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## **Evolution and Creationism at Cornell University**

# **Introduction I: The Controversy**

Controversy has surrounded the theory of evolution since its conception. Evolution is defined as the concept of "living organisms that share common ancestors and have descended with modification from these ancestors" (Scott). However, this theory has not been unanimously accepted as the primary theory in explaining the development of species. Instead, creationists believe "that each species of organism was created separately in its present form, by a supernatural creator" that is based off of the book of Genesis (Richner). Currently, in America there is a long-standing battle between evolutionists and creationists as to how organisms, especially humans, develop from generation to generation.

Charles Darwin, the pioneer of evolution, eschewed the popular beliefs of the 19<sup>th</sup> century by proposing that man is an evolving species who descended from a common ancestor with no direction from God. He noted that "I cannot persuade myself that a beneficent and omnipotent God would have designedly created parasitic wasps with the express intention of their feeding within the living bodies of Caterpillars" (Darwin). In his book *On the Origin of Species*, Darwin outlines the need for variation, heritability and the struggle for successful reproduction in order to produce the outcome of natural selection within a species. He proposed that natural selection allows organisms to survive over centuries and individually evolve throughout the generations.

Darwin foresaw the controversy that his theory was going to create so he made sure to explicitly defend his case on evolution in his work of the *Descent of Man*. He writes, "I am aware that the conclusions arrived at in this work will be denounced by some as highly irreligious; but he who denounces them is bound to show why it is more irreligious to explain the origin of man as a distinct species by descent from some lower from, through the laws of variation and natural selection, than to explain the birth of the individual through the laws of ordinary reproduction. The birth both of the species and of the individual are equally parts of that grand sequence of events, which our minds refuse to accept as the result of blind chance" (Darwin).

Darwin's predictions of controversy accurately reflect the process in which evolution came to be accepted within the United States. In the beginning of the 20<sup>th</sup> century, antievolutionary beliefs began to develop when a high school education became required for all children. Because of this, a growing number of adolescents began to learn about evolution, making parents increasingly uneasy as their creationist beliefs were challenged.

Fundamentalist religious groups throughout the country mobilized to rid schools of evolution, successfully getting many states to ban its teaching. Tennessee's Butler Act stated, "it shall be unlawful for any teacher to teach any theory that denies the Story of Divine Creation of man as taught in the Bible and to teach instead that man has descended from a lower order of animal" (Scott). John T. Scopes, a science teacher, was put on trial for violating this law, and his case became the turning point for evolutionary thought in America. While mass opinion of creationism was not explicitly tied to religion before the Scope trial, after the prosecutor William Jennings Bryan successfully won the case by convicting Scopes, the creationist views purported by Bryan were widely seen as religious based fanaticism. Thus, the creationist ideology began to

leave public opinion in the North and settle into concentrated parts of the South. Even though public mockery was widespread, numerous anti-evolution laws were still created and by 1930 "70% of American classrooms omitted evolution" (Scott). Nevertheless, times began to change for evolutionary teachings in 1957 when the Soviet Union launched Sputnik. Many Americans realized the need for advancements in the scientific arena in order to compete in future international relations. Therefore, evolution was added to high school textbooks with information that could only have been previously found in college level readings, leading to the dissemination of evolution as the primary theory of the generational development of organisms.

Creationists tried to protest the widespread teaching of evolution and the ban on teaching creationist science in schools through the 1981 case of McLean vs. Arkansas. The Supreme Court recognized that teaching creationism in schools violates the establishment clause of the First amendment. The Court claimed that "creationism is a religious idea and the First amendment prohibits government from promoting religion"(Scott). In opposition to the Court's decision, Henry Morris created a grassroots movement against the mass acceptance of evolution by founding the Institute for Creation Research. The ICR is the primary organization that teaches creation science; they send creation literature each month to over 200,000 recipients. Through the ICR Morris also created a Museum of Creation and Earth History which primarily educates home schooled and Christian based school children about the biblical origins of man. Recently concerned with the overly stigmatized notions of religious fanaticism associated with creationism, many Creationists are currently changing tactics to make their beliefs more accepted by using "strategies to avoid the word creation and repackaging creation science as evidence against evolution"(Scott).

Despite having evolution taught in public schools throughout America, creationist beliefs are still extremely prevalent in today's society. In a survey conducted by Gallup Poll in 2008, 14% of Americans believe in the evolutionary theory that God had no part in the development of man. However, 44% of the American population believed in the creationist viewpoint that man was created in his present form. While strict evolutionary beliefs have increased in America from 9% in 1982 to 14% in the present day, it is still much less than the beliefs supporting creationism (Evolution). The overwhelming majority of Americans who believe in creationism, even when it is purposefully not taught in the school system, shows that creationism is promoted through other venues like organized religious institutions and grass roots organizations.

## Introduction II: Religion in America and Cornell University

Because America is currently imbedded in the debate between creationism and evolution, it is necessary to look at the religious historical conception of the country to understand why the country is so divided. After fleeing religious persecution in England, America was founded as a means to allow any religion to be practiced and accepted. Thomas Jefferson notes that "no man shall be compelled to frequent or support any religious worship, place, or ministry whatsoever, on account of his religious opinions or belief; but that all men shall be free to profess, and by argument to maintain, their opinions in matters of religion, and that the same shall in no wise diminish, enlarge, or affect their civil capacities" (What Place). This religious freedom and strict decree that "civil capacities" should not be affected by any religious ideals is seen in the U.S. constitution. The First Amendment declares, "Congress shall make no law respecting an establishment of religion, or prohibiting the free exercise thereof" (Myerson). Similar to the founding religious conceptions of the United States, Cornell University was created on nondenominational principles as well. Founded in 1865, Ezra Cornell and Andrew Dickson White were liberal pioneers in creating an institution that taught a nonsectarian education. This created much controversy and lead to Cornell being called the "Godless institution". Nevertheless, Cornell University's charter was modeled after principles found in the U.S. Constitution because it "stipulates that people from any, or no, religion are welcome to teach or study here" (What Place). Andrew Dickson White stipulated when founding the University that it "should be under the control of no political party and of no single religious sect." This resemblance to the founding fathers' own concerns on religion is still seen today in recent President of Cornell University Hunter Rawlings' statement that "to use religion as an instrument of civil policy is, in [James] Madison's words, 'an unhallowed perversion of the means of salvation"(What Place).

The almost identical historical religious founding in both America and Cornell University then leads to some puzzling questions concerning beliefs on evolution and creationism. According to a survey in Professor Provine's History of Evolution class, the overwhelming majority of students believe in evolution, while almost none believe in creationism. An additional survey outlined below was conducted throughout the entire undergraduate community at Cornell University and reflects similar statistics. Thus it is puzzling to find that in a country founded on equality of religion as compared to a university founded on the same principles, there is such a drastic division in the beliefs (and non beliefs) on evolution. This paper will explore the separation between academics and culture in the quest to understand the immense differences of the average American creationist versus the average Cornellian evolutionist. To do this, the survey detailing the evolutionary beliefs of undergraduates is analyzed and compared to statistics found in a similar survey conducted among American citizens. The paper concludes with conjectures as to why there are such immense discrepancies between the American population and Cornell undergraduates in relation to their beliefs on creationism and evolution.

# Methods

Cornell University undergraduate students were surveyed by answering a series of questions modeled after a May 2008 Gallup Poll assessing American's beliefs on evolution. Cornell students were invited to attend a Facebook group called Evolutionary Fun and asked to take a quick three minute survey. 593 undergraduates took the survey over the week span of November 13, 2009. The survey was open to everyone in the community but less than 3% of participants were graduate students or other, so the data is restricted to undergraduate students. 2% of the population was under 18 so they were also excluded from the results due to ethical limitations. 96.84% of the population was between 18-21 year olds with a somewhat equal distribution between the different years. The survey encompassed 30% Freshman, 36% Sophomore, 13% Junior and 17% of the Senior classes.

The author of this survey attempted to send out the survey to both the Cornell Democrats and Cornell Republicans listserv but was only successful in accessing the Cornell Democrat listserv. This is because after contacting the Cornell Republicans asking to assess their evolutionary beliefs, the author received a perfunctory no along with the explanation that "religious beliefs are a private matter and not one that we discuss much less publicize to the rest of the Cornell community" despite the fact that the survey does not mention or request religious beliefs. The data was compiled anonymously in a Google Documents account in which the author was the sole accessor. Participants were not asked any personal information except their age, college, gender and political affiliation. There were then six additional questions that correlated with the Gallup Poll study previously mentioned in order to directly compare evolution and creationist beliefs of Cornell undergraduates to the general American public.

# Results

When the belief of evolution was directly assessed, 61% of all undergraduates responded that "humans developed over millions of years and that God had no part". 92.04% of participants then answered definitely or probably true when asked to indicate how true the theory of evolution was to them. Only 5.64% of the undergraduate population believes in creationism as defined as "God created humans as is within the last 10,000 years". Merely 9.78% of the population answered definitely or probably true when indicating the truthfulness of the theory of creationism (Figure 1). Finally, 32.84% of participants believed that "humans developed over millions of years, God guided" reflecting beliefs in theistic evolution.



Of the respondents, 51% were women and 49% were men. Both genders had almost identical beliefs on evolution (averaging a total of 61% of respondents believing in this theory),

Figure 1

theistic evolution (averaging 33%) and creationism (averaging 5.5%). Thus, gender is not a significant factor in ascertaining different beliefs on evolution.

When asked about the relationship between science and religion 26% of participants believe that they generally agree with each other, 32.5% believe that they are not related in any meaningful way and 41.21% believe that they generally conflict with each other.

When discerning the desire to have creationism taught in schools, 75.91% of students responded that they would be upset if it was taught (Figure 2). In fact, if the respondent said that creationism in an earlier question was definitely false, 91% of those undergraduates would be upset if creationism were taught (Figure 3). Only 18.3% of students would not be upset and 5.7% had no opinion. The percentage of students who had no opinion on creationism being taught in public schools dropped by 2/3 if the respondents first said that creationism was definitely false.







A regression between the Freshman and Senior classes show the dichotomy of beliefs on evolution from the time undergraduates begin their studies to the time they have finished. In a bivariate regression with class years as the independent variable and the belief on evolution as the dependent variable the coefficient was -.084. This means that as students increase their time spent at Cornell University they become more accepting of the beliefs of evolution. The p value, the probability that the null hypothesis is correct, is .026, so the data is statistically significant. The r-squared figure, the percent of total variation defined by the model, is 2.1%. So while class year is not a huge factor in affecting evolutionary beliefs, it does directly impact a significant percentage of the population.

While there was a similar distribution statistically of respondents between most colleges, the School of Hotel Administration and the College of Architecture, Art and Planning were eliminated from the data. This is because they are three of the smallest schools at Cornell University and only 2% of their populations participated in the survey making their representative data not statistically significant. The College of Arts and Sciences has the greatest percentage of students (68%) who believe in evolution, while only 3% believe in creationism (Figure 4). The College of Human Ecology, College of Engineering and the College of Agriculture and Life Sciences all have similar statistics with creationistic beliefs averaging 7% between the two schools and evolutionary beliefs averaging 56%. The outlier of the five colleges is the School of Industrial and Labor Relations with 58% of students believing in evolution and an overwhelming12% of the student body believing in creationism (Figure 5).

# Figure 4





Science majors believe in evolution 70% and creationism 7% while 78% of non-majors believe in evolution and 8% believe in creationism. A regression detailing science versus non-science majors, eliminating undecided students, yields an r squared of 0 and a p value of .563 so the data is not statistically significant. Thus, an undergraduate's major does not have a direct

impact on evolutionary beliefs. This may be in part due to the fact that Cornell University requires all undergraduates to fulfill distribution requirements. Therefore every undergraduate must get some semblance of a scientific course that almost always contains evolutionary theory.

Finally, an analysis looking solely at the evolutionary beliefs of Democrats and Republicans at Cornell University yields the results that both are made up of undergraduates who primarily believe in evolution. Among affiliated Democrats, 68% believe in evolution, 30% believe in a theistic evolution and 2% believe in creationism (Figure 6). With affiliated Republicans, 61% believe in evolution, 33% believe in theistic evolution and 6% believe in creationism (Figure 7).



A two dummy variable regression with the independent variable being political affiliation and the dependent variable once again being the participants' beliefs on evolution, shows that political affiliation has a strong correlation to the acceptance of evolution. The r squared was 22.9 and the p value is below 1/100 of a percent, so the data is extremely statistically significant. Thus, almost a quarter of evolutionary beliefs on Cornell's campus are determined by political affiliation.

#### Discussion

The results to the Cornell survey are both impressive and puzzling when compared to the Gallup Poll survey assessing American's evolutionary and creationist beliefs. The asymmetry between 61% percent of Cornellians believing in evolution versus a mere 14% of Americans can be explained through numerous components (Evolution). The first is the drastic differences between education levels of the two groups. According to a recent U.S. Census only 28% of Americans have attained at least a bachelor's degree (College Degree). Gallup argues that there is a strong correlation between beliefs and education by noting, "Among those with high-school educations or less, more say they do not believe in evolution than say they believe in it" (On Darwin's Birthday). The educational perspective can be applied to the fact that while 66% of Cornell students believe that evolution is definitely or probably true, merely 53% of Americans said the same thing. Since the population at this Ivy League institution is much different than the 72% of Americans who have not even completed college, educational levels are a significant factor in affecting evolutionary beliefs.

A similar jump in ideals between the two groups is seen by the fact that only 5.6% of Cornellians believe in creationism as compared to 44% of Americans. This can be explained not only through education, but also through differences in overall religious prevalence between the two groups. Despite noting that both Cornell University and America were founded on principles of nondenominationalism, 83.9% of Americans find themselves affiliated with some religious denomination. It can be in part contributed to the country's acceptance of religion that 59% of Americans believe that "religion plays a very important role in their lives" (Among Wealthy). Not only this but "more than half (54%) of the adult population in America reside in a household where either they themselves or someone else belongs to a place of worship" (Kosmin). In addition, 83% of Americans identify themselves as Christian, making Christianity the major religion in the country. Gallup Poll notes that belief in evolution is directly correlated to Church attendance with weekly attendance leading towards a 24% belief in evolution while never going leads to a 55% belief in evolution. Although religion can in no way be forced upon citizens, it is seen how even in a nondenominational country the prevalence of one religion can foster support for the biblical based creationist theory that claims to explain science.

In contrast to the religious prevalence of an average American community, the environment of Cornell University is focused primarily on secular learning, not religion. Former President Rawlings stresses the need for Cornell to maintain its secularism especially in the face of creationism by saying that it is "a religious belief masquerading as a secular idea. It is neither clearly identified as a proposition of faith nor supported by other rationally based arguments" (Lang). Rawlings argues that because Cornell is a secular university, it is against its principles to disseminate creationism. Columnist for the Cornell Daily Sun Andrew Daines notes that the persistent secularism of the school has dismissed all religious based learning endeavors. He believes that through the University's secularism, it has created, "an anti-religious bias [which] permeates our ivory tower. Faith [and] specifically the faith of others, seems to be a source of mistrust on campus." (Finocchiaro). Thus, the absence of a religious environment, and to a certain extent the "anti religious bias" on campus, correlates to the dismissal of creationism by undergraduate students.

The structure of a secular university such as Cornell also promotes an educated environment in which evolution is the primary theory taught. "No secular school is inclined to give credited courses on antievolutionism" because they are seen to be largely misleading and are contradictory to many scientific facts (Numbers). According to Larry Witham, "the usual source for a secular university student [who do not believe in evolution] will be the antievolution speakers who, relishing campus free speech, frequent the nation's universities". The dismissal of creationism is seen in Cornell University's course offerings in the Department of Ecology and Evolutionary Biology. 7 of the 15 classes offered to undergraduates for the Fall semester of 2009 are centered around or discuss evolution with no mention of creationism. Therefore, the regression modeling an increase in evolutionary beliefs by the time an undergraduate is finished with their degree can be attributed in some part to the educational environment and course offerings available on campus.

Religion also plays a great role in determining the emotional response to the question concerning the practice of teaching creationism in schools. As stated earlier, 75.91% of students would be upset if creationism was taught in their local public schools. However, in the Gallup survey, the exact opposite sentiments are seen in the American population. Only 22% of Americans would be upset if creationism was taught, while 75% would not be bothered. The significant difference in opinion can be attributed to the fact that both undergraduates and the American population are significantly affected by the social norms surrounding their environment. Cornell students can thus be more practical in their assessment and understanding of the distinction between church and state due to their own experiences in a secular school. David Livingstone notes that "rationality is in large measure situation specific, such that what counts as rational is contingent on the context in which people are located" (Numbers). Therefore, many Americans may believe in creationism even if they believe rationally that the theory is false because it is difficult to separate religious ideals from education in communities that are centered on religion. In contrast, because Cornell University is a private liberal institution based on progressive measures and is geographically isolated, it is especially easy for

students to become swept up in the bandwagon effect and believe in evolution due to the pressure to conform to the beliefs of their peers.

The fact that political affiliation is one of the most significant factors in determining beliefs can again be attributed to the vast differences in environments between Cornell undergraduates and the American population. Due to the prevalence and significance of both the Cornell Democrats and Republicans, it is obvious that Cornell undergraduates are more motivated to discuss and enjoy politics than the general apathetic American public. While 60% of respondents from both political parties at Cornell believe in evolution, Republicans in both Cornell and America are more likely to believe in creationism. According to the Gallup poll, 68% of Republican Americans do not believe in evolution (Majority). This can be linked back historically to the conservative ideals that are associated with the Republican Party. It is noted that "republicans are much more likely to be religious and attend church than independents or Democrats in general" (Majority). Because creationism is disseminated primarily in religious based organizations, it is fitting that the Republican Party at both Cornell and in America will significantly support these ideals over the Democratic party.

In relation to colleges and schools within the University, it is particularly surprising that in lieu of a difference between majors, the School of Industrial and Labor Relations has more creationists than any other college. Due to the goals associated with a degree in ILR, it correlates to a more conservative and Republican viewpoint. Because it is a small school with an average class size of 33 students, it is very easy for students and faculty to discuss the more conservative ideals associated with a major focused on labor history, law and business. The school also sponsors numerous political debates, not offered by other schools such as the College of Arts and Sciences, on "contemporary U.S. labor issues [conducted] by the Cornell

Republicans and moderated by an ILR Associate Dean" (Myers). The fact that there is such a strong representation of Republican political activity from the School of Industrial and Labor Relations' undergraduates is once again deterministic of an increase in creationist beliefs.

Age is also another significant factor in the differences of evolution and creationist beliefs between Cornell University undergraduates and the American population. The Cornell survey incorporated students who were 29 or younger, with 84.9% of the respondents being between the age group of 18-21 years old. However, the median age of Americans is 35.3 years, thus the representative Gallup poll tested more than half of Americans that were over the age of 21(U.S Median Age). Another Gallup study found that beliefs in evolution for 18-21 year olds is 49%, while citizens who are 30 years or older drop towards a 31% belief in evolution (On Darwin's Birthday). William Jennings Bryan, the staunch opponent of evolution. He notes, "I passed through a period of skepticism when I was in college, and the college days cover the dangerous period in a young man's life. It was at this period that I became confused by the different theories of creation" (Bryan). Therefore, young age is an important component to the great increase in undergraduates who believe in evolution, whereas an older age will lead to many older Americans supporting creationism.

However, 12% more Cornell undergraduates still believe in evolution than the average American of the same age. This is not only promoted by the secular structure of the University but also the educated and extremely liberal environment. 50.6% of 18 to 20 years olds attend college. The North East has the highest proportion of college graduates, leading to a progressive culture whose public opinion supports the theory of evolution (College Degree). Because "nearly 38 percent of Cornell's undergraduate students are from New York State, while 28

percent are from the Mid-Atlantic and New England states" students coming into Cornell are predisposed to have grown up with the theory of evolution rather than creationism (Fast Web). This extremely liberal environment composed students, faculty and staff who due to their educated communities have been surrounded by evolutionary teachings correlates to the overwhelming majority of 18-21 year olds who believe in evolution. It is also fitting that the percentage of evolutionary believers drastically drops when compared to the average American because once college students leave school they become reintegrated into a society that combines many different viewpoints leading to an "informal continuing education by exposure to written material, television, museums and organized religion" in which creationism can have greater exposure (Witham).

It is thus necessary to conclude that despite having a common non-denominational foundation there are numerous reasons as to why the average American citizen believes in the theory of creationism while the average Cornell undergraduate believes primarily in the theory of evolution. It is safe to conjecture that religious attendance, political affiliation, the educational environment and age determine evolutionary beliefs. It would thus be interesting to conduct a follow up study analyzing the different political affiliations of each college within the University. It would also be relevant to poll undergraduates on religious beliefs and the frequency of attending services in order to ascertain the statistical data of the prevalence of religion on campus. Because the average Cornell undergraduate is greatly different from the average American due to both environmental and demographical distinctions, it would be unrealistic to expect similar beliefs of evolution between the two groups despite a common founding.

## Link to the Survey:

https://spreadsheets.google.com/viewform?formkey=dG1VM1ZWZ1N6OGtYSUJ0dE9RdEIMVWc6MA

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