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The Importance of Undecideds in the Evolution vs. Creationism Debate

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For decades, researchers have discussed the gap in knowledge between scientists and the general public in the issue of evolution. The National Academy of Sciences states that “evolution pervades all biological phenomena...No other biological concept has been more extensively tested and more thoroughly corroborated than the evolutionary history of organisms” (National Academy of Sciences, 1984). However, religious-led opposition to evolution has been successful and the General Social Survey (GSS) consistently demonstrates that up to 85 percent of Americans are either undecided or do not believe in evolution (Scott, 1997).

In order to examine this important issue, this paper proposes that we use the scientific paradigm. The first reason to use this paradigm is that science is based on observations and reproducible experiments of the natural world. We can therefore depend on science for unbiased and verifiable information. Additionally, science is falsifiable, which means that experiments must exist that could prove a scientific theory false. This is an important distinction from other ways of knowing, such as meditation or religion, in which there is no way to test or disprove their theories. Finally, even creationists stress the scientific nature of their beliefs and advocate teaching creationism and intelligent design in high school science classes. For these reasons, science is the most appropriate paradigm to examine this issue.

The discrepancy in beliefs, as well as the resulting debate, between evolutionists, led by scientists, and creationists, led by religious leaders, has enormous scientific, political, moral, and educational implications. The first is the fate of scientific research in this country, including federally funded stem cell research. If the United States falls behind on this cutting edge research, then other countries may surpass the U.S. in technological innovations and the resulting economic advantages that brings. An equally important implication for the whole world concerns the issue of global warming, where the United States will either heed scientists’ advice and combat greenhouse gases or conform to

naysayers and do nothing. This debate also has political implications and directly challenges the separation of church and state when school boards pass laws requiring the teaching of religious-backed pseudoscience in public classrooms. Thirdly, this debate has moral implications because, at the heart of the debate, is the question of whether we find truth in science or in religion. Perhaps most important though, is the generational effects of our current debate. Although evolution is a required part of the high school science curriculum in all 50 states, and none officially promote equal treatment for creation science or intelligent design, only 12 to 15 percent of the public endorses this status-quo policy (Lerner, 2000; Plutzer & Berkman, 2008). This is a precarious situation, in which the educational system is teaching children the evolutionary history of organisms, a concept which the great majority of their parents, and the general public, neither personally believe nor support its teaching. However, evolution and other science based learning at both the secondary and tertiary levels are essential to the United States' continued global leadership in science and technology.

Despite the importance of this debate, many Americans remain undecided on this fundamental scientific, religious, and societal issue (Plutzer & Berkman, 2008; Bishop, 2007). Depending on the religiosity suggested in the wording of the question, the percentage of apparent biblical creationists varies from 42 to 64 percent and the percentage of Darwinist or naturalistic evolutionists varies from 10 to 46 percent (Bishop, 2007). This suggests that the public's views on the issue is extremely malleable and is vulnerable to persuasion by both scientists and religious fundamentalists. The most important variable in understanding one's evolutionary beliefs is their degree of religiosity and especially their religion's degree of fundamentalism (Mazur, 2004; Scott, 1997). The more literally one interprets holy texts positively correlates with their objection to evolution (Scott, 1997), which results in the fact that Biblical-literalist Christians, ultraconservative Jews, and Koranic-literalist Muslims object to evolution the most (Scott, 1997). Since an overwhelming majority of Americans have at least some religious connection, they tend to view this issue through a religious lens (Ecklund, 2007; Wuthnow 1988). This

has resulted in the fact that the percentage of the public who believes that evolution is *unguided by God* has never exceeded 17 percent (Plutzer & Berkman, 2008). Furthermore, the true percentage of the public who believe that evolution is unguided by God is probably even lower since this 17 percent was likely comprised of many scientists, who unanimously support evolution and who are overwhelmingly atheist (National Academy of Sciences, 1984; Scott, 1997; Larson & Witham, 1997). Since people form their views on religion at a very young age, this religious connection suggests that people's views about evolution form much earlier than their other attitudes toward scientific issues such as stem cell research, which this paper will explore in more detail later. This assumption seems to be supported by party socialization theories, which analyze how children, who, having no experience of their own in either political parties or evolutionary thought, look to their parents and other institutions, such as church, for orientation (Achen, 2002).

Despite the fact that the majority of Americans do not support evolution, they do support other scientific theories. In fact, among the most well accepted scientific theories among scientists, including heliocentrism, cell theory, atomic theory, and plate tectonics, evolution alone is rejected by nonscientists (Scott, 1997). For example, while only about two out of five Americans believe in the theory of evolution, almost four out of five accept the theory of continental drift, even though both theories are equally well supported by science (National Academy of Sciences, 1984).

One reason for this may be the perception that evolution and religion are incompatible. Especially since religious fundamentalists have adamantly opposed evolution (Scott, 1997) and scientists are often atheists (Larson and Witham, 1998), people are vulnerable to cognitive biases such as the framing effect. For a number of possible reasons, they perceive a conflict between religion and science, and find it easier, instead of trying to reconcile any differences, to just remain undecided about either option. Another possible reason for the disparity may not be an internal dilemma, but may just exist

when they actually report of their views on the debate to a surveyor. This idea is based on the Social Desirability Theory, which confirms the tendency of people to seek social approval when asked about characteristics they view as highly desirable, such as religiosity (Phillips & Clancy, 1972; Randall & Fernandes, 1991). These ideas suggest that even though many people believe in the science behind evolution, they choose an intermediate, undecided view because of an internal or external dilemma regarding the religious component of evolution. This group, which I will call the “Undecideds,” is represented by the 49 percent of respondents to the General Social Survey (GSS) who, when asked “how true” is the following statement: “Human beings evolved from earlier species of animals,” answer either “*probably true*” or “*probably not true*” (SPSS, 2011).

This group of Undecideds deserves attention for three reasons. The first reason is the sheer number of people who have doubts about a theory that scientists came to a unanimous consensus on decades ago. In other words, it is astonishing that almost half of Americans are undecided about a theory that has as much scientific support as the fact that the Earth is round.

The second reason that Undecideds deserve attention is that they have been largely overlooked by previous researchers who, although they have performed a number of surveys to study the percentages of people who are undecided about evolution (Mazur, 2004) and even what informs their belief one way or another (Mazur, 2004), have not disaggregated the data to focus on just this group. For example, when Mazur analyzed the impact of religion, ignorance, political views, close-mindedness, and subcultures on people’s belief in evolution, he combined the results of respondents who answered ‘definitely not true’ and ‘probably not true’ into one category, essentially ignoring the fundamental difference between these two groups (Mazur, 2004). This is an inaccurate portrayal of the data because there are very important distinctions between these two groups. Perhaps the most important of these differences is the fact that respondents who answered ‘*definitely not true*’ are almost certainly stuck in

their beliefs and are unlikely to change their views, regardless of how much scientists lobby them or how much evidence exists that supports an alternative conclusion. However, respondents who answered '*probably* not true' are inherently suggesting that they have not come to a firm decision on this topic, and are thus open to more evidence and can be convinced to change their views. Since the same reasoning holds true for respondents who answered 'definitely true' and 'probably true,' for the purpose of this paper, it is much more appropriate to organize peoples' responses into three categories. The first category includes those who answered that evolution is 'definitely true.' The second category includes those respondents who are Undecided on the topic and answered that evolution is 'probably true' or 'probably not true.' Although there is an obvious distinction between these two answers, the purpose of this paper is to analyze people who are Undecided about their beliefs, and therefore it is not important if respondents are leaning towards evolution or creationism. Instead, it is more important that neither of these groups of respondents have made up their mind on this issue and that both groups are open to be swayed one way or another. The final, and third category, are respondents who answered 'definitely not true' that humans evolved. I believe that this three category system is much more appropriate than Mazur's two category system and it is easier to interpret than the GSS's four category system.

Additionally, researchers have not explored the possible correlation between people's beliefs in evolution and their beliefs in other important scientific issues, such as stem cell research and global warming. If people do not believe in evolution but still support protecting the environment and funding controversial, but cutting edge, science, then perhaps peoples' evolutionary beliefs are not as important as they may seem. However, if people's disbelief in evolution causes them to oppose stem cell research or not be willing to pay higher taxes to protect the environment, then peoples' evolutionary beliefs are definitely important. Analyzing these correlations will help understand why Undecideds' evolutionary beliefs matter.

To answer the question of why Undecideds' beliefs on evolution matter, this paper proposes that an answer might be found by considering their views on other important scientific issues. Specifically, this paper will explore if Undecideds' beliefs are more aligned with creationists' or evolutionists' on other important scientific issues. These "other scientific issues" will be further disaggregated into two categories, those which are in some way affiliated with God or Religion (God-loaded), and those which are not (non-God-loaded).

This paper proceeds as follows. Section 1 will outline the theoretical approach used to explain the Undecideds' beliefs both on evolution and on other scientific issues. To do this, this section will include the framework of the Social Desirability Theory, the Complexity Thesis, and the Theory of Cognitive Dissonance. Using this theoretical framework, Section 2 will then establish the paper's testable hypothesis. Section 3, data and methods, will summarize the data from the General Social Survey from the years 1993, 1994, and 2000. This section will also include an explanation of which "other scientific questions" were analyzed and compared with peoples' evolutionary views. Section 4 will outline my findings and include statistical examples of my research. Finally, Section 5 is my discussion where I summarize the main insights of the paper, mention limitations, and give recommendations for moving Undecideds and doing research in the future.

Theoretical Framework

Following the theory of Social Desirability, Undecideds exaggerate their belief in God and religion in their quest for social approval. The first component of Social Desirability theory, the "need for social approval," describes the tendency of respondents to want to be viewed favorably by others (Phillips, 1972; Randall 1991). The second component, "trait desirability," describes the consistent pattern of people over-reporting activities which they deem to be socially or culturally desirable

(Phillips, 1972; Randall 1991). Classic examples of traits with a high desirability include happiness, voting, church attendance, and religiosity. Applying the Social Desirability Theory to this research, this theory explains why Undecideds may exaggerate their belief in God and religion to the General Social Survey.

The relationship between science and religion has been, and remains, very complex. To account for much of the historical conflict between the two factions, a theory called “conflict thesis” was surmised, which argued that science and religion are in perpetual conflict and leads to public hostility when religion aggressively challenges new scientific ideas (Orr, 2009). In his seminal book, *History of the Conflict between Religion and Science*, Draper writes that “the history of science...is a narrative of the conflict of two contending powers, the expansive force of the human intellect on one side, and the compression arising from traditional faith and human interests on the other” (Draper, 1874). Sparked by the famous Galileo case, the conflict thesis was a leading theory on the relationship between science and religion throughout the nineteenth and early twentieth century (Orr, 2009). By the 1970s, however, academics and commentators had almost unanimously rejected this theory of perpetual conflict because they realized that these conflicts, although well-known, represented only a fraction of the overall interactions between science and religion (Orr, 2009). Therefore, they needed a more complex theory which could account for all the ways in which science and religion complement and assist one another.

To account for this new logic, John Hedly Brooke conceived the Complexity Thesis, which supposes that science and religion have conflicted at times, lived in harmony at other times, and are indifferent during the remaining times (Orr, 2009). Brooke writes that “there is no such thing as the relationship between science and religion...[only] what difference individuals and communities have made of it in a plethora of different contexts” (Brooke, 1991). This can be seen in the historical

examples given, in which he writes about the Galileo affair to demonstrate times of conflict, the church supporting astronomical research to demonstrate times of harmony, and Pauling's discover of beta-sheets to demonstrate times of indifference (Orr, 2009). It might seem as though this theory actually defeats this paper's premise that Undecideds perceive evolution and their belief in God as incompatible.

However, this premise still holds under three possibilities. The first possibility is that the majority of Americans still knows, and subscribes to, the Conflict Thesis as opposed to the Complexity Thesis. The second possibility is that the specific debate between Darwinian evolution and religion falls into the category of being more conflict-prone than harmonizing, as the next section will argue. The third possibility, which is argued in the following section, adheres to the "framing effect" theory and suggests that although there might be harmony in the evolution versus religion debate, Undecideds only hear from the most partisan commentators, which suggests to them that indeed, there does remain a conflict between evolution and religion.

This section will argue that although the relationship between science and religion is sometimes categorized by indifference or harmony, this specific debate between evolution and religion is categorized by conflict. Although some parishioners were pleased to see that this science forced the church to abandon literal readings of Genesis, most think that Darwinism "clearly provoked a crisis of faith" (Orr, 2009). Among this group is a group of conservative, bible-literal Christians who fear that if their children learn evolution, they will cease to believe in God and without God to guide them, their children will grow up to be bad people (Morris, 1963). Additionally, many religious websites have criticized numerous studies of the relationship between geological data and the fossil record and used them as propaganda to try to discredit evolutionary scientists (Park, 2006). Some religious groups even argue that scientists "intentionally or subconsciously manipulate all studies to conform to evolutionary theory" (Park, 2006). In an impassioned tirade, one prominent creationist even goes as far as to say that

"Evolution is at the foundation of communism, fascism, Freudianism, social darwinism, behaviorism, Kinseyism, materialism, atheism, and in the religious world, modernism and neoorthodoxy" (Morris, 1963).

For all these reasons, religious fundamentalists continued this fight to the courtroom in an effort to "save their children" and introduce creationism into public school biology classrooms (Plutzer & Berkman, 2008). Starting in 1925 with the Scopes "Monkey Trial" in Tennessee, this legal conflict continues to this day, with scientists relentlessly defending evolution on one side and religious groups continually to file appeals and new cases on the other. These religious groups are very persistent, as they continue to fight this battle despite the fact that the court has found in favor of the scientists in every case, ruling that the teaching of creationism is a violation of the Establishment Clause of the First Amendment to the U. S. Constitution (Mazur, 2004). Whether fighting the battle in a courtroom, on a website, or by yourself, these are all examples of religious groups being in conflict with evolutionary scientists, who religious groups claim or imply have "an inherent bias or underlying atheistic agenda" (Park, 2006).

However, in the conflict between evolution and religion, scientists are also going on the offensive. So-called New Atheists, led by Richard Dawkin's book, *The God Delusion*, have used evidence supporting evolution to also argue against the existence of a diety (Plutzer & Berkman, 2008). Eugenie Scott writes that "although antievolutionists pay lip service to supposed scientific problems with evolution, what motivates them to battle its teaching is apprehension over the implications of evolution for religion" (Scott, 1997). Some of this conflict between religious fundamentalists and scientists may stem from a lack of common grounds, as only 7 percent of the members of the National Academy of Science report believing in God, which is the foundation of religious groups' belief system (Larson & Witham, 1997). Additionally, many scholars and members of the general public argue that scientists are

unable to put their personal religious beliefs aside and therefore “view scientific knowledge as incompatible with religion” (Ecklund, 2007). These fights demonstrate that although there may be harmony in other areas of the religious-scientific relationship, conflict seems to dominate in the religious-evolutionary debate.

A third possible explanation for this apparent conflict is that although there may be harmony in the average, every-day relationship between science and religion, the average person is only hearing the most polarizing, conflict-prone views on the topic. Perhaps, even though there is an intense, vocal battle between passionate commentators on both ends of the political spectrum, the vast majority of scientists, religious groups, and Americans fall somewhere in the middle and do not voice their opinions (Hunter, 1991). This analysis might argue that everybody in this middle group, including Undecideds, is the victim of the “framing effect.” A form of cognitive bias, the framing effect argues that presenting the same option in different formats can alter people's decisions (Plous, 1993). Applied to this paper, this theory suggests that since Undecideds are hearing only the most partisan commentators, the evolution versus religion debate is framed as conflict-prone, which causes the average person to believe that it really is conflict-prone. So even if there is harmony in the evolution versus religion debate, the average person, included the Undecideds, wouldn't hear those views because “nuanced, middling positions get lost in the extremes of culture war rhetoric” (Hunter, 1991).

An analogous example will illustrate the power of this argument. As gay-rights and Christian Right groups debate over issues of homosexual rights in public education, both sides have pursued “inflexible, polarizing strategies” that solely target their constituencies and have thus lost the opportunity to come up with new, creative, mutual understandings of their positions (Miceli, 2005). This strategy ultimately results in both sides losing a potential new audience and demonstrates how opposing frames can become mutually reinforcing constraints (Miceli, 2005). This same logic applies to

the evolutionary debate. As scientists and religious fundamentalists pursue inflexible, polarizing strategies that target only their constituencies, they lose the ability to come together in the middle and to reach their potential new audience of Undecideds. This final perspective fits both the complexity theory and the framing theory. As Brooke argued, the relationship between science and religion is only what individuals make of it in different contexts (Brooke, 1991). It would also support this paper's theoretical framework that Undecideds' *perceive* (correctly or not) that there is a deep conflict between evolutionary scientists and religion, and that consequently, their belief in evolution and religion is incompatible.

Cognitive Dissonance establishes the reason which explains why Undecideds remain unsure about the evolution versus religion debate, instead of actively seeking answers, experiences, or information which may suggest that it *is* both possible and consistent to believe in both evolution and religion. This theory, developed by Leon Festinger, is concerned with the relationship among cognitions, or "pieces of knowledge" (Festinger, 1957; Rudolph, 2006). It suggests that when people hold two dissonant, or conflicting, ideas simultaneously, it "sets up an unpleasant internal state - cognitive dissonance - which people try to reduce whenever possible" (Festinger, 1957). Since there is no easy or "right" answer in the evolution versus religion debate, this theory suggests that holding the seemingly conflicting views of believing in both religion and evolution requires a certain amount of inherent and long-lasting cognitive dissonance. Since living with cognitive dissonance creates an unpleasant internal state, it makes sense that Undecideds will avoid the mental effort that is required to hold both these views.

Hypotheses

My theoretical framework suggests that Undecideds believe in science but their additional belief (or reported belief) in religion causes an uncomfortable cognitive dissonance due to their perception that it is impossible to believe in both religion and evolution, so they pick a middle, undecided standpoint. If however, Undecideds are asked about scientific questions which are unrelated to religion, this cognitive dissonance should be eliminated and Undecideds' responses should align with evolutionists. On the other hand, if Undecideds are asked about scientific questions directly related to religion, their cognitive dissonance will remain and their responses should reflect a decision to remain undecided or align with creationists. If this framework accurately describes Undecideds' tendencies, several testable conditions must be met.

Hypothesis 1: Undecideds' responses to scientific questions which are *unrelated* to God or religion will be aligned with evolutionists.

Hypothesis 2: Undecideds' responses to scientific questions that are *directly related* to God or religion will remain in the middle of evolutionists and creationists.

Data and Methods

As part of a larger data-collection program study designed to monitor social change within the United States and to compare the United States to other nations, the National Data Program for the Sciences at the University of Chicago supports the General Social Survey. Although it has been in existence since 1972, this research paper will only utilize data from 1993, 1994, and 2000. It is important to note that since the question remained exactly the same for these three years, and responses did not significantly change, the data can be used interchangeably. In these three years, the GSS

asked representative samples of United States adults how true was the statement, "Human beings evolved from earlier species of animals." Closed-ended responses were definitely true, probably true, probably not true, and definitely not true. However, for reasons previously discussed, I combined respondents who answered that evolution is 'probably true' and 'probably not true' into a single, new category which I named "Undecideds." To do this, I used the recode function in the SPSS program to manipulate the General Social Survey data. By combining two variables into one new variable called Undecideds, I am better able to interpret the data the way I need to.

Taken from the same GSS data, this paper also analyzed respondents' answers to other questions relating to science. This set of data is organized into two subsets. The first is science-based questions directly relating to God and religion. To begin the research, this set of data included the following five questions: "Suppose a test shows the baby has a serious genetic defect. Would you (yourself want to/ want your partner to) have an abortion if a test shows the baby has a serious genetic defect," "check one box for each of these statements to show how much you agree or disagree with it. Human beings should respect nature because it was created by God," "When a person has a disease that cannot be cured, do you think doctors should be allowed by law to end the patient's life by some painless means if the patient and his family request it," "Do you think that modifying the genes of certain crops is extremely dangerous for the environment, very dangerous, somewhat dangerous, not very dangerous, not dangerous at all for the environment," and "Do you strongly agree, agree, disagree, or strongly disagree that methods of birth control should be available to teenagers between the ages of 14 and 16 if their parents do not approve?"

The second set of science-based questions is unrelated to God and religion. To begin, this set of data included the following five questions, "Are we spending too much money, too little money, or about the right amount on improving and protecting the environment," "How willing would you be to

pay much higher taxes in order to protect the environment,” “In your opinion, how true is this? Astrology- the study of star signs- has some scientific truth,” “the greenhouse effect is caused by a hole in the earth’s atmosphere,” “In general, do you think that a rise in the world’s temperature caused by the ‘greenhouse effect’ is extremely dangerous for the environment, Very dangerous, Somewhat dangerous, Not very dangerous, Not dangerous at all for the environment.”

The sample is the 3,673 respondents to this survey. My dependent variable is peoples’ responses on other scientific issues, which I will test quantitatively. My independent variable is respondents’ answer to the question of whether “humans evolved from animals,” which I will also test quantitatively. After completing the cross-tabulations, I proved that these analyses were valid by completing Chi square tests to ensure that the statistics are significant. In each of these figures, the Chi square test showed a significance of .000, which tells us that we can be more than 99% confident that these statistics are valid.

Findings

Religiosity

The first finding confirmed previous research which suggested a strong correlation between high religiosity and support for creationism. Taken from the 1994 GSS data, Figure 1 is a cross-tabulation comparing respondents’ belief in evolution to their interpretation of the Bible. In each row, respondents’ views are disaggregated into whether they consider it “definitely true” that humans evolved from animals, whether they are “Undecided” that humans evolved from animals, or whether they consider it “definitely not true” that humans evolved from animals. In each column, respondents’ views are disaggregated into whether they feel that “the bible is the actual word of God and is to be

taken literally,” that “the bible is the inspired word of God but not every in it should be taken literally,” or that “the Bible is an ancient book of fables, legends, history, and moral precepts recorded by man.”

Figure 1: belevol * bible Feelings about the Bible

			bible FEELINGS ABOUT THE BIBLE				Total
			1 WORD OF GOD	2 INSPIRED WORD	3 BOOK OF FABLES	4 OTHER	
Belevol	1.00	Count	19	54	37	1	111
	Evolutionists	% within belevol	17.1%	48.6%	33.3%	.9%	100.0%
	2.00	Count	105	235	70	6	416
	Undecideds	% within belevol	25.2%	56.5%	16.8%	1.4%	100.0%
	3.00	Count	145	108	9	1	263
	Creationists	% within belevol	55.1%	41.1%	3.4%	.4%	100.0%
Total	Count	269	397	116	8	790	
	% within belevol	34.1%	50.3%	14.7%	1.0%	100.0%	

This data supports previous research which suggests that there is a strong correlation between high religiosity and support for creationism. Fifty-five percent of creationists believe that the Bible is the actual word of God and to be taken literally, compared to just 17 percent of Evolutionists. On the opposite end of the spectrum, only 3 percent of creationists believe the Bible is a book of fables recorded by man, compared to over 33 percent of Evolutionists. This data clearly supports previous research suggesting that religion is the primary indicator of evolutionary belief.

God-loaded & non-God loaded Scientific Questions

My second finding is that there is little evidence of any correlation or pattern between Undecideds and support for either God-loaded or non-God-loaded scientific questions, undermining my hypotheses. For example, in Figure 2, I compared respondents' views on evolution with their response

to the question of “When a person has a disease that cannot be cured, do you think doctors should be allowed by law to end the patient's life by some painless means if the patient and his family request it?”

Figure 2: belevol * letdie1 ALLOW INCURABLE PATIENTS TO DIE

			letdie1 ALLOW INCURABLE PATIENTS TO DIE		Total
			1 YES	2 NO	
belevol	1.00	Count	95	13	108
	Evolutionists	% within belevol	88.0%	12.0%	100.0%
	2.00	Count	323	89	412
	Undecideds	% within belevol	78.4%	21.6%	100.0%
	3.00	Count	133	122	255
	Creationists	% within belevol	52.2%	47.8%	100.0%
Total			551	224	775
			71.1%	28.9%	100.0%

Since this is a God-loaded question, I would have expected that Undecideds would either be in the middle or more aligned with Creationists. However, upon analyzing this data, I learned that 78 percent of Undecideds support euthanasia, which is much closer to the 88 percent of Evolutionists than the 52 percent of Creationists who believe the same thing, which suggests that my hypotheses are incorrect.

I found a similar pattern (or lack there-of) when I analyzed non-God-loaded questions. In Figure 3, I compared respondents' views on evolution with their belief that we are spending “too little,” “about right,” or “too much” money on our space exploration program.

Figure 3: belevol * natspac SPACE EXPLORATION PROGRAM

			natspac SPACE EXPLORATION PROGRAM			Total
			1 TOO LITTLE	2 ABOUT RIGHT	3 TOO MUCH	
belevol	1.00	Count	31	38	24	93
	Evolutionists	% within belevol	33.3%	40.9%	25.8%	100.0%
	2.00	Count	48	142	120	310
	Undecideds	% within belevol	15.5%	45.8%	38.7%	100.0%
	3.00	Count	29	121	121	271
	Creationists	% within belevol	10.7%	44.6%	44.6%	100.0%
Total		Count	108	301	265	674
		% within belevol	16.0%	44.7%	39.3%	100.0%

Since this is a non-God-loaded question, I would expect that Undecideds would be more aligned with evolutionists than creationists. However, upon analyzing the data, I learned that Undecideds are actually more aligned with creationists on space exploration. About 15 percent of Undecideds thought we spent too little on space exploration, which is much more aligned with the 11 percent of Creationists who thought we spent too little than the 33 percent of Evolutionists who thought the same thing. These graphs represent some of the evidence which undermines my hypotheses and suggests there is no relationship between peoples' evolutionary beliefs and their views on other scientific questions.

Protecting & Sacrificing for the Environment

My third finding demonstrates that Undecideds theoretically want to support science and protect the environment, but are not willing to make any sacrifices for it. For example, in Figure 4, I compared respondents' views of evolution with their views of whether we are spending too much, too little, or just enough money on environmental problems.

Figure 4: belevol * natenvir IMPROVING & PROTECTING ENVIRONMENT

			natenvir IMPROVING & PROTECTING ENVIRONMENT			Total
			1 TOO LITTLE	2 ABOUT RIGHT	3 TOO MUCH	
belevol	1.00	Count	66	26	4	96
	Evolutionists	% within belevol	68.8%	27.1%	4.2%	100.0%
	2.00	Count	217	85	14	316
	Undecideds	% within belevol	68.7%	26.9%	4.4%	100.0%
	3.00	Count	165	89	26	280
	Creationists	% within belevol	58.9%	31.8%	9.3%	100.0%
Total	Count		448	200	44	692
	% within belevol		64.7%	28.9%	6.4%	100.0%

This data shows that 69 percent of Undecideds believe that we are spending too little on improving and protecting our environment, which almost perfectly aligns them with Evolutionists on this question, and about ten percentage points higher than Creationists.

I then analyzed Undecideds' responses to questions asking if respondents were willing to make a sacrifice to protect the environment. For example, in Figure 5, I compared respondents' views on evolutionary belief with their willingness to accept cuts to their standard of living in order to help the environment.

Figure 5: belevol * grnsol: ACCEPT CUT IN LIVING STNDS TO HELP ENVIR?

			grnsol ACCEPT CUT IN LIVING STNDS TO HELP ENVIR?					Total
			1 VERY WILLING	2 FAIRLY WILLING	3 NEITHER WILLING NOR UNWILL	4 NOT VERY WILLING	5 NOT AT ALL WILLING	
belevol	1.00	Count	19	69	43	38	15	184
	Evolutionists	% within belevol	10.3%	37.5%	23.4%	20.7%	8.2%	100.0%
	2.00	Count	19	169	151	194	81	614
	Undecideds	% within belevol	3.1%	27.5%	24.6%	31.6%	13.2%	100.0%
	3.00	Count	17	91	76	123	90	397
	Creationists	% within belevol	4.3%	22.9%	19.1%	31.0%	22.7%	100.0%
	Total	Count	55	329	270	355	186	1195
		% within belevol	4.6%	27.5%	22.6%	29.7%	15.6%	100.0%

Figure 5 shows that only 31 percent of Undecideds are “very willing” or “fairly willing” to accept cuts to their standard of living in order to help the environment, compared to 48 percent of Evolutionists and 27 percent of Creationists. This data demonstrates that Undecideds are not willing to sacrifice for the environment, aligning them much more with creationists than evolutionists. This data, combined with Figure 4, suggests that Undecideds theoretically support protecting and improving the environment, but are not willing to sacrifice anything for those improvements. This pattern was evident in a number of other questions, as Undecideds were not willing to pay higher taxes for the environment or give money to environmental organizations.

Undecideds are...Undecided

My fourth finding suggests that Undecideds are not just undecided about evolution, but are also undecided on most other scientific issues as well. In Figure 6, I compared respondents' belief in evolution with their belief that it is "definitely true," "probably true," "probably not true," or "definitely not true" that humans are the main cause of plant and animal extinction.

Figure 6: belevol * grntest6: HUMANS ARE MAIN CAUSE OF EXTINCT

			grntest6 HUMANS ARE MAIN CAUSE OF PLANT & ANIMAL EXTINCT				Total
			1 DEFINITELY TRUE	2 PROBABLY TRUE	3 PROBABLY NOT TRUE	4 DEFINITELY NOT TRUE	
belevol	1.00	Count	52	66	42	26	186
	Evolutionists	% within belevol	28.0%	35.5%	22.6%	14.0%	100.0%
	2.00	Count	67	306	180	53	606
	Undecideds	% within belevol	11.1%	50.5%	29.7%	8.7%	100.0%
	3.00	Count	73	160	100	53	386
	Creationists	% within belevol	18.9%	41.5%	25.9%	13.7%	100.0%
Total		Count	192	532	322	132	1178
		% within belevol	16.3%	45.2%	27.3%	11.2%	100.0%

There are many possible hypotheses for which way respondents could answer this question. I would have expected they answer in a similar pattern to their beliefs in evolution, since there are many parallels between the questions. However, Undecideds have a lower response that humans are "definitely" the main cause of extinctions than either Evolutionists or Creationists. Moreover, less Undecideds answered that humans are "definitely not" the main cause of extinctions than either Evolutionists or Creationists. More research must be done to analyze why Undecideds are so undecided about other scientific issues, but one theory is that Undecideds may just have indecisive personalities. Another possibility is that Undecideds do not prioritize these issues and instead focus more on their

mortgage or children. Still another possibility is that Undecideds are hesitant to commit to scientific issues because they are skeptical of the scientific community, which I will explore in the next section.

Skeptics

My final finding suggests that people who are Undecided about evolution may be Undecided because they are skeptical of science. In Figure 7, I compared respondents' belief in evolution with their level of confidence in the scientific community.

Figure 7: belevol * consci: CONFIDENCE IN SCIENTIFIC COMMUNITY

			consci CONFIDENCE IN SCIENTIFIC COMMUNITY			Total
			1 A GREAT DEAL	2 ONLY SOME	3 HARDLY ANY	
Belevol	1.00	Count	65	56	3	124
	Evolutionists	% within belevol	52.4%	45.2%	2.4%	100.0%
	2.00	Count	151	209	31	391
	Undecideds	% within belevol	38.6%	53.5%	7.9%	100.0%
	3.00	Count	84	154	23	261
	Creationists	% within belevol	32.2%	59.0%	8.8%	100.0%
Total	Count	300	419	57	776	
	% within belevol	38.7%	54.0%	7.3%	100.0%	

Figure 7 shows that only 39 percent of Undecideds have “a great deal” of confidence in the scientific community, compared to 32 percent of creationists and 52 percent of Evolutionists. Contrary to my original predictions outlined in the theoretical framework, this data suggests that perhaps people are Undecided about evolution because they do not trust the science supporting the theory.

Discussion

My hypotheses were not supported by my data, but I did discover a number of interesting findings, some of which supported previous research and some of which brought up new questions of their own. My hypothesis was based on the assumption that Undecideds believe in both science and religion and that they chose to remain undecided on evolution because they thought that their belief in both evolution and religion is incompatible and remaining undecided is the easiest solution. My data, however, suggests that Undecideds do not have a high level of confidence in the scientific community, which could be the flaw in my assumptions and the reason that my hypotheses were not supported. With this in mind, in this section I discuss a number of revised hypotheses which could explain why 49 percent of America remains undecided on evolution and why they might be important for the future of science in this country.

One possible explanation for the fascinatingly high number of people who do not believe in evolution may lie in their schooling. Even though the law explicitly forbids teaching creationism in public school science classes, research shows that between 15 and 30 percent of High School Biology teachers still teach creationism in their classrooms (Moore, 2008). It is unfair to America's students that they are subjected to misinformation by their science teachers who are illegally giving them incorrect information. One way to combat this problem is for policymakers and scientists to increase penalties for teachers breaking the law and, at the same time, increase enforcement of these new penalties.

Another possible way to increase the number of people who believe in evolution is to teach the debate. Although the current law allows curricula to teach only evolution, there is evidence that teaching the differences between evolution and creationism may actually be a better strategy. In a comprehensive study, Brian J. Alters and Craig E. Nelson followed two comparable "Introduction to Biology" college classes (Alters, 2002). In one of the classes, the professor followed the status quo and

taught only evolution. In the other class, the professor taught the debate and described the merits of evolution and the shortcomings of creationism. The researchers found that students in the second class were much more likely to be moved towards evolution than students in the first class, suggesting that perhaps all high school teachers and college professors should teach an informed debate about the merits of evolution and the deficiencies of creationism.

A third way to change Undecideds' views on evolution is to focus on the definition of science and explain why science is the best way of knowing for this particular issue. Scientists should explain that evolution is a scientific theory and that if creationists want Intelligent Design to be taught in science classes, it needs to be held to the same scientific standards as evolution. Once one applies these scientific standards to Intelligent Design, it is clear that the theory is not based on observations and reproducible experiments of the natural world and, more importantly, no experiments exist that could prove the theory false. If scientists were more effective communicators about the definition and importance of science, then perhaps more people would understand the scientific basis of evolution and be moved to say it is "definitely true" that humans evolved from animals.

Along the same lines, another way to move Undecideds is to remove religion from the debate. If scientists reinforce the merits of science, then people will realize that evolution is a natural phenomenon based on reproducible evidence, and it is not a matter of faith or religion, any more than gravity or genetics are. Moreover, "to ask whether someone believes in [evolution] is a nonsensical question, much like asking if someone believes in subatomic particles" (Steinhorn, 2007). If scientists can remove religion from this evolutionary debate, then they can focus on the scientific merits of the theory and not the possible conflicts with religion.

However, if scientists cannot remove religion from this debate, scientists and religious leaders should come together, agree that certain fundamental beliefs are indeed compatible, and then turn this

“zero-sum debate” into a “non-zero-sum discussion,” where people can believe in both evolution and religion. Doing this will remove the cognitive dissonance that people currently feel about believing in both evolution and religion, which will be a giant leap for reconciliation. This idea of reconciliation is hardly new, as these proposals appeared in Victorian England to respond to religious threats to beliefs about origins provoked by Darwinism (Brown, 1947) and it continues today with Sir John Templeton’s \$800 million foundation which underwrites many reconciliatory activities (Nelkin, 2004). There has been much previous research on how to reconcile these two groups through the use of “God talk” and papal proclamations, however, there are more reasons than ever for the religious and scientific communities to come together now (Mazur, 2004; Nelkin, 2004). If science can convince Americans that they are working in service of, or alongside, God, this could allay public concerns about research practices, minimize constraints on scientific autonomy, and encourage more research funding, especially on controversial scientific research with religious tenants that were discussed in this paper (Easterbrook, 1997). Alternatively, if scientists cannot agree on some kind of harmony on important issues, the consequences could be dire. If federal funding is eliminated from important, cutting edge science just because it is seen as incompatible with religion, then the U.S. risks falling behind other, less religious countries who continue to work on potentially controversial science, like stem cells. Additionally, there is reason for religious groups to make reconciliatory steps as well. If fundamental religious groups can accept a more moderate view that evolution is compatible with religious beliefs, like Pope John Paul II did for the Roman Catholic Church, then perhaps they can convert the other 93 percent of scientists at the National Academy of Sciences to believe in God as well.

In my research, I found evidence that this approach may have validity. If scientists reframe their goals in religious terms, then perhaps both science and religion could emerge with a victory. In one of my cross-tabulations, I compared respondents’ views of evolution with their belief of whether “humans should respect nature created by God,” and Evolutionists, Undecideds, and Creationists all had very high

responses of agreeing and strongly agreeing (with over 78 percent of Creationists choosing one of these two responses). So perhaps in an effort to, say, slow down the effects of global warming, scientists could argue that we should protect the environment precisely *because* it's created by God. This same logic could be applied to other scientific problems, such as stem cells, which we should use *in order to* help save more of God's creatures. This is not a long-term solution, but we have real problems right now that need to be addressed.

Also, since there was little evidence supporting my hypotheses that people's evolutionary beliefs impacted their beliefs in other scientific questions, this paradox could answer the so-what question which I set out to explore. Maybe peoples' beliefs in evolution are not the key to helping science advance, stop global warming, and conduct research with life-saving stem cells. Maybe the key to helping science achieve these goals lies in reframing each issue and each debate in religious terms.

This was the first research to disaggregate this General Social Survey data in order to focus on respondents who were undecided on the issue of evolution. Hopefully, this will convince scientific and religious communities to take reconciliatory steps in their own best interest as well as in the best interest of the country. I also hope that policy makers will consider this research and increase penalties for teaching creationism in a science classroom, revise the high school and college curricula to teach the debate, and perhaps even reframe important scientific issues in religious terms. Finally, I hope this research will provide a base of knowledge so that other researchers can explore what causes Undecideds' beliefs in evolution and further discuss the implications of their beliefs, which will shape America's future in the coming decades.

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