

U.S. College Students' Perception of Religion and Science: Conflict, Collaboration, or Independence? A Research Note

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This research examines how undergraduates perceive the relationship between religion and science and the factors that shape those perceptions. Longitudinal data generated from the Spirituality in Higher Education Project representing a national sample of undergraduates is analyzed. The analysis finds that, despite the seeming predominance of a conflict-oriented narrative, the majority of undergraduates do not view the relationship between these two institutions as one of conflict. Undergraduate students are also more likely to move away from a conflict perspective than to adopt one during their college years. However, there are significant differences across fields of study and levels of religiosity. Students in the education and business fields, for example, are most likely to adopt a pro-religion conflict stance during college. Future research might examine the mechanisms that lead students in some fields towards or away from a conflict perspective.

Keywords: *religion, science, conflict, college students, education.*

INTRODUCTION

The public and scholars alike have long been interested in the relationship between religion and science. The primary question has centered on whether these two institutions are waged in a conflict over their respective claims to truth and sociopolitical authority, or are they independent from or even in collaboration with each other (Evans and Evans 2008)? A popular strategy among social scientists to evaluate this question has been to assess whether scientists are less religious than nonscientists (Ecklund 2008, 2010; Ecklund and Scheitle 2007; Gross and Simmons 2009; Larson and Whitman 1999; Leuba 1916, 1934; Stark 1963). The assumption is that, because they are the most knowledgeable about scientific matters, scientists will be most likely to demonstrate some conflict with religion if such a conflict exists (Wuthnow 1989:143). If scientists are less religious than nonscientists, then the inference has been that there is an inherent conflict between scientific knowledge and religious belief.

As Ecklund and Park (2009:280) point out, such inferences do not tell us much about whether individuals actually view the relationship between religion and science as one of conflict. Such perceptions may be more important than any association between scientific knowledge and religious belief, as it is individuals' opinions about the relationship that will play a significant role in public debates. Regardless of individuals' personal religiosity or scientific knowledge, how they approach the relationship between religion and science could have important consequences

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in schoolrooms, courthouses, and legislatures. Presented here is research on how undergraduates, some of whom will serve as leaders within those forums, perceive the relationship between religion and science. Utilizing longitudinal data from the Spirituality in Higher Education Project (SHEP), a nationally representative survey of undergraduates, I examine the association between students' religiosity and field of study and their view of the religion and science relationship.

The conflict narrative of understanding religion and science has often been the driving force in scholarly and popular discussions (Evans and Evans 2008; Russell 1997:7–18). The assumption is that religion and science each make claims about reality or truth and, because their respective claims often differ, they must be in conflict with each other. This conflict has both personal consequences as individuals are forced to choose one version of the truth (Russell 1997:7–18), as well as social and political consequences, of which the trial of Galileo, the Scopes Monkey Trial, or the more recent Dover School Board Intelligent Design Trial (Slack 2008) are often offered as examples.

While the conflict framework often receives the most attention, others have claimed that religion and science are not in conflict because they address fundamentally different types of truth. Quoting Cardinal Baronius, Galileo argued for this independence perspective when he said that “the intention of the Holy Ghost is to teach us how one goes to heaven, not how heaven goes” (Barbour 1997:14).¹ One of the most famous and eloquent explanations of this independence position was provided by Stephen Jay Gould in his writing on “nonoverlapping magisteria” (Gould 1998). Gould argues that the lack of conflict between science and religion arises from a lack of overlap between their respective domains of professional expertise—science in the empirical constitution of the universe, and religion in the search for proper ethical values and the spiritual meaning of our lives (1998:271).

DATA

The data used in the following analysis come from the SHEP, which was funded by the John Templeton Foundation and collected by the Higher Education Research Institute (HERI) at the University of California in Los Angeles. In 2003 the SHEP investigators included a two-page survey focusing on religion and spirituality within HERI's long-running annual Freshman Survey. The survey was administered to 112,232 entering college freshman at 236 institutions. In 2007 a follow-up survey was given to a subsample of 36,703 students who completed the original survey, of which 14,527 responded. This longitudinal component represents the data used here.

As with all longitudinal studies, the loss of respondents between the first and second wave of the study introduces the potential for sample selection bias. In the topic being examined here, the primary question would be whether nonrespondents vary significantly in their views of the religion and science relationship or on variables related to those views. A primary source of attrition in a longitudinal study of a college student population is due to differential retention rates. That is, students who drop out of school are more likely to be missing in the second wave of the survey. However, it is not clear that students with poorer college performance or retention rates would have different views of the religion and science relationship. One might hypothesize that those who are less religious would be less inclined to respond to the follow-up survey since most of the items were concerning religion and spirituality. These individuals might be more likely to hold a pro-science conflict perspective given their lower level of religiosity, thereby biasing the sample towards a pro-religion or at least a nonconflict-oriented perspective.

¹ Although Galileo's life is often pointed to as a case of religion persecuting science, others have argued the historical record is somewhat incorrect in this case (see Numbers 2009).

While these issues are always present in longitudinal data, because the SHEP investigators had extensive information from the 2004 freshman survey available for each respondent and nonrespondent, they were able to devise weights to correct for potential response bias based on a number of observable student characteristics.² The multivariate weighting system accounts for a wide variety of variables, including gender, race and ethnicity, socioeconomic status, career and major choice, religious preference, and a number of variables assessing values and attitudes. Response bias was also corrected based on differential sampling of students from different types of institutions. As previous research on the use of longitudinal data has shown, the use of weights produced from observable sources of attrition in regression analyses produces consistent estimates even if attrition is large and nonrandom (e.g., Moffit, Fitzgerald, and Gottschalk 1999; Fitzgerald, Gottschalk, and Moffitt 1998).³ For more details concerning the methodology underlying the SHEP data, see *Spirituality in Higher Education* (2007) and Astin, Astin, and Lindholm (forthcoming).

Outcome

The SHEP survey instrument included over 160 items measuring students' views and behaviors concerning religion and spirituality. Among these was an item that asked, "for me, the relationship between science and religion is one of . . ." Possible responses were 1) conflict . . . I consider myself to be on the side of religion; 2) conflict . . . I consider myself to be on the side of science; 3) independence . . . they refer to different aspects of reality; or 4) collaboration . . . each can be used to help support the other. This question was asked of students in both waves of the survey, providing the opportunity to not only assess their view of this relationship and factors associated with that view, but also if and how their views changed during their college years.

Predictors

In assessing the factors associated with how individuals perceive the religion and science relationship, individuals' connection to both religion and science are likely to be important. With this in mind, I include controls assessing students' religious affiliation, religious commitment, religious and social conservatism, their exposure to science education in high school, and their college field of study. Students were asked their "current religious preference" among 20 potential responses. Some of these responses represent specific denominations (e.g., United Church of Christ), while others represent larger religious traditions (e.g., Methodist, Presbyterian, Lutheran). These latter responses in particular make classification (e.g., conservative Protestant) difficult, since traditions such as Methodist or Lutheran consist of a wide range of denominational strains with different social, theological, and political perspectives. As a result, four broad categories are examined here: Protestant, Catholic, other, and unaffiliated.

The SHEP investigators constructed several latent variable scales. Two of these measured students' level of religious commitment and religious and social conservatism. The religious commitment scale consists of 12 summed items that asked the following (Cronbach's alpha = .97):

- Personal goal: Seeking to follow religious teachings in my everyday life
- Self-rating: Religiousness
- Belief: I find religion to be personally helpful
- Belief: I gain spiritual strength by trusting in a Higher Power

² Stata's SVY (survey) procedure is utilized in these analyses.

³ Of course, there is always the possibility that there are factors related to attrition that are not observable.

- Self-description: Feeling a sense of connection with God/Higher Power that transcends my personal self
- Experience: Felt loved by God
- My spiritual/religious beliefs: Are one of the most important things in my life
- My spiritual/religious beliefs: Provide me with strength, support, and guidance
- My spiritual/religious beliefs: Give meaning/purpose to my life
- My spiritual/religious beliefs: Lie behind my whole approach to life
- My spiritual/religious beliefs: Have helped me develop my identity
- My spiritual/religious beliefs: Help define the goals I set for myself

The religious and social conservatism scale consists of seven items that asked the following (Cronbach's alpha = .77):

- Belief: People who don't believe in God will be punished
- Belief: If two people really like each other, it's all right for them to have sex even if they've known each other for only a very short time (reverse coded)
- Belief: Abortion should be legal (reverse coded)
- Self-description: Being committed to introducing people to my faith
- Close friends: Share my religious/spiritual views
- Conception of God: Father-figure
- Reason for prayer: Forgiveness

Students were asked in their freshman year their "probable field of study." The survey instrument grouped 85 potential majors into 10 broader fields: arts and humanities, biological science, business, education, engineering, physical sciences, professional studies, social sciences, technical, or "other field." These categories are used in the analyses below, although several minor adjustments are made. Mathematics and statistics are moved from the "physical science" category and placed into an "engineering and math" category. Computer science is also moved into this category from the "other field" category. Communications is moved from the "other field" category into the "social science" category. The remaining "other" majors were combined with the "technical" majors into a technical/other category. Finally, the remaining physical science majors are moved into a general "natural science" group with the biological science majors. In the end there are nine different fields of study examined in the analyses: natural sciences, arts and humanities, social sciences, engineering and mathematics, business, education, professional, technical/other, and undecided. To account for previous exposure to a science education a measure for the number of years of study in physical and biological sciences during high school is also included.

Several demographic measures are included in the analysis. A control for students' race is constructed consisting of whether the student identified as white, black, Asian, Hispanic, multi-racial, or other race on the freshman survey. In addition, a gender and age control is included. The latter is measured on an eight-point scale ranging from 16 or younger to 30 to 39 years. A measure representing the student's total SAT score is also entered in the models. Finally, a measure assesses whether the school has a religious affiliation. This is coded (0) public or nonsectarian; (1) Catholic, evangelical, or other religious.

After cases with missing values on the variables utilized in the analysis are excluded, the final analytical sample consists of 10,810 cases. Descriptive statistics for this sample are shown in Table 1.

RESULTS

I begin by presenting some descriptive patterns concerning students' view of the relationship between religion and science. Table 2 displays responses on this issue by students' major in

Table 1: Descriptive statistics ($N = 10,810$)

	Mean or Percentage	S.D.	Min	Max
<i>View of religion-science relationship</i>				
Conflict—I side with religion	17%	—	—	—
Conflict—I side with science	14%	—	—	—
Independence or collaboration	69%	—	—	—
<i>Major (freshman year)</i>				
Natural sciences	11%	—	—	—
Engineering and mathematics	19%	—	—	—
Social sciences	12%	—	—	—
Arts and humanities	10%	—	—	—
Education	9%	—	—	—
Business	13%	—	—	—
Professional	15%	—	—	—
Technical/other	4%	—	—	—
Undecided	6%	—	—	—
High school science courses	7.57	1.52	2	14
<i>Religious affiliation</i>				
Protestant	44%	—	—	—
Catholic	30%	—	—	—
Other	9%	—	—	—
No affiliation	17%	—	—	—
Religious commitment scale	34.52	10.20	12	47
Religious conservatism scale	16.27	4.40	7	24
Religiously affiliated institution	17%	—	—	—
Total SAT score	1194	179	530	1600
<i>Race</i>				
White	76%	—	—	—
Black	4%	—	—	—
Asian	7%	—	—	—
Hispanic	4%	—	—	—
Other	3%	—	—	—
Multiracial	6%	—	—	—
Female	54%	—	—	—
Age	3.35	.56	1	8

their freshman year. We see that a significant majority of undergraduates in all of the fields view the relationship between religion and science as one of independence or collaboration, not one of conflict. This finding alone is somewhat surprising given the predominance of the conflict narrative in discussions about the religion and science relationship. On the other hand, it does parallel Ecklund and Park's (2009) finding that, even though they have relatively low levels of personal religiosity, the majority of academic scientists do not view the relationship between religion and science as one of conflict.

Looking at differences across fields of study we see that business and education students are the most likely to hold a conflict perspective. Education students overwhelmingly view themselves as on the side of religion in this conflict, while business students are more divided in their loyalties. Overall, natural science students are relatively low in holding a conflict perspective, but they are among the highest in holding a pro-science conflict perspective. A little over 20 percent of natural

Table 2: Undergraduates’ view of religion-science relationship by freshman field of study (*N* = 10,810)

	Conflict: Overall	Conflict: I Side with Religion	Conflict: I Side with Science	Independence or Collaboration	Total%
Natural sciences	29.7	9.5	20.2	70.3	100
Arts & humanities	26.1	17.1	9.0	73.9	100
Social sciences	27.0	17.3	9.7	73.0	100
Engineering & mathematics	29.5	7.5	22.0	70.5	100
Business	38.9	23.4	15.5	61.1	100
Education	41.5	35.6	5.9	58.5	100
Professional	29.2	19.2	10.0	70.8	100
Technical	33.5	25.3	8.2	66.5	100
Undecided	33.9	15.2	18.7	66.1	100

science students “side” with science. Only engineering and mathematics students report a higher allegiance to science in a perceived conflict with religion.

Table 3 shows students’ mean scores on the religious commitment and religious and social conservatism scales by their view of the religion and science relationship. As would be expected, students with a conflict perspective tend to have either higher or lower scores on these scales depending on whether they side with religion or science.

To sort out the role of religion and field of study, I conducted a multinomial logistic regression predicting students’ view of the religion and science relationship. This model examines how variables, net of the other variables in the model, increase or decrease the likelihood of a respondent choosing a response over a reference or base outcome. The reference response used here is the combined “independence/collaboration” response. This means that the model assesses how the predictors affect the likelihood of choosing one of the conflict perspectives. The results of this analysis are shown in Table 4.

Looking first at the coefficients for field of study, we see that students in the arts and humanities, education, and business fields are all more likely than natural science students to have a pro-religion conflict perspective. Business students are not more likely than natural science students to have a pro-science conflict view, though, which corresponds to the finding in Table 2 that a sizable portion of business students have a pro-science conflict perspective even though another large portion has a pro-religion stance. Although they are not significantly more likely than natural science students to take a pro-religion conflict stance, students in the social sciences and engineering and mathematics fields are less likely than natural science students to have a pro-science view. These effects are generally what were observed in Table 2, but they take into account differences across the fields in religious affiliation and commitment. This means

Table 3: Undergraduates’ mean religious commitment and religious conservatism scores by view of religion-science relationship in their freshman year (*N* = 10,810)

	Overall	Independence or Collaboration	Conflict: I Side with Religion	Conflict: I Side with Science
Mean score on religious commitment scale	31.33	32.06	39.06	18.29
Mean score on religious conservatism scale	14.96	15.01	18.31	10.62

Note: Higher scores = higher levels of religious commitment/conservatism.

Table 4: Multinomial logistic regression predicting undergraduate's view of the religion and science relationship in their freshman year (base outcome = independence/collaboration; $N = 10,810$)

	Freshman View			
	Conflict—I Side with Religion		Conflict—I Side with Science	
	Relative Risk Ratio	<i>t</i>	Relative Risk Ratio	<i>t</i>
<i>Major (freshman year)</i>				
Natural sciences (ref.)	—	—	—	—
Engineering and mathematics	.88	−.71	.68*	−1.99
Social sciences	1.73	1.29	.40**	−4.16
Arts and humanities	1.50*	2.35	.28**	−4.31
Education	2.46**	4.73	.44**	−4.74
Business	2.66**	5.69	.80	−1.05
Professional	1.58	1.66	.62	−1.50
Technical/other	1.74	1.59	.31*	−2.04
Undecided	1.71	1.98	.54	−1.91
High school science courses	.99	−.16	.97	−.52
<i>Religious affiliation</i>				
Protestant (ref.)	—	—	—	—
Catholic	.72**	−3.54	1.18	1.06
Other	.58*	−2.34	1.38	1.36
No affiliation	.28*	−2.31	2.41**	4.47
Religious commitment scale	1.05**	3.76	.88**	−10.44
Religious conservatism scale	1.16**	6.03	.85**	−3.03
Religiously affiliated institution	.66**	−3.42	.99	−.05
Total SAT score	.99**	−13.48	1.00	.55
<i>Race</i>				
White (ref.)	—	—	—	—
Black	1.36	1.58	.77	−.45
Asian	1.62**	3.28	.67*	−2.49
Hispanic	1.13	.42	1.09	.16
Other	1.94	1.20	.64	−.86
Multiracial	.83	−0.36	.59*	−2.32
Female	.82	−1.19	.78	−1.63
Age	.81*	−2.06	1.35	1.61

that, beyond reflecting differences in their religious composition, students in different fields hold unique perspectives on the religion and science relationship.

Turning to the effects of religious affiliation and commitment, we see that all religious affiliations are less likely than Protestants to hold a pro-religion conflict stance. When looking at the pro-science side of the conflict perspective, we find that only those with no religious affiliation are more likely than Protestants to hold this view. The religious commitment measure shows that students scoring higher on this scale are more likely to have a pro-religion conflict stance and less likely to have a pro-science conflict perspective. The religious conservatism scale shows a similar association.

Interestingly, students at a religiously affiliated institution are less likely to hold a pro-religion conflict perspective. This is after controlling for religious commitment and religious conservatism, both of which are positively associated with attending a religious institution. This means that students at religious institutions are less likely to hold a pro-religion

Table 5: Changes in undergraduates' views of religion-science relationship between freshman and junior years (*N* = 10,810)

View as a Junior	View as a Freshman		
	Conflict—I Side with Religion	Conflict—I Side with Science	Independence or Collaboration
Conflict—I side with religion	27.4	.9	5.2
Conflict—I side with science	1.8	53.2	7.8
Independence or collaboration	70.8	45.9	87.0
%	100	100	100

conflict perspective than students with similar levels of religious commitment and conservatism at a secular school. It is possible that religious students at a secular school may feel more threatened or under attack by science and therefore are more likely to take on a defensive, pro-religion conflict perspective. Alternatively, it is possible that students at religious institutions are exposed more to the independence or collaboration perspective, while those at secular schools may be more exposed to the conflict perspective, which then becomes reflected in their views.

Looking at the demographic controls, the analysis shows that gender is not a significant predictor of whether a student chooses one of the conflict perspectives over the independence or collaboration perspective, although older students are less likely to hold a pro-religion conflict perspective. The race measures show that Asian students are more likely than white students to hold a pro-religion and less likely to hold a pro-science conflict perspective.

So far we have been looking at students' view of the science and religion relationship in their freshman year. However, because students responded to the same question in their junior year, we can also examine how their perspectives change during college. Table 5 shows a cross-tabulation of responses in students' junior year based on their response in the freshman year. Looking down each column shows how students who held that column's perspective in their freshman year responded in their junior year. For example, 27.4 percent of students who held a pro-religion conflict perspective in their freshman year still held this perspective in their junior year. A little over 70 percent of these students now said that they view the religion and science relationship as one of independence or collaboration. Looking at the pro-science conflict column, we see that students holding this stance in their freshman year are more stable in their view than the pro-religion students, as 53.2 percent did not change their opinion between the two surveys. However, of the 46.8 percent that did have a change of opinion, 45.9 percent moved to the independence or collaboration perspective and only 0.9 percent moved to the pro-religion side. Students with the most stable opinion are those who held an independence or collaboration perspective in their freshman year, as 87.0 percent of these students held the same opinion in their junior year. Those who moved away from this opinion were fairly evenly split between the pro-religion and pro-science groups, with 5.2 percent and 7.8 percent moving to these groups, respectively.

To summarize these changes, we can say that few students move from viewing the relationship between religion and science as one of independence or collaboration to viewing it as one of conflict. The more common change is from a conflict perspective to an independence or collaboration one. College and/or aging seems to temper the views of those who held a conflict perspective. It is also worth noting that pro-science conflict views tend to be more entrenched than pro-religion conflict views. Table 6 compares changes in views by freshman field of study. We see that those in the education and business field are most likely to switch from an independence/collaboration perspective to a pro-religion conflict view. Very few students make the

Table 7: Multinomial logistic regression predicting undergraduates' view of the religion and science relationship in junior year controlling for view in freshman year (base outcome = independence/collaboration; $N = 10,810$)

	Junior View			
	Conflict—I Side with Religion		Conflict—I Side with Science	
	Relative Risk Ratio	<i>t</i>	Relative Risk Ratio	<i>t</i>
<i>Freshman view</i>				
Independence-collaboration (ref.)	—	—	—	—
I side with religion	3.76**	5.76	.91	-.25
I side with science	.91	-.15	4.10**	7.93
<i>Major (freshman year)</i>				
Natural sciences (ref.)	—	—	—	—
Engineering and mathematics	1.28	1.18	1.19	.83
Social sciences	2.52*	2.03	1.28	1.21
Arts and humanities	.92	-.19	1.12	.44
Education	2.51*	2.08	.57	-1.94
Business	4.71*	2.44	1.26	.51
Professional	2.14	1.81	1.14	.51
Technical/other	.88	-.32	.75	-.60
Undecided	1.78*	2.02	.86	-.60
High school science courses	1.07	1.44	1.06	1.41
<i>Religious affiliation (freshman year)</i>				
Protestant (ref.)	—	—	—	—
Catholic	.75	-1.39	.90	-.54
Other	.50**	-2.98	1.45	1.56
No affiliation	.08**	-4.90	1.51*	2.03
Religious commitment scale (freshman year)	1.02	1.67	.91**	-10.89
Religious conservatism scale (freshman year)	1.07	1.73	.99	-.19
Religiously affiliated institution	.57**	-2.64	.97	-.17
Total SAT score	.99**	-6.00	1.001**	2.85
<i>Race</i>				
White (ref.)	—	—	—	—
Black	.79	-.06	.23	-1.57
Asian	1.88**	2.65	.76*	-2.34
Hispanic	.51	-1.27	.77	-.57
Other	.03**	-2.89	.85	-.32
Multiracial	.87	-.40	.74	-1.67
Female	.54**	-3.03	.72*	-2.39
Age	.80*	-2.42	.86	-1.45

most extreme switch from one side of the conflict perspective to the other (i.e., pro-religion to pro-science or pro-science to pro-religion).

Table 7 further examines these findings through a multinomial logistic analysis predicting undergraduates' view of the religion and science relationship in their junior year while controlling for their view in their freshman year. Because the analysis controls for students' previous views, it represents a conditional change model that examines what factors lead a person to be more

or less likely to move into a different view between the freshman and junior years. The analysis shows that social science, education, business, and undecided students are more likely than natural science students to move into a pro-religion conflict view. Field of study has no significant effect on students switching into a pro-science view. Equally interesting is the finding that students at religiously affiliated institutions are less likely than those at secular institutions to move into a pro-religion perspective during their studies. Religious “others” and “nones” are less likely than Protestants to move into a pro-religion view.

DISCUSSION

The predominant narrative surrounding the religion and science relationship has been driven by the assumption that these institutions are engaged in an unavoidable conflict resulting from their contradictory claims to truth (Evans and Evans 2008). However, the analysis conducted above found that most undergraduates, regardless of their area of study or even their religiosity, do not hold a conflict perspective. Furthermore, many more students move away from a conflict perspective to an independence/collaboration perspective than vice versa. This finding might be especially surprising since many people, especially religious families, assume that higher education has a secularizing influence on students (Smith and Snell 2009:248), which might be expected to increase perceptions of a conflict. Despite its seeming predominance, the conflict model of understanding religion and science issues does not seem to have much support within the undergraduate population. Ecklund and Park (2009) made a similar conclusion in their analysis of the views of academic scientists.

Still, some of the patterns seen in the analysis above might be disconcerting for those looking to move beyond the public battles for power between religion and science. The finding that scientists and engineers are among the most likely to have a pro-science conflict perspective could mean that some of the most influential voices in these public debates might be more likely to fuel the debates than attenuate them. Similarly, future educators are among the most likely to hold a pro-religion conflict perspective. Given that classrooms and school boards have been one of the central forums for the struggle over religion and science, this does not bode well for a reduction of those struggles.

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