that only about 3% of the overall variation in climate change views is accounted for by evolution views.

In Model 2, we include our measures of religious tradition and religious service attendance. The reference category for the religious tradition indicators is the religiously unaffiliated. We find that, compared with the unaffiliated, Evangelical, Mainline, and Black Protestants are all more likely to express climate change skepticism, although the coefficient for Evangelicals is three times larger than that of Mainline and Black Protestants. Catholics, Jews, Mormons, adherents to non-Western traditions, and those of other religions do not significantly differ from the unaffiliated in their level of climate change skepticism. We also see that, independent of religious tradition, frequency of religious service attendance is positively associated with climate change skepticism. The coefficient for evolution skepticism remains significant, although its size has been reduced by about half. This decrease in magnitude reveals that some but not all of the variation in climate change views is explained by differences in religious tradition and religious service attendance. Indeed, looking at the explained variance at the bottom of the table we see that adding the religion measures only accounted for about 2% of the overall variance in climate change views beyond the variance explained by evolution views. Although this model shows some significant associations between climate change skepticism and religion, it does not tell us whether these are uniquely religious associations or whether they are due to the religion measure's overlap with other characteristics of individuals. Evangelical Protestants, for example, tend to be more politically conservative than other Protestants and the religiously unaffiliated, so we might ask if their skepticism is a function of those political views? For example, if we took two individuals who shared the same political ideology but one was Catholic and

Table 3. OLS Regression Models Predicting Climate Change and Evolution Skepticism (Standardized Coefficients Shown; N = 9,636).

	Climate change skepticism			Evolution skepticism		
	Evolution skepticism only	+ Religion	Full model	Climate change skepticism only	+ Religion	Full model
Evolution skepticism	.17**	.09**	.02	—	—	—
Climate change skepticism	—	—	—	.17**	.07**	.01
Religious tradition						
Evangelical Protestant	—	.15**	.05*	—	.43**	.37**
Black Protestant	—	.05**	.02	—	.15**	.12**
Mainline Protestant	—	.04*	-.01	—	.25**	.21**
Catholic	—	.02	-.01	—	.24**	.21**
Jewish	—	.02	.02	—	.02*	.02*
Mormon	—	.03	.01	—	.14**	.12**
Muslim, Hindu, Buddhist, Other non-Western	—	-.02	-.02	—	.02	.02
Other religion	—	.02	-.01	—	.19**	.16**
Unaffiliated (ref.)	—	—	—	—	.31**	.28**
Religious service attendance	—	.05**	.03			
Confidence in scientific community	—	—	-.10**	—	—	-.06**
Likelihood of reading science news article	—	—	-.12**	—	—	.01
Political conservatism	—	—	.28**	—	—	.15**
Race						
White (ref.)	—	—	—	—	—	—
Black	—	—	.01	—	—	.03
Hispanic	—	—	-.05**	—	—	-.02
Other	—	—	-.01	—	—	.01
Age	—	—	.01	—	—	.05**
Female	—	—	-.05	—	—	.05**
Education	—	—	-.03**	—	—	-.03**
R ²	.03	.05	.16	.03	.31	.34

Source. 2014 Religious Understandings of Science Survey.

Note. OLS = ordinary least squares.

*p < .05. **p < .01.

one was an Evangelical Protestant, would the latter still show higher levels of skepticism toward climate change? We examine this issue in the Full Model column.

In the Full Model predicting climate change skepticism we include our demographic measures and our measures of political ideology, confidence in the scientific community, and interest in science. After including these measures we see that the coefficient for evolution skepticism becomes non-significant, indicating that the initial overlap between these two views is explained by the other measures included in the model. We see that almost all of the religion measures also become non-significant. The only significant association that remains is the difference between Evangelical Protestants and the religiously unaffiliated, with the former still showing higher levels of climate change skepticism net of all the other measures in the model. Such a finding confirms other research, which shows that evangelicals tend to have a uniquely skeptical view of climate change (e.g., Smith & Leiserowitz, 2013). For the other religion measures that were previously significant, the change to non-significance means that these are not unique, direct, or net effects but rather a byproduct of how religion is associated with the other measures in the model. This does not mean that religion is not important in an indirect manner, but simply that if we take two individuals who are equal on those other measures (e.g., political conservatism), then we would not expect any difference between one who, say, attends religious services frequently and one who does not.

Examining those other measures we find that confidence in the scientific community and the stated likelihood of reading a science news story are both negatively associated with climate change skepticism. Women and the more highly educated are less skeptical of climate change compared with men and the less educated, while Hispanics are less skeptical compared with Whites. The largest association, however, is produced by political conservatism, which is positively related to climate change skepticism. The effect of this measure is more than two times that of any other predictor.

Predicting Evolution Skepticism

Turning to our measure of evolution skepticism we find different patterns. Model 1 includes the climate change skepticism measure as a predictor and is equivalent to what we saw in Model 1 looking at that outcome. In the second model, which includes the religion measures, we see that religion is a much clearer and stronger predictor of evolution skepticism than it is of climate change skepticism. Individuals part of all of the religious traditions except for the non-Western traditions are significantly more likely to express skepticism toward evolution when compared with the religiously unaffiliated. Even for the measures that were significant in the climate change skepticism analysis, the coefficients are much larger. Looking at the total explained variance at the

bottom of the table, we see that the religion measures explained an additional 28% of the variance in evolution skepticism. This was 2% for the climate change skepticism outcome. When we enter all of our measures into the model, we find little change in the effects of religion on evolution skepticism. Remember that most of these effects became non-significant when examining climate change skepticism. This means that if we compared two individuals who were otherwise the same on all of our measures, we would expect the person who attends religious services more frequently to have more skepticism toward evolution than the person who does not attend.

The Full Model also shows that the self-reported likelihood of reading a science news article is not significantly related to evolution skepticism even though it was for climate change skepticism. This suggests that evolution skepticism is less subject to one's consumption of scientific information. Political conservatism is positively related to evolution skepticism, as it was for climate change skepticism, although the coefficient is about half what it was for the latter. We also see that the effects of age and gender differ for evolution skepticism. Age was not significantly related to climate change skepticism, but it is positively associated with evolution skepticism. Females reported less skepticism concerning climate change but more skepticism toward the evolution claim. Collectively, the measures added in the Full Model only contributed an additional 3% of the overall variance in evolution skepticism, while they contributed to the majority of the explained variance in climate change skepticism.

To summarize the collective findings of the analyses in Table 3, we can say that religion is a fairly weak independent predictor of climate change skepticism but a relatively strong independent predictor of evolution skepticism. Controlling for all other variables, only Evangelicals are significantly more likely to be more skeptical about climate change compared with the religiously unaffiliated. Climate change views are directly shaped much more by political ideology, confidence in the scientific community, and individuals' interest in scientific information.

Discussion

About 20% of the U.S. population is skeptical that climate change is occurring at all or that humans have a role in climate change. About 45% of the U.S. population views natural evolution as probably or definitely false. To what extent do these groups overlap, and why?

We found clear, consistent, and broad associations between religion and skepticism of evolution. Those that attend services more and those of any religious tradition (except for the Muslim, Hindu, Buddhist, Other non-Western

category), relative to the unaffiliated, are more likely to be skeptical of evolution. These religion-related associations cannot be explained away by a wide variety of social and demographic characteristics. It is clear that evolution skepticism is strongly tied to religious identity, practice, and belief.

It is difficult to make such a direct and strong conclusion when looking at the predictors of climate skepticism, though. While we found what initially appeared to be significant associations between religion and attitudes toward climate change, almost all were accounted for by political ideology and interest and confidence in science. The only religion-related association that remained or appeared after taking into account a wide range of measures is for Evangelicals which show a higher level of climate skepticism relative to the religiously unaffiliated. Overall, though, climate skepticism appears to be driven more by politics and confidence in the views of the scientific community than by religion.

Similarly, when we directly predicted creationist views with climate views and vice versa, we found an initial correlation that disappeared when other social and demographic characteristics were accounted for. In short, the two forms of skepticism only appear to overlap because they both dip into a similar, politically conservative population with as a whole lower levels of confidence in the scientific community and lower levels of interest in science. But if we compared two politically conservative individuals, one of whom holds a creationist view and the other who does not, there is no reason to predict that the former would be more likely to be a climate change skeptic, unless the individual is an Evangelical Protestant.

For concerned science policy makers, environmental scientists, religious leaders, and citizens themselves, deeply practical implications emerge from these findings. Those who are evolution skeptics and those who are climate change skeptics are not necessarily part of the same group and different factors are associated with the attitudes of each group of skeptics. For evolution skeptics it is indeed religiosity that appears to be a driver and for climate change skepticism it is political ideology, specifically conservative ideology, that seems to be the primary driver.

These results have significant implications for efforts to increase confidence in climate change research. First, this means that both scholars and journalists need to start de-coupling climate change skepticism and evolution skepticism. Second, attention should be paid to the effects of confidence in and interest in science. Indeed, in our analyses the extent to which an individual is confident in and interested in science had a significant and strong role in reducing skepticism about *both* evolution and climate change. Finally, science policy experts would do well to try to convince religious leaders of various types to advance science education and confidence in science among their constituents.

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Notes

1. This is an online research panel that is representative of the entire U.S. population according to Census estimates. Panel members are recruited using a statistically valid sampling method with a published sampling frame of residential addresses that covers approximately 97% of U.S. households reflective of the Census. When non-Internet households are recruited, they are provided a net-book computer and free Internet service so they may also participate as online panel members. The KnowledgePanel consists of about 50,000 adult members (ages 18 and older) and includes persons living in cell phone only households.
2. The specific benchmarks are for gender, race and Hispanic ethnicity, education, household income, region, household Internet access, and household primary language.
3. We examined whether having these two measures would cause multicollinearity problems. However, the correlation between the interest in science measure and confidence in science measure is only .28. Given that this correlation is not extreme by any means and our view that these measures are representing distinct phenomena, we decided to keep them separate in the analysis.
4. We also examined ordered logistic models given the limited number of response options for our outcomes, but our primary findings were not different between the two sets of results. The main differences were that in the ordered logit results, the coefficient for Mormons was significant in the "+ Religion" model for the climate change outcome, while it is not in the ordinary least squares (OLS) results (although it is non-significant in the Full Model for both sets of results). Also, in the ordered logit results, the Jewish coefficient is non-significant ($p = .065$) for the evolution outcome, while in the OLS results this coefficient reaches the level of statistical significance ($p = .044$). The ordered logit results can be found in the supplemental online appendix.

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