New England Science Public: Series Evolution

Volume 2
Issue 1 *Acceptance of Evolution by America's Educators of Prospective Teachers*

Article 1

2014

Acceptance of Evolution by America's Educators of Prospective Teachers

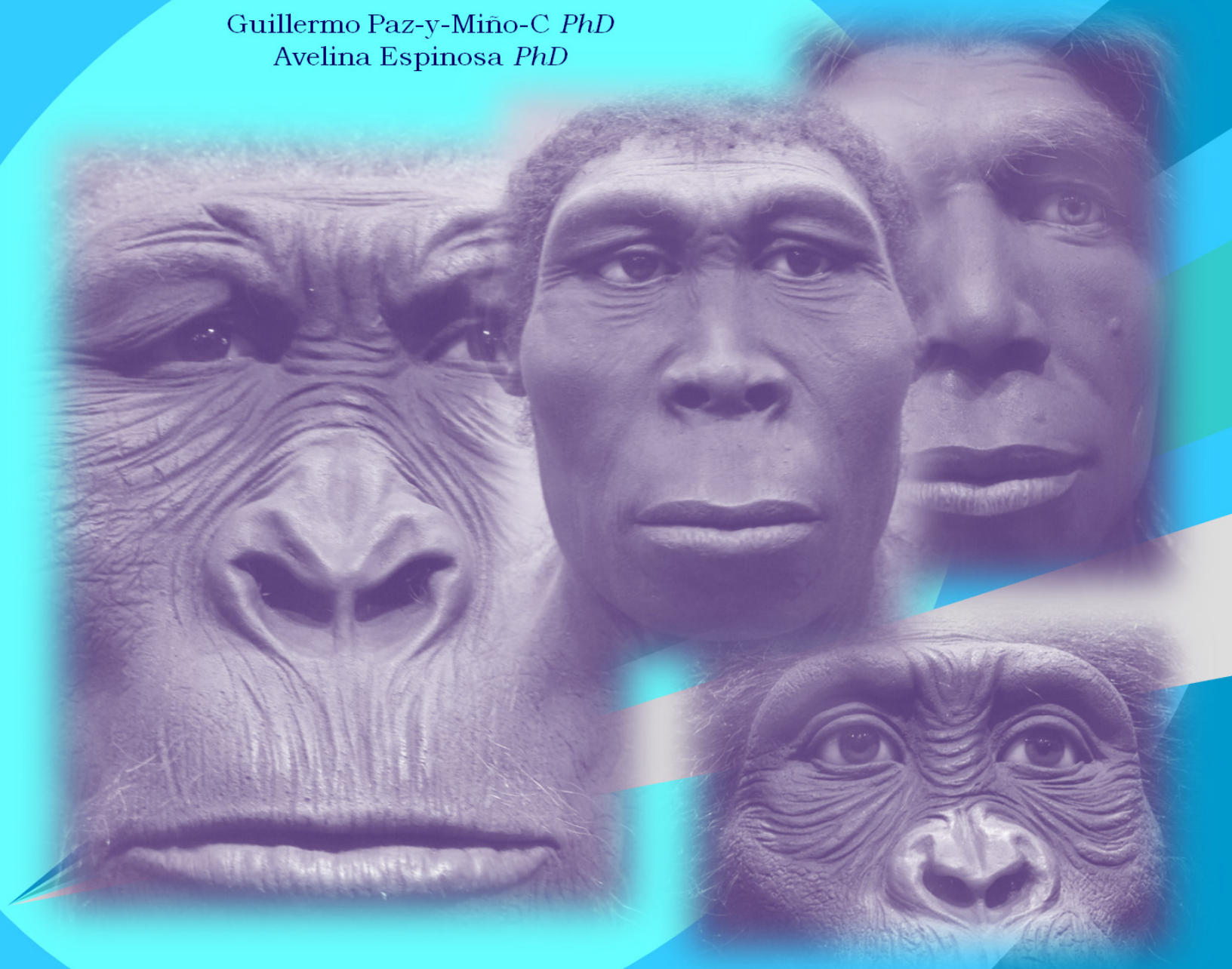
Guillermo Paz-y-Miño-C
University of Massachusetts - Dartmouth, gpazymino@umassd.edu

Avelina Espinosa
Roger Williams University, aespinosa@rwu.edu

Acceptance of Evolution by America's Educators of Prospective Teachers

...the disturbing reality of evolution illiteracy at colleges and universities

Guillermo Paz-y-Miño-C *PhD*
Avelina Espinosa *PhD*



NE Science Public

Series Evolution
Vol. 2, No. 1, 2014

New England Science Public: Series Evolution
ISSN 2326-0971

Library of Congress Cataloging-in-Publication Data

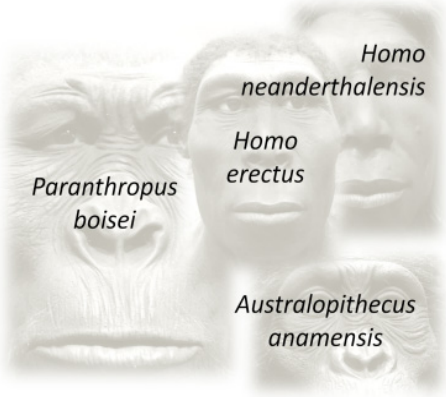
Paz-y-Miño-C, Guillermo & Espinosa, Avelina
Acceptance of Evolution by America's Educators of Prospective Teachers

New England Science Public: Series Evolution
ISSN 2326-0971 – *http://docs.rwu.edu/nesciencepublicevolution/*

Citation of Vol. 2 No. 1 Paz-y-Miño-C G & Espinosa A. 2014. Acceptance of Evolution by America's Educators of Prospective Teachers. New England Science Public: Series Evolution 2(1): 1-92.

Published Vol. 2, No. 1, September 15, 2014 (ref. Captain Robert FitzRoy arrived in the Galapagos September 15, 1835; at that time, the young naturalist Charles Darwin was FitzRoy's distinguished guest on board of the HMS Beagle)

Keywords evolution, life sciences, natural history, higher education, assessment
Correspondence gpazymino@umassd.edu/NE_SciPublic@rwu.edu; aespinosa@rwu.edu/NE_SciPublic@rwu.edu



Designed by New England Science Public

Images cover: Hominid reconstructions based on fossils (*Paranthropus boisei*, *Homo erectus*, *Homo neanderthalensis*, *Australopithecus anamensis*, by Atelier WILD LIFE ART © W. Schnaubelt & N. Kieser, Germany, info@wildlifeart.de), exhibition 'Becoming Human – Hominid Evolution' (Hessen State Museum in Darmstadt), Museum für Naturkunde Berlin © photo G Paz-y-Miño-C

New England Science Public – New England Center for the Public Understanding of Science, Roger Williams University, One Old Ferry Road, Bristol, Rhode Island 02809, United States, *NE_SciPublic@rwu.edu* phone (401) 254-3137

ACCEPTANCE OF EVOLUTION BY AMERICA'S EDUCATORS OF PROSPECTIVE TEACHERS

...the disturbing reality of evolution illiteracy at colleges and universities

Executive Summary*

Conceptual Premise The Incompatibility Hypothesis (*IH*) helps us understand and explain the everlasting and fluctuating antagonism —in cycles, from moderate to intense during human history— in the relationship between science/evolution (= empirical knowledge) and religion. Belief in supernatural causation *disrupts*, *distorts*, *delays* and *stops* (= the *3D+S*) the comprehension and acceptance of scientific evidence.

> *IH* has three major predictions: (1) *Chronological-conflict-and-accommodation*, which explains the historical emergence of antagonism between evolution and religion when advances in science continue to challenge the belief in supernatural causation. In such situations, subsequent and gradual accommodation —by creationists— to the new scientific discoveries is expected. However, the clashes are destined to continue for as long as belief in the supernatural persists. (2) *Change in evolution's acceptance as function of educational attainment*, which explains the positive association between acceptance of evolution and overall level of education. Proper, comprehensive formal education leads to an organized exposure to subject content, rational assessment of facts, critical thinking, and adoption of an educated position in respect to evolution. And (3) *Change in evolution's acceptance as function of religiosity*, which explains the negative association between acceptance of evolution and level of religious beliefs; high levels of belief in the supernatural correlate with low acceptance of evolution.

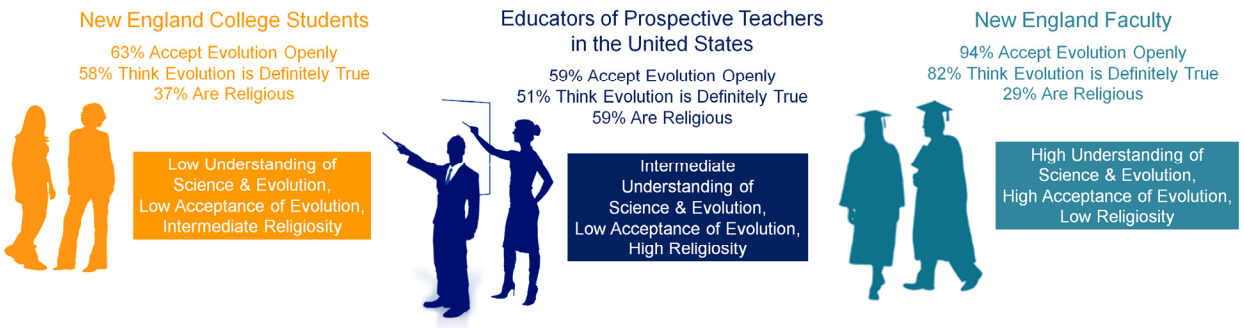
The Study Under the conceptual framework of *IH*, here we document the patterns of acceptance of evolution of 495 Educators of Prospective Teachers affiliated with 281 colleges and universities widely distributed in 4 regions, 9 divisions, and 50 states in the United States (regions/divisions match designations by US Census Bureau). These higher-education professionals (65% PhD-, 22% doctorate-holders) were polled in five areas:

> (i) their views about evolution, creationism and Intelligent Design, (ii) their understanding of how science and the evolutionary process work, (iii) their position about the hypothetical 'harmony or compatibility' between science/evolution and supernatural causation, (iv) their awareness of the age of the Earth, its moon, our solar system and the universe, and the application of the concept of evolution to the cosmos, and (v) their personal convictions concerning the evolution and/or creation of humans in the context of the educators' religiosity.

Our significant findings included:

1) Acceptance of evolution by these educators was influenced by their level of understanding the foundations of science/evolution and their beliefs in supernatural causation (image below). In comparison to two other populations, whose acceptance of evolution had already been documented (i.e. New England General Faculty —non-educators of future teachers— and New England College Students), the educators had an intermediate level of understanding science/evolution, low acceptance of evolution, and high religiosity, as follows:

> • 59% of the educators accepted evolution *openly*, 51% thought that evolution is *definitely true*, and 59% admitted to be *religious*. Among the New England Faculty, 94% accepted evolution openly, 82% thought

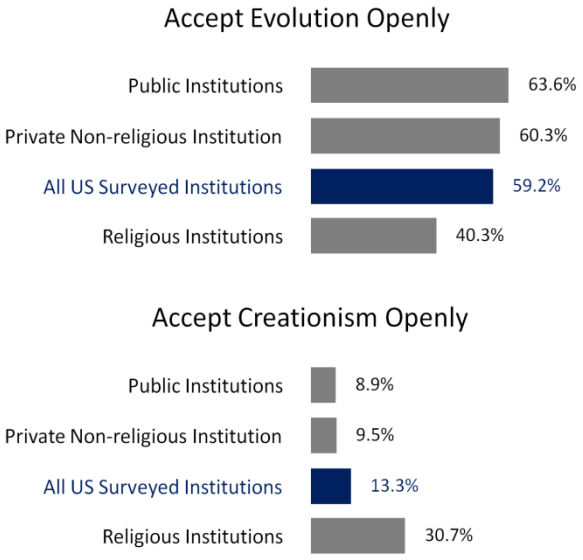


'*Acceptance of Evolution Openly*' and '*Thinking that Evolution is Definitely True*' among Educators of Prospective Teachers in the United States (center). For comparison, New England College Students (left) and General Faculty (right) are depicted; both have the highest national levels of acceptance of evolution among students and university professors, respectively.

that evolution is definitely true, and 29% admitted to be religious. Among the College Students, 63% accepted evolution openly, 58% thought that evolution is definitely true, and 37% admitted to be religious.

• The educators' science- and evolution-literacy were below the New England Faculty's but above the students'. Educators in each of the four regions of the US (i.e. North East, Midwest, South, and West) had science- and evolution-literacy scores below the researchers' but above the students'.

• The educators' religiosity was the highest of the three populations. Educators in each of the four regions of the US had religiosity scores above both the researchers' and the students'.



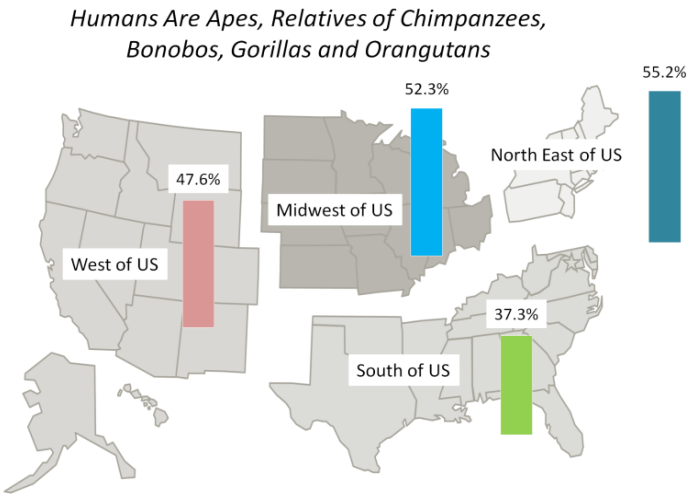
2) Open acceptance of evolution by the Educators of Prospective Teachers nationwide was higher at public (63%) and private non-religious (60%) institutions than at religious colleges and universities (40%, image left). Open acceptance of creationism by the educators was conspicuous at religious institutions (30%), i.e. 2.3 times higher than the national average (13%, image left).

3) Understanding of science and acceptance of evolution decreased with increasing religiosity (= negative association of variables). Acceptance of evolution increased with higher levels of understanding science (= positive association of variables). The non-religious responders to the survey reached the highest levels of understanding science and evolution in contrast to the deeply-religious who scored lowest in the science- and evolution-literacy scores. Per-region results were:

• Educators in each of the four regions of the US, who scored low in religiosity, had the highest scores in both science- and evolution-literacy among all educators of prospective teachers in the country.

• Educators in each of the four regions of the US, who scored high in religiosity, had the lowest scores in both science- and evolution-literacy among all educators of prospective teachers in the country.

4) The majority [percent range per US Region r = 80 – 94%] of educators considered the following definition of evolution to be true: *a gradual process by which the universe changes, it includes the origin of life, its diversification and the synergistic phenomena resulting from the interaction between life and the environment*. However, the majority [r = 61 – 79%] of the educators also had a Lamarckian view of evolution, they considered this definition to be true: *a gradual process by which organisms acquire traits during their lifetimes, such as longer necks, larger brains, resistance to parasites, and then pass on these traits to their descendants*.

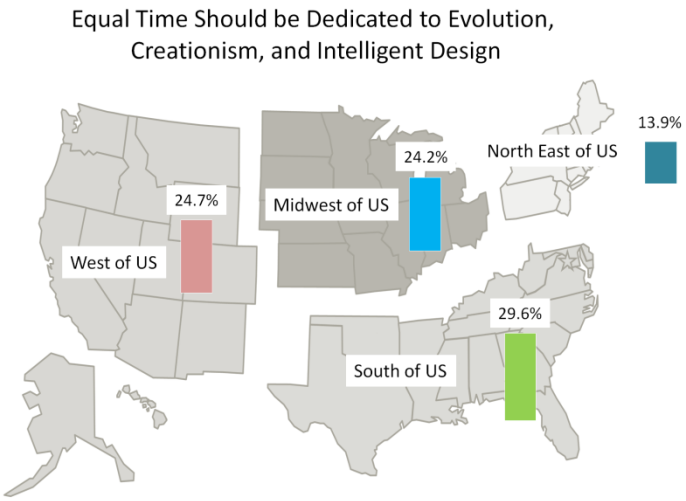


5) Although the majority [r = 74 – 92%] of educators knew that *all current living organisms are descendants of common ancestors, which have evolved for thousands, millions or billions of years*, only three-to-five [as per US Region] in every ten educators knew (or accepted) that *humans are apes, relatives of chimpanzees, bonobos, gorillas and orangutans* (image left). Only three-to-four in every ten educators rejected —correctly— the statement that *the origin of the human mind and consciousness cannot be explained by evolution*. And about half or more-than-half [r = 47 – 69%] of the educators thought —wrongly— that *the universe, our solar system and planet Earth are finely tuned to embrace human life*.

6) The majority [*r* = 87 – 93%] of educators knew that *the Earth and its moon are several billions of years old*. The majority [*r* = 54 – 82%] also agreed that *the concept of evolution applies to the origin and processes of change in the universe, the galaxies, solar systems and planets*. However, two-to-three in every ten educators thought —wrongly— that *our sun is the center of the universe*. Moreover, three-to-five in every ten educators did not know (or accepted) that *a future catastrophic collision between Earth and a large asteroid or comet will happen*.

7) The majority [*r* = 53 – 72%] of educators agreed that *hearing about evolution* [made them] *appreciate the factual explanation about the origin of life on Earth and its place in the universe*. However, at least one in every five educators agreed that *hearing about evolution made no difference to her/him because evolution and creationism are in harmony*. One in every ten educators in the West or South of the US agreed that *hearing about evolution made her/him realize how wrong scientists are concerning explanations about the origin of life on Earth and its place in the universe*.

8) Opinions about Intelligent Design (*ID* = design creationism; = Designer responsible for the assemblage of complexity in nature) by the educators varied widely and in all surveyed topics. Although in all regions of the US four-to-five in every ten educators were *concerned about the controversy evolution versus creationism versus ID and its implications for science education*, and at least two-to-four in every ten educators conceived *ID* as *not scientific but proposed to counter evolution based on false claims*, and at least three-to-four in every ten educators considered *ID* to be *religious doctrine consistent with creationism*, still 10-22% of educators nationwide believed that *ID is a scientific theory about the origin and evolution of life on Earth*.



9) The majority [*r* = 57 – 78%] of educators supported the exclusive teaching of evolution in science class. One-to-three in every ten educators, however, thought that equal time should be dedicated to evolution, creationism and *ID* in the science class (image left). Eight-to-nine in every ten educators preferred science courses where evolution is discussed comprehensively and humans are part of it.

10) The majority [*r* = 70 – 83%] of educators strongly disagreed or disagreed with the notion that *creationism is a valid scientific alternative to evolutionary explanations for the origin of species*; although one-to-two in every ten educators strongly agreed or agreed with this view.

11) The majority [*r* = 84 – 89%] of educators strongly disagreed or disagreed with the notion that *it is possible to offer an excellent biology college course with no mention of Darwin or Evolution*.

12) The majority [*r* = 61 – 71%] of educators strongly disagreed or disagreed with the notion that *many reputable scientists view creationism and ID as valid alternatives to evolution*. However, one-to-three in every ten educators strongly agreed or agreed with this view.

13) Half or more-than-half [*r* = 49 – 62%] of educators strongly agreed or agreed with the notion that *almost all scientists reject creationism and ID as valid accounts for the origin of species*. However, two-to-four in every ten educators strongly disagreed or disagreed with this view.

14) Three-to-six in every ten educators strongly agreed or agreed with the statement that *evolution is the unifying theme of all sciences*. Opposition to this view was evident in all US regions [*r* = 20 – 37%].

Conclusions and Implications of the Results

• This study is the first to document, comprehensively, the disturbing reality of evolution illiteracy among educators of prospective teachers at 281 colleges and universities in the United States. These highly educated professionals are responsible for mentoring the *teachers-to-be* in the American school system. Their hesitation to embrace evolution resides in a deficient understanding of science/evolution and high religiosity.

• Belief in the supernatural disrupts, distorts, delays and stops the comprehension and acceptance of scientific evidence; this study demonstrates that highly-educated faculty —the educators of prospective teachers— are influenced by creationist- and pseudo-science views, which act as cultural pollutants on the assessment of science/evolution principles.

• The controversy over evolution-and-science versus creationism —and all its forms— is ultimately inherent to the incompatibility between scientific rationalism/empiricism and the belief in supernatural causation. The Incompatibility Hypothesis (*IH*) does help us understand and explain the everlasting and fluctuating antagonism in the relationship between science/evolution and religion. As we have stated in our previous studies '*...Harmonious coexistence between science/evolution and religion is illusory. Societies will struggle, indefinitely, to achieve long-lasting camaraderie between science and religion. If co-persisting in the future, the relationship between science and religion will fluctuate between moderate and intense antagonism*.'

Recommendations

• The educators of prospective teachers in the US need to reach comparable levels of understanding science/evolution and accepting evolution to those of the non-educator professors; all highly educated college and university faculty in the US, regardless of field of specialization, should have similar science/evolution literacy.

• The ubiquitous disconnect between the education departments and the rest of the academic fields at the US colleges and universities is concerning, and it requires immediate approach between the educators and the research faculty.

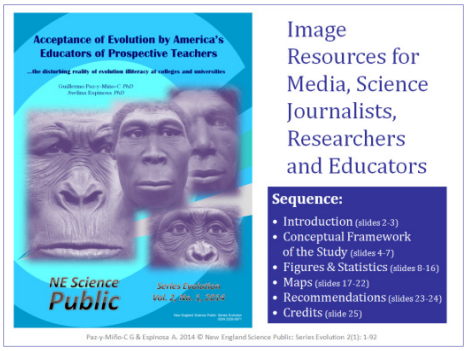
• Education departments at colleges and universities in the US need to fortify the on-the-job- science/ evolution training of their educators of prospective teachers.

• It is crucial that the educators of prospective teachers lead the institutional (their own colleges and universities), regional and national strategies to secure proper science/evolution education among the prospective teachers who earn degrees under their guidance. As university professors, the educators of prospective teachers are less vulnerable to institutional or societal reprisal for leading the teaching of evolution than their academic progeny of young teachers. The educators of future educators are as responsible for sponsoring proper science/evolution training to the prospective teachers as the latter are of acquiring and communicating that knowledge to their students.

• Educators of prospective teachers need to study the legal protection that guarantees proper science/ evolution education at all academic levels and make that information available to the prospective teachers as part of their regular training.

• Educators of prospective teachers need to monitor the antievolution movements that grow strong among misinformed citizens, vary in impact geographically, and benefit from the disconnect between highly-educated audiences, like educators-of-prospective-teachers/science-faculty, and society. The educators of prospective teachers must take the lead in conceptualizing and strategizing the civil discourse and societal action to ensure internationally competitive science/evolution literacy in the US.

Guillermo Paz-y-Miño-C *PhD*
Avelina Espinosa *PhD*



* This 92-page study includes 23 figures with histograms, pie-graphs and statistics; 34 maps and 12 tables. The supplementary materials include 15s figures and 25s tables. A PDF slide show '*Media Resources'* is available for science journalists, researchers and educators:

http://docs.rwu.edu/nesciencepublicevolution
NE_SciPublic@rwu.edu

ACCEPTANCE OF EVOLUTION BY AMERICA'S EDUCATORS OF PROSPECTIVE TEACHERS

Guillermo Paz-y-Miño-C *PhD*
Department of Biology, University of Massachusetts Dartmouth, North Dartmouth 02747, USA – *gpazymino@umassd.edu*
New England Science Public and the New England Center for the Public Understanding of Science – *NE_SciPublic@rwu.edu*

Avelina Espinosa *PhD*
Department of Biology, Roger Williams University, Bristol 02809, USA – *aespinosa@rwu.edu*
New England Science Public and the New England Center for the Public Understanding of Science – *NE_SciPublic@rwu.edu*

Introduction

The fact of evolution is accepted by the scientific community worldwide. Evolution is true:

> "The '*concept of evolution'* helps us understand the gradual process by which the universe changes, it includes the origin of life, its diversification and the phenomena resulting from the interaction between life and the environment... The '*theory of evolution*' (Greek *theoria*) provides naturalistic explanations of empirical observations; it organizes them in a comprehensive system with central and auxiliary hypotheses. From the epistemological perspective (Greek *episteme*, epistemology = theory of knowledge), the theory of evolution encompasses the nature and scope of knowledge about the *phenomenon of evolution* (= what really happens, the fact), including the chronological discoveries by naturalists and scientists during the development of our cumulative understanding of how evolution works. Scholars call the latter '*theory of evolution*,' which epistemological beginning is [often and arguably] attributed to the mid and late 1800s, and to Charles Darwin and Alfred R. Wallace, as the main contributors to the conceptualization of evolution at the mechanistic level (= natural selection). But the phenomenon of evolution is ongoing, precedes Darwin and Wallace in billions of years, and it shall continue, with comparable magnitude, in time and space. The *concept of evolution*, therefore, is about the occurrence of evolution (i.e. aggregation of matter, the emergence of organic compounds from simpler molecules, the formation of self-replicating macro-molecules, the encasing of chemical reactions within the boundaries of lipid-layered membranes, the formation of cells and their reproduction and differentiation, and the diversification of uni- and multi-cellular life) and it helps us understand and represent cognitively —via mental symbolism and abstraction— the reality of evolution. Our understanding of evolution improves with new discoveries, but the reality of evolution continues to exist regardless of our awareness and level of understanding of it."
>
> Adapted from Paz-y-Miño-C G. & Espinosa A. 2011a. On The Theory Of Evolution Versus The Concept Of Evolution: Three Observations. *Evolution: Education & Outreach* 4: 308–312.

We have postulated that the controversy over evolution-and-science versus creationism is inherent to the incompatibility between scientific rationalism/empiricism and the belief in supernatural causation (Paz-y-Miño-C & Espinosa 2013a, 2012a). This hypothesis (= incompatibility) helps us understand and explain the everlasting and fluctuating antagonism —in cycles, from moderate to intense opposition during human history— in the relationship between science/evolution (= empirical knowledge) and religion (Paz-y-Miño-C & Espinosa 2013a, in press).

The incompatibility hypothesis (*IH*) has three major predictions (Paz-y-Miño-C & Espinosa in press): (1) *Chronological-conflict-and-accommodation*, which explains the historical emergence of antagonism between evolution and religion when advances in science continue to challenge the belief in supernatural causation; in such situations, subsequent and gradual accommodation —by creationists— to the new scientific discoveries is expected; however, the clashes are destined to continue for as long as belief in the supernatural persists. Intrinsic to this prediction is the expectation of differential level of conflict —high or low— between evolution and *proximate* or *distant creationism* (i.e. a Creator/Designer of the universe omnipresent in the *foreground* of causality or far-away in the cosmic *background*, but still maker of the laws of nature). (2) *Change in evolution's acceptance as function of educational attainment*, which explains the positive association between acceptance of evolution and overall level of education. The underlying assumption of this prediction is that proper, comprehensive formal education leads to an organized exposure to subject content, rational assessment of facts, critical thinking, and adoption of an educated position in respect to evolution. And (3) *Change in evolution's acceptance as function of religiosity*, which explains the negative association between acceptance of science/evolution and level of religious beliefs; in essence, the higher the level of belief in the supernatural the lower the level of acceptance of science/evolution.

Predictions 2 and 3 are directly relevant to this study (for a comprehensive discussion of the *IH*'s predictions see Paz-y-Miño-C & Espinosa in press). Here we document the patterns of acceptance of evolution of 495 *Educators of Prospective Teachers* affiliated with 281 colleges and universities widely distributed in 4 regions, 9 divisions, and 50 states in the United States (Tables 1 and S1). These higher-education professionals were polled (= online surveys distributed via email, see Methods) in five areas: (1) their views about evolution, creationism and Intelligent Design, (2) their understanding of

how science and the evolutionary process work, (3) their position about the hypothetical 'harmony or compatibility' between science/evolution and supernatural causation, (4) their awareness of the age of the Earth, its moon, our solar system and the universe, and the application of the concept of evolution to the cosmos, and (5) their personal convictions concerning the evolution and/or creation of humans in the context of the responders' religiosity.

In previous studies (Paz-y-Miño-C & Espinosa 2013b, 2012b, 2011b, 2009a,b), we characterized the attitudes toward science/evolution by research faculty, educators of prospective teachers, and college students in the historically progressive New England states (i.e. Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island and Vermont). Note that in Northeastern US favorable views toward evolution are the highest nationwide, only 59% (The Pew Research Center For The People & The Press 2005). Although we documented proper understanding of the foundations of science/evolution by the researchers (Paz-y-Miño-C & Espinosa 2011b), we also detected hesitation to embrace science/evolution by the educators of prospective teachers due to deficient understanding of science/evolution and high religiosity (Paz-y-Miño-C & Espinosa 2012b). The students ranked —as we expected— third in science/evolution literacy in respect to the researchers (first) and the educators (second; Paz-y-Miño-C & Espinosa 2009a,b). Religiosity was noteworthy in each of these populations: 29.0% of the researchers, 41.5% of the educators, and 37.3% of the students considered *religion to be very important in their lives* (Paz-y-Miño-C & Espinosa 2013b, 2012b, 2011b).

In agreement with predictions 2 and 3 of *IH* (above), we also found that: acceptance of evolution increased with academic level among the college students (from Freshman to Senior years, Paz-y-Miño-C & Espinosa 2009a,b); understanding of science and acceptance of evolution decreased with increasing religiosity in the three populations (= negative association of variables); acceptance of evolution increased with higher levels of understanding science (= positive association of variables); the non-religious reached the highest levels of understanding science and evolution in contrast to the deeply-religious who scored lowest in science- and evolution-literacy parameters (Paz-y-Miño-C & Espinosa 2013b).

Our research, therefore, generated measurable confirmation —under a theoretical framework, i.e. *IH*— that creationist views and the belief in supernatural causation *disrupted*, *distorted*, *delayed* and *stopped* the comprehension and acceptance of scientific evidence (i.e. the *3D+S*, Paz-y-Miño-C & Espinosa in press) even among highly educated audiences at the most academic region in the US. Because the educators of prospective teachers were the least studied population, not only in New England, but nationwide (Paz-y-Miño-C & Espinosa 2012b), we considered crucial to assess the impact of *cultural pollutants* (= unsubstantiated beliefs, e.g. Kahan 2012, but see 2014) on their attitudes toward science/evolution. These educators were [still are] the academic mentors of all the '*teachers-to-be*' enrolled at America's colleges and universities.

ACCEPTANCE OF EVOLUTION, LITERACY IN SCIENCE/EVOLUTION, AND LEVELS OF RELIGIOSITY

For the purpose of statistical comparisons between the nationwide sample of Educators of Prospective Teachers and other populations whose attitudes toward science and acceptance of evolution were already known, below we include some statistical trends characteristic of two groups: New England General Faculty (researchers, non-educators) and New England College Students. Profiles of these groups are available in Paz-y-Miño-C & Espinosa (2012b, 2011b, 2009a,b).

The Educators of Prospective Teachers had an intermediate level of understanding of science/evolution, low acceptance of evolution, and high religiosity in respect to the New England General Faculty, who had high understanding of science/evolution, high acceptance of evolution, and low religiosity (Figure 1). The College Students —a population still in academic training— had low understanding of science/evolution, low acceptance of evolution, and intermediate religiosity.

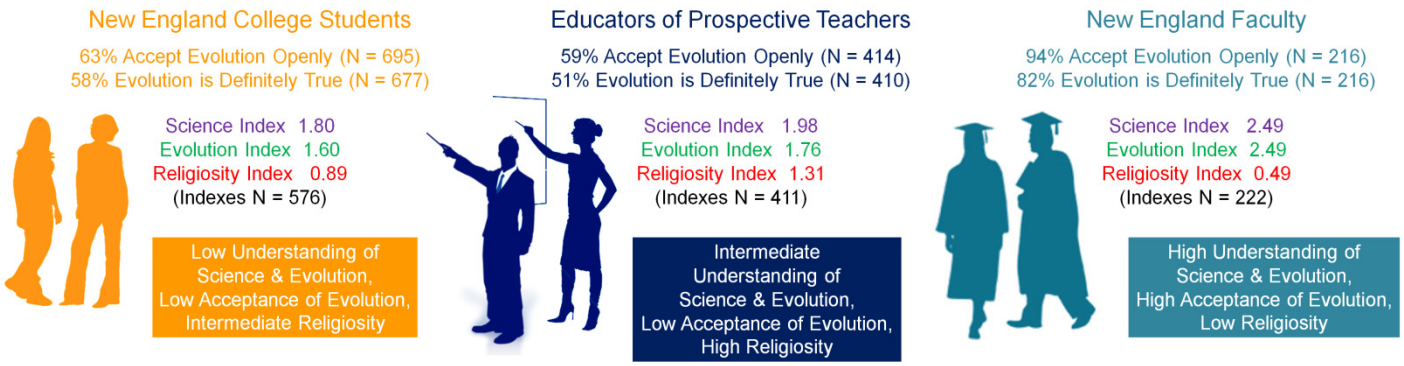


Figure 1 '*Acceptance of Evolution Openly*' and '*Thinking that Evolution is Definitely True*' among Educators of Prospective Teachers in the United States (center). For Comparison, New England College Students (left) and General Faculty (right) Are Depicted; both Have the Highest National Levels of Acceptance of Evolution among Students and University Professors, Respectively. –Total number of responders per group can vary because participants were allowed to skip questions and/or end survey voluntarily at any time (see Methods).

Fifty nine percent (59%) of the Educators of Prospective Teachers, 94% of the New England Faculty and 63% of the College Students *accepted evolution openly*; 51% of the Educators of Prospective Teachers, 82% of the New England Faculty and 58% of the College Students thought that evolution is *definitely true* (Figure 1). The significance of the Science-, Evolution-, and Religiosity-Indexes, also reported in Figure 1, is discussed in the next section.

Quantification of the Interaction between Science-Evolution and Religiosity

To quantitate the levels of religiosity, understanding of science and the evolutionary process, we used three descriptive indexes as characterizers of acceptance of evolution, each ranging from 0 to 3 (least to most religious or knowledgeable about science or evolution, Figure 2; for *conceptual three dimensional landscape* see Box 1): Religiosity Index *RI* (The Pew Global Attitudes Project 2007), Science Index *SI* and Evolution Index *EI* (Paz-y-Miño-C & Espinosa 2013b, 2011b). These indexes are powerful predictors of religious views worldwide (47 countries, The Pew Global Attitudes Project 2007) and of levels of understanding science and the evolutionary process (e.g. sample of 1,133 US adults with diverse academic backgrounds, from college students to university professors; Paz-y-Miño-C & Espinosa 2013a,b, 2012b, 2011b).

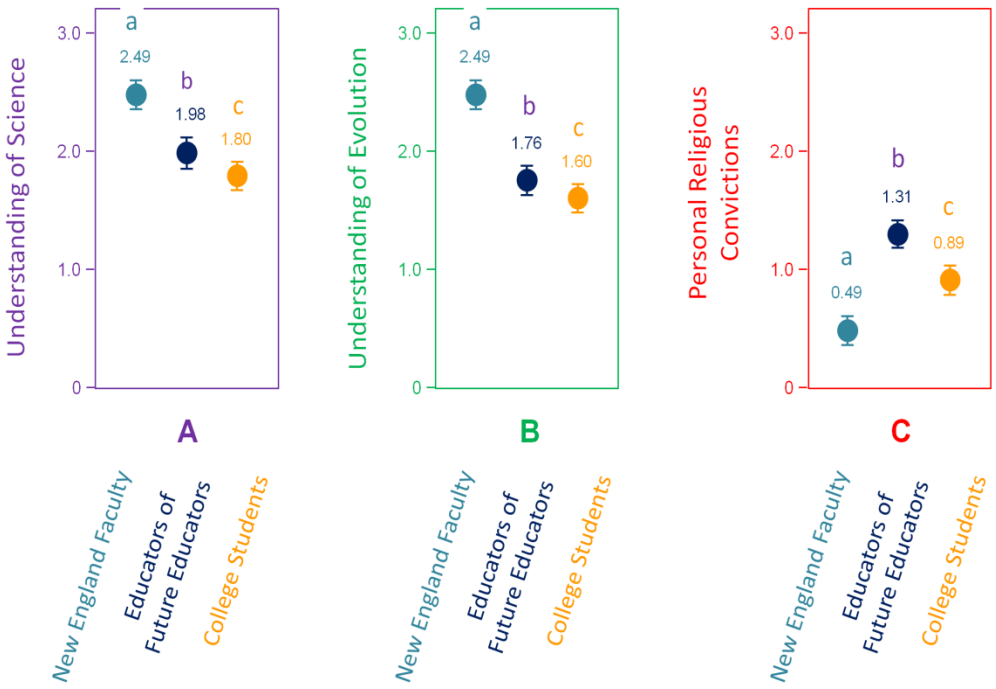


Figure 2 Understanding-of-Science Index (A), Understanding-of-Evolution Index (B), and Personal-Religious-Convictions Index (C) of New England General Faculty (N = 222), Educators of Prospective Teachers in 50 States of the United States (N = 411), and New England College Students (N = 576).

Each index ranges from 0 to 3 (lower to higher levels of understanding of science and evolution, or least to most religious position): A, science index, Kruskal-Wallis one-way ANOVA on ranks, H = 95.024, df = 2, $P \leq 0.001$. B, evolution index, Kruskal-Wallis one-way ANOVA on ranks, H = 174.958, df = 2, $P \leq 0.001$. C, religiosity index, Kruskal-Wallis one-way ANOVA on ranks, H = 84.987, df = 2, $P \leq 0.001$. Lowercase letters indicate Dunn-test two-tail pair-wise comparisons within groups $P \leq 0.05$. Error bars are standard errors. Total number of responders per group can vary because participants were allowed to skip questions and/or end survey voluntarily at any time (see Methods).

Each index relies on examining responses to simple, informative questions:

Religiosity Index *RI* *

+1 if responders believe that *faith in God is necessary for morality*,
+1 if *religion is very important in their lives*, and
+1 if *they pray daily*.

New England Faculty *RI* = 0.49
Educators of Prospective Teachers *RI* = 1.31
College Students *RI* = 0.89

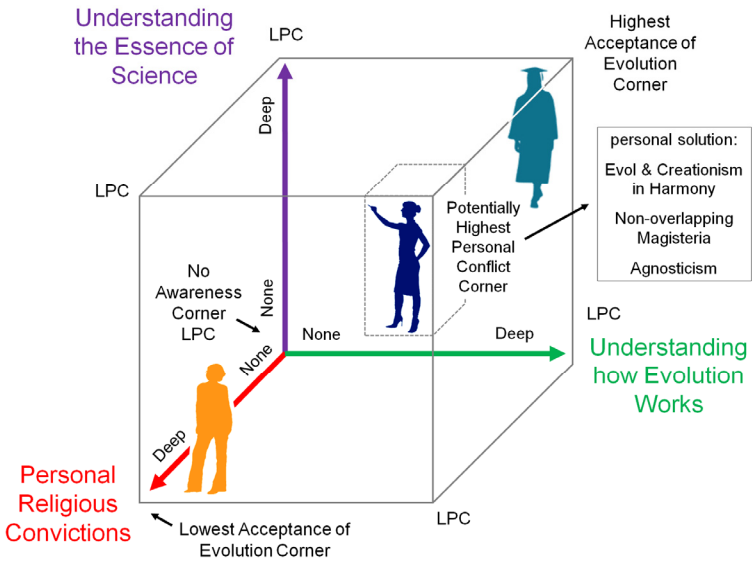
Kruskal-Wallis one-way ANOVA on ranks, H = 84.987, df = 2, $P \leq 0.001$ (Figure 1)

Science Index *SI* *

+1 if responders reject the idea that *scientific theories are based on opinions by scientists*,
+1 if they disagree with the notion that *scientific arguments are as valid and respectable as their non-scientific counterparts*, and
+1 if they reject the statement that *crime-scene and accident-scene investigators use a different type of scientific method to investigate a crime or an accident.*

BOX 1

Conceptual Three Dimensional Landscape Where Acceptance of Evolution is Depicted as Function of Religiosity, Science Awareness and Evolution Literacy



The point zero corresponds to low/none personal religious convictions, understanding how evolution works, or understanding of the essence of science; zero is a *no awareness corner*, with low probability of occurrence (LPC). The tips of the coordinates' arrows correspond to a high/deep religiosity, evolution, or science awareness. The *highest acceptance of evolution corner* (top right) is characterized for its low religiosity and high/deep evolution and science awareness. The *lowest acceptance of evolution corner* (bottom left) is characterized by its high religiosity and low evolution and science awareness. A potentially highest *personal conflict corner* resides at the intersection of high or deep religiosity and evolution and science awareness; this conflict condition can be resolved by the individual adopting comforting positions, such as: evolution and creationism are in harmony, non-overlapping magisteria (*NOMA* = science and religion occupy separate domains, Gould 1999), or agnosticism (doubt about the existence or nonexistence of a deity). Other corners are also labeled LPC due to their low probability of occurrence (adapted from Paz-y-Miño-C G. & Espinosa A. 2012a. Introduction: Why People Do Not Accept Evolution: Using Protistan Diversity to Promote Evolution Literacy. *Journal of Eukaryotic Microbiology* 59: 101-104).

What is Evolution?

The concept of evolution provides naturalistic explanations about the origin of life, its diversification and biogeography, and the synergistic phenomena resulting from the interaction between life and the environment; mutations, gene flow, genetic drift and natural selection shape life's biological processes in Earth's ecosystems. Since the publication of *The Origin of Species by Charles Darwin*, in 1859, Darwinian evolution has been scrutinized experimentally; today the *theory of evolution* is widely accepted by the scientific community. Worldwide, the scientific community recognizes evolution as true.

What is Creationism?

In contrast to evolution, creationism, theistic evolution, creation science or young-earth creationism rely on supernatural causation to explain the origin of the universe and life. These views are not recognized by scientists as evidence-based explanations of empirical reality, or of cosmic processes, which —according to modern understanding of '*cosmic evolution*' (as in Krauss 2010)— do encompass the formation of the universe, the emergence of the simplest elements that transformed into more complex elements and molecules, including prebiotic compounds in our planet and that, ultimately, led to the evolution of molecular diversity and complexity of today's living organisms and ecosystems. Creationism in principle (i.e. admittance that a proximate Creator/Designer of the universe is present in the foreground of causality) or creationism in practice (i.e. believe in a more distant Maker of the laws of nature, responsible for evolution, e.g. BioLogos = *evolutionary creation*) have no empirical support.

What is Intelligent Design?

Born in the 1980s, ID proposes that a Designer is responsible, ultimately, for the assemblage of complexity in biological systems; according to ID, evolution cannot explain holistically the origin of the natural world, nor the emergence of intricate molecular pathways essential to life, nor the immense phylogenetic differentiation of life, and instead ID proposes an intelligent agent as the ultimate cause of nature. In conceptually mistaken, type-I-error-based arguments to discredit evolution, ID has attributed randomness to molecular change, deleterious nature to single-gene mutations, insufficient geological time or population size for molecular improvements to occur, and invoked '*design intervention*' to account for complexity in molecular structures and biological processes (Paz-y-Miño-C & Espinosa 2011c, 2010). In 2005, ID was exposed in court for violating the rules of science by '*invoking and permitting supernatural causation*' in matters of evolution, and for '*failing to gain acceptance in the scientific community*.' Today, '*design creationism*' (= designer/creator-based foundations), although defeated by science and in the courts, grows influential in the US, Europe, Australia and South America.

Adapted from Paz-y-Miño-C G. & Espinosa A. 2013a. The Everlasting Conflict Evolution-And-Science Versus Religiosity. Pp. 73-97. In Simpson G & Payne S (eds). *Religion And Ethics*, NOVA Publishers, New York.

Paz-y-Miño-C G. & Espinosa A. 2013b. Attitudes toward Evolution at New England Colleges and Universities, United States. *New England Science Public: Series Evolution* 1: 1-32.

New England Faculty *SI* = 2.49
Educators of Prospective Teachers *SI* = 1.98
College Students *SI* = 1.80

Kruskal-Wallis one-way ANOVA on ranks, $H = 95.024$, $df = 2$, $P \leq 0.001$ (Figure 1)

Evolution Index *EI* *

+1 if responders reject the idea that *organisms acquire beneficial traits during their lifetimes and then pass on these traits to their descendants*,
+1 if they disagree with the notion that *during evolution monkeys such as chimpanzees can turn into humans*, and
+1 if they reject the statement that *the origin of the human mind and consciousness cannot be explained by evolution*.

New England Faculty *EI* = 2.49
Educators of Prospective Teachers *EI* = 1.76
College Students *EI* = 1.60
Kruskal-Wallis one-way ANOVA on ranks, $H = 174.958$, $df = 2$, $P \leq 0.001$ (Figure 1)

* *RI*, *SI*, *EI*: New England Faculty $N = 222$, Educators of Prospective Teachers $N = 411$, College Students $N = 576$ (Figure 1)

In Figure 3, we plot the *SI*, *EI* and *RI* scores corresponding to the Educators of Prospective Teachers *per region* in the US; for comparison, the indexes of the New England Faculty and College Students are also shown. [The regions match official designations by the US Census Bureau, see Methods].

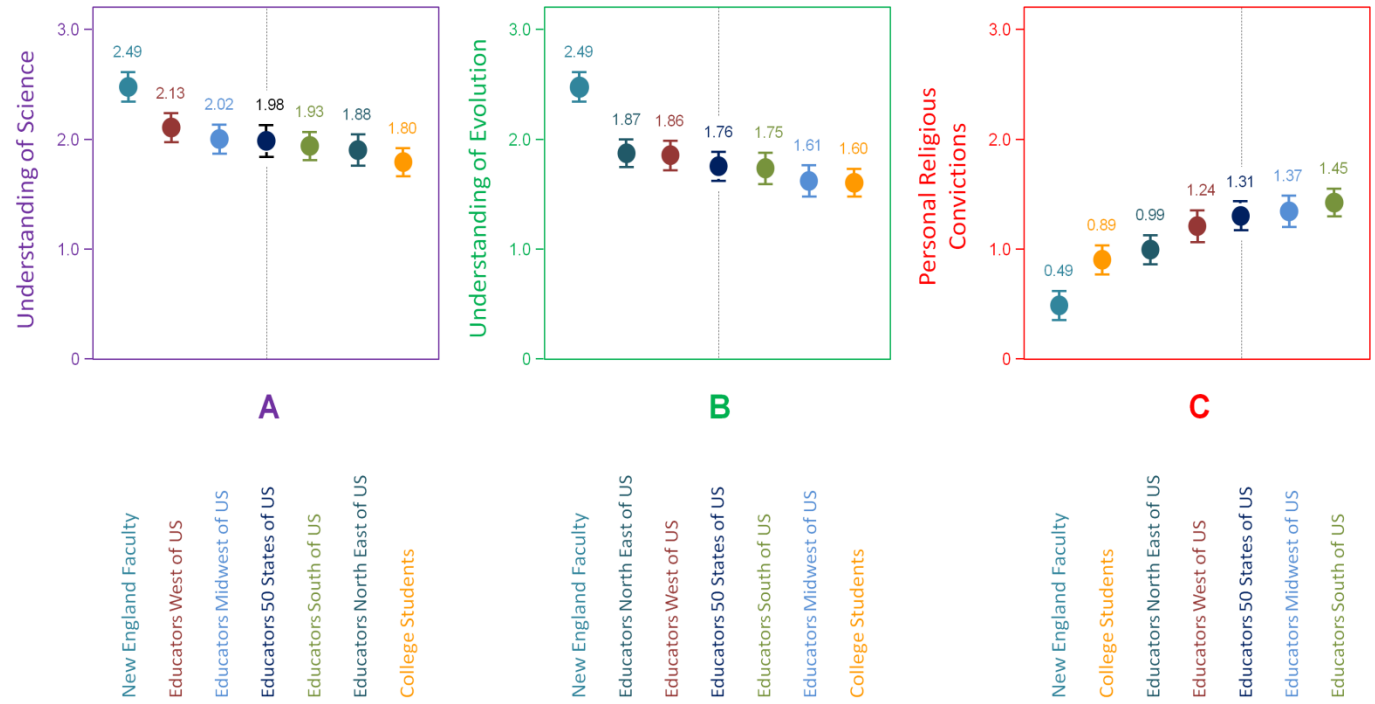


Figure 3 Understanding-of-Science Index (A), Understanding-of-Evolution Index (B), and Personal-Religious-Convictions Index (C) of New England General Faculty ($N = 222$), Educators of Prospective Teachers per Region and in 50 States of the United States ($N = 411$: West $N = 86$, Midwest $N = 84$, South $N = 174$, North East $N = 67$), and New England College Students ($N = 576$). A, science index, Kruskal-Wallis one-way ANOVA on ranks, $H = 101.557$, $df = 6$, $P \leq 0.001$. B, evolution index, Kruskal-Wallis one-way ANOVA on ranks, $H = 182.477$, $df = 6$, $P \leq 0.001$. C, religiosity index, Kruskal-Wallis one-way ANOVA on ranks, $H = 122.644$, $df = 6$, $P \leq 0.001$. Error bars are standard errors. Vertical dashed line indicates placement of Educators' national mean value (= 50 states in the US). Total number of responders per group can vary because participants were allowed to skip questions and/or end survey voluntarily at any time (see Methods).

The data in Figure 3 revealed the following pattern: Educators in the West (*SI* = 2.13) and Midwest (*SI* = 2.02) of the US had levels of understanding science above the mean index for all Educators of Prospective Teachers in the country (*SI* = 1.98, Figure 3A). Educators in the North East (*EI* = 1.87) and West (*EI* = 1.86) had levels of understanding evolution above the national average (*EI* = 1.76, Figure 3B). Educators in all regions of the US were more religious than both the New England Faculty (*RI* = 0.49) and College Students (*RI* = 0.89, Figure 3C). Note that educators in the South (*EI* = 1.75) and Midwest (*EI* = 1.61) ranked below the national mean *EI*, and were the most religious (Midwest *RI* = 1.37; South *RI* = 1.45).

A summary of the Science-, Evolution-, and Religiosity Indexes, per *division* within *regions* of the US, is provided in Table 2. We found overall consistency in the index values per divisions within a region, which suggested reliability of the results (see *Representativeness of the Sample and Statistical Confidence* in Methods).

Level of Religiosity Interacted Negatively with Levels of Understanding Science/Evolution

The levels of understanding science and evolution by the Educators of Prospective Teachers decreased with increasing religiosity (= negative association of variables, Figure 4); in contrast, the levels of understanding evolution increased with increasing understanding of science (= positive association of variables). [A similar pattern was found for the New England Faculty and College Students, data not shown, but see details in Paz-y-Miño-C & Espinosa 2013b].

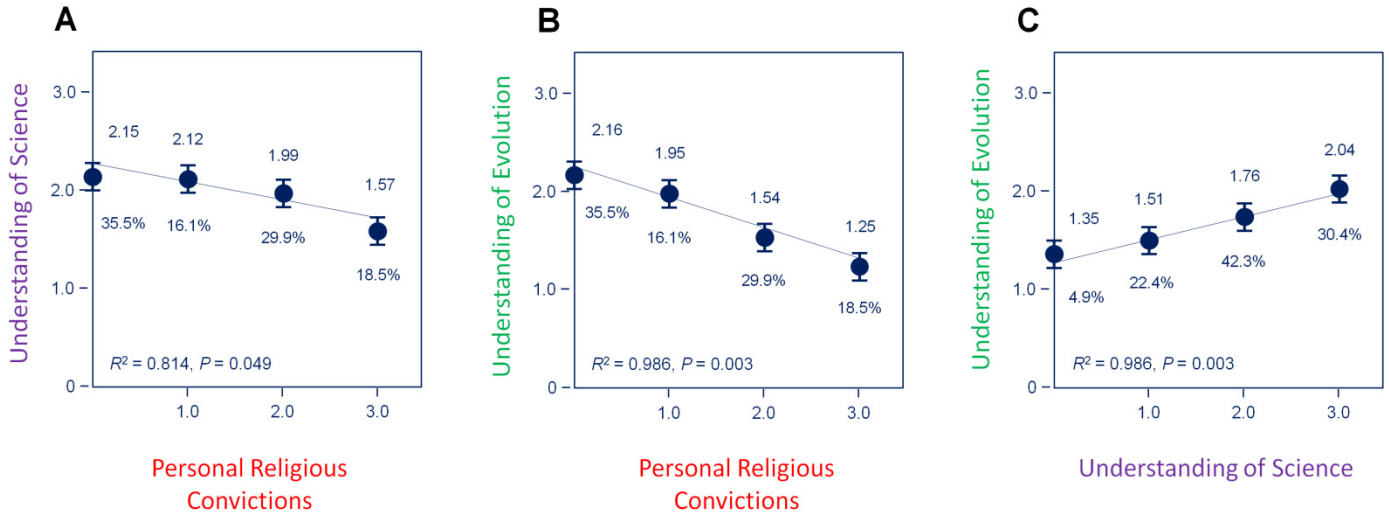


Figure 4 Understanding of Science (A) and Evolution (B) was High Among the Non-religious and Low Among the Deeply Religious Educators of Prospective Teachers in 50 States of the United States; Understanding of Evolution was High Among Those With High Understanding of Science (C), N = 411. Linear regressions one tail: (A) Understanding of Science versus Personal Religious Convictions R^2 = 0.814, P = 0.049; (B) Understanding of Evolution versus Personal Religious Convictions R^2 = 0.986, P = 0.003; (C) Understanding of Evolution versus Understanding of Science R^2 = 0.986, P = 0.003. Total number of responders can vary because participants were allowed to skip questions and/or end survey voluntarily at any time.

The *SI*, *EI* and *RI* patterns reported in Figure 4 were in accordance with our proposal that the interaction between science/evolution literacy and level of religiosity influences an individual's acceptance of evolution: belief in supernatural causation disrupts, distorts, delays and stops comprehension/acceptance of evidence (Paz-y-Miño-C & Espinosa in press).

How Did the Non-Religious Differ in their Understanding of Science/Evolution from the Religious?

Thirty five percent (35.5%) of the Educators of Prospective Teachers scored 0.0 in religiosity, in contrast to 69.8% of the New England Faculty, and 53.5% of the College Students. Figure 5 depicts the levels of understanding science and evolution as function of no-religiosity. The colored areas in the circles correspond to the percentage of the non-religious responders in respect to the total number of individuals surveyed within groups. The center of each circle is aligned with the levels of understanding science or evolution (Science Index *SI* or Evolution Index *EI*, respectively, as in Figure 2), values shown on the vertical axis. Note how, for the non-religious New England Faculty, the Science and Evolution Indexes were high (*SI* = 2.59 and *EI* = 2.53), for the Educators of Prospective Teachers, the scores were intermediate (*SI* = 2.15 and *EI* = 2.19), and for the College Students, a population in academic training, both indexes were below 2.0.

In Figure 6, we plotted the levels of understanding science for the non-religious Educators of Prospective Teachers as per US-region, the following pattern emerged: Educators in the Midwest (*SI* = 2.22), West (*SI* = 2.19), and North East (*SI* = 2.15) of the US had levels of understanding science above, or similar to, the mean index for all the non-religious educators in the country (*SI* = 2.15). Only educators in the South (*SI* = 2.10) had levels of understanding science below the national average. Educators in each of the US-regions had Science Indexes below the New England Faculty's, although higher than the College Students'.

In Figure 7, we plotted the levels of understanding evolution for the non-religious Educators of Prospective Teachers as per US-region, the following pattern emerged: Educators in the West (*EI* = 2.48) and North East (*EI* = 2.24) of the US had levels of understanding evolution above the mean index for all the non-religious educators in the country (*EI* = 2.19). Educators in the South (*EI* = 2.15) and Midwest (*EI* = 1.93) had levels of understanding evolution below the national

average. Educators in each of the US-regions had Evolution Indexes below the New England Faculty's, although higher than the College Students'.

Note that, only in the North East of the US, one in every two educators (49.3%) was non-religious, in contrast to 36.0% in the West, 32.1% in the Midwest, and 31.6% in the South. These percentages differed from the 69.8% of the New England Faculty and 53.3% of the College Students who were non-religious (Figures 6-7). [For detailed by-region and by-division statistics of *SI* and *EI* for the non-religious educators see Tables S2 and S3].

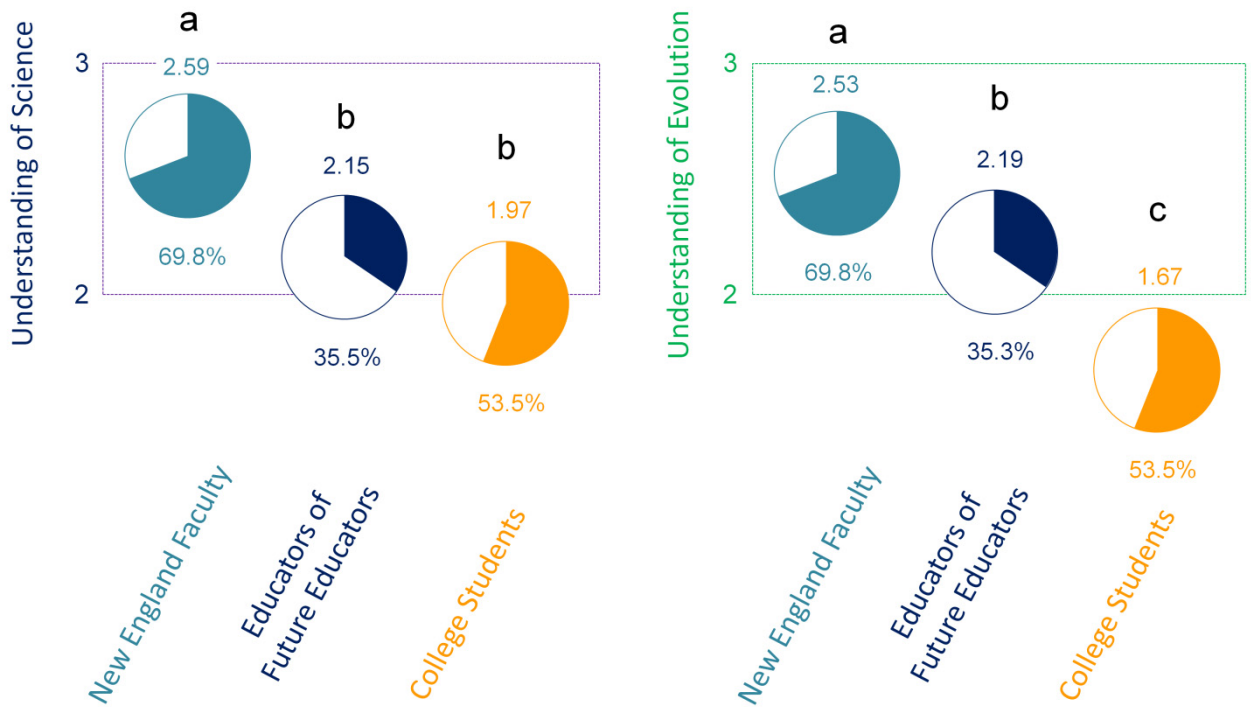


Figure 5 Understanding of Science and Evolution as Percentile of the Non-religious. The Majority of New England Faculty and College Students Scored Zero in Religiosity, but Only One Third of the Educators of Prospective Teachers Did. For understanding of science: Kruskal-Wallis one-way ANOVA on ranks, $H = 57.256$, $df = 2$, $P \leq 0.001$. For understanding of evolution: Kruskal-Wallis one-way ANOVA on ranks, $H = 114.006$, $df = 2$, $P \leq 0.001$. Lowercase letters indicate Dunn-test two-tail pair-wise comparisons within groups $P \leq 0.05$. New England Faculty $N = 155$, Educators of Prospective Teachers $N = 146$, College Students $N = 308$. Total number of responders per group can vary because participants were allowed to skip questions and/or end survey voluntarily at any time.

One in every five (18.5%) Educators of Prospective Teachers scored high in religiosity (*RI* = 3.0), in contrast to only 3.2% of the New England Faculty, and 12.3% of the College Students (Figure 8). Note that, in contrast to Figure 5, the understanding of science and evolution were particularly low among the deeply religious responders in the three groups (*SI* and *EI* equal to or below 2.0); for the religious Educators of Prospective Teachers the *SI* (= 1.58) and *EI* (= 1.10) scores were even lower than for the students' (*SI* = 1.32, *EI* = 1.35). Although, the number of very religious researchers was in the single digits (New England Faculty $N = 7$), the Educators of Prospective Teachers' was noticeable ($N = 76$).

Here it is crucial to highlight that 29.0% of the New England Faculty, 59.5% of the Educators of Prospective Teachers, and 37.3% of the College Students considered the statement *religion is very important in my life* —one of the three statements to assess religiosity— as true (data for the educators Table 3; data for the researches and students not shown, but see details in Paz-y-Miño-C & Espinosa 2012b).

In Figure 9, we plotted the levels of understanding science for the deeply-religious Educators of Prospective Teachers as per US-region, the following pattern emerged: Educators in the West (*SI* = 2.21) and Midwest (*SI* = 1.67) of the US had levels of understanding science above the mean index for all the deeply-religious educators in the country (*SI* = 1.58). Educators in the North East (*SI* = 1.38) and South (*SI* = 1.36) had levels of understanding science below the national average. Except for the educators in the West (*SI* = 2.21), all other educators in each of the US-regions had Science Indexes below the New England Faculty's (*SI* = 2.0), although higher than the College Students' (*SI* = 1.32).

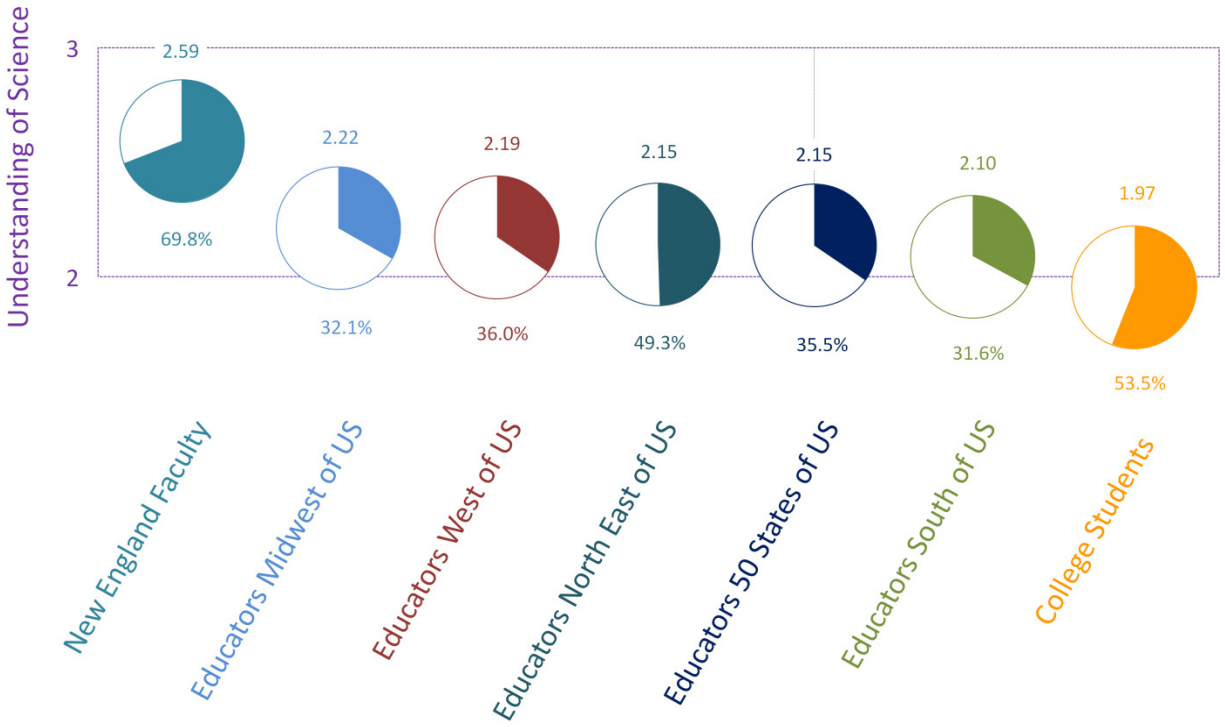


Figure 6 Understanding of Science By Region in the US as Percentile of the Non-religious. Kruskal-Wallis one-way ANOVA on ranks, $H = 59.775$, $df = 6$, $P \leq 0.001$. New England Faculty $N = 155$, Educators Midwest $N = 27$, Educators West $N = 31$, Educators North East $N = 33$, Educators 50 states $N = 146$, Educators South $N = 55$, College Students $N = 308$. Vertical dashed line indicates placement of Educators' national mean value. Total number of responders per group can vary because participants were allowed to skip questions and/or end survey voluntarily at any time.

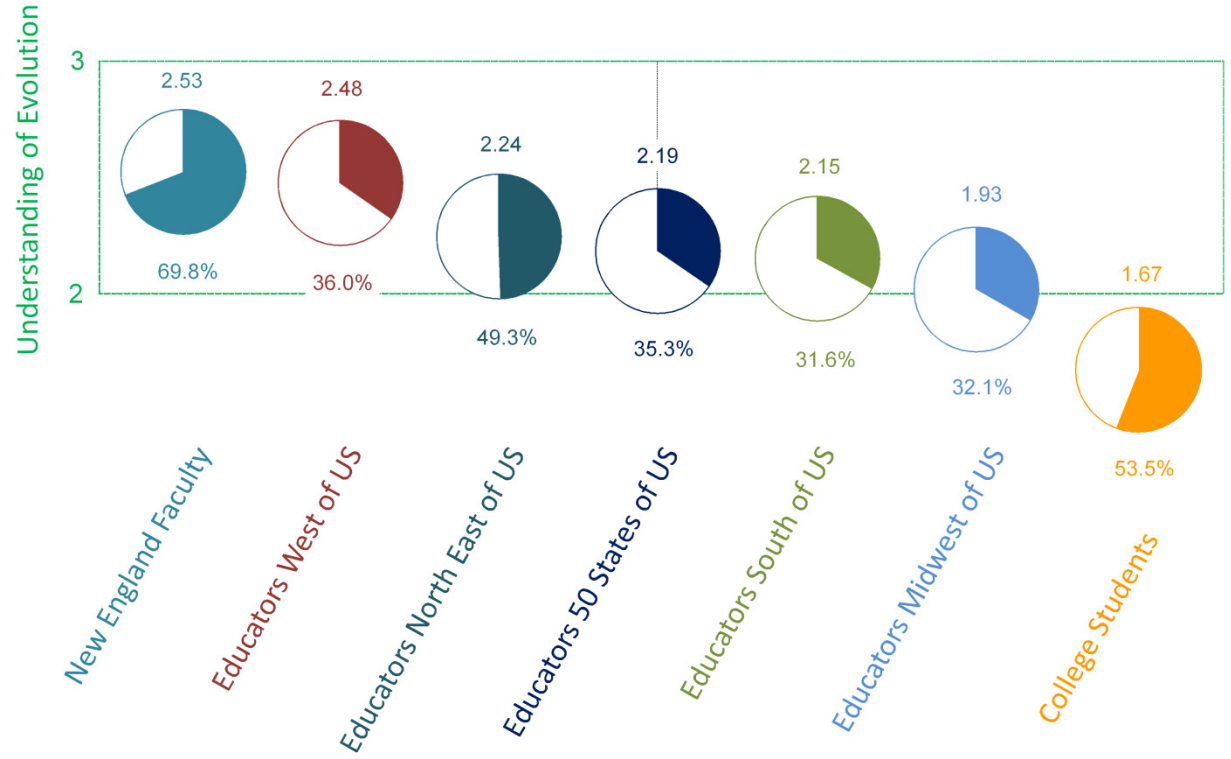


Figure 7 Understanding of Evolution By Region in the US as Percentile of the Non-religious. Kruskal-Wallis one-way ANOVA on ranks, $H = 127.896$, $df = 6$, $P \leq 0.001$. New England Faculty $N = 155$, Educators Midwest $N = 27$, Educators West $N = 31$, Educators North East $N = 33$, Educators 50 states $N = 146$, Educators South $N = 55$, College Students $N = 308$. Vertical dashed line indicates placement of Educators' national mean value (= 50 states in the United States). Total number of responders per group can vary because participants were allowed to skip questions and/or end survey voluntarily at any time.

In Figure 10, we plotted the levels of understanding evolution for the deeply-religious Educators of Prospective Teachers as per US-region, the following pattern emerged: Educators in the South (*EI* = 1.31) and Midwest (*EI* = 1.20) of the US had levels of understanding evolution above the mean for all the deeply-religious educators in the country (*EI* = 1.10). Educators in the North East (*EI* = 1.0) and West (*EI* = 0.43) had levels of understanding evolution below the national average. Interestingly, educators in each of the US-regions had *EI*s below both the New England Faculty's (*EI* = 2.0) and the College Students' (*EI* = 1.35).

Note that educators in each of the US regions (i.e. South 22.4%, Midwest 17.9%, West 16.3%, North East 11.9%) were more religious than the New England Faculty (3.2%) or the College Students (12.3%, except North East, Figures 9-10). [For detailed by-region and by-division statistics of *SI* and *EI* for the deeply-religious educators see Tables S4 and S5].

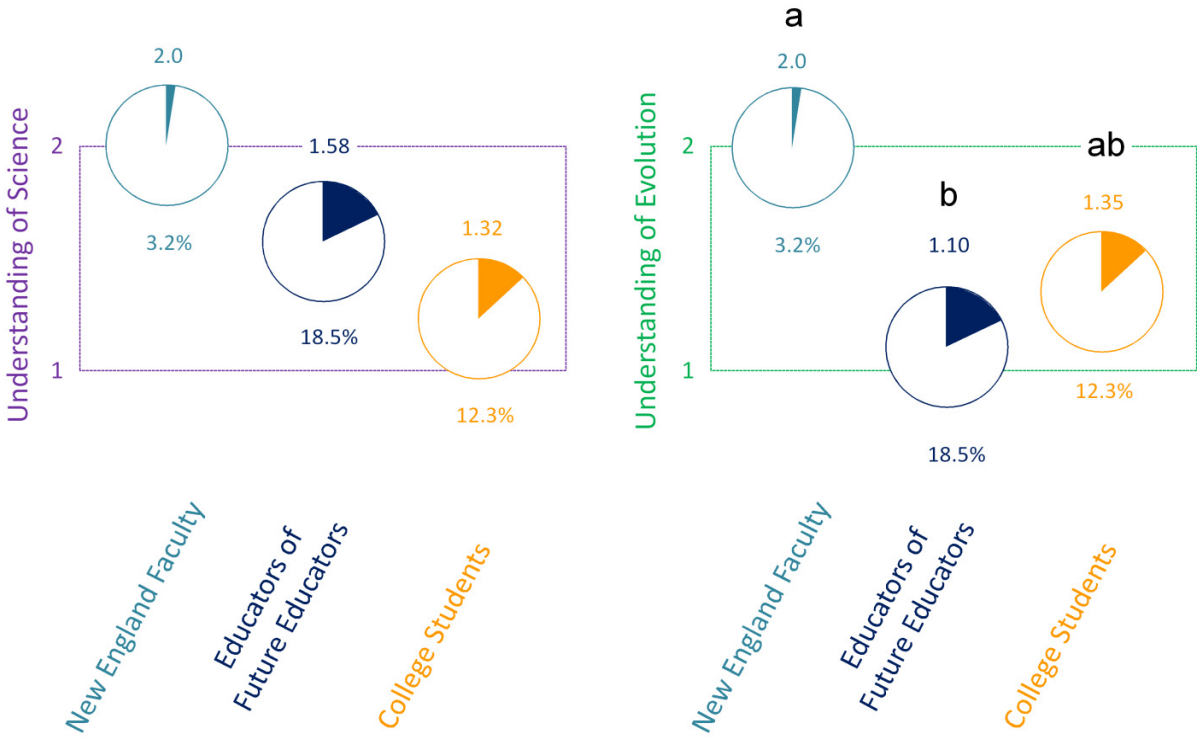


Figure 8 Understanding of Science and Evolution as Percentile of the Deeply-religious. A Minority of New England Faculty Scored High in Religiosity. However, One in Every Five Educators of Prospective Teachers and One in Every Ten Students Were Deeply Religious. For understanding of science: Kruskal-Wallis one-way ANOVA on ranks, $H = 4.644$, $df = 2$, $P = 0.098$. For understanding of evolution: Kruskal-Wallis one-way ANOVA on ranks, $H = 10.223$, $df = 2$, $P = 0.006$. Lowercase letters indicate Dunn-test two-tail pair-wise comparisons within groups $P \leq 0.05$. New England Faculty $N = 7$, Educators of Prospective Teachers $N = 76$, College Students $N = 71$. Total number of responders per group can vary because participants were allowed to skip questions and/or end survey voluntarily at any time.

Open versus Private Acceptance of Evolution/Creationism – Is Evolution True or Probably True?

More than half of the Educators of Prospective Teachers, in all US-regions, accepted evolution openly (Figure 11A), as follows: West 67.4%, North East 66.8%, Midwest 58.3%, and South 52.6%. Creationism was accepted openly mainly in the South (20.6%) and West (12.8%) of the US (Figure 11B). [For detailed by-region and by-division statistics on acceptance of evolution versus creationism, see Figure S1 and Table S6, respectively; for definitions of evolution/creationism see Box 1].

Open acceptance of evolution was higher among educators affiliated with public (63.6%) or private non-religious (60.3%) institutions than among those affiliated with religious colleges/universities (40.3%, Figure 12). Only educators affiliated with religious institutions had lower acceptance of evolution than the national average (59.2%). One in every three (30.7%) educators affiliated with religious institutions was openly creationist. [For detailed by-region and by-division statistics on acceptance of evolution versus creationism at public, private non-religious and religious institutions, see Tables S7-S9; for female versus male comparisons see Table S10].

More than half of the educators in the North East (64.2%) and West (56.9%) of the US thought that *evolution is definitely true*. In contrast, about half or less than half of the educators in the Midwest (48.8%) or South (46.2%) agreed with that view (Figure 11C). Agreement with the statement *evolution is probably true* was conspicuous in the Midwest (42.9%) and South (30.6%; Figure 11D). [For detailed by-region and by-division statistics on agreement with the likelihood of evolution, i.e. *evolution is definitely true* or *probably true*, see Figure S2 and Tables S11; for sex comparisons see Table S12].

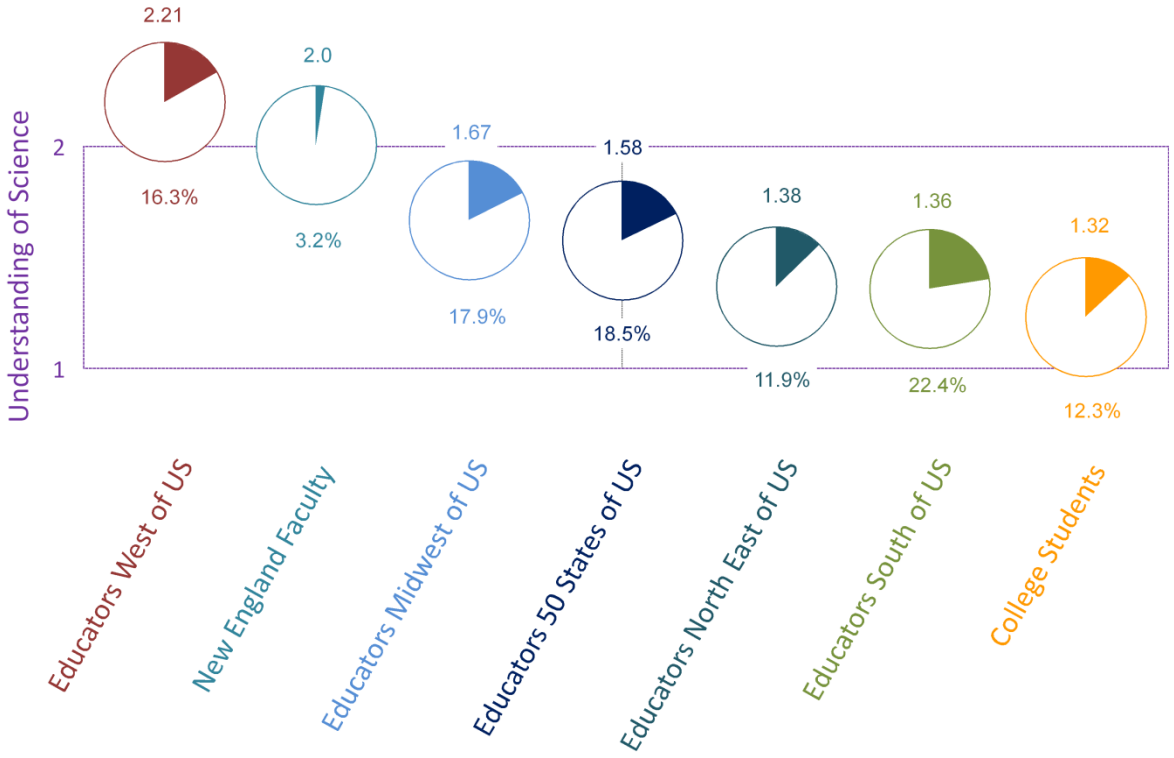


Figure 9 Understanding of Science By Region in the US as Percentile of the Deeply-religious. Kruskal-Wallis one-way ANOVA on ranks, H = 13.841, df = 6, P = 0.031. New England Faculty N = 7, Educators Midwest N = 15, Educators West N = 14, Educators North East N = 8, Educators 50 states N = 76, Educators South N = 39, College Students N = 71. Vertical dashed line indicates placement of Educators' national mean value (= 50 states in the US). Total number of responders per group can vary because participants were allowed to skip questions and/or end survey voluntarily at any time.

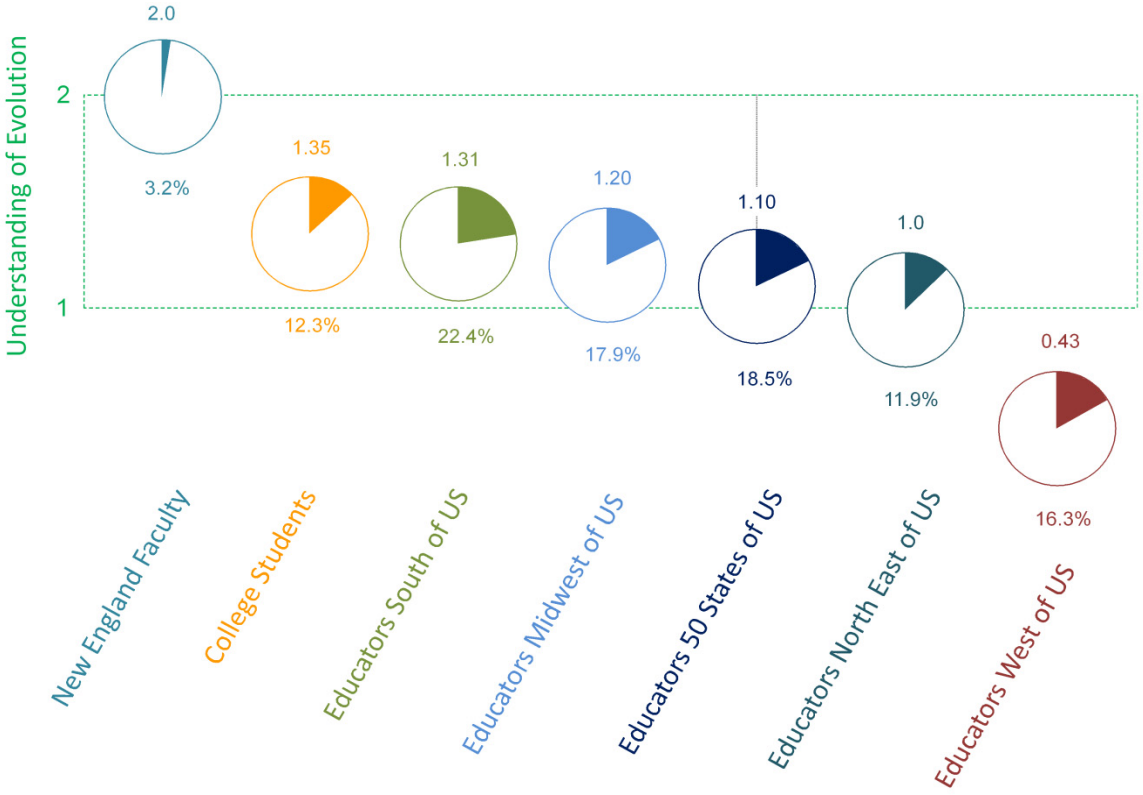


Figure 10 Understanding of Evolution By Region in the US as Percentile of the Deeply-religious. Kruskal-Wallis one-way ANOVA on ranks, H = 26.416, df = 6, $P \leq 0.001$. New England Faculty N = 7, Educators Midwest N = 15, Educators West N = 14, Educators North East N = 8, Educators 50 states N = 76, Educators South N = 39, College Students N = 71. Vertical dashed line indicates placement of Educators' national mean value (= 50 states in the United States). Total number of responders per group can vary because participants were allowed to skip questions and/or end survey voluntarily at any time.

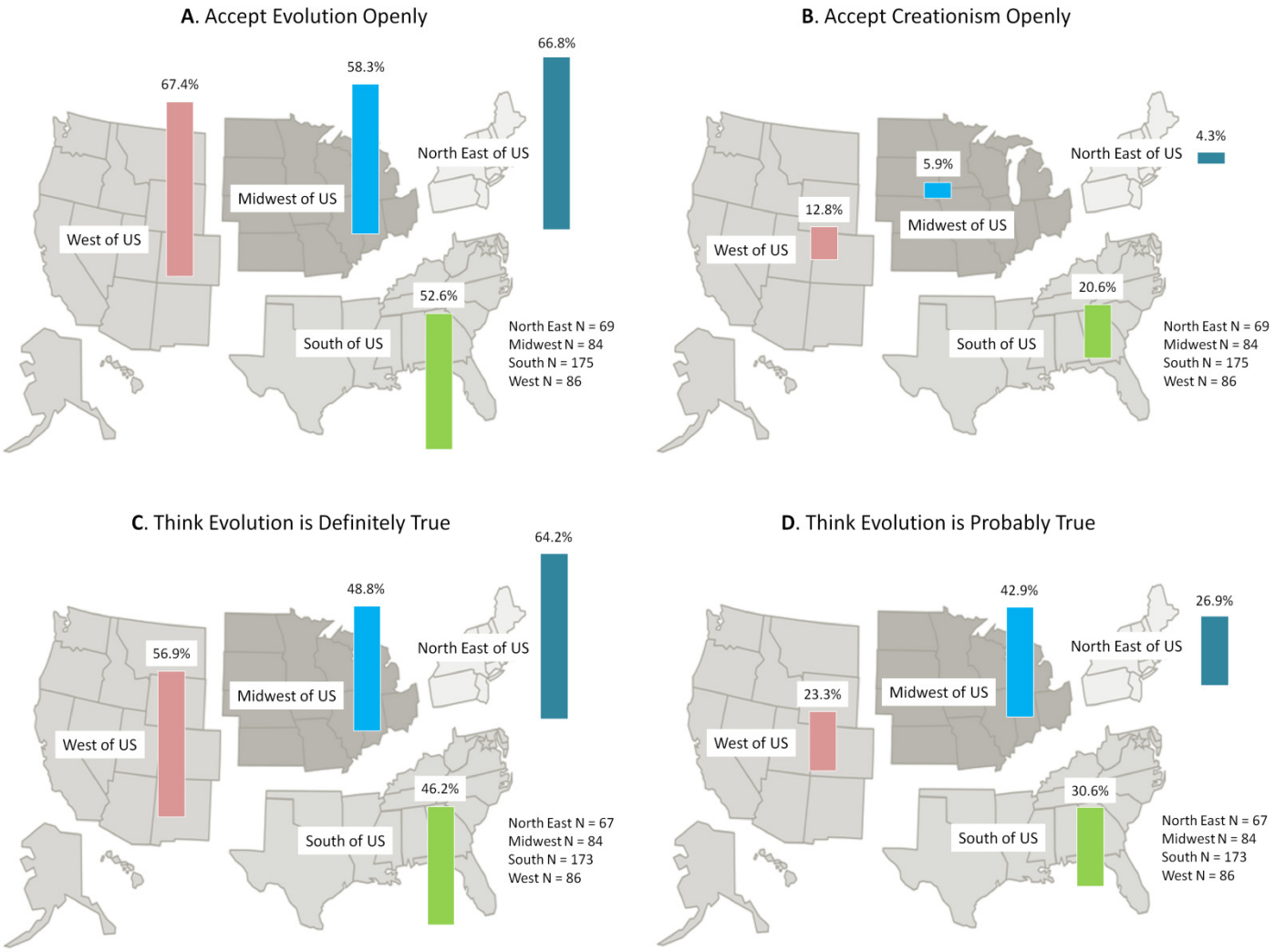


Figure 11 Educators of Prospective Teachers' Views About Evolution and Creationism. Total number of responders per group can vary because participants were allowed to skip questions and/or end survey voluntarily at any time.

Design Creationism or Intelligent Design

Opinions about Intelligent Design (= ID, definition in Box 1) varied widely among the Educators of Prospective Teachers in all US-regions (Figure 13): 51.9% of the educators in the South, 47.4% in the Midwest, 42.4% in the West, and 42.2% in the North East were '*very concerned about the controversy evolution vs. creationism vs. Intelligent Design and its implications for science education*' (Figure 13A). At least one in every three educators considered ID a '*religious doctrine consistent with creationism*' (South 39.8%, North East 39.2%, West 35.1%, Midwest 32.3%, Figure 13B). Agreement with the statement '*Intelligent Design is not scientific but has been proposed to counter evolution based on false claims*' was relatively low (North East 39.2%, Midwest 31.3%, West 28.9%, South 19.9%, Figure 13C). At least one-to-two in every ten educators considered Intelligent Design a '*scientific theory about the origin and evolution of life on Earth*' (South 22.5%, West 16.5%, Midwest 16.2%, North East 10.1%, Figure 13D). These responses suggest different levels of knowledge about and perception of ID. [For detailed by-region and by-division statistics on views about Intelligent Design see Figures S3-S4 and Tables S13-S14].

The Teaching of Evolution in Science Classes – Creationism as Alternative to Evolution in Science Classes

The majority of Educators of Prospective Teachers thought that evolution alone should be taught in science classes (Figure 14A): North East 78.5%, West 69.1%, Midwest 67.7%, and South 57.1%. At least one-to-three in every ten educators agreed with dedicating 'equal time to evolution, creationism and Intelligent Design (South 29.6%, West 24.7%, Midwest 24.2%, North East 13.9%, Figure 14B). Preference for science courses where '*evolution is discussed comprehensively and humans are part of it*' was high in all regions: North East 91.1%, Midwest 88.9%, West 84.5%, and South 81.1% (Figure 14C). [For detailed by-region and by-division statistics on views about the teaching of evolution in science classes, particularly the inclusion of human evolution, see Figures S5-S6 and Tables S15-S16].

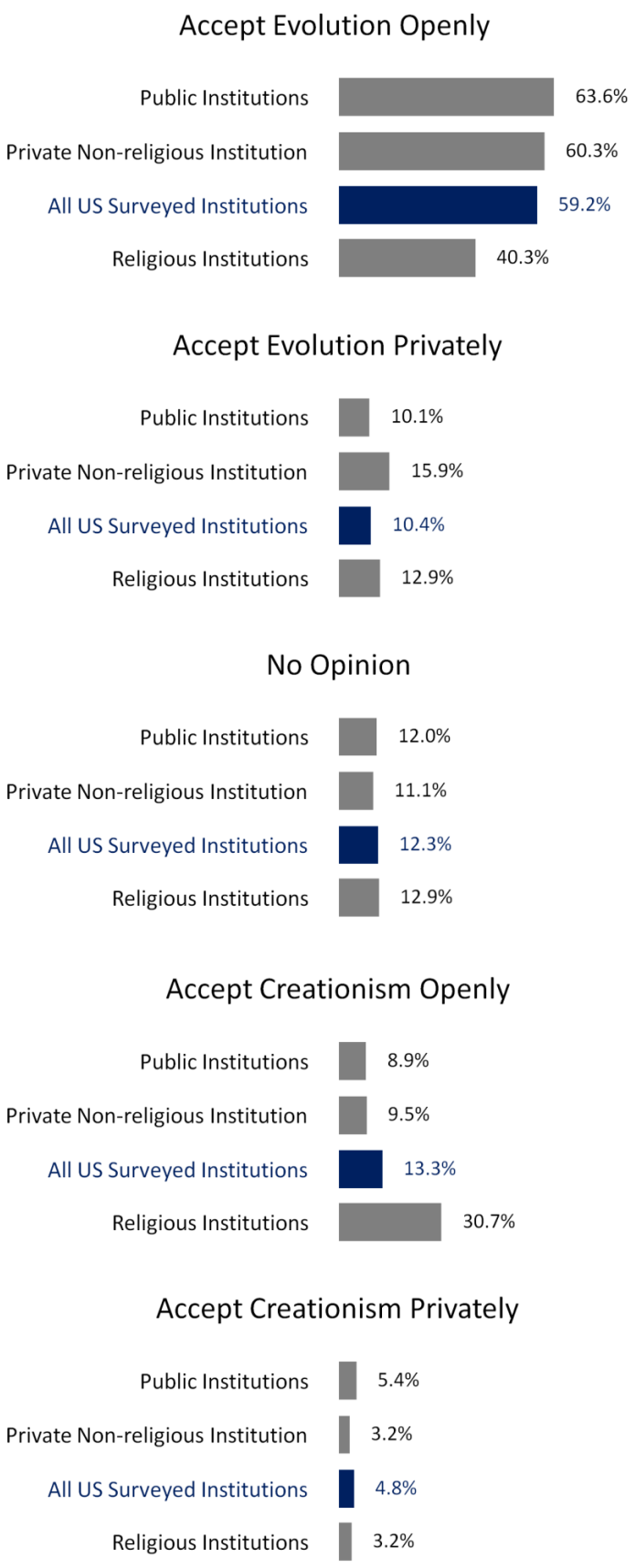


Figure 12 Acceptance of Evolution by Educators of Prospective Teachers was Highest at Public Institutions, Followed by the Non-Religious Private Institutions; Creationism was Accepted Openly Mainly at Religious Institutions. Comparisons among groups: *Chi-square* = 29.541, *df* = 12, *P* = 0.012; Responders Affiliated with Public Institutions *N* = 258, Private Non-religious Institutions *N* = 63, All US Surveyed Institutions *N* = 414, Religious Institutions *N* = 62. Total number of responders per group can vary because participants were allowed to skip questions and/or end survey voluntarily at any time.

One-to-four in every ten educators strongly agreed or agreed with the statement '*creationism is a valid scientific alternative to evolutionary explanations for the origin of species*' (Figure 15A): South 25.2%, West 16.2%, Midwest 14.2%, and North East 8.8%. However, at least three in every four educators strongly disagreed or disagreed with this view (Figure 15B): North East 83.5%, West 80.2%, Midwest 78.5%, and South 70%. [For detailed by-region and by-division statistics on views about creationism as scientific alternative to evolutionary explanations for the origin of species, see Figure S7 and Table S17].

Except for educators in the South of the US, only a minority of responders strongly agreed or agreed with the statement '*it is possible to offer an excellent biology college-course with no mention of Darwin or evolution*' (Figure 16A): South 13.1%, West 8.0%, North East 5.8%, and Midwest 4.6%. However, at least four in every five educators strongly disagreed or disagreed with this view (Figure 16B): West 89.5%, Midwest 86.8%, North East 86.4%, and South 84.9%. [For detailed by-region and by-division statistics on views about offering college biology courses with no mention of Darwin or evolution, see Figure S8 and Table S18].

Perception of 'Reputable Scientists' Endorsement of Creationism and Intelligent Design'

One-to-three in every ten educators strongly agreed or agreed with the statement '*many reputable scientists view creationism and Intelligent Design as valid alternatives to evolution*' (Figure 17A): South 32.7%, West 27.8%, Midwest 23.7%, and North East 13.3%. However, more than half of the educators strongly disagreed or disagreed with this view (Figure 17B): North East 71.5%, West 66.2%, South 61.4%, and Midwest 60.6%. [For detailed by-region and by-division statistics on views about reputable scientists' endorsement of creationism and Intelligent Design, see Figure S9 and Table S19].

When we formulated the statement above in an alternative manner, suggesting rejection of creationism and Intelligent Design by reputable scientists (i.e. '*almost all scientists reject creationism and Intelligent Design as valid accounts for the origin of species*'), half- or more-than half of all educators strongly agreed or agreed with the statement (Figure 18A): North East 62.6%, West 59.2%, Midwest 58.3%, and South 49.9%. In contrast, two-to-four in every ten educators strongly disagreed or disagreed with this view (Figure 18B): South 43.6%, West 30.1%, Midwest 22.7%, and North East 20.8%. [For detailed by-region and by-division statistics, see Figure S10 and Table S20].

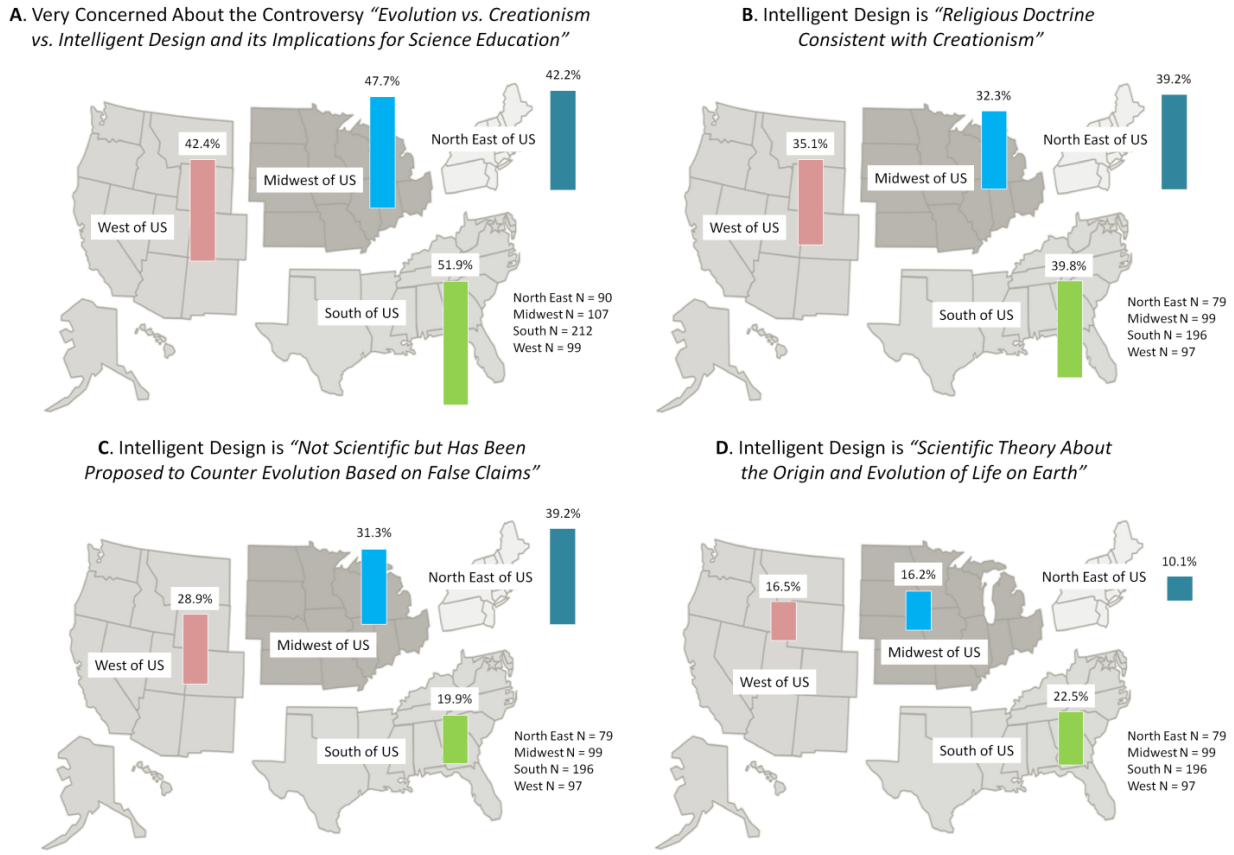


Figure 13 Educators of Prospective Teachers' Views About Intelligent Design. Total number of responders per group can vary because participants were allowed to skip questions and/or end survey voluntarily at any time.

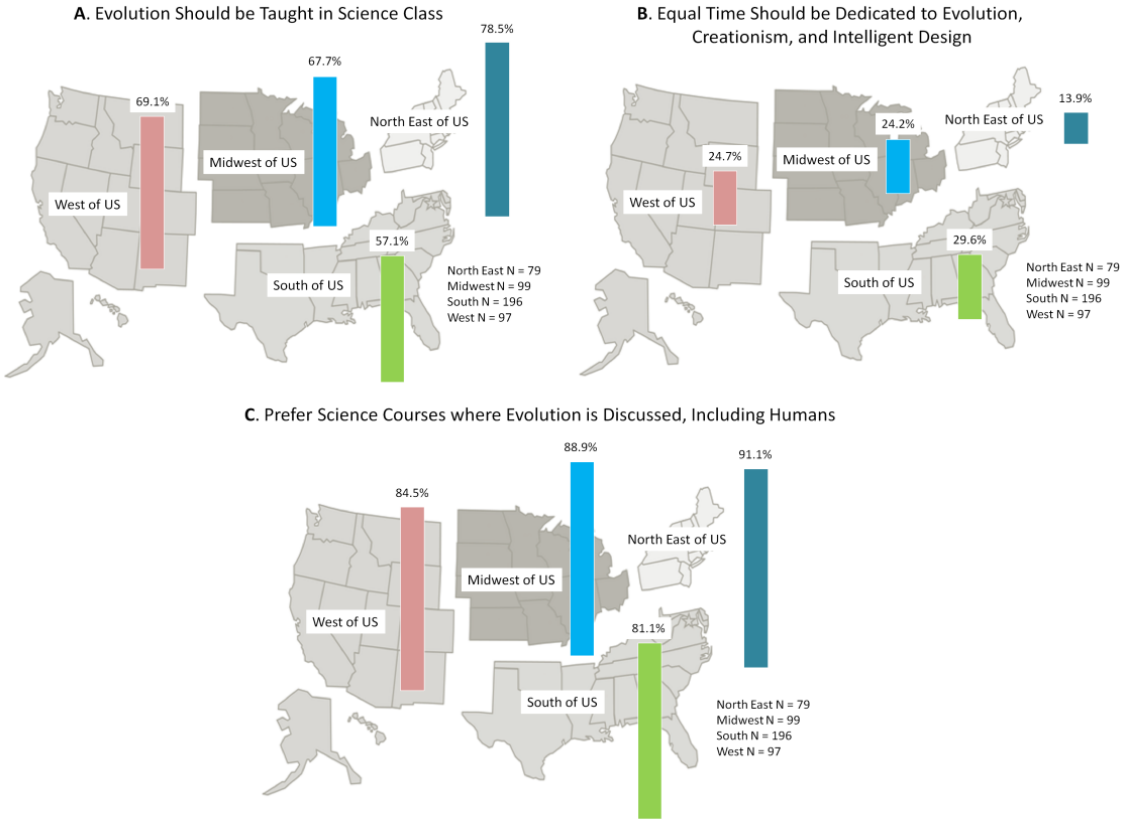


Figure 14 Educators of Prospective Teachers' Views About the Teaching of Evolution in Science Classes. Total number of responders per group can vary because participants were allowed to skip questions and/or end survey voluntarily at any time.

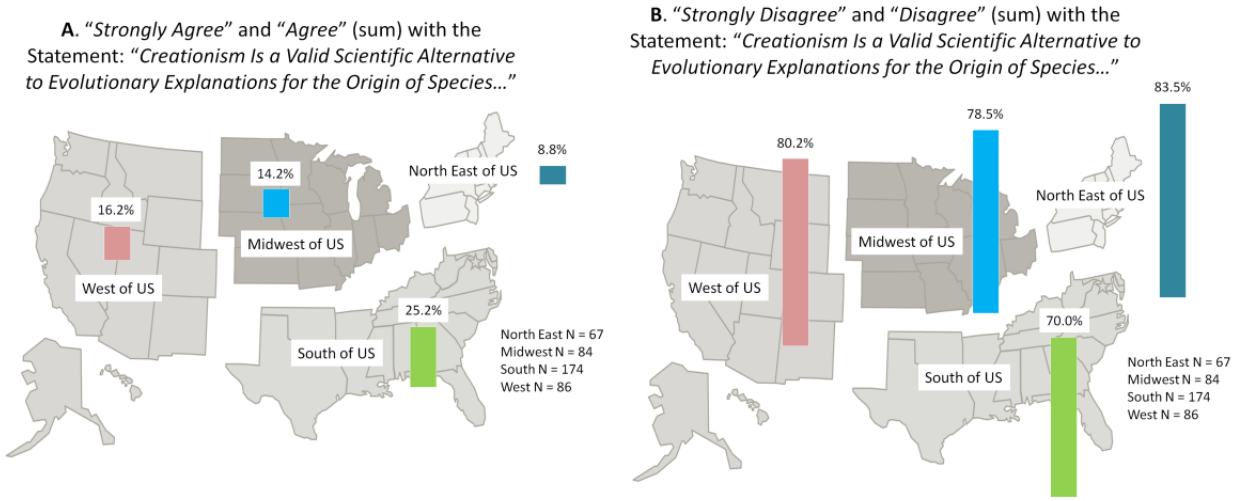


Figure 15 Educators of Prospective Teachers' Views About Creationism as Valid Alternative to Evolution. Total number of responders per group can vary because participants were allowed to skip questions and/or end survey voluntarily at any time.

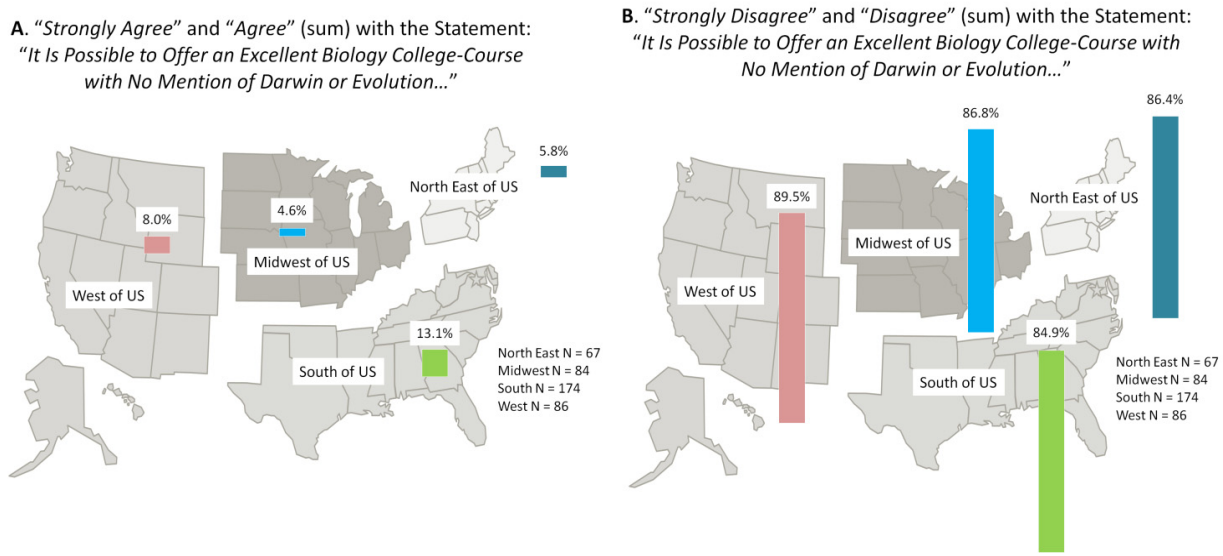


Figure 16 Educators of Prospective Teachers' Views About College-Biology Courses With No Evolutionary Content. Total number of responders per group can vary because participants were allowed to skip questions and/or end survey voluntarily at any time.

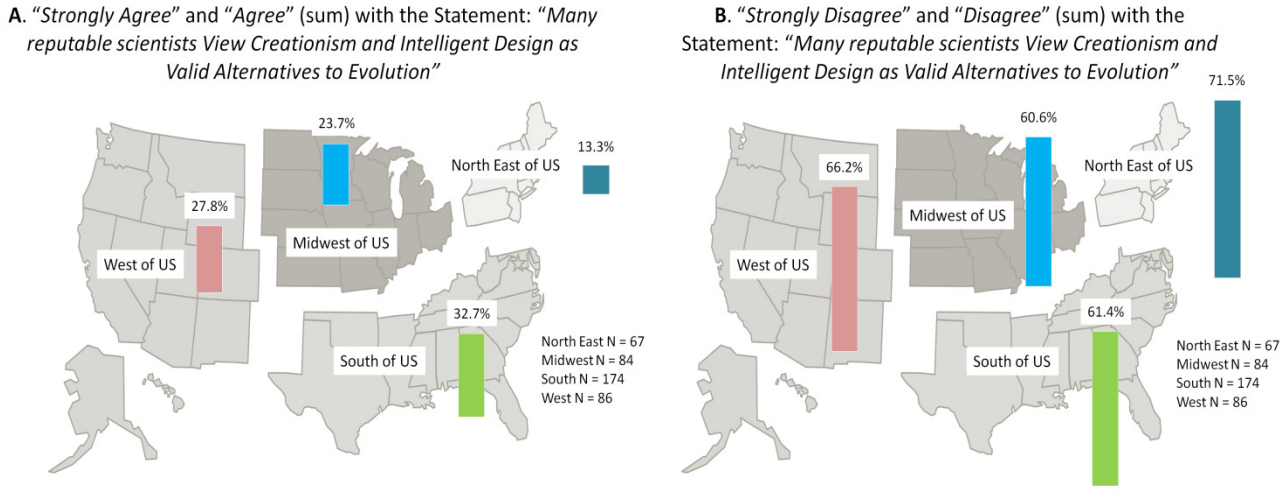


Figure 17 Educators of Prospective Teachers' Perception of Reputable Scientists' Endorsement of Creationism and Intelligent Design. Total number of responders per group can vary because participants were allowed to skip questions and/or end survey voluntarily at any time.

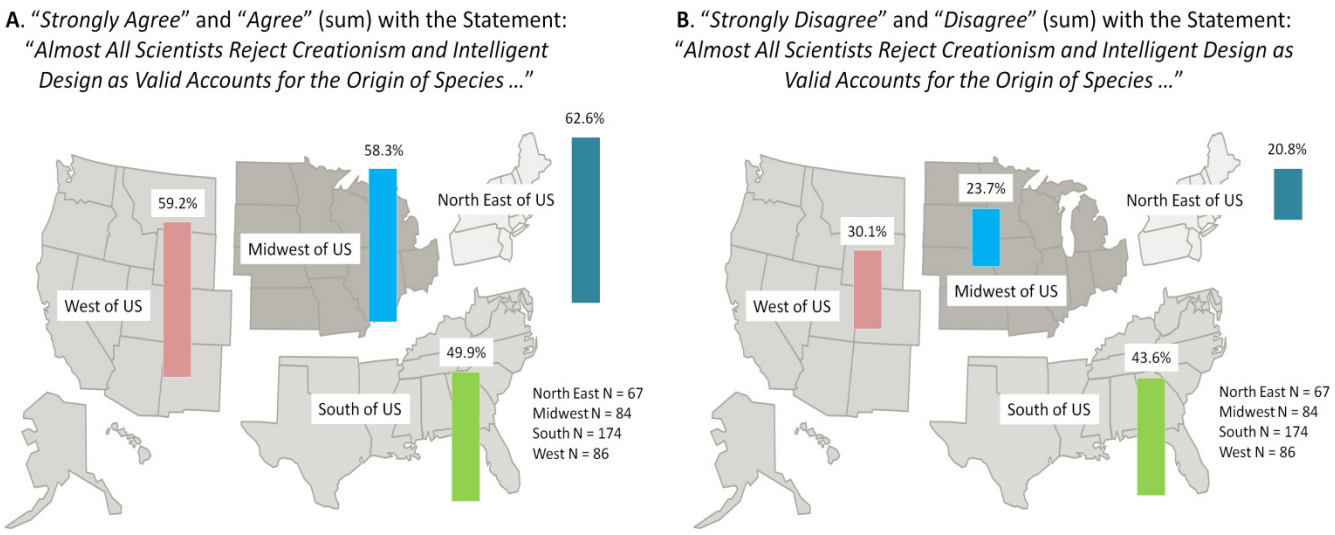


Figure 18 Educators of Prospective Teachers' Perception of Reputable Scientists' Rejection of Creationism and Intelligent Design. Total number of responders per group can vary because participants were allowed to skip questions and/or end survey voluntarily at any time.

Evolution as Unifying Theme in Science – Reactions to Alternative Definitions of Evolution

Two-to-five in every ten educators strongly agreed or agreed with the statement '*evolution is the unifying theme of all sciences*' (Figure 19A): Midwest 59.4%, North East 52.1%, South 41.3%, and West 31.3%. In contrast, two-to-four educators strongly disagreed or disagreed with this view (Figure 19B): South 37.2%, West 36.0%, North East 20.8%, and Midwest 17.7%. [For detailed by-region and by-division statistics on agreement with the view that evolution is the unifying theme of all sciences, see Figure S11 and Table S21; the purpose of the statement was to assess the responders' reaction to it].

The majority of educators considered the following definition of evolution to be true: '*evolution is a gradual process by which the universe changes, it includes the origin of life, its diversification and the synergistic phenomena resulting from the interaction between life and the environment*' (Figure 20A): North East 94.0%, Midwest 92.8%, South 82.2%, and West 80.2%. [Note that the purpose of the definition was to assess the responders' reaction to it, not to validate the definition].

Lamarckian views about the evolutionary process prevailed among the educators in all US-regions. The majority of responders considered the following definition of evolution to be true: '*evolution is a gradual process by which organisms acquire traits during their lifetimes, such as longer necks, larger brains, resistance to parasites, and then pass on these traits to their descendants*' (Figure 20B): Midwest 79.7%, South 67.8%, North East 65.6%, and West 61.6%. [For detailed by-region and by-division statistics on agreement with alternative definitions of evolution, see Figure S12 and Table S22].

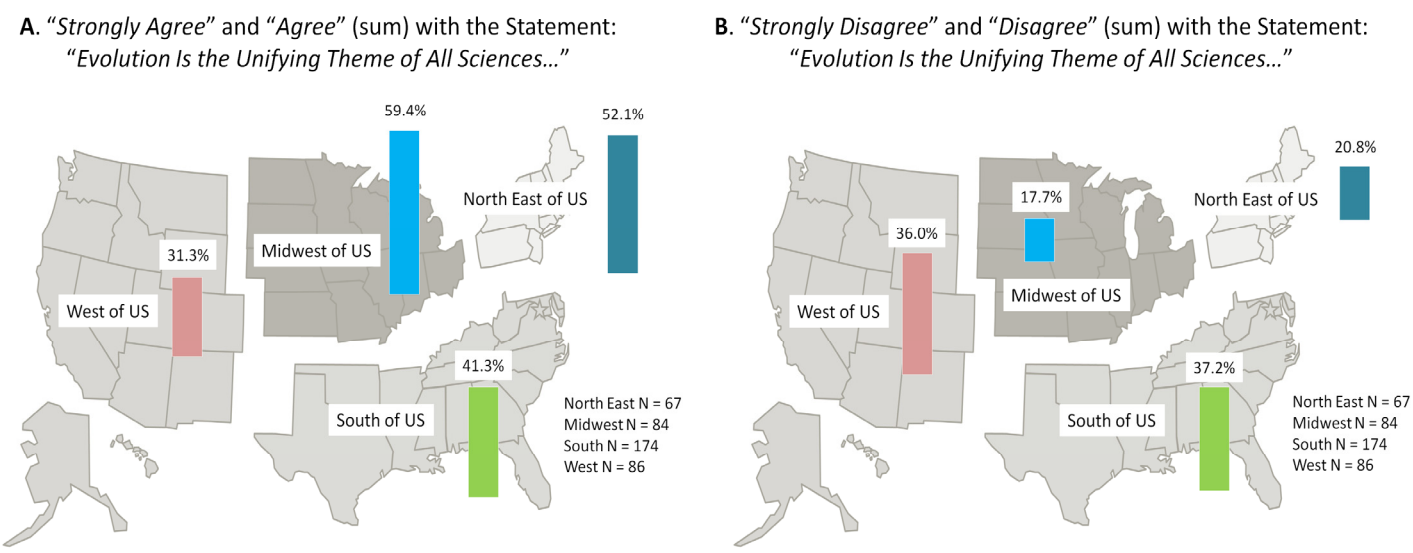


Figure 19 Educators of Prospective Teachers' Views About Evolution as Unifying Theme of All Sciences. Total number of responders per group can vary because participants were allowed to skip questions and/or end survey voluntarily at any time.

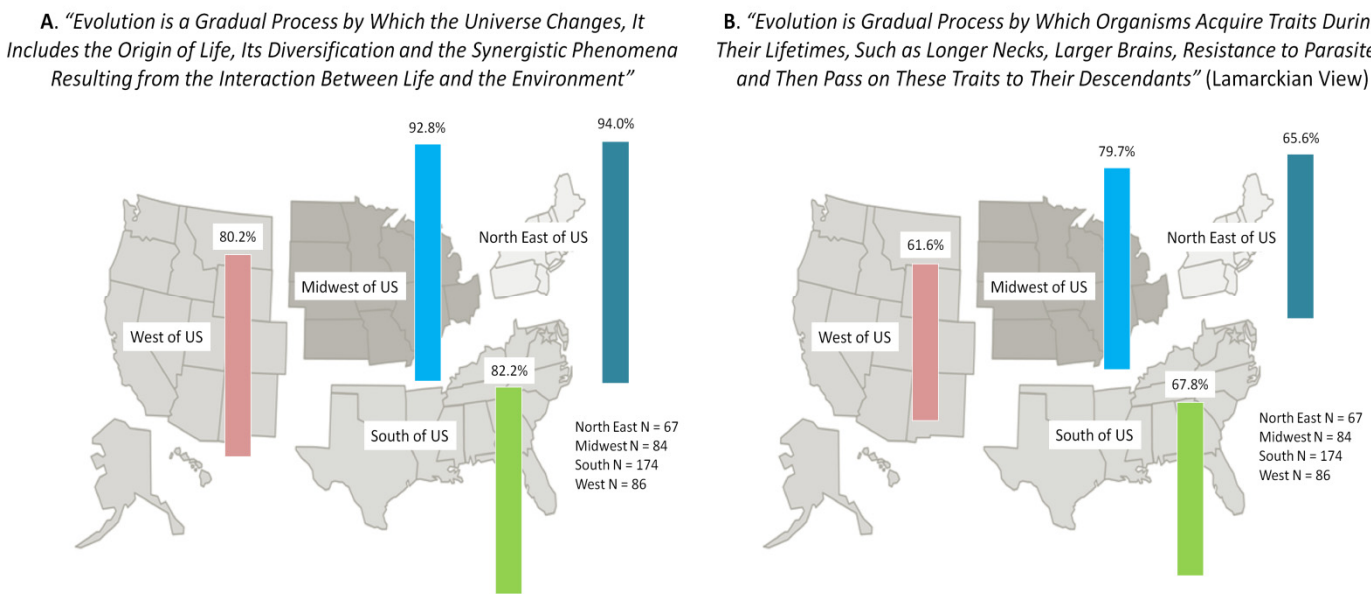


Figure 20 Educators of Prospective Teachers' Agreement with Alternative Definitions of Evolution. Total number of responders per group can vary because participants were allowed to skip questions and/or end survey voluntarily at any time.

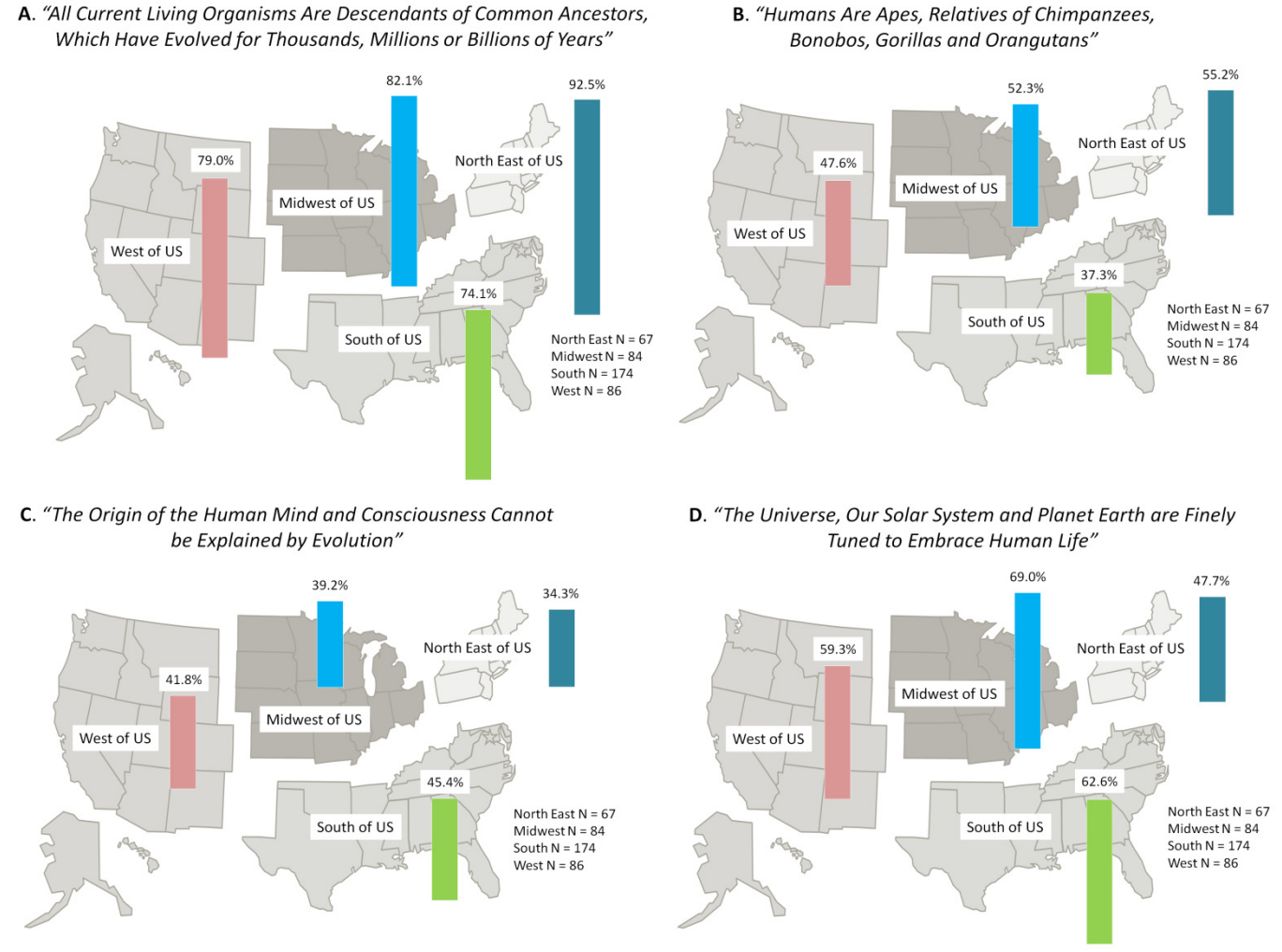


Figure 21 Educators of Prospective Teachers' Views About the Evolutionary Process, Evolution of Consciousness and 'Fine Tuning.' Total number of responders per group can vary because participants were allowed to skip questions and/or end survey voluntarily at any time.

Views about the Evolutionary Process, Evolution of Consciousness, and Cosmic Evolution

The majority of educators considered the following statement about the evolutionary process to be true: '*all current organisms are descendants of common ancestors, which have evolved for thousands, millions or billions of years*' (Figure 21A): North East 92.5%, Midwest 82.1%, West 79.0%, and South 74.1%. However only four-to-five in every ten educators agreed with the statement '*humans are apes, relatives of chimpanzees, bonobos, gorillas and orangutans*' (Figure 21B): North East 55.2%, Midwest 52.3%, West 47.6%, and South 37.3%. Three-to-four in every ten educators agreed —wrongly— with the notion that '*the origin of the human mind and consciousness cannot be explained by evolution*' (Figure 21C): South 45.4%, West 41.8%, Midwest 39.2%, and North East 34.3%. Four-to-seven in every ten educators agreed —wrongly— with the view that '*the universe, our solar system and planet Earth are finely tuned to embrace human life*' (Figure 21D): Midwest 69.0%, South 62.6%, West 59.3%, and North East 47.7%. [For detailed by-region and by-division statistics on views about the evolutionary process, evolution of consciousness and cosmic evolution, see Figure S13 and Table S23].

Nine in every ten educators agreed with the statement '*the Earth and its moon are several billions of years old*' (Figure 22A): West 96.5%, Midwest 91.6%, North East 89.5%, and South 87.3%. Five-to-eight in every ten educators agreed with the statement '*evolution also applies to the origin and processes of change in the universe, the galaxies, solar systems and planets*' (Figure 22B): Midwest 82.1%, South 68.3%, North East 65.6%, and West 54.6%. At least one in every five educators thought —wrongly— that '*our sun is the center of the universe*' (Figure 22C): Midwest 30.9%, South 22.9%, North East 22.3%, and West 22.0%. And only three-to-five in every ten educators knew that '*a future catastrophic collision between Earth and a large asteroid or comet will happen*' (Figure 22D): West 52.3%, North East 49.2%, South 45.9%, and Midwest 39.2%. [For detailed by-region and by-division statistics on views about the evolution of Earth, its moon, our solar system, and the universe, see Figure S14 and Table S24].

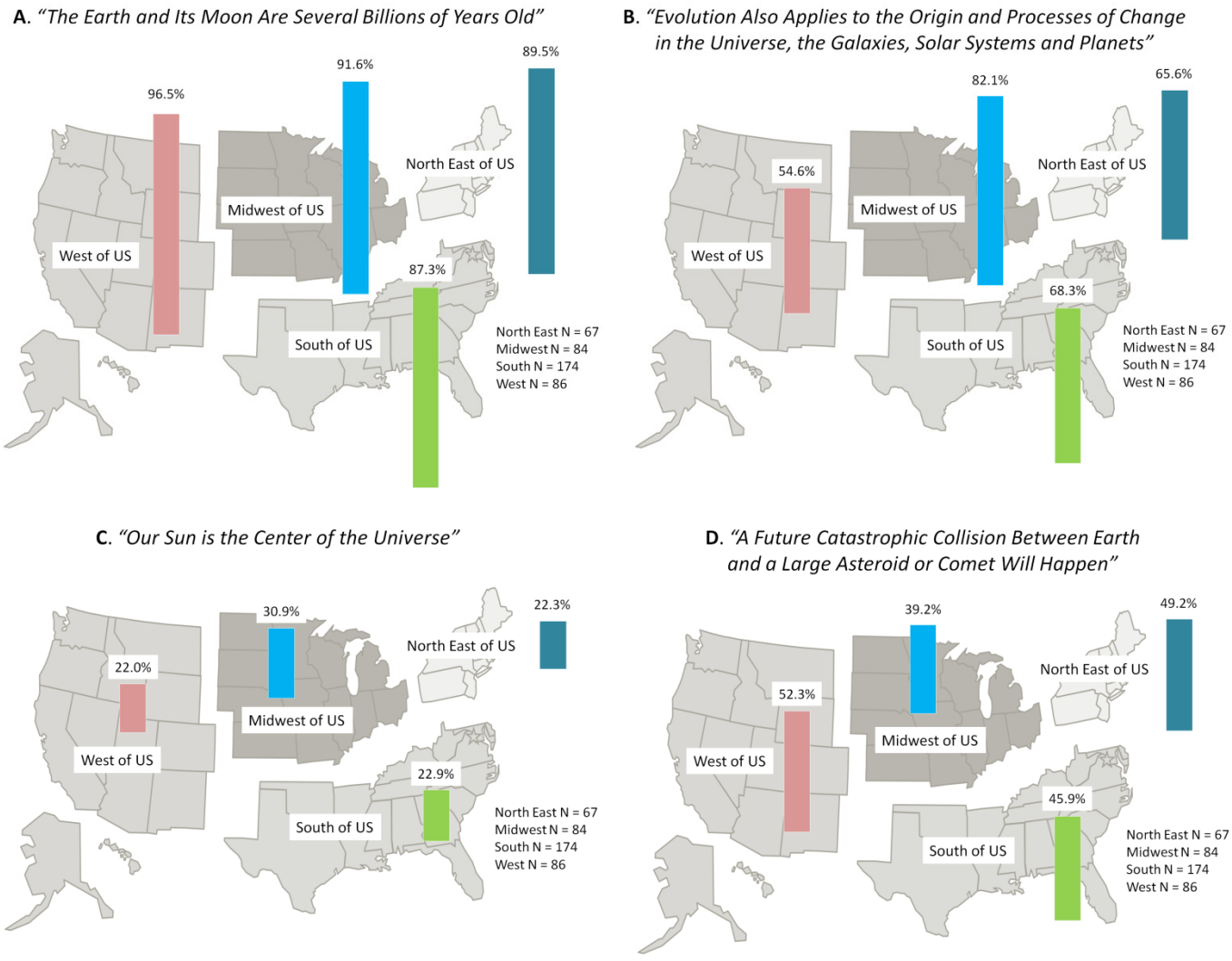


Figure 22 Educators of Prospective Teachers' Views About Evolution of Earth, its Moon, the Solar System, and the Universe. Total number of responders per group can vary because participants were allowed to skip questions and/or end survey voluntarily at any time.

Views about Hypothetical Harmony between Evolution and Creationism

Five-to-seven in every ten educators agreed with the statement '*hearing about evolution makes me appreciate the factual explanation about the origin of life on Earth and its place in the universe*' (Figure 23A): North East 72.2%, Midwest 68.7%, West 64.9%, and South 53.6%. At least one in every five educators agreed with the alternative statement '*hearing about evolution makes no difference to me because evolution and creationism are in harmony*' (Figure 23B): South 26.0%, Midwest 22.2%, North East 18.9%, and West 18.6%. A minority of educators agreed with the statement '*hearing about evolution makes me realize how wrong scientists are concerning explanations about the origin of life on Earth and its place in the universe*' (Figure 23C): West 13.4%, South 10.7%, Midwest 2.2%, and North East 0.0%. [For detailed by-region and by-division statistics on views about hypothetical harmony between evolution and creationism, see Figure S15 and Table S25].

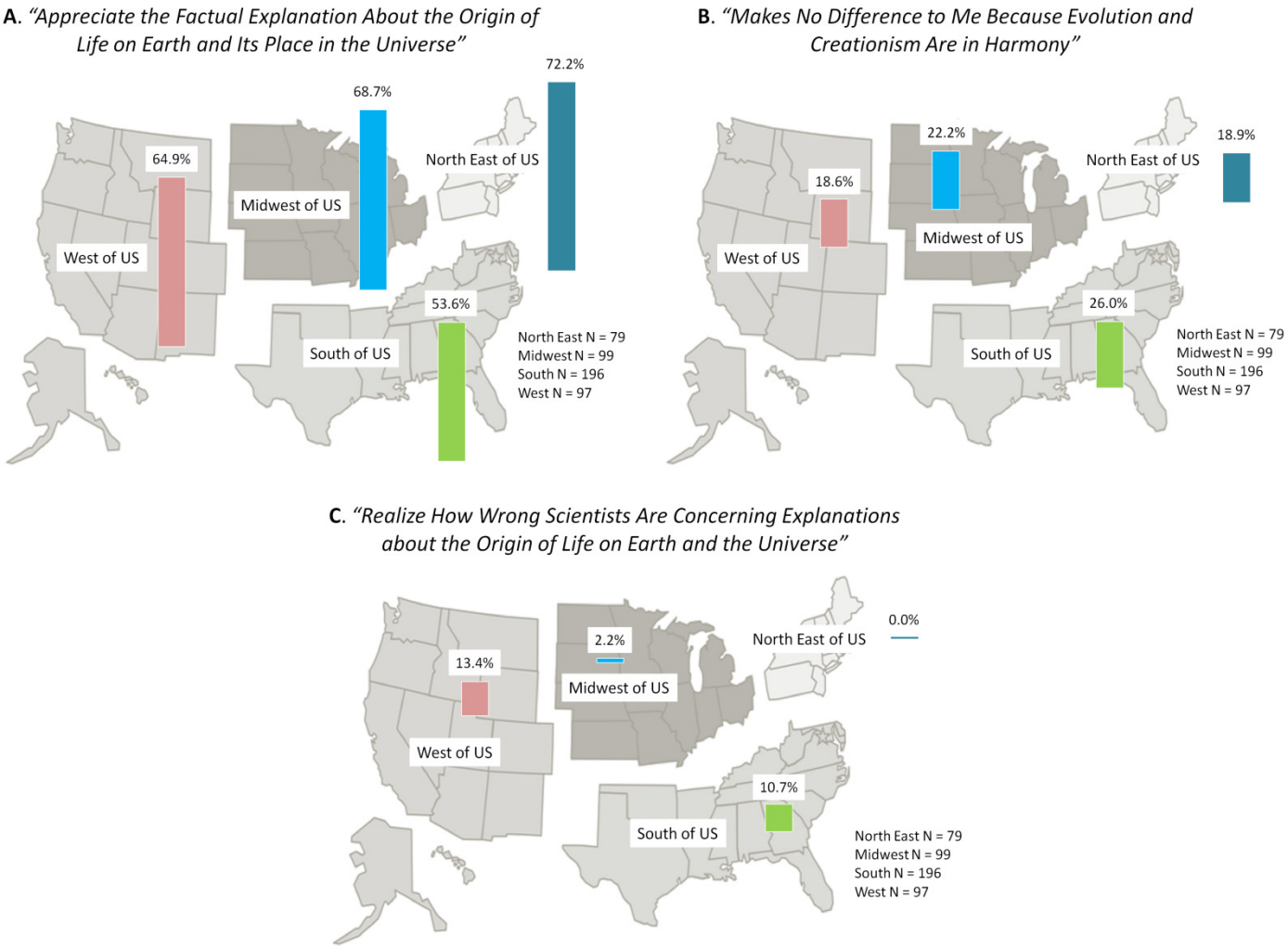


Figure 23 Educators of Prospective Teachers' Views About Hypothetical Harmony Between Evolution and Creationism. Total number of responders per group can vary because participants were allowed to skip questions and/or end survey voluntarily at any time.

SUMMARY OF RESULTS

1) Acceptance of evolution by Educators of Prospective Teachers in the US was influenced by their level of understanding the foundations of science/evolution and their beliefs in supernatural causation. In comparison to two other populations, whose acceptance of evolution had already been documented (i.e. New England General Faculty and New England College Students), the educators had an intermediate level of understanding science/evolution, low acceptance of evolution, and high religiosity, as follows:

- 59% of the educators accepted evolution openly, 51% thought that evolution is definitely true, and 59% admitted to be religious. Among the New England Faculty, 94% accepted evolution openly, 82% thought that evolution is

definitely true, and 29% admitted to be religious. Among the College Students, 63% accepted evolution openly, 58% thought that evolution is definitely true, and 37% admitted to be religious.

- The educators' Science (*SI* = 1.98) and Evolution (*EI* = 1.76) indexes were below the New England Faculty's (*SI* = 2.49, *EI* = 2.49) but above the students' (*SI* = 1.80, *EI* = 1.60). Educators in each of the four regions of the US (i.e. North East, Midwest, South, and West) had *SI* and *EI* scores below the researchers' but above the students'.

- The educators' Religiosity Index (*RI* = 1.31) was the highest of the three populations (New England Faculty *RI* = 0.49, College Students *RI* = 0.89). Educators in each of the four regions of the US had *RI* scores above both the researchers' and the students'.

2) Open acceptance of evolution by the Educators of Prospective Teachers nationwide was higher at public (63%) and private non-religious (60%) institutions than at religious colleges and universities (40%). Open acceptance of creationism by the educators was conspicuous at religious institutions (30%), i.e. 2.3 times higher than the national average (13%).

3) Understanding of science and acceptance of evolution decreased with increasing religiosity (= negative association of variables). Acceptance of evolution increased with higher levels of understanding science (= positive association of variables). The non-religious responders to the survey reached the highest levels of understanding science and evolution in contrast to the deeply-religious who scored lowest in the Science (*SI*) and Evolution (*EI*) indexes, as follows:

- The 35% of the educators who scored zero in religiosity (*RI* = 0.0) had high Science (*SI* = 2.15) and Evolution (*EI* = 2.19) indexes. The 69% of the researchers who scored zero in religiosity (*RI* = 0.0) had even higher Science (*SI* = 2.59) and Evolution (*EI* = 2.53) indexes than the educators'. The 53% of non-religious students (*RI* = 0.0) had Science (*SI* = 1.97) and Evolution (*EI* = 1.67) indexes that were highest among all student responders. Educators in each of the four regions of the US, who scored zero in religiosity, had the highest scores in both *SI* and *EI* among all educators.

- The 18% of the educators who scored high in religiosity (*RI* = 3.0) had low Science (*SI* = 1.58) and Evolution (*EI* = 1.10) indexes. The 3% of the researchers who scored high in religiosity (*RI* = 3.0) had low Science (*SI* = 2.0) and Evolution (*EI* = 2.0) indexes, but not as low as the educators'. The 12% deeply-religious students (*RI* = 3.0) had the lowest Science (*SI* = 1.32) and Evolution (*EI* = 1.35) indexes of all groups. Educators in each of the four regions of the US, who scored high in religiosity, had the lowest scores in both *SI* and *EI* among all educators.

4) The majority [percent range per US Region *r* = 80 – 94%] of educators considered the following definition of evolution to be true: *a gradual process by which the universe changes, it includes the origin of life, its diversification and the synergistic phenomena resulting from the interaction between life and the environment*. However, the majority [*r* = 61 – 79%] of the educators also had a Lamarckian view of evolution when considering the following alternative definition to be true: *a gradual process by which organisms acquire traits during their lifetimes, such as longer necks, larger brains, resistance to parasites, and then pass on these traits to their descendants*.

5) Although the majority [*r* = 74 – 92%] of educators knew that all current living organisms are descendants of common ancestors, which have evolved for thousands, millions or billions of years, only three-to-five [as per US Region] in every ten educators knew (or accepted) that humans are apes, relatives of chimpanzees, bonobos, gorillas and orangutans. Only three-to-four in every ten educators rejected —correctly— the statement that the origin of the human mind and consciousness cannot be explained by evolution. And about half or more-than-half [*r* = 47 – 69%] of the educators thought —wrongly— that the universe, our solar system and planet Earth are finely tuned to embrace human life.

6) The majority [*r* = 87 – 93%] of educators knew that the Earth and its moon are several billions of years old. The majority [*r* = 54 – 82%] also agreed that the concept of evolution applies to the origin and processes of change in the universe, the galaxies, solar systems and planets. However, two-to-three in every ten educators thought —wrongly— that our sun is the center of the universe. Moreover, three-to-five in every ten educators did not know (or accepted) that a future catastrophic collision between Earth and a large asteroid or comet will happen.

7) The majority [*r* = 53 – 72%] of educators agreed that hearing about evolution [made them] appreciate the factual explanation about the origin of life on Earth and its place in the universe. However, at least one in every five educators agreed that hearing about evolution made no difference to her/him because evolution and creationism are in harmony. One in every ten educators in the West or South of the US agreed that hearing about evolution made her/him realize how wrong scientists are concerning explanations about the origin of life on Earth and its place in the universe.

8) Opinions about Intelligent Design (ID) by the Educators of Prospective Teachers varied widely and in all surveyed topics. Although in all regions of the US four-to-five in every ten educators were concerned about the controversy evolution versus creationism versus ID and its implications for science education, and at least two-to-four in every ten educators conceived ID as not scientific but proposed to counter evolution based on false claims, and at least three-to-four in every ten

educators considered ID to be religious doctrine consistent with creationism, still 10-22% of educators nationwide believed that ID is a scientific theory about the origin and evolution of life on Earth.

9) The majority [*r* = 57 – 78%] of educators supported the exclusive teaching of evolution in science class. One-to-three in every ten educators, however, thought that equal time should be dedicated to evolution, creationism and ID in the science class. Eight-to-nine in every ten educators preferred science courses where evolution is discussed comprehensively and humans are part of it.

10) The majority [*r* = 70 – 83%] of educators strongly disagreed or disagreed with the notion that creationism is a valid scientific alternative to evolutionary explanations for the origin of species; although one-to-two in every ten educators strongly agreed or agreed with this view.

11) The majority [*r* = 84 – 89%] of educators strongly disagreed or disagreed with the notion that it is possible to offer an excellent biology college course with no mention of Darwin or Evolution.

12) The majority [*r* = 61 – 71%] of educators strongly disagreed or disagreed with the notion that many reputable scientists view creationism and ID as valid alternatives to evolution. However, one-to-three in every ten educators strongly agreed or agreed with this view.

13) Half or more-than-half [*r* = 49 – 62%] of educators strongly agreed or agreed with the notion that almost all scientists reject creationism and ID as valid accounts for the origin of species. However, two-to-four in every ten educators strongly disagreed or disagreed with this view.

14) Three-to-six in every ten educators strongly agreed or agreed with the statement that evolution is the unifying theme of all sciences. Opposition to this view was evident in all US regions [*r* = 20 – 37%].

CONCLUSIONS AND IMPLICATIONS OF THE RESULTS

Based on current scientific evidence all people in the world should accept the fact of evolution, i.e. the phenomenon and the processes of change in nature, the laws that govern such processes, the empirical observations of the actual occurrence of evolution, the naturalistic and rational explanations of such observations, the scientific experiments intelligently conceived by accredited, skeptical researchers to test central and auxiliary hypotheses concerning evolution, which after centuries of scrutiny have helped scientists build the body of knowledge collectively called the *Theory of Evolution*. Evolution is true and it will remain as one of science's major discoveries ever (Paz-y-Miño-C & Espinosa 2013c).

This study is the first to document, comprehensively, the disturbing reality of evolution illiteracy among educators of prospective teachers in the United States. These professionals (65% PhD- or 22% doctorate-holders), affiliated with 281 colleges and universities in the country, are responsible for mentoring the *teachers-to-be* in the American school system. Their hesitation to embrace evolution resides in a deficient understanding of science/evolution and high religiosity.

Acceptance of evolution, not only by these educators, but also by the general public, is disrupted, distorted, delayed and stopped (the *3D+S*, Paz-y-Miño-C & Espinosa in press) by belief in supernatural causation, which affects individual and collective reasoning about science facts (belief = *cultural pollutant*). Worldwide, acceptance of evolution is conditioned to the premise that a deity created humans (= 41% of adults, 24 countries, *N* = 18,829; Box 2; note that acceptance of evolution, *excluding humans*, can be higher); and 28% of adults are strict creationists who believe in religious scriptures concerning the origin of our universe and of humans (e.g. *Genesis*: the creation of the universe by God a few thousand years ago = Young Earth Creationists), and explicitly reject the fact that humans are apes. Moreover, 31% of the world's general public does not know who to trust in matters of evolution, neither scientists nor spiritualists (IPSOS 2011).

In the US, negative attitudes toward evolution correlate primarily with three variables: religious beliefs, pro-life beliefs (linked to high religiosity and conservatism) and political ideology (Miller et al. 2006). Independents and democrats accept evolution more than conservative republicans (61%, 57% vs. 30%, respectively, *N* = 1,007, The Gallup Poll 2007; Box 2). Level of education correlates positively with acceptance of evolution: high school or less 21%, some college 41%, college graduates 53%, and postgraduates 74% (The Gallup Poll 2007, Box 2). The American atheists have the highest acceptance of —human— evolution (87%) in comparison to any religious affiliation in the country (Box 2).

The controversy over evolution-and-science versus creationism and all its forms is ultimately inherent to the incompatibility between scientific rationalism/empiricism and the belief in supernatural causation. The Incompatibility Hypothesis (*IH*, see Box 2) does help us understand and explain the everlasting and fluctuating antagonism in the relationship between science/evolution and religion (Paz-y-Miño-C & Espinosa 2013a, in press). As we have stated in our previous studies '*…Harmonious coexistence between science/evolution and religion is illusory. Societies will struggle, indefinitely, to achieve long-lasting camaraderie between science and religion. If co-persisting in the future, the relationship between science and religion will fluctuate between moderate and intense antagonism*.'

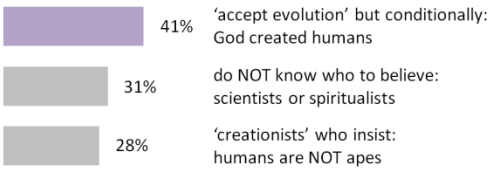
BOX 2

Acceptance of Evolution in the World vs. the United States

(for comparison only some countries are shown)

Based on Current Scientific Evidence, All People in the World Should Accept Evolution

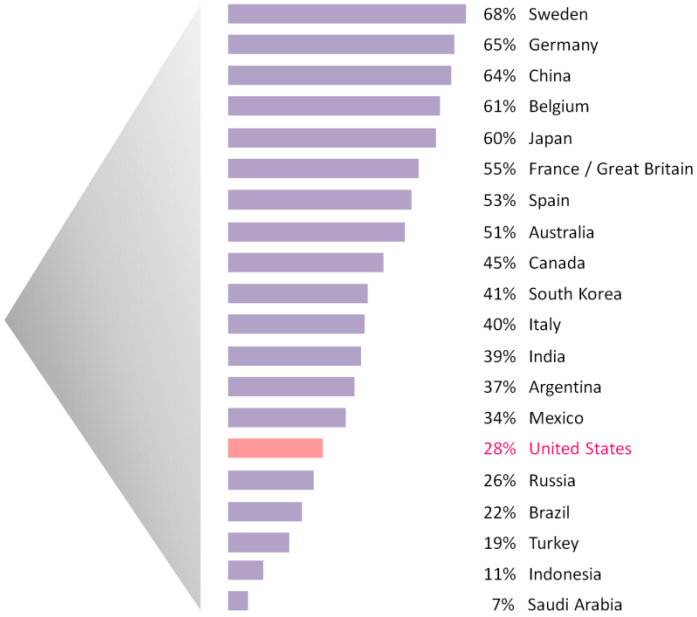
However:



Adapted from IPSOS. 2011. Supreme Being, the Afterlife, and Evolution.

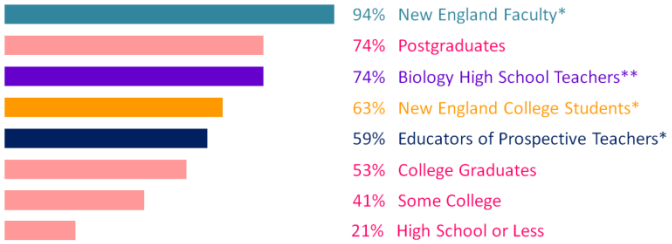
Accept Evolution Conditionally: God Created Humans

Note that acceptance of evolution, *excluding humans*, can be ~10% higher



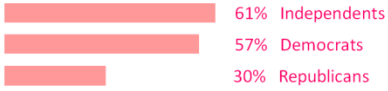
Adapted from IPSOS. 2011. Supreme Being, the Afterlife, and Evolution.

Acceptance of Evolution US By Education Level



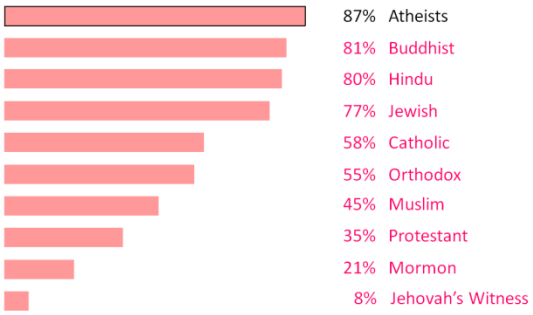
Adapted from Gallup 2009, *data this study, **data Berkman & Plutzer 2010.

Acceptance of Evolution US By Partisanship



Adapted from Gallup 2007.

Acceptance of Human Evolution US: Non-Religious vs. Religious



Adapted from The Pew Forum on Religion and Public Life. 2008. US Religious Landscape Survey.

Why People Do Not Accept Evolution:

As a rational explanation of a natural phenomenon, the Incompatibility Hypothesis (*IH*) allows us to examine the controversy over evolution-and-science versus creationism. The observable 'phenomenon' in society is 'the controversy,' the conflicts that emerge when facts organized in a rational interpretation of empirical reality (= the science of evolution) challenge 'belief-' and the 'supernatural-causation-based' answers to questions about the origin of the universe and life, the mutability and phylogenetic diversification of life, its extinctions, and the finite nature of *Nature* (Paz-y-Miño-C & Espinosa 2011a). *IH* is an ultimate-level hypothesis, rather than a proximate one; *IH* explains the 'cause' of the controversy, its fundamental reason (Paz-y-Miño-C & Espinosa 2013a, b, 2012a). It also addresses directly the question: what elicits the controversy evolution-and-science versus creationism? Answer: their intrinsic incompatibility, their opposing approaches to assess reality, i.e. science via testing hypotheses, falsifying and/or testing predictions, and replication of experiments; creationism, in contrast, via the belief in supernatural causality (Paz-y-Miño-C & Espinosa 2013a,b). We acknowledge and value proximate levels of analysis of the controversy, including the detailed and simultaneous characterization of multiple factors that can influence an individual's acceptance of evolution and scientific evidence, for example, religious beliefs, pro-life beliefs and political ideology (Miller et al. 2006), or political activity, political and religious conservatism, knowledge about evolution and its relevance, creationist reasoning, evolutionary misconceptions, and exposure to evolution (Hawley et al. 2011). From a research program perspective, however, *IH* is a central hypothesis, as a guiding ultimate level of analysis, while the indispensable proximate-level studies are auxiliary in essence (= auxiliary hypotheses, Lakatos 1978).

Adapted from Paz-y-Miño-C G. & Espinosa A. in press. The Incompatibility Hypothesis: Evolution versus Supernatural Causation. In Trueba G (ed). *Why Does Evolution Matter? The Importance of Understanding Evolution*. Cambridge Scholars Publishing.

RECOMMENDATIONS

In a previous article (Paz-y-Miño-C & Espinosa 2012b), we provided recommendations to improve science and evolution literacy among educators of prospective teachers in New England and, therefore, strengthen the communication of evolution to their students, the 'educators-to-be.' The same observations apply to all US educators of future educators:

How Can Educators of Prospective Teachers Strengthen Their Own Science and Evolution Literacy?

1) Apply *equal rigor* to the training in pedagogy and science/evolution; the educators of prospective teachers should reach comparable levels of understanding science/evolution and accepting evolution to those of the non-educator professors.

2) Dialog with the science faculty at their own institutions and concur to fortify the on-the-job- science/evolution training of the educators of prospective teachers, as well as of the students enrolled in education programs. The ubiquitous disconnect between the education departments and the rest of the academic fields at the US colleges and universities is concerning, and it requires immediate approach between the educators and the general faculty.

3) Educate themselves about the 'antievolution wars' and participate decisively in the pro-teaching-of evolution movement. It is crucial that the educators of prospective teachers lead the institutional (their own colleges and universities), regional and national strategies to secure proper science/evolution education among the prospective teachers who earn degrees under their guidance. As university professors, the educators of prospective teachers are less vulnerable to institutional or societal reprisal for leading the teaching of evolution than their academic progeny of young teachers. The educators of future educators are as responsible for sponsoring proper science/evolution training to the prospective teachers as the latter are of acquiring and communicating that knowledge to their students.

4) Study the legal protection that guarantees proper science/evolution education at all academic levels and make this information available to the prospective teachers as part of their regular training.

5) Implement curricular reform at their education departments and institutions to fortify science training of prospective teachers. Higher-education programs in science, particularly biology, are fundamental to integrate evolution into the academic backgrounds of prospective teachers.

6) Poll in-campus variations in attitudes toward science and evolution among the educators of future educators, the prospective teachers they mentor, and the general faculty, and coordinate immediate responses to the emerging antievolutionism in the US campuses.

7) Co-sponsor with the general faculty in- and off- campus lecture series, workshops and debates to examine the antievolution phenomena, learn about the obstacles raised by schools boards on the science school curriculum and orient other educators of future educators and prospective teachers on how to communicate modern science to all. Workshop-discussion modules on *why evolution matters* [Paz-y-Miño-C & Espinosa 2013c] can be particularly effective when organized for educators of future educators and prospective teachers.

8) Pursue participation in- and organization of *'town halls for scientists and public*' to discuss issues related to scientific research and the controversy evolution versus creationism and all its forms, including Intelligent Design, Theistic Evolution [BioLogos = Evolutionary Creation, Box 1], and Creation Science.

9) Participate in and sponsor multidisciplinary conferences (anthropology, biology, education, ethics, history, law, philosophy, political science, social psychology, religious studies) committed to advice community groups on theoretical and practical aspects of civil action to counter antievolution campaigns, anti-intellectualism tendencies, and pro creationism agendas.

10) Monitor the antievolution movements that grow strong among misinformed citizens, vary in impact geographically, and benefit from the disconnect between highly-educated audiences, like educators of prospective teachers/general faculty, and society. The educators of prospective teachers must take the lead in conceptualizing and strategizing the civil discourse and societal action to ensure internationally competitive science/evolution literacy in the US.

Adapted from Paz-y-Miño-C G. & Espinosa A. 2012b. Educators Of Prospective Teachers Hesitate To Embrace Evolution Due To Deficient Understanding Of Science/Evolution And High Religiosity. *Evolution: Education & Outreach* 5: 139–162.

METHODS

The Sampling Approach

We sampled *Educators of Prospective Teachers* affiliated with 281 academic institutions (105 colleges, 176 universities) that were widely distributed in 4 regions, 9 divisions, and 50 states in the United States (Table 1). The regions and divisions corresponded to official designations by the US Census Bureau, as follows:

Region 1 NORTHEAST: Division 1 New England and Division 2 Mid Atlantic
Region 2 MIDWEST: Division 3 East North Central and Division 4 West North Central
Region 3 SOUTH: Division 5 South Atlantic, Division 6 East South Central and Division 7 West South Central
Region 4 WEST: Division 8 Mountain and Division 9 Pacific

A list of the colleges and universities surveyed per state is included in Table S1. In each of the 50 states, we selected an average of 5.5 institutions [r = 2 – 7, *mode* = 6], including, when possible, at least two public secular, two private secular and two religious colleges and/or universities (methodology adapted from Paz-y-Miño-C & Espinosa 2013b, 2012b, 2011b, 2009a,b). We contacted via email (addresses obtained from institutional websites) 4,770 individuals according to three criteria: first, full time academic employees affiliated with one or multiple education departments, their subdivisions, programs and subprograms, or equivalents; second, instructors responsible for teaching students enrolled in education programs (i.e. mentors of future educators); and third, educators affiliated with as many education subfields sponsored by their employer institutions.

An opening disclaimer in the survey asked participants to confirm agreement with the statement: '*I am an educator of future educators (= prospective teachers), that is a faculty and/or university and/or college instructor who educates: (1) students who will become educators themselves, or (2) current educators that take courses with me and/or receive academic advice from me*.' Almost all responders (99.5%) agreed with the statement. The survey also requested: '*if you are not an educator of future educators, please close this survey; realize that this survey is only for educators of future educators*.'

For the purpose of statistical comparisons between the sample of *Educators of Prospective Teachers* and other populations whose attitudes toward science and acceptance of evolution were already known (i.e. studies by Paz-y-Miño-C & Espinosa 2011b, 2009a,b), we included in this article some statistical trends characteristic of two groups: *New England General Faculty*, who were researchers in 40 distinctive disciplines (non-education specialists) affiliated with 35 academic institutions (17 colleges, 18 universities in Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island and Vermont) and *College Students* from four representative New England institutions: Public secular University of Massachusetts Dartmouth, Private secular Roger Williams University, Religious Providence College, and Religious Salve Regina University. The comparisons '*Educators of Prospective Teachers* versus *New England General Faculty* versus *New England College Students*' were important for three reasons: first, New England has the highest rate of public acceptance of evolution in the US (59%, The Pew Research Center For The People & The Press 2005); second, the New England states have among the highest evolution education standards in the US (*letter grade* for coverage of evolution in state science standards: Connecticut *D*, Maine *C*, Massachusetts *B*, New Hampshire *A*, Rhode Island *B*, Vermont *B*; Mead & Mates 2009); and third, both the New England General Faculty and the College Students have the highest scores in science/evolution literacy, and the lowest scores in religiosity, thus-far reported for researchers and students in the US (Paz-y-Miño-C & Espinosa 2011b, 2009a,b).

Profile of Participants in the Study The Educators of Prospective Teachers who participated in this study belonged to 16 areas of specialization, predominantly: *teachers' education*, *elementary education*, *secondary education* and *curriculum instruction* (Table 4); 64.2% of these individuals were affiliated with public institutions, 17.4% with private non-religious institutions, and 18.3% with religious institutions (Table 5); 40.3% worked at 4-year colleges and 59.6% at 5-6-year universities (Table 5). Sixty percent of all responders were females and 40% were males (Table 6); the majority of participants (61.1%) were 50+ years of age (Table 6). The highest degree earned by participants varied: 65.6% held a PhD, 22.2% a doctorate or equivalent, and 11.1% were masters (Table 7). Eighty five percent identified themselves as *white Caucasian*, 3.4% as *African American*, and 2.5% as *multi-cultural* (Table 8). One third of the responders (31.3%) considered themselves to be *liberal* as per political ideology, 29.0% viewed themselves as *moderate*, 20.9% as *progressive*, and 14.0% as *conservative* (Table 9). The responders' partisanship was in accordance with their political ideology, as follows: 49.5% indicated to be *democrat*, 23.1% *independent*, 13.8% *republican*, and 11.3% *unaffiliated* (Table 9). One in every two responders (49.1%) considered her/himself to be *religious*, 18.7% *agnostic*, 18.4% *very religious*, 8.3% *atheist*, and 5.3% *non-believer in any god* (Table 10).

The profiles of the New England General Faculty and College Students can be found in our previous publications (Paz-y-Miño-C & Espinosa 2012b, 2011b, 2009a,b).

The Online Survey

Four hundred and ninety five (*N* = 495) Educators of Prospective Teachers responded to a 31-question anonymous and voluntary online survey (procedures developed by Paz-y-Miño-C & Espinosa 2013b, 2012b, 2011b, 2009a,b). Fourteen of the 31 questions requested information about the background of each participant (i.e. academic specialization, institutional affiliation public/private/religious, age range, sex, highest degree earned, cultural ancestry/geographic origin/ethnicity, political ideology, partisanship, overall religiosity, among other characterizers —not all reported in this study); 17 questions in the survey explored science/evolution literacy, attitudes toward science/evolution/creationism/Intelligent Design (for definitions see Box 1), creationist views, and specific indicators of religiosity.

Below we summarize only 20 questions —all part of the 31 queries in the survey— that were directly relevant to this study. The complete survey can be requested from the authors.

All participants were free to withdraw from the survey at any time; no risks or discomfort were involved in the study. The Institutional Review Board of the University of Massachusetts Dartmouth approved the nation-wide study of the Educators of Prospective Teachers (participants were surveyed during the fourth week of March, first week of April, and third week of September 2011). [For details of research-protocols approved for the samples of New England General Faculty and College Students see Paz-y-Miño-C & Espinosa 2011b, 2009a,b].

All participants answered questions 1-20 in order and were instructed to not skip or go back to previous questions to fix and/or compare answers (but see below). Questions 1-14 had five (a, b, c, d, e) choices per question; questions 15-19 were true/false; and question 20 had three (a, b, c) choices.

All choices per question, including the true/false options, were presented randomly and only one choice was possible per question, except for questions 12, 13 and 20 that allowed responders to select true or false in each of the subcomponents (i.e. questions 12, 13: true/false for a or b or c or d or e; question 20: true/false for a or b or c). For the purpose of reporting the data in this article and matching the description of each question with the figure and table legends, here we state the questions as follows (similar to Paz-y-Miño-C & Espinosa 2013b, 2012b, 2011b, 2009a,b):

Questions Addressing Views about Evolution, Creationism, and Intelligent Design

Question 1 Evolution, creationism and Intelligent Design in the science class. Which of the following explanations about the origin and development of life on Earth should be taught in science classes? A = evolution, B = equal time to evolution, creationism, intelligent design, C = creationism, D = intelligent design, E = do not know enough to say.

Question 2 Willingness to discuss evolution. Select the statement that describes you best: A = I accept evolution and express it openly regardless of other's opinions, B = no opinion, C = I accept evolution but do not discuss it openly to avoid conflicts with friends and family, D = I believe in creationism and express it openly regardless of others' opinions, E = I believe in creationism but do not discuss it openly to avoid conflicts with friends and family.

Question 3 Overall opinion about evolution. Select the statement with which you agree most about *'evolution is'*: A = definitely true, B = probably true, C = definitely false, D = probably false, E = do not know enough to say.

Question 4 Level of concern about 'the evolution-creationism controversy in society.' How concerned are you about the controversy 'evolution versus creationism versus intelligent design' and its implications for science education? A = very concerned, B = somehow concerned, C = not concerned, D = the debate is trivial, E = no opinion.

Question 5 Awareness of 'Intelligent Design.' Which of the following statements is consistent with Intelligent Design? A = Intelligent Design is religious doctrine consistent with creationism, B = Intelligent Design is not scientific but has been proposed to counter evolution based on false claims, C = Intelligent Design is a scientific theory about the origin and evolution of life on Earth, D = no opinion, E = Intelligent Design is a scientific alternative to evolution and of equal scientific validity among scientists.

Question 6 Preference for science courses with evolutionary content. With which of the following statements do you agree? A = I prefer if college instructors teach science courses where evolution is discussed comprehensively and humans are part of it, B = I prefer if college instructors teach science courses where plant and animal evolution is discussed but not human evolution, C = do not know enough to say, D = I prefer if college instructors avoid teaching science courses with evolutionary content, E = I prefer if college instructors teach science courses where the topic evolution is never addressed.

Question 7 Supernatural causation as alternative to evolution. Your position in respect to the statement: Creationism is a valid scientific alternative to evolutionary explanations for the origin of species: A = strongly agree, B = agree, C = disagree, D = strongly disagree, E = no opinion.

Question 8 Exclusion of 'Darwin' or 'evolution' from biology courses. Your position in respect to the statement: It is possible to offer an excellent biology college-course with no mention of Darwin or evolution: A = strongly agree, B = agree, C = disagree, D = strongly disagree, E = no opinion.

Question 9 Scientists' support to creationism or Intelligent Design. Your position in respect to the statement: Many reputable scientists view creationism and Intelligent Design as valid alternatives to evolution: A = strongly agree, B = agree, C = disagree, D = strongly disagree, E = no opinion.

Question 10 Scientists' rejection of creationism or Intelligent Design. Your position in respect to the statement: Almost all scientists reject creationism and Intelligent Design as valid accounts for the origin of species: A = strongly agree, B = agree, C = disagree, D = strongly disagree, E = no opinion.

Question 11 Significance of 'evolution' in respect to 'all sciences.' Your position in respect to the statement: Evolution is the unifying theme of all sciences: A = strongly agree, B = agree, C = disagree, D = strongly disagree, E = no opinion.

Questions Addressing Views about the Evolutionary Process

Question 12 An acceptable definition of evolution. Indicate if each of the following definitions of evolution is either true or false: A = gradual process by which the universe changes, it includes the origin of life, its diversification and the synergistic phenomena resulting from the interaction between life and the environment, B = directional process by which unicellular organisms, like bacteria, turn into multi cellular organisms, like sponges, which later turn into fish, amphibians, reptiles, birds, mammals and ultimately humans, the pinnacle of evolution, C = gradual process by which monkeys, such as chimpanzees, turn into humans, D = random process by which life originates, changes, and ends accidentally in complex organisms such as humans, E = gradual process by which organisms acquire traits during their lifetimes, such as longer necks, larger brains, resistance to parasites, and then pass on these traits to their descendants.

Question 13 Evidence about the evolutionary process. Indicate if each of the following statements about evolution is either true or false: A = all current living organisms are descendants of common ancestors, which have evolved for thousands, millions or billions of years, B = humans are apes, relatives of chimpanzees, bonobos, gorillas and orangutans, D = the hominid (human lineage) fossil record is so poor that scientists cannot tell with confidence that modern humans evolved from ancestral forms, D = the origin of the human mind and consciousness cannot be explained by evolution, E = the universe, our solar system and planet Earth are finely tuned to embrace human life.

Question about Hypothetical Harmony between Evolution and Creationism

Question 14 Evolution and your reaction to it. Which of the following statements fits best your position concerning evolution? A = hearing about evolution makes me appreciate the factual explanation about the origin of life on Earth and its place in the universe, B = hearing about evolution makes no difference to me because evolution and creationism are in harmony, C = do not know enough to say, D = hearing about evolution makes me realize how wrong scientists are concerning explanations about the origin of life on Earth and the universe, E = hearing about evolution makes me uncomfortable because it is in conflict with my faith.

Questions about the Evolution of Earth, our Moon, our Solar System, and the Universe

Question 15 Awareness of the age of our planet and the moon. Your position in respect to the statement: The Earth and its moon are several billions of years old: A = true, B = false.

Question 16 Awareness of our planet's continental drift. Your position in respect to the statement: In planet Earth, the continents constantly move; this phenomenon has occurred over millions of years: A = true, B = false.

Question 17 Understanding of the concept of evolution and its applications to cosmic processes. Your position in respect to the statement: 'Evolution' also applies to the origin and processes of change in the universe, the galaxies, solar systems and planets: A = true, B = false.

Question 18 Persistence of old views about the sun. Your position in respect to the statement: Our sun is the center of the universe: A = true, B = false.

Question 19 Awareness of imminent collisions between objects in our solar system or in the universe. Your position in respect to the statement: A future catastrophic collision between Earth and a large asteroid or comet will happen: A = true, B = false.

Question Addressing Responders' Religiosity

Question 20 Religiosity. Indicate if each of the following statements about religiosity is either true or false, select all that apply: A = faith in God is necessary for morality, B = religion is very important in my life, C = I pray at least once a day.

Understanding-of-Science-, Evolution- and Religiosity Indexes

The Pew Global Attitudes Project (2007) has used the three choices of Question 20 (above) to generate a *Religiosity Index* (*RI*), a powerful predictor of religious views worldwide (47 countries), which we applied to our sample of Educators of Prospective Teachers. *RI* ranges from 0 to 3 (least to most religious): +1 if responders believe that *faith in God is necessary for morality*, +1 if *religion is very important in their lives*, and +1 if *they pray daily*.

To account for the levels of understanding of science and the evolutionary process, we used two descriptive indexes (*Science Index SI*, *Evolution Index EI*; Paz-y-Miño-C & Espinosa 2012b, 2011b), analogous to *RI* (above). Thus, we were able to compare levels of understanding of science (*SI*) and evolution (*EI*) to level of religiosity (*RI*). In previous studies, we have determined that these three interacting factors are associated with an individual's acceptance of evolution (Paz-y-Miño-C & Espinosa 2013a,b, 2012a,b; see also Box 1). The *SI* and *EI* range from 0 to 3 (lower to higher levels of understanding of science and evolution) and rely on three questions each, which were selected from a pool of five questions about science and ten about evolution (all part of the 31-questions in the entire online survey): *SI* +1 if responders rejected the idea that *scientific theories are based on opinions by scientists*, +1 if they disagreed with the notion that *scientific arguments are as valid and respectable as their non-scientific counterparts*, and +1 if they rejected the statement that *crime-scene and accident-scene investigators use a different type of scientific method to investigate a crime or an accident*; *EI* +1 if responders rejected the idea that *organisms acquire beneficial traits during their lifetimes and then pass on these traits to their descendants*, +1 if they disagreed with the notion that *during evolution monkeys such as chimpanzees can turn into humans*, and +1 if they rejected the statement that *the origin of the human mind and consciousness cannot be explained by evolution*.

Statistical Analyses

For the five-choice questions (1-11, 14), the data were organized in contingency tables, for example, *North East of the US, Midwest of the US, South of the US, West of the US* x *a, b, c, d, e* (Chi-square tests, null hypotheses rejected at $P \leq 0.05$). When questions had none or very few responders in one, two or three of their choices (< 5%, note that Chi-square analyses are inaccurate when over 20% of the expected values are less than 5, Siegel & Castellan 1988), we stated in the Figure legend '*Statistics N/A* [Not Applicable]*, see Methods*,' as in the Supplementary Figures S5, S6, S8, S14B, and S15; in each of these cases, the overall responders' preferences for one of the choices in each question was evident, although we could not determine with statistical confidence that the responses differ among groups.

For the true/false questions 12-13 and 15-19, 20, we organized the data corresponding to each subcomponent of the question (Questions 12-13 and 15-19: subcomponents a, b, c, d, e; Question 20: subcomponents a, b, c) in separate contingency tables per each of the five or three subcomponents per question, respectively. For example, Questions 12-13 and 15-19, subcomponents a or b or c or d or e (each separately): *True, False* x *North East of the US, Midwest of the US, South of the US, West of the US,* and Question 20, subcomponents a or b or c (each separately): *True, False* x *North East of the US, Midwest of the US, South of the US, West of the US,* (Chi-square tests, null hypotheses rejected at $P \leq 0.05$).

Although we instructed participants to not skip questions, they could do it freely (= Human Subjects / Institutional Review Board policies); therefore, the total number of responders per question varied, as noted in the figure and table legends. For the purpose of statistical comparisons between the indexes obtained for the Educators of Prospective Teachers (*SI*, *EI*, *RI*, this study) and other populations whose indexes were already known, we used raw data corresponding to the New England General Faculty and College Students (available from our previous research; Paz-y-Miño-C & Espinosa 2011b, 2009a,b). We analyzed the data of each index separately as function of subpopulation (i.e. *SI* or *EI* or *RI*: *Educators of Prospective Teachers*, *New England Faculty*, *College Students*) with Kruskal-Wallis one-way ANOVA on ranks (null hypotheses rejected at $P \leq 0.05$). For pair wise comparisons (i.e. when contrasting index scores between groups, as in Figures 2, 5, 8), we used Dunn-test two-tail, null hypotheses rejected at $P \leq 0.05$. Linear regression was used to analyze the association between the 0-to-3 levels of: *SI* (dependent variable) versus *RI* (independent variable), or *EI* (dependent variable) versus *RI* (independent variable), or *EI* (dependent variable) versus *SI* (independent variable); here we report linear regressions exclusively for the Educators of Prospective Teachers (for other groups see Paz-y-Miño-C & Espinosa 2011b, 2009a,b). Because we hypothesized directionality in the inverse association between level of understanding of science/evolution (dependent variables) and level of religiosity (independent variable), as well as a positive association between level of understanding of evolution (dependent variable) and level of understanding of science (independent variable), we used one-tail tests to reject null hypotheses at $P \leq 0.05$. Our expectation of directionality in the interaction of variables was based on the predictions inherent to the Incompatibility Hypothesis (*IH*, above; see also Box 2).

Survey Response Rates

Four hundred and ninety five (10.3%) of the 4,770 educators of prospective teachers contacted to participate in the study completed the survey (summary in Table 1, details in Table S1), a response rate consistent with the parameters of sample representativeness and statistical confidence (see *Representativeness of the Samples and Statistical Confidence*, below); note that scholars in survey methodology no longer attribute primary validity of surveys' results to response rates (Groves et al. 2009; Berkman & Plutzer 2011), but rather to demographic segmentation and consistency in —and low— variance in responses (van Bennekom 2002), as is the case in this study (below).

We found congruency between the rates of individuals contacted and the rates of those responding to the survey, as per region, division and sex (Table 1), as follows:

NORTHEAST: 15.5% contacted in respect to Grand Total; 62.7% females, 37.3% males
15.1% responders in respect to all responders; 54.6% females, 45.3% males

Division New England: 11.1% responders in respect to all responders; 54.5% females, 45.4% males
Division Mid Atlantic: 4.0% responders in respect to all responders; 55.0% females, 45.0% males

MIDWEST: 20.4% contacted in respect to Grand Total; 64.6% females, 35.3% males
21.6% responders in respect to all responders; 65.4% females, 34.5% males

Division East North Central: 10.1% responders in respect to all responders; 56.0% females, 44.0% males
Division West North Central: 11.5% responders in respect to all responders; 73.6% females, 26.3% males

SOUTH: 39.3% contacted in respect to Grand Total; 63.2% females, 36.7% males
43.2% responders in respect to all responders; 60.7% females, 39.2% males

Division South Atlantic: 18.3% responders in respect to all responders; 67.0% females, 32.9% males
Division East South Central: 12.9% responders in respect to all responders; 59.3% females, 40.6% males
Division West South Central: 11.9% responders in respect to all responders; 52.5% females, 47.4% males

WEST: 24.7% contacted in respect to Grand Total; 61.5% females, 38.4% males
20.0% responders in respect to all responders; 53.5% females, 46.4% males

Division Mountain: 11.5% responders in respect to all responders; 49.1% females, 50.8% males
Division Pacific: 8.4% responders in respect to all responders; 59.5% females, 40.4% males

The response-rates of the New England General Faculty and College Students, which were similarly robust, can be found in our previous publications (Paz-y-Miño-C & Espinosa 2013b, 2011b, 2009a,b).

Representativeness of the Sample and Statistical Confidence

We consider our sample statistically representative of the Educators of Prospective Teachers, as per region and division of the US, for the following reasons:

1) The demographic segmentation of responders (= percent of responders per region and division, as well as per type of institution as function of the segmentation of those contacted) was in accordance with the demographics of the entire population participating in the study (Tables 1 and S1); note that the response rate per region and division as function of those completing the survey was statistically similar between those contacted and those responding to the survey (Region *Chi-square* = 0.878, *df* = 3, *P* = 0.830; Division *Chi-square* = 2.527, *df* = 8, *P* = 0.960; data extracted from Table 1).

Beside the congruency between the rates of individuals contacted nationwide and the rates of those responding per region/division and sex (above), we also found congruency between the rates of responders per region/division and the rates of '*place of origin*' of responders. This was important because it demonstrated that 60.0% of all responders per region [*r* = 50 – 70%] and 56.7% of all responders per division [*r* = 40 – 72%] were natives to their region/division (Tables 11-12). Therefore, the majority of Educators of Prospective Teachers in our sample were both local and philopatric as per region/division (a similar trend was detected at 41 of the 50 states sampled; data extracted from Tables 11-12):

NORTHEAST: 50.6% of responders were natives to region

Division New England: 40.0% of responders were natives to division
Division Mid Atlantic: 65.0% of responders were natives to division

MIDWEST: 70.0% of responders were natives to region

Division East North Central: 72.0% of responders were natives to division
Division West North Central: 64.9% of responders were natives to division

SOUTH: 57.9% of responders were natives to region

Division South Atlantic: 58.2% of responders were natives to division
Division East South Central: 53.1% of responders were natives to division
Division West South Central: 50.8% of responders were natives to division

WEST: 60.6% of responders were natives to region

Division Mountain: 56.1% of responders were natives to division
Division Pacific: 57.1% of responders were natives to division

The New England General Faculty's and College Students' samples were also statistically representative of the populations from which they were extracted (Paz-y-Miño-C & Espinosa 2013b, 2011b, 2009a,b).

2) The responses were tightly clustered in each sample *per region* and *per division*, which we used to generate the science *SI*, evolution *EI*, and religiosity *RI* indexes, and from which we drew broad conclusions about acceptance of evolution in the context of the responders' science/evolution literacy and their level of religiosity (note that consistency in —and low— variance is associated with satisfactory accuracy, see van Bennekom 2002):

NORTHEAST: *SI* variance = 0.773, *EI* variance = 0.754, *RI* variance = 1.227

Division New England: *SI* variance = 0.784, *EI* variance = 0.729, *RI* variance = 1.028
Division Mid Atlantic: *SI* variance = 0.769, *EI* variance = 0.730, *RI* variance = 1.648

MIDWEST: *SI* variance = 0.625, *EI* variance = 0.651, *RI* variance = 1.247

Division East North Central: *SI* variance = 0.557, *EI* variance = 0.633, *RI* variance = 1.263
Division West North Central: *SI* variance = 0.659, *EI* variance = 0.669, *RI* variance = 1.213

SOUTH: *SI* variance = 0.746, *EI* variance = 0.614, *RI* variance = 1.335

Division South Atlantic: *SI* variance = 0.822, *EI* variance = 0.672, *RI* variance = 1.410
Division East South Central: *SI* variance = 0.689, *EI* variance = 0.602, *RI* variance = 1.199
Division West South Central: *SI* variance = 0.706, *EI* variance = 0.541, *RI* variance = 1.421

WEST: *SI* variance = 0.724, *EI* variance = 1.015, *RI* variance = 1.245

Division Mountain: *SI* variance = 0.681, *EI* variance = 1.295, *RI* variance = 1.250
Division Pacific: *SI* variance = 0.810, *EI* variance = 0.602, *RI* variance = 1.234

3) The margin of error per sample at 95% certainty and 50% response distribution was consistent with conventional polling of public opinions of variable sizes (see van Bennekom 2002), as follows: *Educators of Prospective Teachers* ± 4.6%, *New England Faculty* ± 5.5%, and *College Students* ± 3.3% (sample size calculator Raosoft 2014).

4) As we expected, the Educators of Prospective Teachers held intermediate scores in the levels of understanding science/evolution when compared to the New England General Faculty (high scores) and the College Students (low scores). We also expected the educators-nationwide to be the most religious among the three populations because we had found such trend in a previous study of New England Educators of Prospective Teachers (Paz-y-Miño-C & Espinosa 2012b).

5) The response rates of the Educators of Prospective Teachers (10.3%) in respect to the total population contacted, were analogous to comparable studies of public opinions in the US (The Pew Research Center For The People & The Press 2009) and consistent with our previous studies (Paz-y-Miño-C & Espinosa 2013b, 2011b, 2009a,b); note observation about modern views on surveys validity based on response rates (above).

Acknowledgements

We thank the educators of prospective teachers, at 281 colleges and universities in the US, for participating in the study and for providing feedback to improve the surveys. Charlotte O'Driscoll, Lauren Murray and Amanda Tanis compiled part of the email data base. The Human Subjects / Institutional Review Board at the University of Massachusetts Dartmouth approved the research protocol. G Paz-y-Miño-C is supported by the UMassD Office of Faculty Development (Innovation in Teaching Awards AY0910, Undergraduate Research Grants F09) and A Espinosa by IDeA-NIH-GMS grant #2 P20 GM103430.

References

Berkman MB, Plutzer E. 2011. Defeating creationism in the courtroom, but not in the classroom. *Science* 331: 404–405.

Berkman MB, Plutzer E. 2010. *Evolution, Creationism, and the Battle to Control America's Classrooms*. New York: Cambridge University Press.

Gould SJ. 1999. *Rocks Of Ages*. New York, NY: Ballantine Books.

Groves RM, Fowler FJ, Couper MP, Lepkowski JM, Singer E, Tourangeau R. 2009. *Survey Methodology*. Hoboken New Jersey: John Wiley & Sons Inc.

Hawley PH, Short SD, McCune LA, Osman MR & Little TD. 2011. What's the matter with Kansas?: The development and confirmation of the evolutionary attitudes and literacy survey (EALS). *Evolution: Education & Outreach* 4: 117–132.

IPSOS. 2011. Supreme being, the afterlife, and evolution. http://www.ipsos-na.com/news-polls/pressrelease.aspx?id=5217.

Kahan D. 2014. Climate science communication and the measurement problem. *Advances Pol. Psych.* http://ssrn.com/abstract=2459057.

Kahan D. 2012. Why we are poles apart in climate change. *Nature* 488: 255.

Krauss LM. 2010. Cosmic evolution. *Evolution: Education & Outreach* 3: 193–197.

Lakatos I. 1978. *The Methodology of Scientific Research Programmes*. Philosophical Papers Volume 1. Cambridge: Cambridge University Press.

Mead LS, Mates A. 2009. Why science standards are important to a strong science curriculum and how states measure up. *Evolution: Education & Outreach* 2: 359–371.

Miller JD, Scott EC, Okamoto S. 2006. Public acceptance of evolution. *Science* 313: 765–766.

Paz-y-Miño-C G & Espinosa A. in press. The incompatibility hypothesis: evolution versus supernatural causation. In Trueba G (ed). *Why Does Evolution Matter? The Importance of Understanding Evolution*, Cambridge Scholars Publishing.

Paz-y-Miño-C G & Espinosa A. 2013a. The everlasting conflict evolution-and-science versus religiosity. Pp. 73-97. In Simpson G & Payne S (eds). *Religion And Ethics*, NOVA Publishers, New York.

Paz-y-Miño-C G. & Espinosa A. 2013b. Attitudes toward evolution at New England colleges and universities, United States. *NE Science Public: Series Evolution* 1: 1–32.

Paz-y-Miño-C G & Espinosa A. 2013c. Galapagos III world evolution summit: why evolution matters. *Evolution: Education & Outreach* 6: 28.

Paz-y-Miño-C G. & Espinosa A. 2012a. Introduction: why people do not accept evolution: using protistan diversity to promote evolution literacy. *Journal of Eukaryotic Microbiology* 59: 101–104.

Paz-y-Miño-C G & Espinosa A. 2012b. Educators of prospective teachers hesitate to embrace evolution due to deficient understanding of science/evolution and high religiosity. *Evolution: Education & Outreach* 5: 139–162.

Paz-y-Miño-C G & Espinosa A. 2011a. On the theory of evolution versus the concept of evolution: three observations. *Evolution: Education & Outreach* 4: 308–312.

Paz-y-Miño-C G & Espinosa A. 2011b. New England faculty and college students differ in their views about evolution, creationism, intelligent design, and religiosity. *Evolution: Education & Outreach* 4: 323–342.

Paz-y-Miño-C G & Espinosa A. 2011c. The Jackprot Simulation couples mutation rate with natural selection to illustrate how protein evolution is not random. *Evolution: Education & Outreach* 4: 502–514.

Paz-y-Miño-C G. & Espinosa A. 2010. Integrating horizontal gene transfer and common descent to depict evolution and contrast it with "common design." *Journal of Eukaryotic Microbiology* 57: 11–18.

Paz-y-Miño-C G & Espinosa A. 2009a. Assessment of biology majors' versus non-majors' views on evolution, creationism and intelligent design. *Evolution: Education & Outreach* 2: 75–83.

Paz-y-Miño-C G & Espinosa A. 2009b. Acceptance of evolution increases with student academic level: a comparison between a secular and a religious college. *Evolution: Education & Outreach* 2: 655–675.

Raosoft Inc. 2014. Sample size calculator. http://www.raosoft.com/samplesize.html.

Siegel S, Castellan NJ. 1988. *Nonparametric Statistics For The Behavioral Sciences*. Boston: McGraw Hill.

The Gallup Poll. 2007. Majority of republicans doubt theory of evolution. http://www.gallup.com/poll/27847/Majority-Republicans-Doubt-Theory-Evolution.aspx.

The Pew Global Attitudes Project. 2007. World publics welcome global trade but not immigration. Washington DC. http://pewglobal.org/files/pdf/258.pdf.

The Pew Forum on Religion and Public Life. 2008. US Religious Landscape Survey. http://religions.pewforum.org/pdf/report-religious-landscape-study-full.pdf.

The Pew Research Center For The People & The Press. 2009. Scientific achievements less prominent than a decade ago: public praises science; scientists fault public, media. Washington DC. http://people-press.org/reports/pdf/528.pdf.

The Pew Research Center For The People & The Press. 2005. Public divided on origins of life: religion a strength and weakness for both parties. Washington DC. http://people-press.org/reports/pdf/254.pdf.

van Bennekom FC. 2002. *Customer Surveying: A Guidebook For Service Managers*. Boston: Customer Service Press.

Table 1. Descriptive Statistics of the Educators of Prospective Teachers Sampled Per Region / Division / State, United States

REGION / *Division per Region* / State	Contacted					Responders*						% in Respect to Grand Total of Responders Completing Survey
	N	Females	%	Males	%	N	%	Females	%	Males	%	
REGION 1 NORTHEAST												
Division 1 New England												
Connecticut	107	52	48.60	55	51.40	12	11.21	NA	NA	NA	NA	2.42
Maine	64	37	57.81	27	42.19	6	9.38	NA	NA	NA	NA	1.21
Massachusetts	54	35	64.81	19	35.19	6	11.11	NA	NA	NA	NA	1.21
New Hampshire	61	44	72.13	17	27.87	10	16.39	NA	NA	NA	NA	2.02
Rhode Island	153	101	66.01	52	33.99	11	7.19	NA	NA	NA	NA	2.22
Vermont	67	42	62.69	25	37.31	10	14.93	NA	NA	NA	NA	2.02
Total Division	**506**	311	61.46	195	38.54	**55**	10.87	30	54.55	25	45.45	11.11
% in Respect to Grand Total Column	10.61					11.11						
Division 2 Mid Atlantic												
New Jersey	51	29	56.86	22	43.14	3	5.88	NA	NA	NA	NA	0.61
New York	153	96	62.75	57	37.25	14	9.15	NA	NA	NA	NA	2.83
Pennsylvania	30	28	93.33	2	6.67	3	10.00	NA	NA	NA	NA	0.61
Total Division	**234**	153	65.38	81	34.62	**20**	8.55	11	55.00	9	45.00	4.04
% in Respect to Grand Total Column	4.91					4.04						
Total Region	**740**	464	62.70	276	37.30	**75**	10.14	41	54.67	34	45.33	15.15
% in Respect to Grand Total Column	15.51					15.15						
REGION 2 MIDWEST												
Division 3 East North Central												
Illinois	123	80	65.04	43	34.96	12	9.76	NA	NA	NA	NA	2.42
Indiana	66	46	69.70	20	30.30	7	10.61	NA	NA	NA	NA	1.41
Michigan	75	47	62.67	28	37.33	7	9.33	NA	NA	NA	NA	1.41
Ohio	68	39	57.35	29	42.65	8	11.76	NA	NA	NA	NA	1.62
Wisconsin	184	122	66.30	62	33.70	16	8.70	NA	NA	NA	NA	3.23
Total Division	**516**	334	64.73	182	35.27	**50**	9.69	28	56.00	22	44.00	10.10
% in Respect to Grand Total Column	10.82					10.10						
Division 4 West North Central												
Iowa	65	43	66.15	22	33.85	4	6.15	NA	NA	NA	NA	0.81
Kansas	48	31	64.58	17	35.42	5	10.42	NA	NA	NA	NA	1.01
Minnesota	126	85	67.46	41	32.54	10	7.94	NA	NA	NA	NA	2.02
Missouri	37	25	67.57	12	32.43	9	24.32	NA	NA	NA	NA	1.82
Nebraska	96	59	61.46	37	38.54	16	16.67	NA	NA	NA	NA	3.23
North Dakota	7	6	85.71	1	14.29	3	42.86	NA	NA	NA	NA	0.61
South Dakota	79	47	59.49	32	40.51	10	12.66	NA	NA	NA	NA	2.02
Total Division	**458**	296	64.63	162	35.37	**57**	12.45	42	73.68	15	26.32	11.52
% in Respect to Grand Total Column	9.60					11.52						
Total Region	**974**	630	64.68	344	35.32	**107**	10.99	70	65.42	37	34.58	21.62
% in Respect to Grand Total Column	20.42					21.62						
REGION 3 SOUTH												
Division 5 South Atlantic												
Delaware	144	88	61.11	56	38.89	10	6.94	NA	NA	NA	NA	2.02
District of Columbia	163	109	66.87	54	33.13	4	2.45	NA	NA	NA	NA	0.81
Florida	118	74	62.71	44	37.29	19	16.10	NA	NA	NA	NA	3.84
Georgia	59	37	62.71	22	37.29	5	8.47	NA	NA	NA	NA	1.01
Maryland	134	91	67.91	43	32.09	5	3.73	NA	NA	NA	NA	1.01

Table 1 continues in next page...

...Table 1 Continued

North Carolina	113	73	64.60	40	35.40	19	16.81	NA	NA	NA	NA	3.84
South Carolina	67	44	65.67	23	34.33	8	11.94	NA	NA	NA	NA	1.62
Virginia	150	91	60.67	59	39.33	17	11.33	NA	NA	NA	NA	3.43
West Virginia	35	24	68.57	11	31.43	4	11.43	NA	NA	NA	NA	0.81
Total Division	**983**	631	64.19	352	35.81	**91**	9.26	61	67.03	30	32.97	18.38
% in Respect to Grand Total Column	20.61					18.38						
Division 6 East South Central												
Alabama	166	100	60.24	66	39.76	25	15.06	NA	NA	NA	NA	5.05
Kentucky	172	111	64.53	61	35.47	25	14.53	NA	NA	NA	NA	5.05
Mississippi	40	31	77.50	9	22.50	4	10.00	NA	NA	NA	NA	0.81
Tennessee	69	44	63.77	25	36.23	10	14.49	NA	NA	NA	NA	2.02
Total Division	**447**	286	63.98	161	36.02	**64**	14.32	38	59.38	26	40.63	12.93
% in Respect to Grand Total Column	9.37					12.93						
Division 7 West South Central												
Arkansas	234	132	56.41	102	43.59	27	11.54	NA	NA	NA	NA	5.45
Louisiana	48	31	64.58	17	35.42	11	22.92	NA	NA	NA	NA	2.22
Oklahoma	45	29	64.44	16	35.56	10	22.22	NA	NA	NA	NA	2.02
Texas	119	77	64.71	42	35.29	11	9.24	NA	NA	NA	NA	2.22
Total Division	**446**	269	60.31	177	39.69	**59**	13.23	31	52.54	28	47.46	11.92
% in Respect to Grand Total Column	9.35					11.92						
Total Region	**1876**	1186	63.22	690	36.78	**214**	11.41	130	60.75	84	39.25	43.23
% in Respect to Grand Total Column	39.33					43.23						
REGION 4 WEST												
Division 8 Mountain												
Arizona	127	62	48.82	65	51.18	15	11.81	NA	NA	NA	NA	3.03
Colorado	105	64	60.95	41	39.05	5	4.76	NA	NA	NA	NA	1.01
Idaho	70	42	60.00	28	40.00	10	14.29	NA	NA	NA	NA	2.02
Montana	75	39	52.00	36	48.00	9	12.00	NA	NA	NA	NA	1.82
Nevada	43	22	51.16	21	48.84	3	6.98	NA	NA	NA	NA	0.61
New Mexico	78	63	80.77	15	19.23	5	6.41	NA	NA	NA	NA	1.01
Utah	77	53	68.83	24	31.17	6	7.79	NA	NA	NA	NA	1.21
Wyoming	13	5	38.46	8	61.54	4	30.77	NA	NA	NA	NA	0.81
Total Division	**588**	350	59.52	238	40.48	**57**	9.69	28	49.12	29	50.88	11.52
% in Respect to Grand Total Column	12.33					11.52						
Division 9 Pacific												
Alaska	124	89	71.77	35	28.23	12	9.68	NA	NA	NA	NA	2.42
California	193	121	62.69	72	37.31	16	8.29	NA	NA	NA	NA	3.23
Hawaii	48	27	56.25	21	43.75	4	8.33	NA	NA	NA	NA	0.81
Oregon	63	34	53.97	29	46.03	5	7.94	NA	NA	NA	NA	1.01
Washington	164	105	64.02	59	35.98	5	3.05	NA	NA	NA	NA	1.01
Total Division	**592**	376	63.51	216	36.49	**42**	7.09	25	59.52	17	40.48	8.48
% in Respect to Grand Total Column	12.41					8.48						
Total Region	**1180**	726	61.53	454	38.47	**99**	8.39	53	53.54	46	46.46	20.00
% in Respect to Grand Total Column	24.74					20.00						
Grand Total Column	**4770**	3006	63.02	1764	36.98	**495**	10.38	294	59.39	201	40.61	100
% in Respect to Grand Total Contacted	**100**	**63.02**		**36.98**		**10.38**		**6.16**		**4.21**		

* Total number of responders can vary because participants were allowed to skip questions and/or end survey voluntarily at any time

Table 2. Science Index, Evolution Index, and Religiosity Index for Educators of Prospective Teachers, United States (N = 411*)

US Region	Division per Region	Science Index	Evolution Index	Religiosity Index	N = Responders per Region	% Responders per Region	% Responders / GRAND TOTAL
Region 1 NORTHEAST							
	Division 1 New England	1.85	1.96	0.83	53	79.10	NA
	Division 2 Mid Atlantic	2.00	1.50	1.57	14	20.90	NA
	Mean Index Region	1.88	1.87	0.99	NA	NA	NA
	Sub total N = Responders per Region	NA	NA	NA	67	NA	16.30
Region 2 MIDWEST							
	Division 3 East North Central	2.17	1.69	1.17	35	41.67	NA
	Division 4 West North Central	1.92	1.55	1.51	49	58.33	NA
	Mean Index Region	2.02	1.61	1.37	NA	NA	NA
	Sub total N = Responders per Region	NA	NA	NA	84	NA	20.44
Region 3 SOUTH							
	Division 5 South Atlantic	1.83	1.78	1.36	69	39.66	NA
	Division 6 East South Central	2.04	1.63	1.52	56	32.18	NA
	Division 7 West South Central	1.96	1.86	1.49	49	28.16	NA
	Mean Index Region	1.93	1.75	1.45	NA	NA	NA
	Sub total N = Responders per Region	NA	NA	NA	174	NA	42.34
Region 4 WEST							
	Division 8 Mountain	2.15	1.81	1.35	52	60.47	NA
	Division 9 Pacific	2.09	1.94	1.09	34	39.53	NA
	Mean Index Region	2.13	1.86	1.24	NA	NA	NA
	Sub total N = Responders per Region	NA	NA	NA	86	NA	20.92
	GRAND MEAN Index All Regions	1.98	1.76	1.31	NA	NA	NA
	GRAND TOTAL N = Responders All Regions	NA	NA	NA	411	NA	100

* Total number of responders can vary because participants were allowed to skip questions and/or end survey voluntarily at any time

Table 3. Importance of Religion, Prayer, and Faith in a God among the Educators of Prospective Teachers Who Participated in the Study, United States (N = 358*)

GROUP / Sub Group	Importance of Religion, Prayer, Faith	TRUE	%	FALSE	%	N
All Responders						
	Religion is very important in my life	213	59.50	145	40.50	358
	I pray at least once a day	201	56.15	157	43.85	358
	Faith in a God is necessary for morality	82	22.91	276	77.09	358
Females						
	Religion is very important in my life	128	59.53	87	40.47	215
	I pray at least once a day	122	56.74	93	43.26	215
	Faith in a God is necessary for morality	43	20.00	172	80.00	215
Males						
	Religion is very important in my life	85	59.44	58	40.56	143
	I pray at least once a day	79	55.24	64	44.76	143
	Faith in a God is necessary for morality	39	27.27	104	72.73	143

* Total number of responders can vary because participants were allowed to skip questions and/or end survey voluntarily at any time

Table 4. Areas of Specialization of the Educators of Prospective Teachers Who Participated in the Study, United States (N = 440*)

Areas of Specialization	Number of Responders Selecting *"Area of Specialization"* (responders could select more than one area)**	% of Grand Total Number of Responders N = 440
Teachers Education	220	50.00
Elementary Education	176	40.00
Secondary Education	162	36.82
Curriculum Instruction	121	27.50
Other***	106	24.09
Special Education	78	17.73
Science (Biology, Chemistry, Physics)	75	17.05
Early Childhood Education	72	16.36
Mathematics	51	11.59
Social Sciences	51	11.59
Reading Specialist/Literacy	51	11.59
Principal	40	9.09
English	32	7.27
Superintendent	28	6.36
Foreign Languages	15	3.41
School Psychologist	15	3.41
Arts/Music	11	2.50

* Total number of responders can vary because participants were allowed to skip questions and/or end survey voluntarily at any time
** Each responder was allowed to select more than one area of specialization and/or write comments about other specializations not listed
*** 106 participants (24.09%) provided written comments highlighting specifics of their areas of specialization

Table 5. Academic Affiliation of the Educators of Prospective Teachers Who Participated in the Study, United States (N = 408*, N = 312*)

Type of Institution	N	%
Public	262	64.22
Private (non-religious)	71	17.40
Religious	75	18.38
Total*	408	100
4-year College	126	40.38
5-6-year University	186	59.62
Total*	312	100

* Total number of responders can vary because participants were allowed to skip questions and/or end survey voluntarily at any time

Table 6. Sex and Age of the Educators of Prospective Teachers Who Participated in the Study, United States (N = 440*)

Sex	N	%	Age	N	%
Female	264	60	50+	269	61.14
Male	176	40	44-50	69	15.68
			37-43	62	14.09
Total	440	100	30-36	35	7.95
			23-29	5	1.14
			Total	440	100

Table 7. Highest Degree Earned by the Educators of Prospective Teachers Who Participated in the Study, United States (N = 440*)

Highest Degree	N	%
PhD	289	65.68
Doctorate or equivalent	98	22.27
Masters	49	11.14
Professional degree	1	0.23
Bachelors	2	0.45
Associate or Technical degree	1	0.23
Total	440	100

Table 8. Self Identified Cultural Background of the Educators of Prospective Teachers Who Participated in the Study, United States (N = 440*)

Cultural Background	N	%
White "Caucasian"	378	85.91
African American	15	3.41
Multi-Cultural	11	2.50
Asian Pacific	8	1.82
American Indian	7	1.59
Hispanic	7	1.59
Other	7	1.59
Mexican American	5	1.14
African	2	0.45
Total	440	100

* Total number of responders can vary because participants were allowed to skip questions and/or end survey voluntarily at any time

Table 9. Self Identified Political Ideology and Partisanship of the Educators of Prospective Teachers Who Participated in the Study, United States (N = 440*)

Political Ideology	N	%	Partisanship	N	%
Liberal views	138	31.36	Democrat	218	49.55
Moderate views	128	29.09	Independent	102	23.18
Progressive views	92	20.91	Republican	61	13.86
Conservative views	62	14.09	Unaffiliated	50	11.36
Other	20	4.55	Libertarian	6	1.36
			Tea-partier	3	0.68
Total	440	100			
			Total	440	100

* Total number of responders can vary because participants were allowed to skip questions and/or end survey voluntarily at any time

Table 10. Self-defined Religiosity, Agnosticism or Atheism among the Educators of Prospective Teachers Who Participated in the Study, United States (N = 358*)

Self Defined As	N	%	Females	%	Males	%
Religious	176	49.16	114	53.02	62	43.36
Agnostic, neither believe in a deity nor in the absence of a deity	67	18.72	43	20.00	24	16.78
Very religious	66	18.44	34	15.81	32	22.38
Atheist, think there is no deity	30	8.38	15	6.98	15	10.49
Non-believer in any god	19	5.31	9	4.19	10	6.99
Total	358	100	215	100	143	100

* Total number of responders can vary because participants were allowed to skip questions and/or end survey voluntarily at any time

Table 11. Place of Origin of the Educators of Prospective Teachers Sampled Per Region, United States

REGION	Contacted All	Responders All	%	Place of Origin of Responders*							
				Native to State	%	Native to Other State	%	International	%	No Answer	%
REGION 1 NORTHEAST											
Connecticut	107	12		2		NA		NA		NA	
Maine	64	6		1		NA		NA		NA	
Massachusetts	54	6		6		NA		NA		NA	
New Hampshire	61	10		3		NA		NA		NA	
New Jersey	51	3		3		NA		NA		NA	
New York	153	14		14		NA		NA		NA	
Pennsylvania	30	3		3		NA		NA		NA	
Rhode Island	153	11		3		NA		NA		NA	
Vermont	67	10		3		NA		NA		NA	
Total Region	740	75	10.14	38	**50.67**	28	37.33	3	4.00	6	8.00
REGION 2 MIDWEST											
Illinois	123	12		12		NA		NA		NA	
Indiana	66	7		7		NA		NA		NA	
Iowa	65	4		4		NA		NA		NA	
Kansas	48	5		3		NA		NA		NA	
Michigan	75	7		7		NA		NA		NA	
Minnesota	126	10		6		NA		NA		NA	
Missouri	37	9		5		NA		NA		NA	
Nebraska	96	16		7		NA		NA		NA	
North Dakota	7	3		3		NA		NA		NA	
Ohio	68	8		7		NA		NA		NA	
South Dakota	79	10		9		NA		NA		NA	
Wisconsin	184	16		5		NA		NA		NA	
Total Region	974	107	10.99	75	**70.09**	26	24.30	4	3.74	2	1.87
REGION 3 SOUTH											
Alabama	166	25		12		NA		NA		NA	
Arkansas	234	27		13		NA		NA		NA	
Delaware	144	10		2		NA		NA		NA	
District of Columbia	139	4		NA		NA		NA		NA	
Florida	118	19		7		NA		NA		NA	
Georgia	59	5		5		NA		NA		NA	
Kentucky	172	25		11		NA		NA		NA	
Louisiana	48	11		7		NA		NA		NA	
Maryland	134	5		5		NA		NA		NA	
Mississippi	40	4		4		NA		NA		NA	
North Carolina	113	19		17		NA		NA		NA	
Oklahoma	45	10		3		NA		NA		NA	
South Carolina	67	8		5		NA		NA		NA	
Tennessee	69	10		9		NA		NA		NA	
Texas	119	11		11		NA		NA		NA	
Virginia	150	17		11		NA		NA		NA	
West Virginia	35	4		2		NA		NA		NA	
Total Region	1852	214	11.56	124	**57.94**	74	34.58	8	3.74	8	3.74
REGION 4 WEST											
Alaska	124	12		4		NA		NA		NA	
Arizona	127	15		7		NA		NA		NA	
California	193	16		11		NA		NA		NA	
Colorado	105	5		5		NA		NA		NA	

Table 11 continues in next page...

...**Table 11** Continued

Hawaii	48	4		2		NA		NA		NA	
Idaho	70	10		2		NA		NA		NA	
Montana	75	9		4		NA		NA		NA	
Nevada	43	3		3		NA		NA		NA	
New Mexico	78	5		5		NA		NA		NA	
Oregon	63	5		5		NA		NA		NA	
Utah	77	6		3		NA		NA		NA	
Washington	188	5		5		NA		NA		NA	
Wyoming	13	4		4		NA		NA		NA	
Total Region	1204	99	8.22	60	**60.61**	26	26.26	5	5.05	8	8.08
Grand Total Column	4770	495	10.38	297	**60.00**	154	31.11	20	4.04	24	4.85

* Total number of responders can vary because participants were allowed to skip questions and/or end survey voluntarily at any time

Table 12. Place of Origin of the Educators of Prospective Teachers Sampled Per Division-and-State within Regions, United States

REGION / *Division per Region* / State	Contacted All	Responders All	%	Place of Origin of Responders*							
				Native to State	%	Native to Other State	%	International	%	No Answer	%
REGION 1 NORTHEAST											
Division 1 New England											
Connecticut	107	12	11.21	2		NA		NA		NA	
Maine	64	6	9.38	1		NA		NA		NA	
Massachusetts	54	6	11.11	6		NA		NA		NA	
New Hampshire	61	10	16.39	3		NA		NA		NA	
Rhode Island	153	11	7.19	7		NA		NA		NA	
Vermont	67	10	14.93	3		NA		NA		NA	
Total Division	506	55	10.87	22	**40.00**	27	49.09	2	3.64	4	7.27
Division 2 Mid Atlantic											
New Jersey	51	3	5.88	3		NA		NA		NA	
New York	153	14	9.15	7		NA		NA		NA	
Pennsylvania	30	3	10.00	3		NA		NA		NA	
Total Division	234	20	8.55	13	**65.00**	4	20.00	1	5.00	2	10.00
REGION 2 MIDWEST											
Division 3 East North Central											
Illinois	123	12	9.76	10		NA		NA		NA	
Indiana	66	7	10.61	7		NA		NA		NA	
Michigan	75	7	9.33	6		NA		NA		NA	
Ohio	68	8	11.76	7		NA		NA		NA	
Wisconsin	184	16	8.70	6		NA		NA		NA	
Total Division	516	50	9.69	36	**72.00**	11	22.00	3	6.00	0	0.00
Division 4 West North Central											
Iowa	65	4	6.15	4		NA		NA		NA	
Kansas	48	5	10.42	3		NA		NA		NA	
Minnesota	126	10	7.94	6		NA		NA		NA	
Missouri	37	9	24.32	5		NA		NA		NA	
Nebraska	96	16	16.67	7		NA		NA		NA	
North Dakota	7	3	42.86	3		NA		NA		NA	
South Dakota	79	10	12.66	9		NA		NA		NA	
Total Division	458	57	12.45	37	**64.91**	17	29.82	1	1.75	2	3.51
REGION 3 SOUTH											
Division 5 South Atlantic											
Delaware	144	10	6.94	2		NA		NA		NA	
District of Columbia	139	4	2.88	NA		NA		NA		NA	
Florida	118	19	16.10	7		NA		NA		NA	
Georgia	59	5	8.47	5		NA		NA		NA	
Maryland	134	5	3.73	5		NA		NA		NA	
North Carolina	113	19	16.81	16		NA		NA		NA	
South Carolina	67	8	11.94	5		NA		NA		NA	
Virginia	150	17	11.33	11		NA		NA		NA	
West Virginia	35	4	11.43	2		NA		NA		NA	
Total Division	959	91	9.49	53	**58.24**	34	37.36	1	1.10	3	3.30

Table 12 continues in next page...

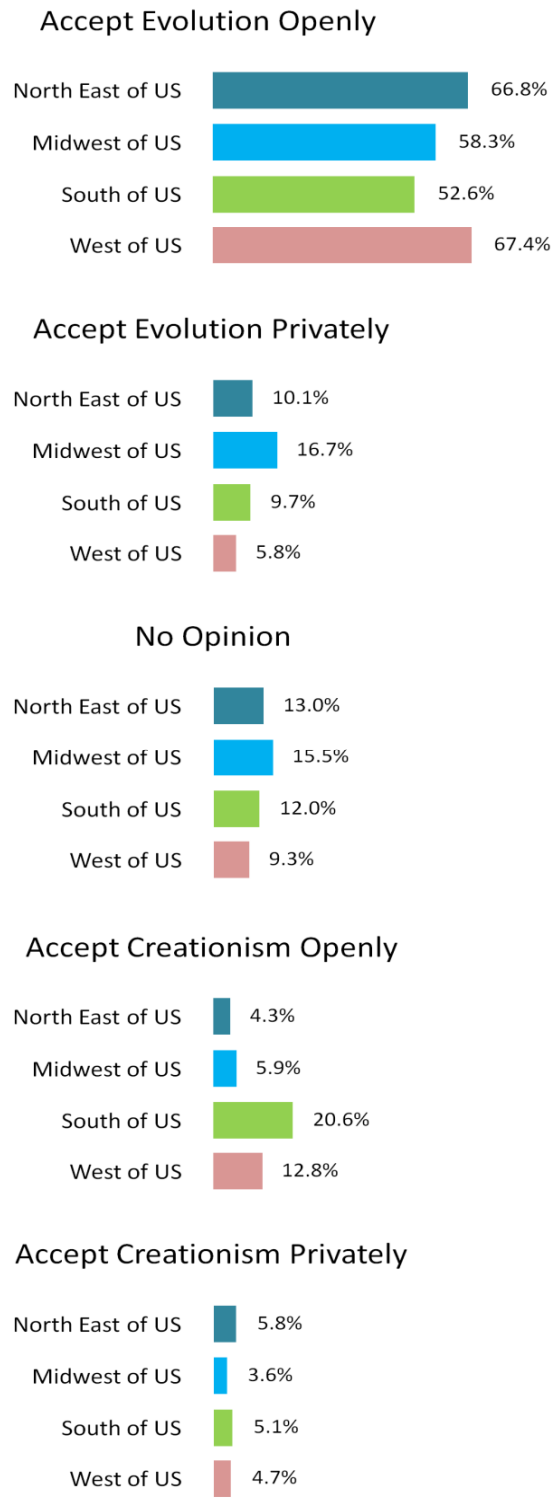
...**Table 12** Continued

Division 6 East South Central											
Alabama	166	25	15.06	11		NA		NA		NA	
Kentucky	172	25	14.53	10		NA		NA		NA	
Mississippi	40	4	10.00	4		NA		NA		NA	
Tennessee	69	10	14.49	9		NA		NA		NA	
Total Division	447	64	14.32	34	**53.13**	27	42.19	2	3.13	1	1.56
Division 7 West South Central											
Arkansas	234	27	11.54	13		NA		NA		NA	
Louisiana	48	11	22.92	6		NA		NA		NA	
Oklahoma	45	10	22.22	3		NA		NA		NA	
Texas	119	11	9.24	8		NA		NA		NA	
Total Division	446	59	13.23	30	**50.85**	20	33.90	5	8.47	4	6.78
REGION 4 WEST											
Division 8 Mountain											
Arizona	127	15	11.81	7		NA		NA		NA	
Colorado	105	5	4.76	4		NA		NA		NA	
Idaho	70	10	14.29	2		NA		NA		NA	
Montana	75	9	12.00	4		NA		NA		NA	
Nevada	43	3	6.98	3		NA		NA		NA	
New Mexico	78	5	6.41	5		NA		NA		NA	
Utah	77	6	7.79	3		NA		NA		NA	
Wyoming	13	4	30.77	4		NA		NA		NA	
Total Division	588	57	9.69	32	**56.14**	18	31.58	2	3.51	5	8.77
Division 9 Pacific											
Alaska	124	12	9.68	3		NA		NA		NA	
California	193	16	8.29	9		NA		NA		NA	
Hawaii	48	4	8.33	2		NA		NA		NA	
Oregon	63	5	7.94	5		NA		NA		NA	
Washington	188	5	2.66	5		NA		NA		NA	
Total Division	616	42	6.82	24	**57.14**	12	28.57	3	7.14	3	7.14
Grand Total Column	4770	495	10.38	281	**56.77**	170	34.34	20	4.04	24	4.85

* Total number of responders can vary because participants were allowed to skip questions and/or end survey voluntarily at any time

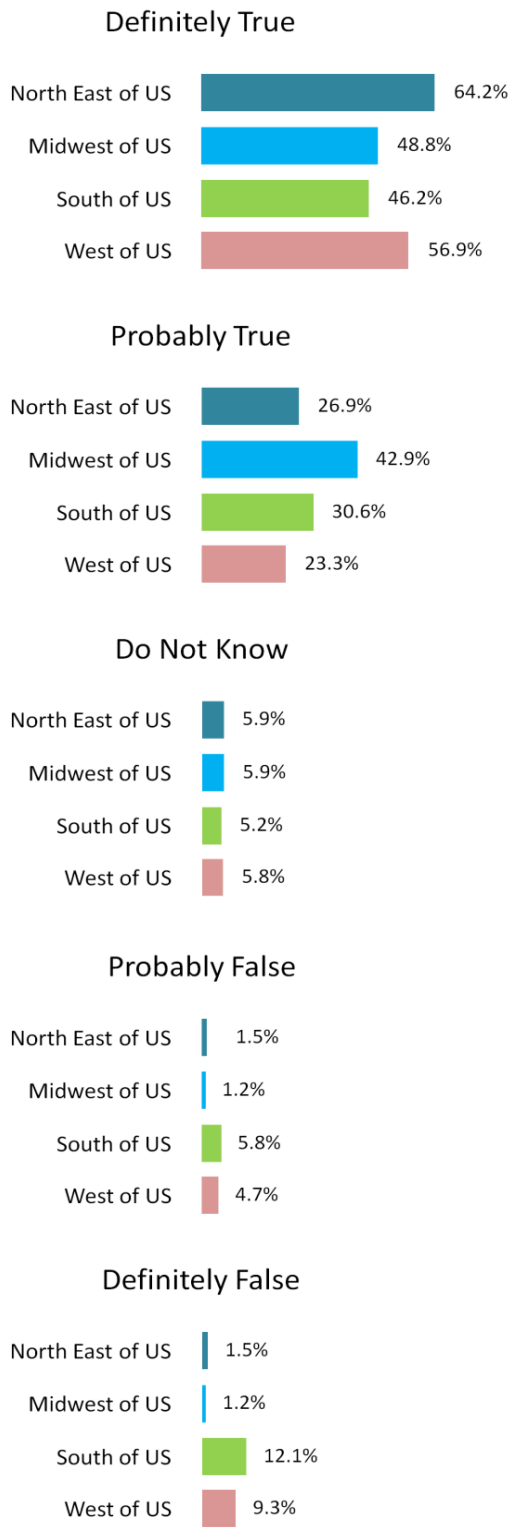
SUPPLEMENTARY FIGURES

Figure S1 The Majority of Educators of Prospective Teachers in the United States Accepted Evolution *Openly* (*N* = 414); Creationism Was Accepted Openly Mainly in the South and West of the US



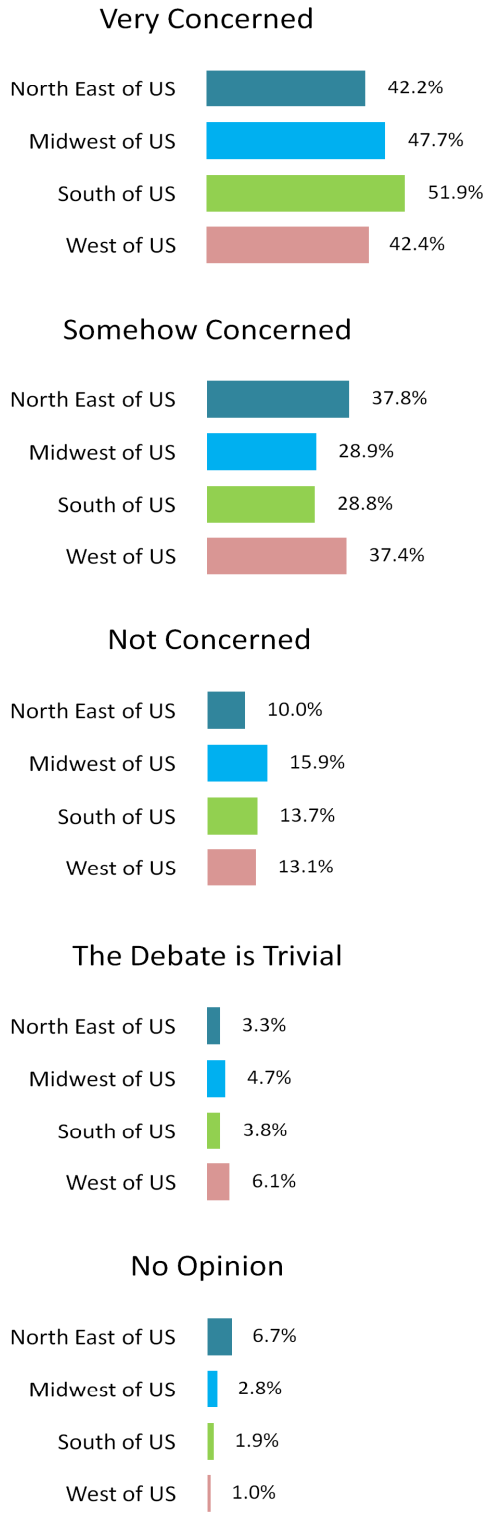
Comparisons among groups: *Chi-square* = 26.732, *df* = 12, *P* = 0.008; North East of US *N* = 69, Midwest of US *N* = 84, South of US *N* = 175, West of US *N* = 86. Total number of responders per group can vary because participants were allowed to skip questions and/or end survey voluntarily at any time.

Figure S2 Most Educators of Prospective Teachers in the United States Though that Evolution is *Definitely True* or *Probably True* (*N* = 410); the *Probably False* or *Definitely False* Positions Occurred Mainly in the South and West of the US



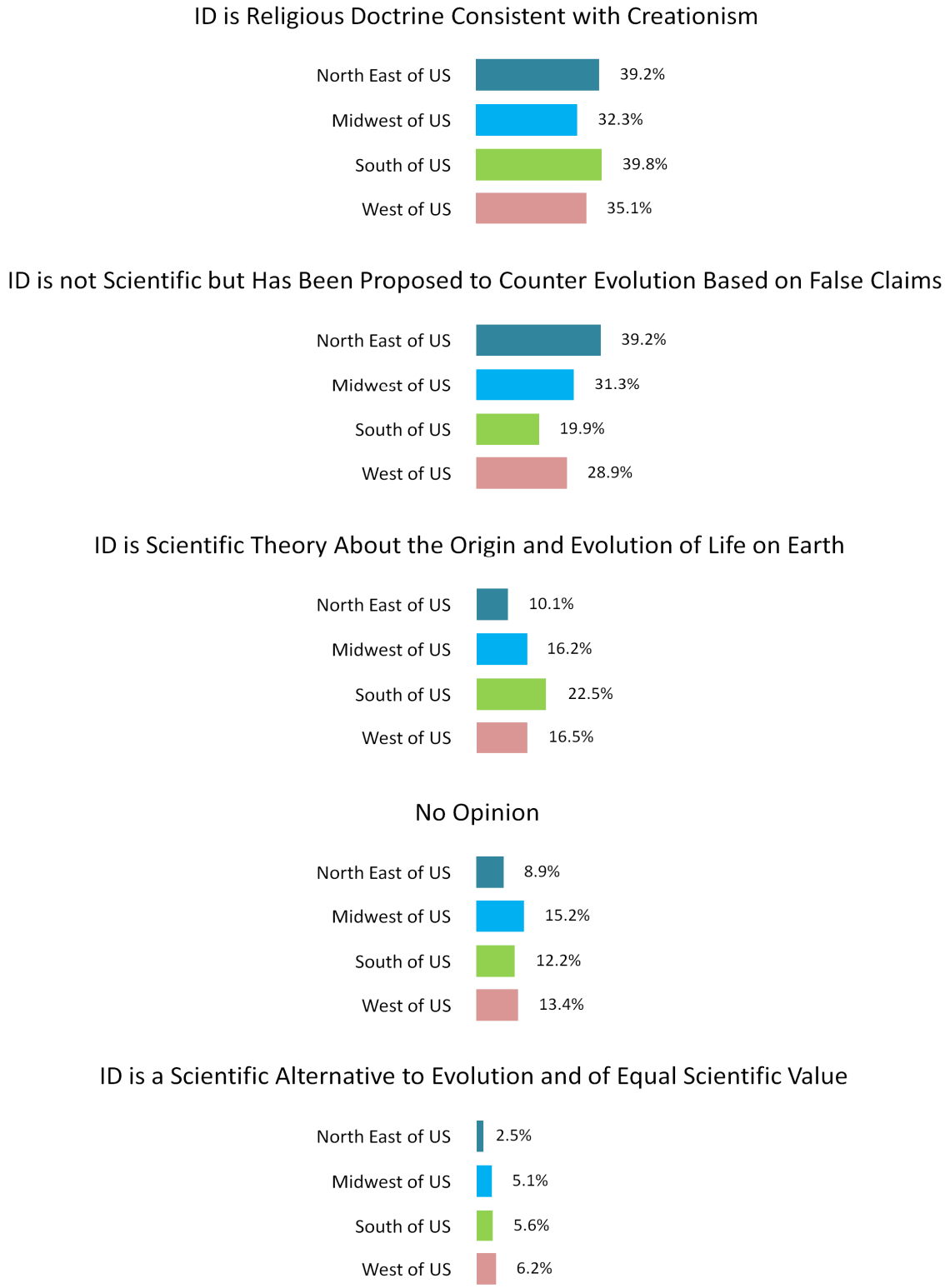
Comparisons among groups: *Chi-square* = 30.225, *df* = 12, *P* = 0.003; North East of US *N* = 67, Midwest of US *N* = 84, South of US *N* = 173, West of US *N* = 86. Total number of responders per group can vary because participants were allowed to skip questions and/or end survey voluntarily at any time.

Figure S3 The Majority of Educators of Prospective Teachers in the United States Were *Very Concerned* or *Somehow Concerned* about the Controversy *Evolution vs. Creationism vs. Intelligent Design and Its Implications for Science Education* (*N* = 508)



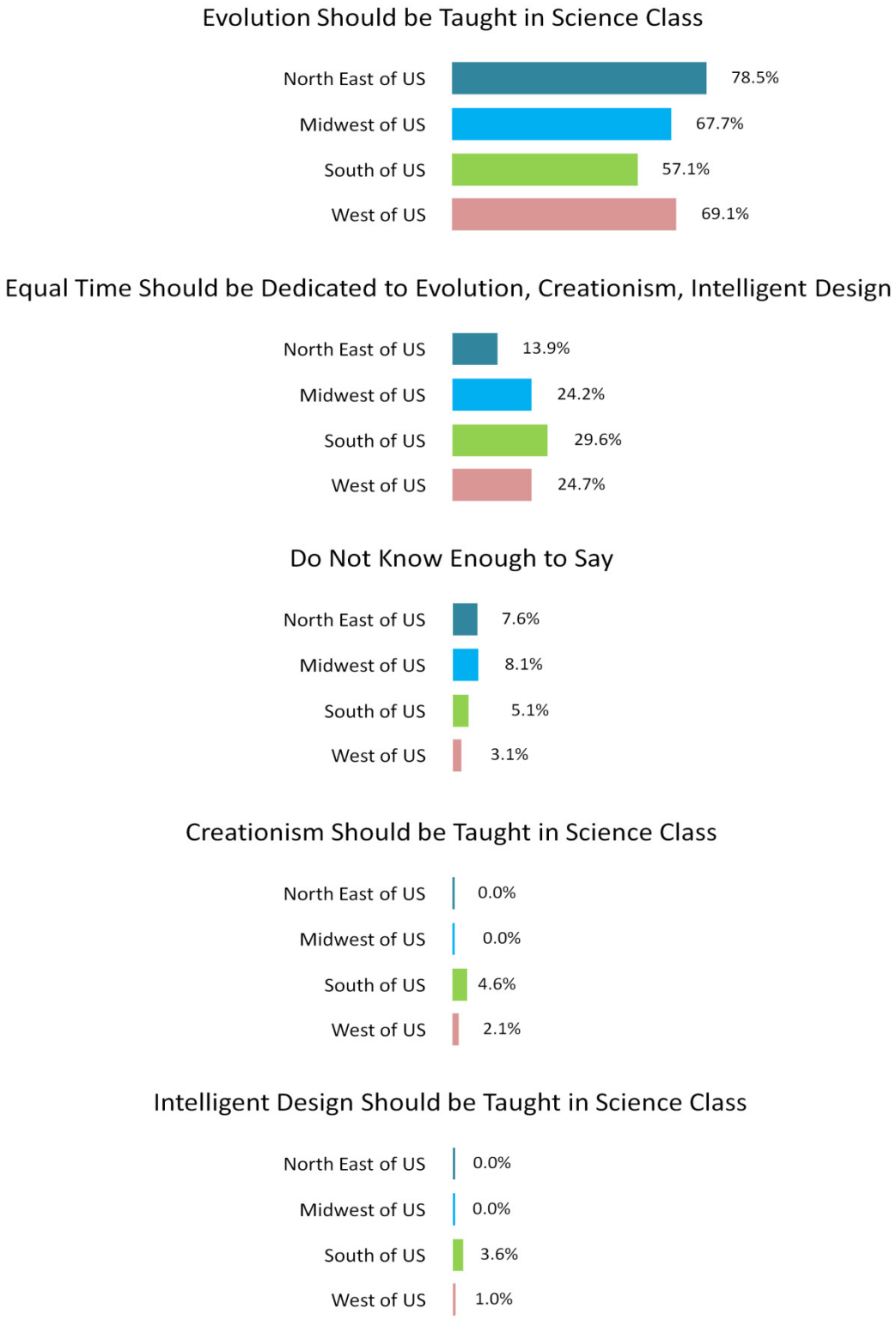
Comparisons among groups: *Chi-square* = 6.265, *df* = 12, *P* = 0.713; North East of US *N* = 90, Midwest of US *N* = 107, South of US *N* = 212, West of US *N* = 99. Total number of responders per group can vary because participants were allowed to skip questions and/or end survey voluntarily at any time.

Figure S4 The Majority of Educators of Prospective Teachers in the United States Viewed Intelligent Design as *Religious Doctrine* or as *Not Scientific* (*N* = 471); However, Views that Intelligent Design is *Scientific Theory* Did Occur



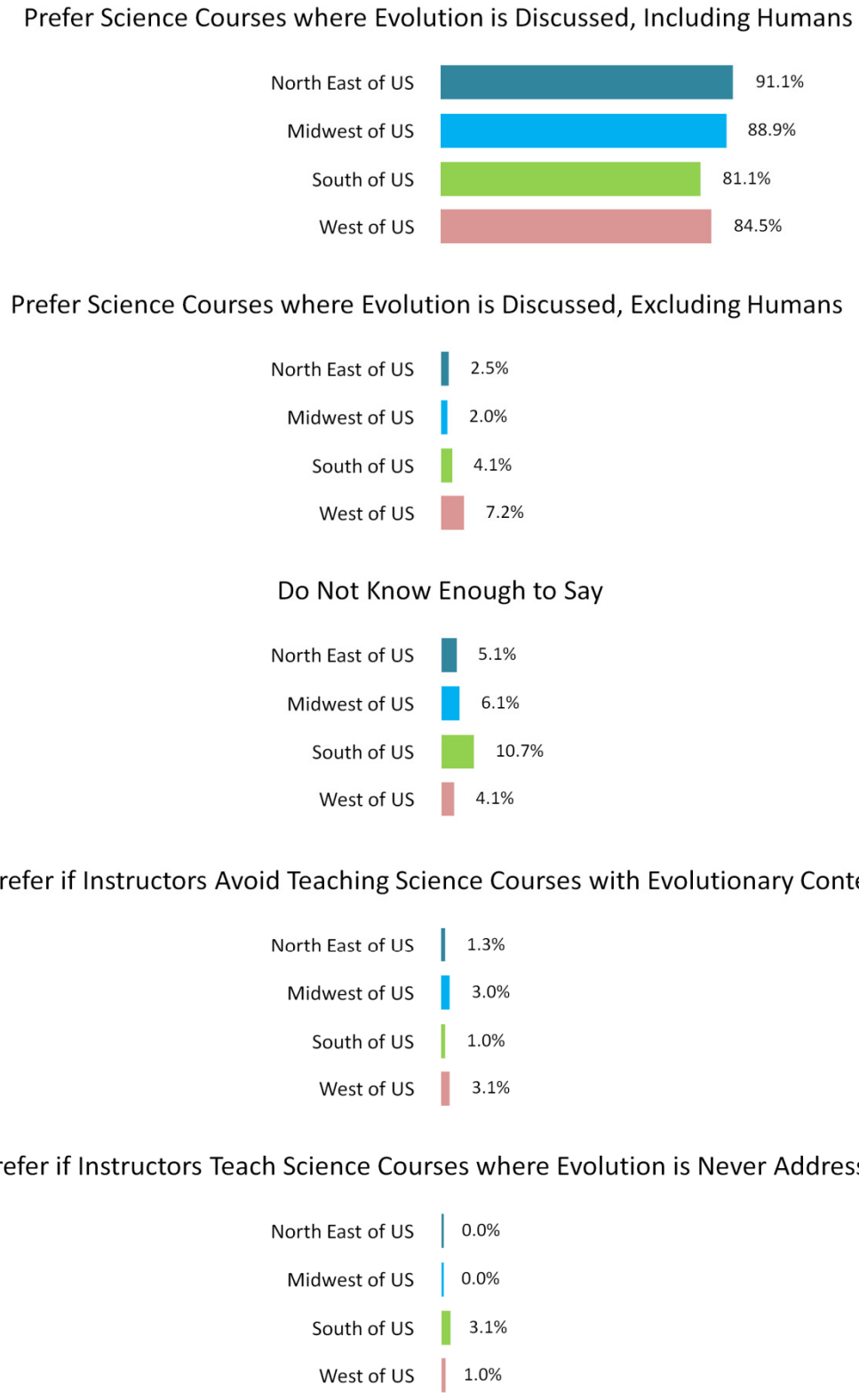
Comparisons among groups: *Chi-square* = 14.442, *df* = 12, *P* = 0.273; North East of US *N* = 79, Midwest of US *N* = 99, South of US *N* = 196, West of US *N* = 97. Total number of responders per group can vary because participants were allowed to skip questions and/or end survey voluntarily at any time.

Figure S5 The Majority of Educators of Prospective Teachers Supported the *Exclusive Teaching of Evolution in the Science Class*. However, Support to Dedicating *Equal Time to Evolution, Creationism and Intelligent Design* Was Conspicuous In All Regions (*N* = 471)



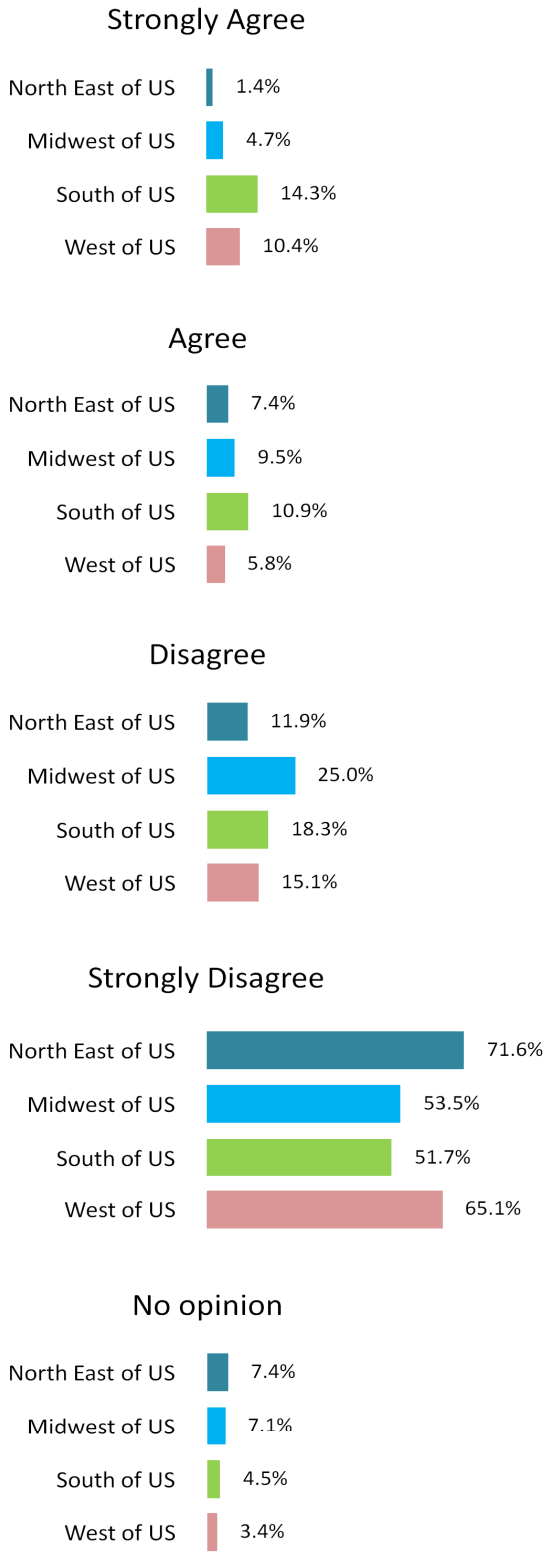
North East of US *N* = 79, Midwest of US *N* = 99, South of US *N* = 196, West of US *N* = 97. Total number of responders per group can vary because participants were allowed to skip questions and/or end survey voluntarily at any time. Statistics N/A, see Methods.

Figure S6 Most Educators of Prospective Teachers in the United States Preferred *Science Courses where Evolution is Discussed Comprehensively, Including Human Evolution* (*N* = 471)



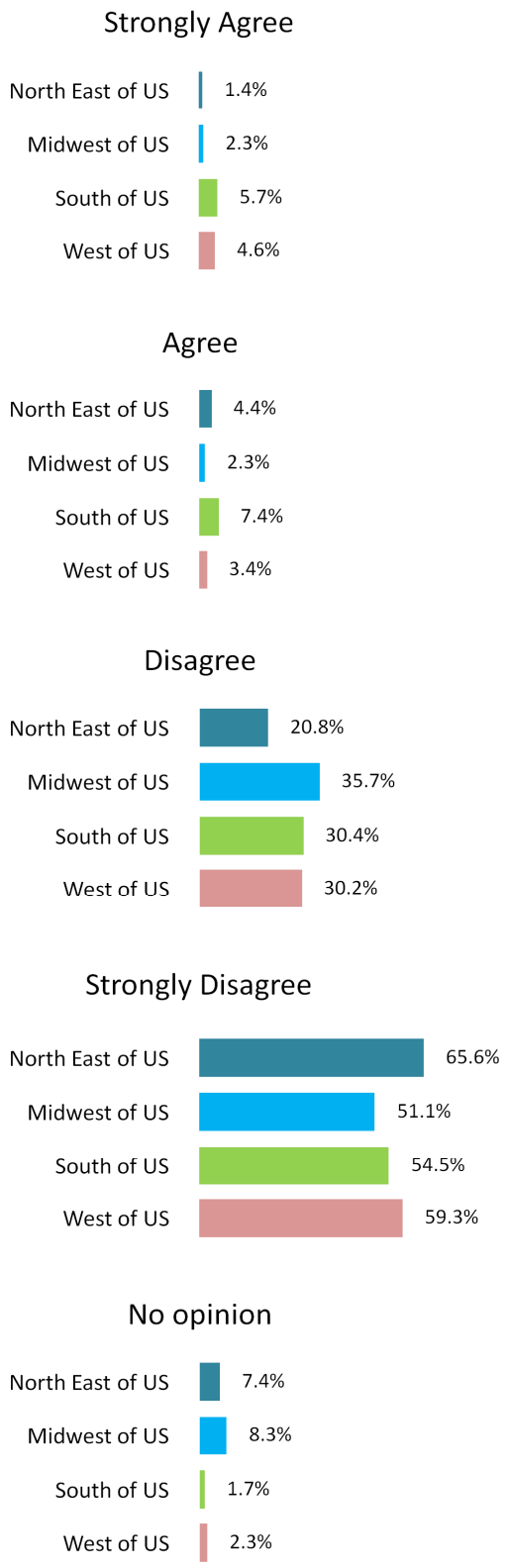
North East of US *N* = 79, Midwest of US *N* = 99, South of US *N* = 196, West of US *N* = 97. Total number of responders per group can vary because participants were allowed to skip questions and/or end survey voluntarily at any time. Statistics N/A, see Methods.

Figure S7 Reaction of Educators of Prospective Teachers to the Statement *Creationism Is a Valid Scientific Alternative to Evolutionary Explanations for the Origin of Species* (*N* = 411)



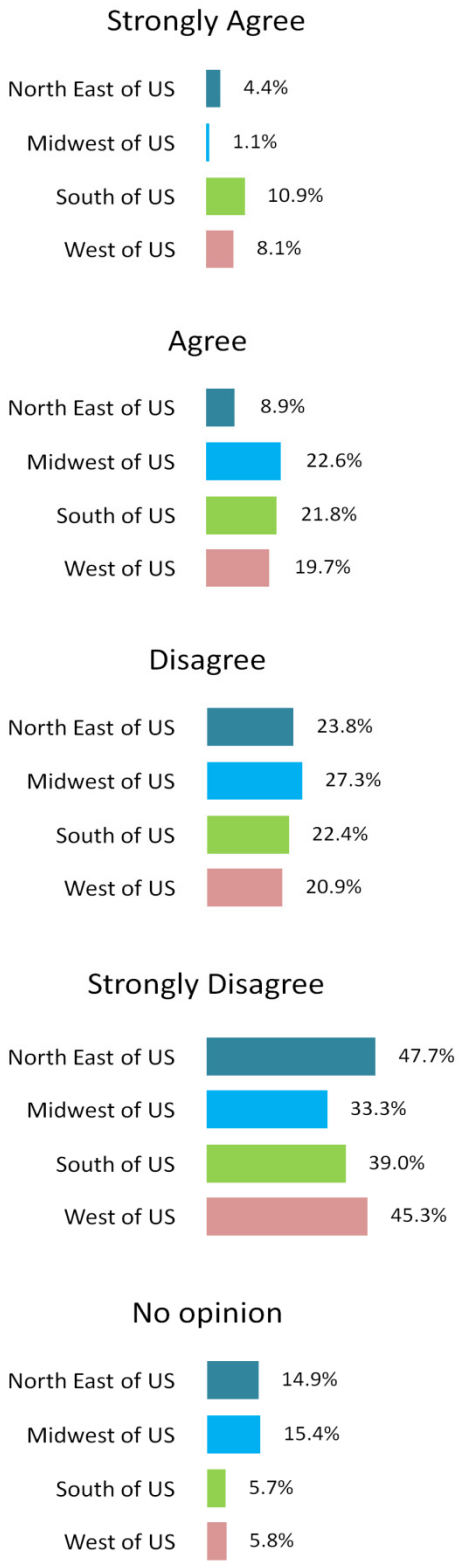
Comparisons among groups: *Chi-square* = 26.626, *df* = 12, *P* = 0.008; North East of US *N* = 67, Midwest of US *N* = 84, South of US *N* = 174, West of US *N* = 86. Total number of responders per group can vary because participants were allowed to skip questions and/or end survey voluntarily at any time.

Figure S8 Reaction of Educators of Prospective Teachers to the Statement *It Is Possible to Offer an Excellent Biology College-Course with No Mention of Darwin or Evolution* (*N* = 411)



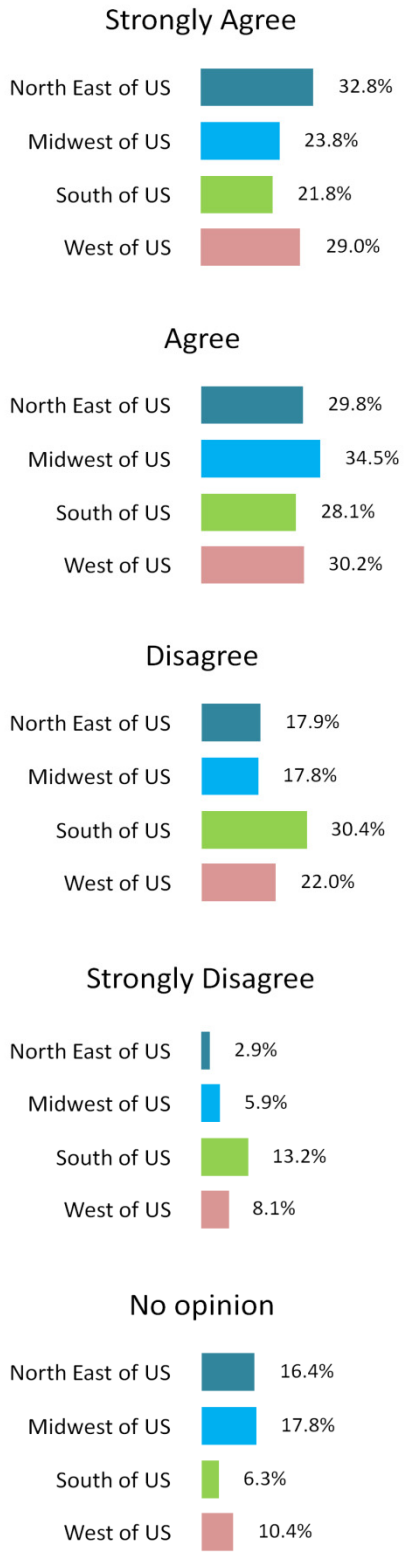
North East of US *N* = 67, Midwest of US *N* = 84, South of US *N* = 174, West of US *N* = 86. Total number of responders per group can vary because participants were allowed to skip questions and/or end survey voluntarily at any time. Statistics N/A, see Methods.

Figure S9 Reaction of Educators of Prospective Teachers to the Statement *Many reputable scientists View Creationism and Intelligent Design as Valid Alternatives to Evolution* (*N* = 411)



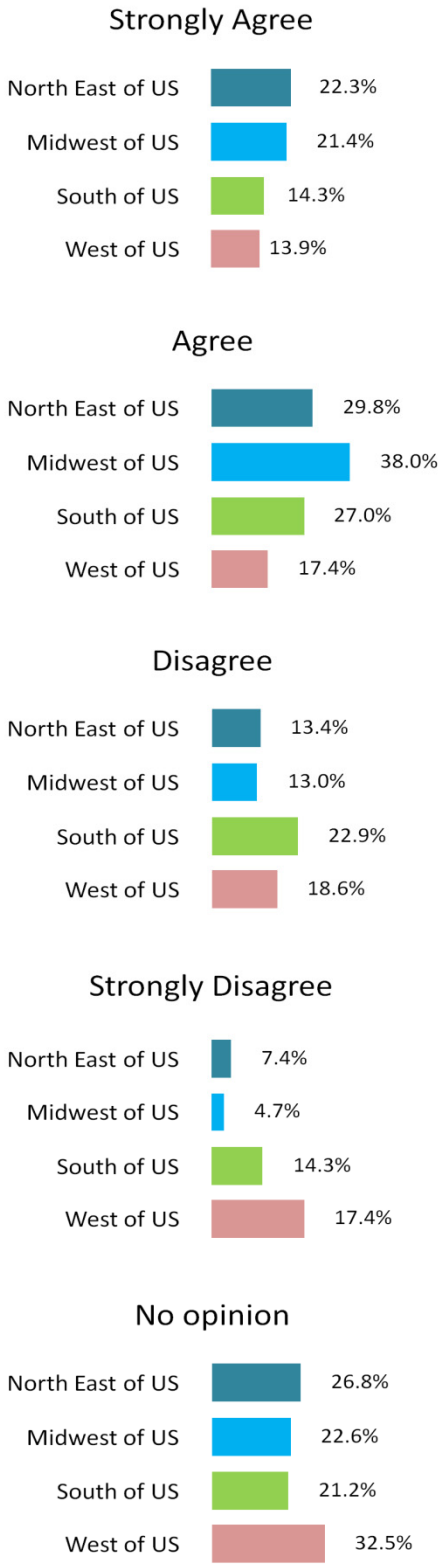
Comparisons among groups: *Chi-square* = 28.266, *df* = 12, *P* = 0.005; North East of US *N* = 67, Midwest of US *N* = 84, South of US *N* = 174, West of US *N* = 86. Total number of responders per group can vary because participants were allowed to skip questions and/or end survey voluntarily at any time.

Figure S10 Reaction of Educators of Prospective Teachers to the Statement *Almost All Scientists Reject Creationism and Intelligent Design as Valid Accounts for the Origin of Species* (*N* = 411)



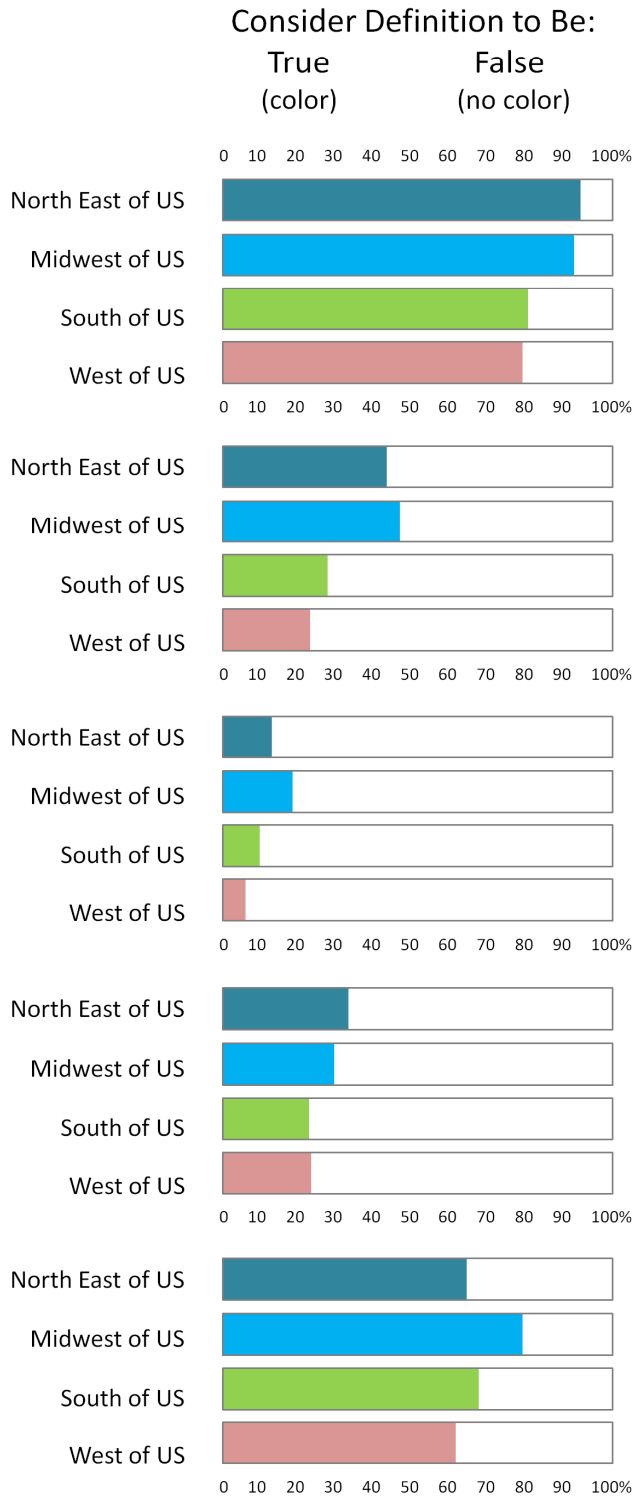
Comparisons among groups: *Chi-square* = 22.317, *df* = 12, *P* = 0.034; North East of US *N* = 67, Midwest of US *N* = 84, South of US *N* = 174, West of US *N* = 86. Total number of responders per group can vary because participants were allowed to skip questions and/or end survey voluntarily at any time.

Figure S11 Reaction of Educators of Prospective Teachers to the Statement *Evolution Is the Unifying Theme of All Sciences* (*N* = 411)



Comparisons among groups: *Chi-square* = 27.670, *df* = 12, *P* = 0.006; North East of US *N* = 67, Midwest of US *N* = 84, South of US *N* = 174, West of US *N* = 86. Total number of responders per group can vary because participants were allowed to skip questions and/or end survey voluntarily at any time.

Figure S12 Educators of Prospective Teachers' Reactions to Alternative Definitions of Evolution, United States (*N* = 411) (note that definitions are not necessarily correct)



Evolution is:

A. gradual process by which the universe changes, it includes the origin of life, its diversification and the synergistic phenomena resulting from the interaction between life and the environment

B. directional process by which unicellular organisms, like bacteria, turn into multi cellular organisms, like sponges, which later turn into fish, amphibians, reptiles, birds, mammals and ultimately humans, the pinnacle of evolution

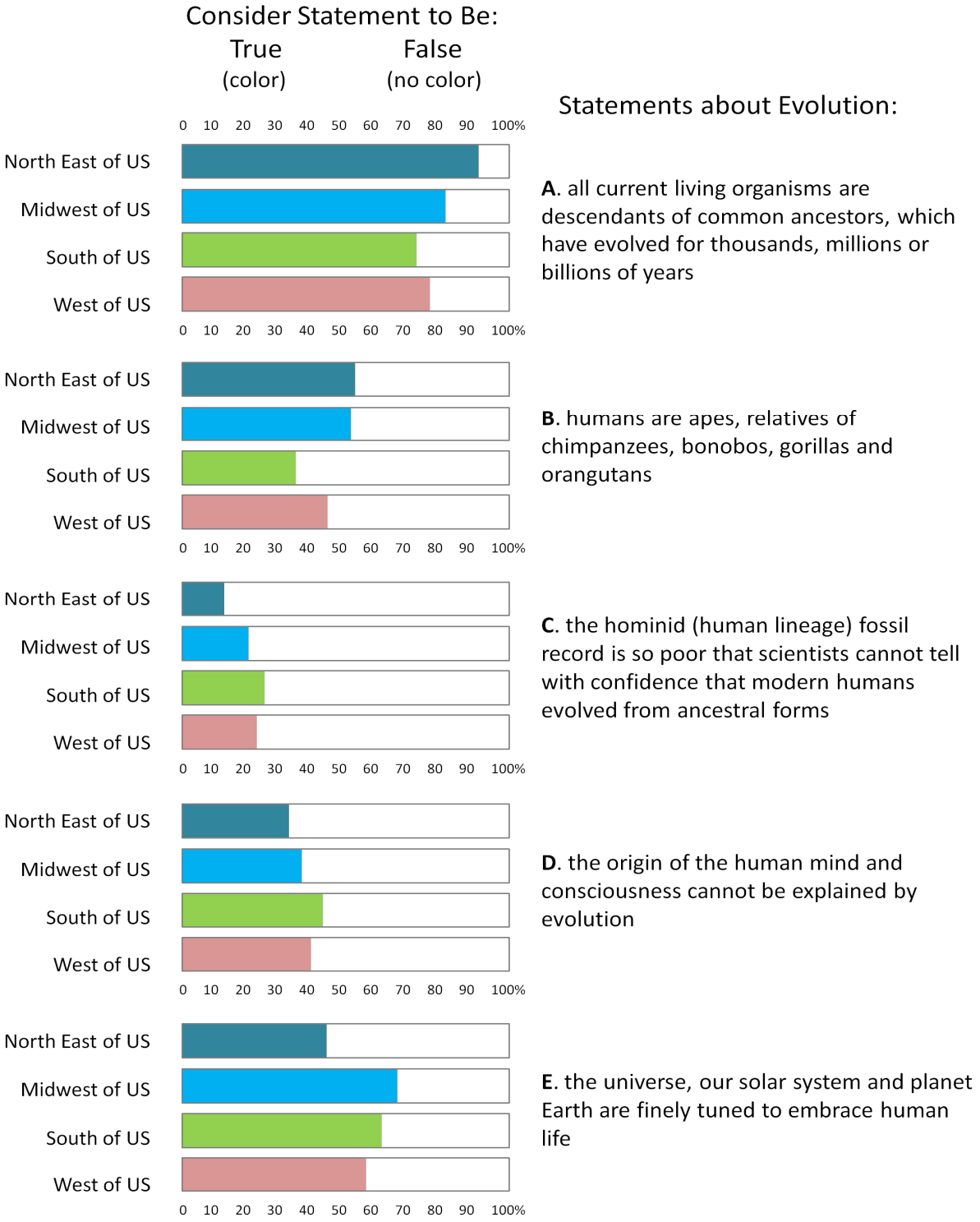
C. gradual process by which monkeys, such as chimpanzees, turn into humans

D. random process by which life originates, changes, and ends accidentally in complex organisms such as humans

E. gradual process by which organisms acquire traits during their lifetimes, such as longer necks, larger brains, resistance to parasites, and then pass on these traits to their descendants

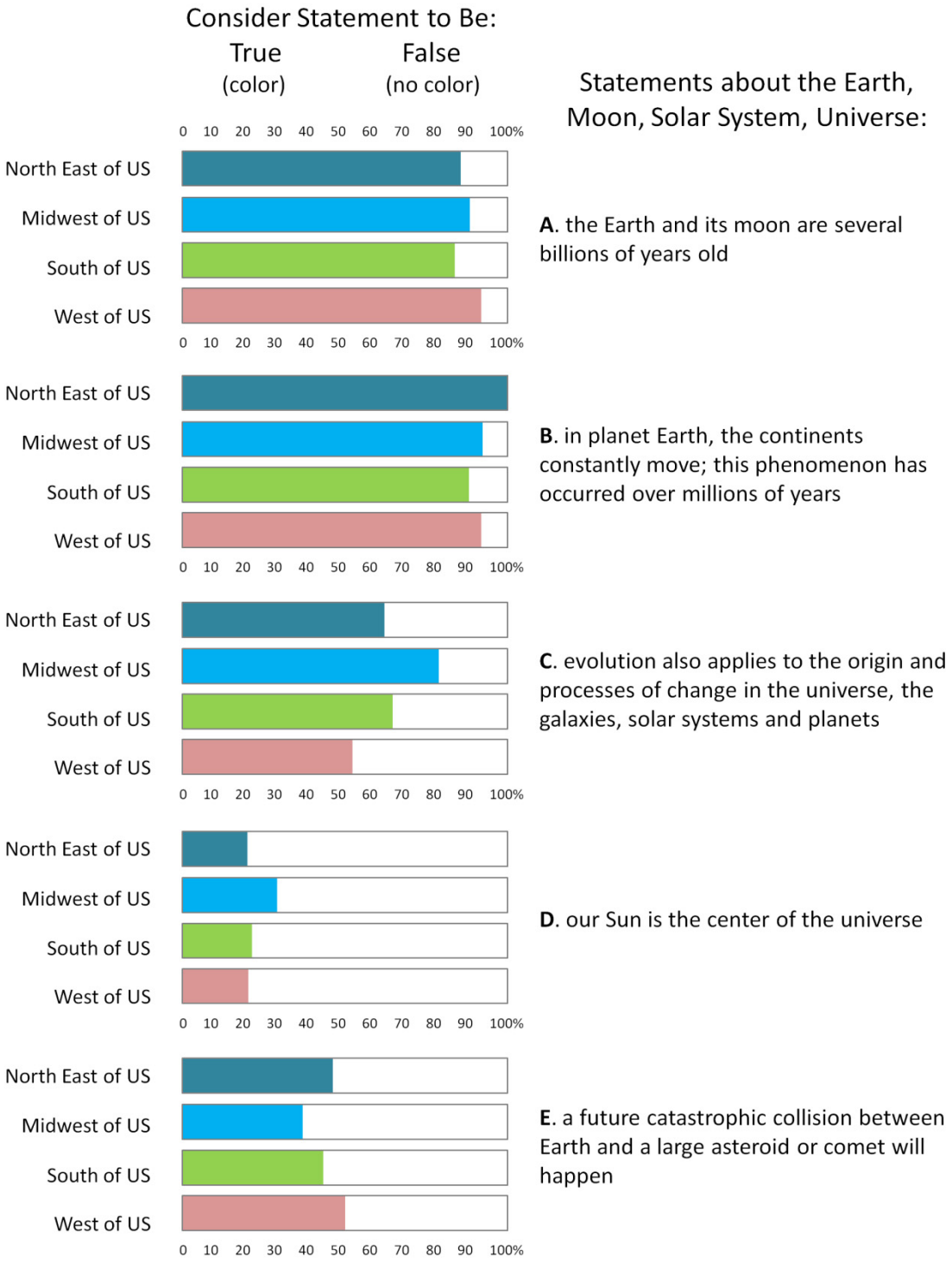
Comparisons within groups: **A**. *Chi-square* = 13.296, *df* = 3, *P* = 0.004. **B**. *Chi-square* = 17.774, *df* = 3, *P* = 0.004. **C**. *Chi-square* = 7.978, *df* = 3, *P* = 0.046. **D**. *Chi-square* = 4.726, *df* = 3, *P* = 0.192. **E**. *Chi-square* = 9.065, *df* = 3, *P* = 0.028. Total number of responders per group can vary because participants were allowed to skip questions and/or end survey voluntarily at any time.

Figure S13 Educators of Prospective Teachers' Reactions to Diverse Statements About the Evolutionary Process, United States (*N* = 411) (note that the statements are not necessarily correct)



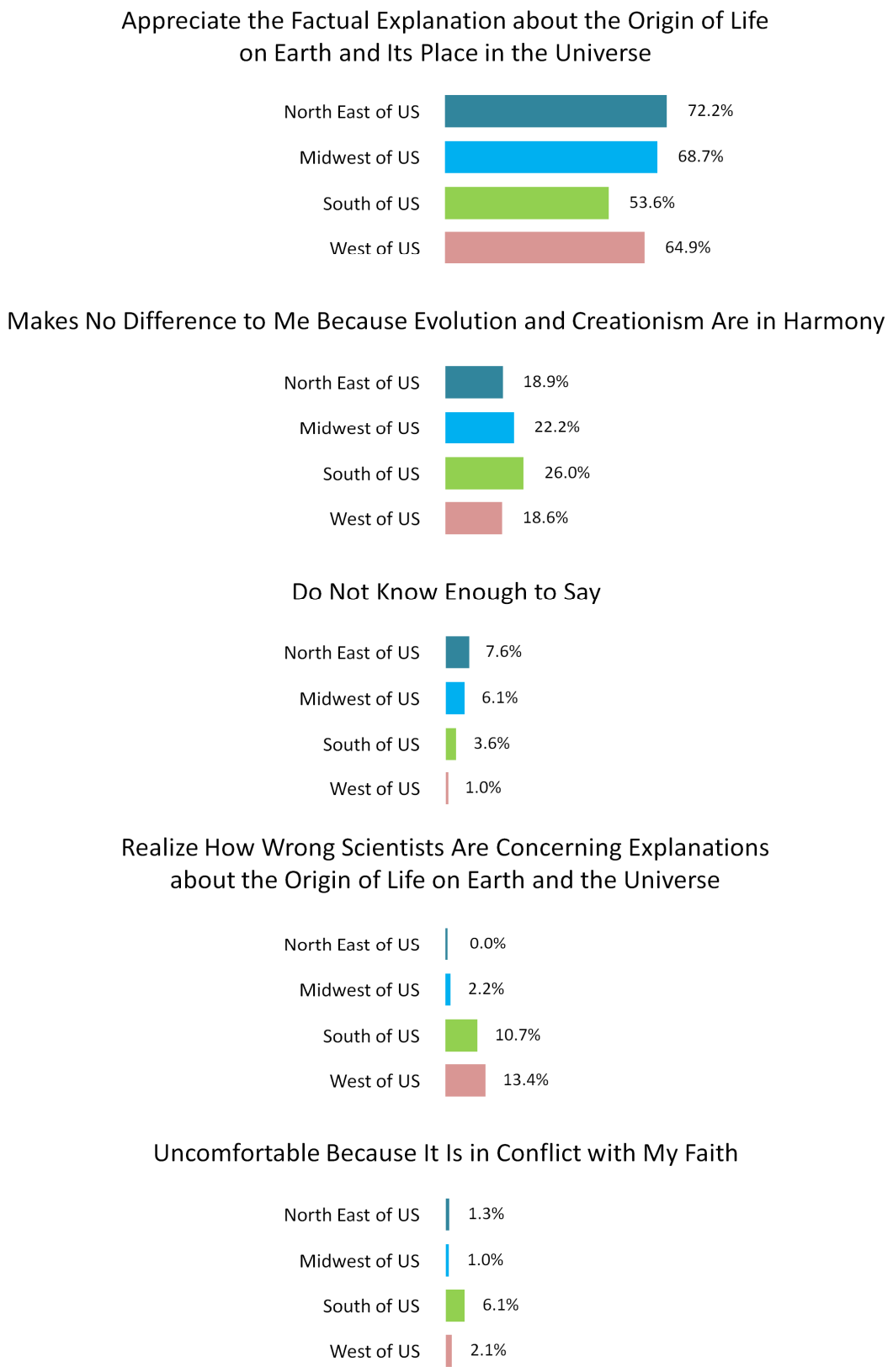
Comparisons within groups: **A**. *Chi-square* = 13.144, *df* = 3, *P* = 0.004. **B**. *Chi-square* = 7.452, *df* = 3, *P* = 0.058. **C**. *Chi-square* = 6.977, *df* = 3, *P* = 0.072. **D**. *Chi-square* = 2.750, *df* = 3, *P* = 0.431. **E**. *Chi-square* = 9.761, *df* = 3, *P* = 0.020. Total number of responders per group can vary because participants were allowed to skip questions and/or end survey voluntarily at any time.

Figure S14 Educators of Prospective Teachers' Reactions to Diverse Statements About the Evolution of the Earth, Its Moon, the Solar System and the Universe, United States (*N* = 411)
(note that the statements are not necessarily correct)



Comparisons within groups: **A**. *Chi-square* = 6.815, *df* = 3, *P* = 0.078. **B**. Statistics N/A, see Methods. **C**. *Chi-square* = 16.877, *df* = 3, *P* = 0.0007. **D**. *Chi-square* = 3.081, *df* = 3, *P* = 0.379. **E**. Chi-square = 3.738, *df* = 3, *P* = 0.291. Total number of responders per group can vary because participants were allowed to skip questions and/or end survey voluntarily at any time.

Figure S15 Reaction of Educators of Prospective Teachers to the Statement *Hearing About Evolution Makes Me…* (*N* = 471)



North East of US *N* = 79, Midwest of US *N* = 99, South of US *N* = 196, West of US *N* = 97. Total number of responders per group can vary because participants were allowed to skip questions and/or end survey voluntarily at any time. Statistics N/A, see Methods.

Table S1. Institutional Affiliations of the Educators of Prospective Teachers Who Participated in the Study, United States

REGION / *Division per Region* / State / *Type of Institution***	Contacted					Responders*						% in Respect to Grand Total of Responders Completing Survey
	N	Females	%	Males	%	N	%	Females	%	Males	%	
REGION 1 NORTHEAST												
Division 1 New England												
Connecticut (2Pub, 2Priv, 2Rel)												
University of Connecticut (Pub)	75	32		43				NA	NA	NA	NA	
University of Hartford (Pub)	8	4		4				NA	NA	NA	NA	
Yale University (Priv)	2	1		1				NA	NA	NA	NA	
Quinnipiac University (Priv)	10	6		4				NA	NA	NA	NA	
Fairfield University (Rel Catholic)	9	8		1				NA	NA	NA	NA	
Albertus Magnus College (Rel Catholic)	3	1		2				NA	NA	NA	NA	
Total State	107	52	48.60	55	51.40	12	11.21	NA	NA	NA	NA	2.42
Maine (2Pub, 2Priv, 1Rel)												
University of Southern Maine (Pub)	24	11		13				NA	NA	NA	NA	
University of Maine Orono (Pub)	20	11		9				NA	NA	NA	NA	
University of New England (Priv)	7	3		4				NA	NA	NA	NA	
Husson University (Priv)	10	9		1				NA	NA	NA	NA	
St. Joseph's College of Maine (Rel Catholic)	3	3		0				NA	NA	NA	NA	
Total State	64	37	57.81	27	42.19	6	9.38	NA	NA	NA	NA	1.21
Massachusetts (2Pub, 2Priv, 2Rel)												
University of Massachusetts Boston (Pub)	24	14		10				NA	NA	NA	NA	
Fitchburg State College (Pub)	10	8		2				NA	NA	NA	NA	
Springfield College (Priv)	7	4		3				NA	NA	NA	NA	
Wheaton College (Priv)	4	3		1				NA	NA	NA	NA	
Merrimack College (Rel Catholic)	4	3		1				NA	NA	NA	NA	
Stonehill College (Rel Catholic)	5	3		2				NA	NA	NA	NA	
Total State	54	35	64.81	19	35.19	6	11.11	NA	NA	NA	NA	1.21

Table S1 continues in next page...

...**Table S1** Continued

New Hampshire (2Pub, 2Priv, 2Rel)												
University of New Hampshire Durham (Pub)	27	17		10				NA	NA	NA	NA	
Plymouth State University (Pub)	15	11		4				NA	NA	NA	NA	
Dartmouth College (Priv)	4	3		1				NA	NA	NA	NA	
Colby-Sawyer College (Priv)	4	4		0				NA	NA	NA	NA	
Rivier College (Rel Catholic)	10	8		2				NA	NA	NA	NA	
St. Anselm College (Rel Catholic)	1	1		0				NA	NA	NA	NA	
Total State	61	44	72.13	17	27.87	10	16.39	NA	NA	NA	NA	2.02
Rhode Island (2Pub, 2Priv, 2Rel)												
University of Rhode Island (Pub)	20	13		7				NA	NA	NA	NA	
Rhode Island College (Pub)	82	52		30				NA	NA	NA	NA	
Brown University (Priv)	17	9		8				NA	NA	NA	NA	
Roger Williams University (Priv)	11	8		3				NA	NA	NA	NA	
Salve Regina University (Rel Catholic)	10	9		1				NA	NA	NA	NA	
Providence College (Rel Catholic)	13	10		3				NA	NA	NA	NA	
Total State	153	101	66.01	52	33.99	11	7.19	NA	NA	NA	NA	2.22
Vermont (2Pub, 2Priv, 2Rel)												
University of Vermont Burlington (Pub)	41	26		15				NA	NA	NA	NA	
Castleton State College (Pub)	7	4		3				NA	NA	NA	NA	
Middlebury College (Priv)	4	2		2				NA	NA	NA	NA	
Norwich University (Priv)	1	1		0				NA	NA	NA	NA	
Saint Michael's College (Rel Catholic)	9	6		3				NA	NA	NA	NA	
Green Mountain College (Rel Methodist)	5	3		2				NA	NA	NA	NA	
Total State	67	42	62.69	25	37.31	10	14.93	NA	NA	NA	NA	2.02
Total Division	**506**	311	61.46	195	38.54	**55**	10.87	30	54.55	25	45.45	11.11
% in Respect to Grand Total Column	10.61					11.11						
Division 2 Mid Atlantic												
New Jersey (3Pub, 2Rel)												
Brookdale Community College (Pub)	19	7		12				NA	NA	NA	NA	
Middlesex County College (Pub)	6	3		3				NA	NA	NA	NA	
Rowan University (Pub)	6	5		1				NA	NA	NA	NA	

Table S1 continues in next page...

...**Table S1** Continued

Caldwell College (Rel Catholic)	11	8		3				NA	NA	NA	NA	
Saint Peters College (Rel Catholic)	9	6		3				NA	NA	NA	NA	
Total State	51	29	56.86	22	43.14	3	5.88	NA	NA	NA	NA	0.61
New York (2Pub, 3Priv, 2Rel)												
State Univ of New York Plattsburgh (Pub)	20	15		5				NA	NA	NA	NA	
State Univ of New York Brockport (Pub)	20	12		8				NA	NA	NA	NA	
Keuka College (Priv)	9	2		7				NA	NA	NA	NA	
Marist College (Priv)	10	6		4				NA	NA	NA	NA	
New York University (Priv)	51	33		18				NA	NA	NA	NA	
Canisius College (Rel Catholic)	25	18		7				NA	NA	NA	NA	
Roberts Wesleyan College (Rel Christian)	18	10		8				NA	NA	NA	NA	
Total State	153	96	62.75	57	37.25	14	9.15	NA	NA	NA	NA	2.83
Pennsylvania (2Pub, 1Priv, 2Rel)												
Northampton Community College (Pub)	11	9		2				NA	NA	NA	NA	
University of Pittsburgh (Pub)	3	3		0				NA	NA	NA	NA	
Cedar Crest College (Priv)	6	6		0				NA	NA	NA	NA	
Alvernia College (Rel Catholic)	7	7		0				NA	NA	NA	NA	
Bryn Athyn Collg. New Church (Rel Christian)	3	3		0				NA	NA	NA	NA	
Total State	30	28	93.33	2	6.67	3	10.00	NA	NA	NA	NA	0.61
Total Division	**234**	153	65.38	81	34.62	**20**	8.55	11	55.00	9	45.00	4.04
% in Respect to Grand Total Column	4.91					4.04						
REGION 2 MIDWEST												
Division 3 East North Central												
Illinois (2Pub, 2Priv, 2Rel)												
Chicago State University (Pub)	43	30		13				NA	NA	NA	NA	
University of Illinois Springfield (Pub)	13	5		8				NA	NA	NA	NA	
Blackburn College (Priv)	5	4		1				NA	NA	NA	NA	
Roosevelt University (Priv)	39	23		16				NA	NA	NA	NA	
Judson University (Rel Evangelical)	10	7		3				NA	NA	NA	NA	

Table S1 continues in next page...

...**Table S1** Continued

Millikin University (Rel Presbyterian)	13	11		2				NA	NA	NA	NA	
Total State	123	80	65.04	43	34.96	12	9.76	NA	NA	NA	NA	2.42
Indiana (2Pub, 2Priv, 2Rel)												
Ball State University (Pub)	16	10		6				NA	NA	NA	NA	
Indiana State University (Pub)	13	10		3				NA	NA	NA	NA	
Butler University (Priv)	20	13		7				NA	NA	NA	NA	
Franklin College (Priv)	5	4		1				NA	NA	NA	NA	
Anderson University (Rel Christian)	8	7		1				NA	NA	NA	NA	
Huntington University (Rel Christian)	4	2		2				NA	NA	NA	NA	
Total State	66	46	69.70	20	30.30	7	10.61	NA	NA	NA	NA	1.41
Michigan (2Pub, 1Priv, 3Rel)												
University of Michigan (Pub)	50	28		22				NA	NA	NA	NA	
Alma College (Priv)	3	2		1				NA	NA	NA	NA	
Robert B Miller College (Priv)	6	5		1				NA	NA	NA	NA	
Adrian College (Rel Methodist)	8	6		2				NA	NA	NA	NA	
Albion College (Rel Methodist)	5	3		2				NA	NA	NA	NA	
Siena Heights University (Rel Catholic)	3	3		0				NA	NA	NA	NA	
Total State	75	47	62.67	28	37.33	7	9.33	NA	NA	NA	NA	1.41
Ohio (2Pub, 2Priv, 2Rel)												
Ohio University (Pub)	14	10		4				NA	NA	NA	NA	
Wright State University (Pub)	11	6		5				NA	NA	NA	NA	
Baldwin Wallace College (Priv)	35	18		17				NA	NA	NA	NA	
Brown Mackie College (Priv)	1	1		0				NA	NA	NA	NA	
Ohio Northern University (Rel Methodist)	4	3		1				NA	NA	NA	NA	
God's Bible School & College (Rel Christian)	3	1		2				NA	NA	NA	NA	
Total State	68	39	57.35	29	42.65	8	11.76	NA	NA	NA	NA	1.62
Wisconsin (2Pub, 2Priv, 2Rel)												
University of Wisconsin Stevens Point (Pub)	15	11		4				NA	NA	NA	NA	
University of Wisconsin Milwaukee (Pub)	132	87		45				NA	NA	NA	NA	
Beloit College (Priv)	2	2		0				NA	NA	NA	NA	
Lakeland College (Priv)	4	1		3				NA	NA	NA	NA	

Table S1 continues in next page...

...**Table S1** Continued

Cardinal Stritch University (Rel Catholic)	18	15		3				NA	NA	NA	NA	
Carthage College (Rel Evangelical Lutheran)	13	6		7				NA	NA	NA	NA	
Total State	184	122	66.30	62	33.70	16	8.70	NA	NA	NA	NA	3.23
Total Division	**516**	334	64.73	182	35.27	**50**	9.69	28	56.00	22	44.00	10.10
% in Respect to Grand Total Column	10.82					10.10						
Division 4 West North Central												
Iowa (3Pub, 1Priv, 3Rel)												
Des Moines Area Community College (Pub)	5	5		0				NA	NA	NA	NA	
University of Iowa (Pub)	38	20		18				NA	NA	NA	NA	
Iowa State University (Pub)	3	3		0				NA	NA	NA	NA	
Drake University (Priv)	3	1		2				NA	NA	NA	NA	
Luther College (Rel Lutheran)	1	1		0				NA	NA	NA	NA	
Mount Mercy College (Rel Catholic)	11	10		1				NA	NA	NA	NA	
Saint Ambrose University (Rel Catholic)	4	3		1				NA	NA	NA	NA	
Total State	65	43	66.15	22	33.85	4	6.15	NA	NA	NA	NA	0.81
Kansas (3Pub, 2Rel)												
Coffeyville Community College (Pub)	1	1		0				NA	NA	NA	NA	
Cowly County Community College (Pub)	6	3		3				NA	NA	NA	NA	
University of Kansas (Pub)	21	15		6				NA	NA	NA	NA	
Baker University (Rel Methodist)	17	10		7				NA	NA	NA	NA	
McPherson College (Rel Christian)	3	2		1				NA	NA	NA	NA	
Total State	48	31	64.58	17	35.42	5	10.42	NA	NA	NA	NA	1.01
Minnesota (2Pub, 1Priv, 3Rel)												
Southwest Minnesota State Univ (Pub)	13	10		3				NA	NA	NA	NA	
St Cloud State University (Pub)	39	25		14				NA	NA	NA	NA	
Carleton College (Priv)	5	4		1				NA	NA	NA	NA	
Hamline University (Rel Methodist)	29	23		6				NA	NA	NA	NA	
University of St Thomas (Rel Catholic)	32	19		13				NA	NA	NA	NA	
St Mary's Univ of Minnesota (Rel Catholic)	8	4		4				NA	NA	NA	NA	
Total State	126	85	67.46	41	32.54	10	7.94	NA	NA	NA	NA	2.02

Table S1 continues in next page...

...**Table S1** Continued

Missouri (1Pub, 1Priv, 1Rel)												
Missouri State University (Pub)	18	15		3				NA	NA	NA	NA	
William Woods University (Priv)	8	3		5				NA	NA	NA	NA	
Southwest Baptist University (Rel Baptist)	11	7		4				NA	NA	NA	NA	
Total State	37	25	67.57	12	32.43	9	24.32	NA	NA	NA	NA	1.82
Nebraska (2Pub, 1Priv, 2Rel)												
University of Nebraska Omaha (Pub)	37	23		14				NA	NA	NA	NA	
University of Nebraska Kearney (Pub)	35	21		14				NA	NA	NA	NA	
Doane College (Priv)	9	6		3				NA	NA	NA	NA	
College of St Mary (Rel Catholic)	4	4		0				NA	NA	NA	NA	
Concordia University (Rel Lutheran)	11	5		6				NA	NA	NA	NA	
Total State	96	59	61.46	37	38.54	16	16.67	NA	NA	NA	NA	3.23
North Dakota (2Pub)												
Fort Berthold Community College (Pub)	5	4		1				NA	NA	NA	NA	
Cankdeska Cikana Community College (Pub)	2	2		0				NA	NA	NA	NA	
Total State	7	6	85.71	1	14.29	3	42.86	NA	NA	NA	NA	0.61
South Dakota (2Pub, 2Rel)												
Black Hills State University (Pub)	43	26		17				NA	NA	NA	NA	
Dakota State University (Pub)	13	5		8				NA	NA	NA	NA	
Augustana College (Rel Evangelical)	14	9		5				NA	NA	NA	NA	
University of Sioux Falls (Rel Christian)	9	7		2				NA	NA	NA	NA	
Total State	79	47	59.49	32	40.51	10	12.66	NA	NA	NA	NA	2.02
Total Division	**458**	296	64.63	162	35.37	**57**	12.45	42	73.68	15	26.32	11.52
% in Respect to Grand Total Column	9.60					11.52						
REGION 3 SOUTH												
Division 5 South Atlantic												
Delaware (1Pub, 1Pub-Priv, 2Priv, 1Rel)												
Delaware State University (Pub)	18	8		10				NA	NA	NA	NA	

Table S1 continues in next page...

...**Table S1** Continued

University of Delaware (Pub-Priv)	67	44		23				NA	NA	NA	NA	
Wilmington University (Priv)	21	13		8				NA	NA	NA	NA	
Winder University (Priv)	31	18		13				NA	NA	NA	NA	
Wesley College (Rel Methodist)	7	5		2				NA	NA	NA	NA	
Total State	144	88	61.11	56	38.89	10	6.94	NA	NA	NA	NA	2.02
District of Columbia (2Pub, 1Priv, 2Rel)												
University of District of Columbia (Pub)	18	14		4				NA	NA	NA	NA	
Gallaudet University (Priv)	24	19		5				NA	NA	NA	NA	
George Washington University (Priv)	85	52		33				NA	NA	NA	NA	
American University (Rel Methodist)	20	13		7				NA	NA	NA	NA	
Catholic University of America (Rel Catholic)	16	11		5				NA	NA	NA	NA	
Total State	163	109	66.87	54	33.13	4	2.45	NA	NA	NA	NA	0.81
Florida (3Pub, 2Priv, 2Rel)												
Florida Gulf Coast University (Pub)	18	11		7				NA	NA	NA	NA	
Florida State University (Pub)	20	13		7				NA	NA	NA	NA	
University of Florida (Pub)	44	30		14				NA	NA	NA	NA	
Flagler College Tallahassee (Priv)	7	4		3				NA	NA	NA	NA	
University of Tampa (Priv)	14	9		5				NA	NA	NA	NA	
Hobe Sound Bible College (Rel Christian)	7	2		5				NA	NA	NA	NA	
Palm Beach Atlantic University (Rel Christian)	8	5		3				NA	NA	NA	NA	
Total State	118	74	62.71	44	37.29	19	16.10	NA	NA	NA	NA	3.84
Georgia (2Pub, 2Priv, 2Rel)												
Darton College (Pub)	2	2		0				NA	NA	NA	NA	
Georgia Southwestern University (Pub)	15	8		7				NA	NA	NA	NA	
Berry College (Priv)	14	8		6				NA	NA	NA	NA	
Clark Atlanta University (Priv)	7	3		4				NA	NA	NA	NA	
Covenant College (Rel Christian)	9	5		4				NA	NA	NA	NA	
Point University (Rel Christian)	12	11		1				NA	NA	NA	NA	
Total State	59	37	62.71	22	37.29	5	8.47	NA	NA	NA	NA	1.01
Maryland (3Pub, 1Priv, 2Rel)												
Baltimore City Community College (Pub)	17	9		8				NA	NA	NA	NA	
Coppin State College (Pub)	3	3		0				NA	NA	NA	NA	

Table S1 continues in next page...

...**Table S1** Continued

University of Maryland (Pub)	46	34		12				NA	NA	NA	NA	
John Hopkins University (Priv)	14	11		3				NA	NA	NA	NA	
College Notre Dame Maryland (Rel Catholic)	15	12		3				NA	NA	NA	NA	
Loyola College in Maryland (Rel Catholic)	39	22		17				NA	NA	NA	NA	
Total State	134	91	67.91	43	32.09	5	3.73	NA	NA	NA	NA	1.01
North Carolina (3Pub, 1Priv, 3Rel)												
Appalachian State University (Pub)	67	44		23				NA	NA	NA	NA	
Elizabeth City State University (Pub)	7	4		3				NA	NA	NA	NA	
North Carolina State University (Pub)	9	5		4				NA	NA	NA	NA	
Davidson College (Priv)	3	2		1				NA	NA	NA	NA	
Catawba College (Rel Christian)	6	5		1				NA	NA	NA	NA	
Gardner-Web University (Rel Baptist)	14	9		5				NA	NA	NA	NA	
Lenoir-Rhyne College (Rel Lutheran)	7	4		3				NA	NA	NA	NA	
Total State	113	73	64.60	40	35.40	19	16.81	NA	NA	NA	NA	3.84
South Carolina (1Pub, 1Priv, 3Rel)												
College of Charleston (Pub)	30	23		7				NA	NA	NA	NA	
Furman College (Priv)	9	4		5				NA	NA	NA	NA	
Anderson University (Rel Christian)	10	7		3				NA	NA	NA	NA	
Charleston Southern University (Rel Baptist)	11	8		3				NA	NA	NA	NA	
South Wesleyan University (Rel Christian)	7	2		5				NA	NA	NA	NA	
Total State	67	44	65.67	23	34.33	8	11.94	NA	NA	NA	NA	1.62
Virginia (2Pub, 2Priv, 3Rel)												
College of William and Mary (Pub)	48	21		27				NA	NA	NA	NA	
Longwood University (Pub)	19	10		9				NA	NA	NA	NA	
Hampton University (Priv)	10	7		3				NA	NA	NA	NA	
Virginia Wesleyan College (Priv)	33	27		6				NA	NA	NA	NA	
Eastern Mennonite University (Rel Christian)	6	4		2				NA	NA	NA	NA	
Regent University (Rel Christian)	2	1		1				NA	NA	NA	NA	
Liberty University (Rel Christian)	32	21		11				NA	NA	NA	NA	
Total State	150	91	60.67	59	39.33	17	11.33	NA	NA	NA	NA	3.43

Table S1 continues in next page...

...**Table S1** Continued

West Virginia (2Pub, 1Pub-Priv, 1Priv, 1Rel)												
Bluefield State College (Pub)	5	3		2				NA	NA	NA	NA	
Concord University (Pub)	13	9		4				NA	NA	NA	NA	
Mountain State University (Pub-Priv)	8	5		3				NA	NA	NA	NA	
Bethany College (Priv)	7	5		2				NA	NA	NA	NA	
Wheeling Jesuit University (Rel Catholic)	2	2		0				NA	NA	NA	NA	
Total State	35	24	68.57	11	31.43	4	11.43	NA	NA	NA	NA	0.81
Total Division	**983**	631	64.19	352	35.81	**91**	9.26	61	67.03	30	32.97	18.38
% in Respect to Grand Total Column	20.61					18.38						
Division 6 East South Central												
Alabama (2Pub, 3Rel)												
Athens State University (Pub)	34	27		7				NA	NA	NA	NA	
University of Alabama (Pub)	104	53		51				NA	NA	NA	NA	
Birmingham Southern College (Rel Method.)	6	3		3				NA	NA	NA	NA	
Samford University (Rel Baptist)	10	7		3				NA	NA	NA	NA	
University of Mobile (Rel Baptist)	12	10		2				NA	NA	NA	NA	
Total State	166	100	60.24	66	39.76	25	15.06	NA	NA	NA	NA	5.05
Kentucky (2Pub, 2Priv, 2Rel)												
Western Kentucky University (Pub)	44	35		9				NA	NA	NA	NA	
University of Kentucky (Pub)	95	55		40				NA	NA	NA	NA	
Centre College (Priv)	4	3		1				NA	NA	NA	NA	
Transylvania University (Priv)	9	6		3				NA	NA	NA	NA	
Bellarmine University (Rel Catholic)	14	9		5				NA	NA	NA	NA	
University of Pikeville (Rel Presbyterian)	6	3		3				NA	NA	NA	NA	
Total State	172	111	64.53	61	35.47	25	14.53	NA	NA	NA	NA	5.05
Mississippi (2Pub, 3Rel)												
Alcorn State University (Pub)	9	8		1				NA	NA	NA	NA	
Delta State University (Pub)	9	6		3				NA	NA	NA	NA	
Belhaven College (Rel Christian)	7	5		2				NA	NA	NA	NA	
Blue Mountain College (Rel Christian)	6	6		0				NA	NA	NA	NA	

Table S1 continues in next page...

...**Table S1** Continued

Mississippi College (Rel Christian)	9	6		3				NA	NA	NA	NA	
Total State	40	31	77.50	9	22.50	4	10.00	NA	NA	NA	NA	0.81
Tennessee (2Pub, 4Rel)												
Austin Peay State University (Pub)	11	8		3				NA	NA	NA	NA	
Tennessee State University (Pub)	15	10		5				NA	NA	NA	NA	
Belmont University (Rel Christian)	11	8		3				NA	NA	NA	NA	
Bryan College (Rel Christian)	5	3		2				NA	NA	NA	NA	
Lipscomb University (Rel Christian)	8	5		3				NA	NA	NA	NA	
Union University (Rel Evangelical)	19	10		9				NA	NA	NA	NA	
Total State	69	44	63.77	25	36.23	10	14.49	NA	NA	NA	NA	2.02
Total Division	**447**	286	63.98	161	36.02	**64**	14.32	38	59.38	26	40.63	12.93
% in Respect to Grand Total Column	9.37					12.93						
Division 7 West South Central												
Arkansas (2Pub, 1Priv, 4Rel)												
Henderson State University (Pub)	75	52		23				NA	NA	NA	NA	
University of Arkansas (Pub)	112	53		59				NA	NA	NA	NA	
Hendrix College (Priv)	3	2		1				NA	NA	NA	NA	
Central Baptist University (Rel Baptist)	3	2		1				NA	NA	NA	NA	
Ouachita Baptist University (Rel Baptist)	6	6		0				NA	NA	NA	NA	
Harding University (Rel Christian)	32	15		17				NA	NA	NA	NA	
University of the Ozarks (Rel Presbyterian)	3	2		1				NA	NA	NA	NA	
Total State	234	132	56.41	102	43.59	27	11.54	NA	NA	NA	NA	5.45
Louisiana (2Pub, 3Rel)												
Louisiana State University (Pub)	28	16		12				NA	NA	NA	NA	
Nicholls State University (Pub)	10	6		4				NA	NA	NA	NA	
Centenary College of Louisiana (Rel Method.)	3	2		1				NA	NA	NA	NA	
Louisiana College (Rel Baptist)	3	3		0				NA	NA	NA	NA	
Our Lady of Holly Cross College (Rel Catholic)	4	4		0				NA	NA	NA	NA	
Total State	48	31	64.58	17	35.42	11	22.92	NA	NA	NA	NA	2.22

Table S1 continues in next page...

...**Table S1** Continued

Oklahoma (2Pub, 2Rel)												
Cameron University (Pub)	12	9		3				NA	NA	NA	NA	
University of Oklahoma (Pub)	18	10		8				NA	NA	NA	NA	
Oklahoma City University (Rel Methodist)	7	6		1				NA	NA	NA	NA	
University of Tulsa (Rel Presbyterian)	8	4		4				NA	NA	NA	NA	
Total State	45	29	64.44	16	35.56	10	22.22	NA	NA	NA	NA	2.02
Texas (2Pub, 1Priv, 2Rel)												
Sull Ross State University (Pub)	10	6		4				NA	NA	NA	NA	
University of Texas Austin (Pub)	81	50		31				NA	NA	NA	NA	
Trinity University (Priv)	14	11		3				NA	NA	NA	NA	
Houston-Tillotson University (Rel Methodist)	3	2		1				NA	NA	NA	NA	
Abilene Christian University (Rel Christian)	11	8		3				NA	NA	NA	NA	
Total State	119	77	64.71	42	35.29	11	9.24	NA	NA	NA	NA	2.22
Total Division	**446**	269	60.31	177	39.69	**59**	13.23	31	52.54	28	47.46	11.92
% in Respect to Grand Total Column	9.35					11.92						
REGION 4 WEST												
Division 8 Mountain												
Arizona (2Pub, 2Priv, 2Rel)												
Arizona State University (Pub)	45	22		23				NA	NA	NA	NA	
Northern Arizona University (Pub)	49	26		23				NA	NA	NA	NA	
Embry-Riddle Aeronautica Univ (Priv)	13	1		12				NA	NA	NA	NA	
Prescott College (Priv)	15	9		6				NA	NA	NA	NA	
Arizona Christian University (Rel Evangelical)	4	3		1				NA	NA	NA	NA	
International Baptist College (Rel Baptist)	1	1		0				NA	NA	NA	NA	
Total State	127	62	48.82	65	51.18	15	11.81	NA	NA	NA	NA	3.03
Colorado (2Pub, 2Priv, 2Rel)												
Colorado State University (Pub)	36	19		17				NA	NA	NA	NA	
University of Colorado Col. Springs (Pub)	6	4		2				NA	NA	NA	NA	
Naropa University (Priv)	1	1		0				NA	NA	NA	NA	
University of Denver (Priv)	47	33		14				NA	NA	NA	NA	

Table S1 continues in next page...

...**Table S1** Continued

Colorado Christian University (Rel Christian)	6	5		1				NA	NA	NA	NA	
Nazarene Bible College (Rel Christian)	9	2		7				NA	NA	NA	NA	
Total State	105	64	60.95	41	39.05	5	4.76	NA	NA	NA	NA	1.01
Idaho (2Pub, 1Priv, 2Rel)												
Lewis-Clark College (Pub)	16	7		9				NA	NA	NA	NA	
University of Idaho (Pub)	25	15		10				NA	NA	NA	NA	
College of Idaho (Priv)	5	3		2				NA	NA	NA	NA	
Northwest Nazarene University (Rel Christian)	1	1		0				NA	NA	NA	NA	
Brigham Young University (Rel Mormon)	23	16		7				NA	NA	NA	NA	
Total State	70	42	60.00	28	40.00	10	14.29	NA	NA	NA	NA	2.02
Montana (3Pub, 1Pub-Priv, 1Priv, 2Rel)												
Aaniiih Nakoda College (Pub)	11	5		6				NA	NA	NA	NA	
Montana State University (Pub)	9	4		5				NA	NA	NA	NA	
University of Montana (Pub)	30	17		13				NA	NA	NA	NA	
Salish Kootenai College (Pub-Priv)	7	6		1				NA	NA	NA	NA	
Rocky Mountain College (Priv)	9	4		5				NA	NA	NA	NA	
Carroll College (Rel Catholic)	5	2		3				NA	NA	NA	NA	
University of Great Falls (Rel Catholic)	4	1		3				NA	NA	NA	NA	
Total State	75	39	52.00	36	48.00	9	12.00	NA	NA	NA	NA	1.82
Nevada (2Pub, 1Priv, 1Rel)												
Nevada State College (Pub)	6	3		3				NA	NA	NA	NA	
University of Nevada Las Vegas (Pub)	28	12		16				NA	NA	NA	NA	
Sierra Nevada College (Priv)	5	5		0				NA	NA	NA	NA	
Touro University of Nevada (Rel Jewish)	4	2		2				NA	NA	NA	NA	
Total State	43	22	51.16	21	48.84	3	6.98	NA	NA	NA	NA	0.61
New Mexico (3Pub, 2Priv, 1Rel)												
Clovis Community College (Pub)	1	1		0				NA	NA	NA	NA	
San Juan College (Pub)	2	2		0				NA	NA	NA	NA	
University of New Mexico (Pub)	54	41		13				NA	NA	NA	NA	
St Johns College (Priv)	10	10		0				NA	NA	NA	NA	
Santa Fe University of A&D (Priv)	3	2		1				NA	NA	NA	NA	

Table S1 continues in next page...

...**Table S1** Continued

University of the Southwest (Rel Christian)	8	7		1				NA	NA	NA	NA	
Total State	78	63	80.77	15	19.23	5	6.41	NA	NA	NA	NA	1.01
Utah (3Pub, 2Priv, 2Rel)												
Snow College (Pub)	1	1		0				NA	NA	NA	NA	
Southern University of Utah (Pub)	11	5		6				NA	NA	NA	NA	
University of Utah (Pub)	17	11		6				NA	NA	NA	NA	
Webster University (Priv)	5	4		1				NA	NA	NA	NA	
Westminster College (Priv)	15	12		3				NA	NA	NA	NA	
Brigham Young University (Rel Mormon)	25	18		7				NA	NA	NA	NA	
LDS Business College (Rel Mormon)	3	2		1				NA	NA	NA	NA	
Total State	77	53	68.83	24	31.17	6	7.79	NA	NA	NA	NA	1.21
Wyoming (2Pub)												
University of Wyoming (Pub)	10	4		6				NA	NA	NA	NA	
Laramie County Community College (Pub)	3	1		2				NA	NA	NA	NA	
Total State	13	5	38.46	8	61.54	4	30.77	NA	NA	NA	NA	0.81
Total Division	**588**	350	59.52	238	40.48	**57**	9.69	28	49.12	29	50.88	11.52
% in Respect to Grand Total Column	12.33					11.52						
Division 9 Pacific												
Alaska (3Pub, 1Priv)												
University of Alaska Anchorage (Pub)	38	30		8				NA	NA	NA	NA	
University of Alaska Fairbanks (Pub)	60	42		18				NA	NA	NA	NA	
University of Alaska Southeast (Pub)	18	10		8				NA	NA	NA	NA	
Alaska Pacific University (Priv)	8	7		1				NA	NA	NA	NA	
Total State	124	89	71.77	35	28.23	12	9.68	NA	NA	NA	NA	2.42
California (3Pub, 1Priv, 3Rel)												
California State University Bakersfield (Pub)	9	7		2				NA	NA	NA	NA	
California State University Fullerton (Pub)	80	64		16				NA	NA	NA	NA	
University of California Berkeley (Pub)	32	16		16				NA	NA	NA	NA	
Stanford University (Priv)	45	17		28				NA	NA	NA	NA	

Table S1 continues in next page...

...**Table S1** Continued

Azusa Pacific University (Rel Evangelical)	13	6		7				NA	NA	NA	NA	
Biola University (Rel Christian)	5	5		0				NA	NA	NA	NA	
California Lutheran University (Rel Lutheran)	9	6		3				NA	NA	NA	NA	
Total State	193	121	62.69	72	37.31	16	8.29	NA	NA	NA	NA	3.23
Hawaii (2Pub, 1Priv, 2Rel)												
University of Hawaii Manoa (Pub)	15	8		7				NA	NA	NA	NA	
University of Hawaii Hilo (Pub)	10	8		2				NA	NA	NA	NA	
Hawaii Pacific University (Priv)	9	6		3				NA	NA	NA	NA	
Brigham Young Univ. Hawaii (Rel Mormon)	8	2		6				NA	NA	NA	NA	
Chaminade University of Hawaii (Rel Catholic)	6	3		3				NA	NA	NA	NA	
Total State	48	27	56.25	21	43.75	4	8.33	NA	NA	NA	NA	0.81
Oregon (2Pub, 4Rel)												
University of Oregon (Pub)	23	15		8				NA	NA	NA	NA	
Western Oregon University (Pub)	14	6		8				NA	NA	NA	NA	
Cascade College (Rel Christian)	11	4		7				NA	NA	NA	NA	
Concordia University (Rel Christian)	8	4		4				NA	NA	NA	NA	
Corban College (Rel Baptist)	5	4		1				NA	NA	NA	NA	
Multnomah University (Rel Christian)	2	1		1				NA	NA	NA	NA	
Total State	63	34	53.97	29	46.03	5	7.94	NA	NA	NA	NA	1.01
Washington (3Pub, 3Rel)												
Bellevue Community College (Pub)	8	5		3				NA	NA	NA	NA	
Green River Community College (Pub)	19	16		3				NA	NA	NA	NA	
University of Washington (Pub)	95	55		40				NA	NA	NA	NA	
Seattle University (Rel Catholic)	35	23		12				NA	NA	NA	NA	
Trinity Lutheran College (Rel Lutheran)	1	1		0				NA	NA	NA	NA	
Walla Walla University (Rel Adventist)	6	5		1				NA	NA	NA	NA	
Total State	164	105	64.02	59	35.98	5	3.05	NA	NA	NA	NA	1.01
Total Division	**592**	376	63.51	216	36.49	**42**	7.09	25	59.52	17	40.48	8.48
% in Respect to Grand Total Column	12.41					8.48						
Grand Total Column	**4770**	**3006**		**1764**		**495**		**294**		**201**		**100**
% in Respect to Grand Total Contacted	100	63.02		36.98		10.38		6.16		4.21		

* Total number of responders can vary because participants were allowed to skip questions and/or end survey voluntarily at any time

** *Pub* Public Institutions N = 109, *Priv* Private Institutions (includes Pub-Priv) N = 65, *Rel* Religious Institutions N = 107, Grand Total Institutions N = 281

Table S2. Regional Science Index and Evolution Index among the Non-religious Educators of Prospective Teachers, United States (N = 146*)

US Region	Mean Index Region Science Index	Evolution Index	Religiosity Index	N = Responders with 0.00 Religiosity	N = Responders per Region	% Responders with 0.00 Religiosity
Region 1 NORTHEAST	2.15	2.24	0.00	33	67	49.25
Region 2 MIDWEST	2.22	1.93	0.00	27	84	32.14
Region 3 SOUTH	2.09	2.15	0.00	55	174	31.61
Region 4 WEST	2.19	2.48	0.00	31	86	36.05
Index All Regions	2.15	2.20	0.00	NA	NA	NA
TOTAL Columns	NA	NA	NA	146	411	35.52

* Total number of responders can vary because participants were allowed to skip questions and/or end survey voluntarily at any time

Table S3. Division-per-Region: Science Index and Evolution Index among the Non-religious Educators of Prospective Teachers, United States (N = 146*)

US Region	Division per Region	Science Index	Evolution Index	Religiosity Index	N = Responders per Region	% Responders per Region	% Responders / GRAND TOTAL
Region 1 NORTHEAST							
	Division 1 New England	2.11	2.25	0.00	28	84.85	NA
	Division 2 Mid Atlantic	2.40	2.20	0.00	5	15.15	NA
	Mean Index Region	2.15	2.24	0.00	NA	NA	NA
	Sub total N = Responders per Region	NA	NA	NA	33	NA	22.60
Region 2 MIDWEST							
	Division 3 East North Central	2.54	2.00	0.00	13	48.15	NA
	Division 4 West North Central	1.93	1.86	0.00	14	51.85	NA
	Mean Index Region	2.22	1.93	0.00	NA	NA	NA
	Sub total N = Responders per Region	NA	NA	NA	27	NA	18.49
Region 3 SOUTH							
	Division 5 South Atlantic	1.96	2.08	0.00	24	43.64	NA
	Division 6 East South Central	2.06	2.13	0.00	16	29.09	NA
	Division 7 West South Central	2.33	2.27	0.00	15	27.27	NA
	Mean Index Region	2.09	2.15	0.00	NA	NA	NA
	Sub total N = Responders per Region	NA	NA	NA	55	NA	37.67
Region 4 WEST							
	Division 8 Mountain	2.00	2.81	0.00	16	51.61	NA
	Division 9 Pacific	2.40	2.13	0.00	15	48.39	NA
	Mean Index Region	2.19	2.48	0.00	NA	NA	NA
	Sub total N = Responders per Region	NA	NA	NA	31	NA	21.23
	GRAND MEAN Index All Regions	2.15	2.20	0.00	NA	NA	NA
	GRAND TOTAL N = Responders All Regions	NA	NA	NA	146	NA	100

* Total number of responders can vary because participants were allowed to skip questions and/or end survey voluntarily at any time

Table S4. Regional Science Index and Evolution Index among the Deeply Religious Educators of Prospective Teachers, United States (N = 76*)

US Region	Mean Index Region Science Index	Evolution Index	Religiosity Index	N = Responders with 3.00 Religiosity	N = Responders per Region	% Responders with 3.00 Religiosity
Region 1 NORTHEAST	2.15	2.24	3.00	8	67	11.94
Region 2 MIDWEST	2.22	1.93	3.00	15	84	17.86
Region 3 SOUTH	2.09	2.15	3.00	39	174	22.41
Region 4 WEST	2.19	2.48	3.00	14	86	16.28
Index All Regions	2.15	2.20	3.00	NA	NA	NA
TOTAL Columns	NA	NA	NA	76	411	18.49

* Total number of responders can vary because participants were allowed to skip questions and/or end survey voluntarily at any time

Table S5. Division-per-Region: Science Index and Evolution Index among the Deeply Religious Educators of Prospective Teachers, United States (N = 76*)

US Region	Division per Region	Science Index	Evolution Index	Religiosity Index	N = Responders per Region	% Responders per Region	% Responders / GRAND TOTAL
Region 1 NORTHEAST							
	Division 1 New England	0.75	1.00	3.00	4	50.00	NA
	Division 2 Mid Atlantic	2.00	1.00	3.00	4	50.00	NA
	Mean Index Region	1.38	1.00	3.00	NA	NA	NA
	Sub total N = Responders per Region	NA	NA	NA	8	NA	10.53
Region 2 MIDWEST							
	Division 3 East North Central	2.00	1.00	3.00	6	40.00	NA
	Division 4 West North Central	1.44	1.33	3.00	9	60.00	NA
	Mean Index Region	1.67	1.20	3.00	NA	NA	NA
	Sub total N = Responders per Region	NA	NA	NA	15	NA	19.74
Region 3 SOUTH							
	Division 5 South Atlantic	1.13	1.25	3.00	16	41.03	NA
	Division 6 East South Central	1.40	1.30	3.00	10	25.64	NA
	Division 7 West South Central	1.62	1.38	3.00	13	33.33	NA
	Mean Index Region	1.36	1.31	3.00	NA	NA	NA
	Sub total N = Responders per Region	NA	NA	NA	39	NA	51.32
Region 4 WEST							
	Division 8 Mountain	2.30	0.10	3.00	10	71.43	NA
	Division 9 Pacific	2.00	1.25	3.00	4	28.57	NA
	Mean Index Region	2.21	0.43	3.00	NA	NA	NA
	Sub total N = Responders per Region	NA	NA	NA	14	NA	18.42
	GRAND MEAN Index All Regions	1.58	1.09	3.00	NA	NA	NA
	GRAND TOTAL N = Responders All Regions	NA	NA	NA	76	NA	100

* Total number of responders can vary because participants were allowed to skip questions and/or end survey voluntarily at any time

Table S6. Acceptance of Evolution and Creationism by Educators of Prospective Teachers, United States (N = 414*)

US Region	Division per Region	Accept Evolution Openly	Accept Evolution Privately	No Opinion	Creationist Openly	Creationist Privately	Total Region	% of Grand Total
Region 1 NORTHEAST								
	Division 1 New England	36	6	6	2	3		
	Division 2 Mid Atlantic	10	1	3	1	1		
	Sub total Region	46	7	9	3	4	69	16.67
	% of Total Region	66.67	10.14	13.04	4.35	5.80		
Region 2 MIDWEST								
	Division 3 East North Central	23	5	4	2	1		
	Division 4 West North Central	26	9	9	3	2		
	Sub total Region	49	14	13	5	3	84	20.29
	% of Total Region	58.33	16.67	15.48	5.95	3.57		
Region 3 SOUTH								
	Division 5 South Atlantic	39	10	7	11	2		
	Division 6 East South Central	22	6	11	14	4		
	Division 7 West South Central	31	1	3	11	3		
	Sub total Region	92	17	21	36	9	175	42.27
	% of Total Region	52.57	9.71	12.00	20.57	5.14		
Region 4 WEST								
	Division 8 Mountain	36	3	4	6	3		
	Division 9 Pacific	22	2	4	5	1		
	Sub total Region	58	5	8	11	4	86	20.77
	% of Total Region	67.44	5.81	9.30	12.79	4.65		
							Grand Total	
	Total columns	245	43	51	55	20	414	
	% in respect to Grand Total	59.18	10.39	12.32	13.29	4.83		100

* Total number of responders can vary because participants were allowed to skip questions and/or end survey voluntarily at any time

Table S7. Acceptance of Evolution and Creationism by Educators of Prospective Teachers Affiliated with Public Institutions, United States (N = 258*)

US Region	Division per Region	Accept Evolution Openly	Accept Evolution Privately	No Opinion	Creationist Openly	Creationist Privately	Total Region	% of Grand Total
Region 1 NORTHEAST								
	Division 1 New England	23	4	4	2	3		
	Division 2 Mid Atlantic	6	0	0	0	0		
	Sub total Region	29	4	4	2	3	42	16.28
	% of Total Region	69.05	9.52	9.52	4.76	7.14		
Region 2 MIDWEST								
	Division 3 East North Central	11	3	2	3	0		
	Division 4 West North Central	16	7	4	0	2		
	Sub total Region	27	10	6	3	2	48	18.60
	% of Total Region	56.25	20.83	12.50	6.25	4.17		
Region 3 SOUTH								
	Division 5 South Atlantic	27	2	5	0	2		
	Division 6 East South Central	18	5	8	8	3		
	Division 7 West South Central	25	1	2	7	1		
	Sub total Region	70	8	15	15	6	114	44.19
	% of Total Region	61.40	7.02	13.16	13.16	5.26		
Region 4 WEST								
	Division 8 Mountain	20	3	4	2	2		
	Division 9 Pacific	18	1	2	1	1		
	Sub total Region	38	4	6	3	3	54	20.93
	% of Total Region	70.37	7.41	11.11	5.56	5.56		
							Grand Total	
	Total columns	164	26	31	23	14	258	
	% in respect to Grand Total	63.57	10.08	12.02	8.91	5.43		100

* Total number of responders can vary because participants were allowed to skip questions and/or end survey voluntarily at any time

Table S8. Acceptance of Evolution and Creationism by Educators of Prospective Teachers Affiliated with Private Non-religious Institutions, United States (N = 63*)

US Region	Division per Region	Accept Evolution Openly	Accept Evolution Privately	No Opinion	Creationist Openly	Creationist Privately	Total Region	% of Grand Total
Region 1 NORTHEAST								
	Division 1 New England	5	2	2	0	0		
	Division 2 Mid Atlantic	1	1	1	0	0		
	Sub total Region	6	3	3	0	0	12	19.05
	% of Total Region	50.00	25.00	25.00	0.00	0.00		
Region 2 MIDWEST								
	Division 3 East North Central	8	1	1	0	1		
	Division 4 West North Central	6	1	1	0	0		
	Sub total Region	14	2	2	0	1	19	30.16
	% of Total Region	73.68	10.53	10.53	0.00	5.26		
Region 3 SOUTH								
	Division 5 South Atlantic	5	4	1	2	0		
	Division 6 East South Central	1	1	0	2	0		
	Division 7 West South Central	3	0	1	1	1		
	Sub total Region	9	5	2	5	1	22	34.92
	% of Total Region	40.91	22.73	9.09	22.73	4.55		
Region 4 WEST								
	Division 8 Mountain	6	0	0	1	0		
	Division 9 Pacific	3	0	0	0	0		
	Sub total Region	9	0	0	1	0	10	15.87
	% of Total Region	90.00	0.00	0.00	10.00	0.00		
							Grand Total	
	Total columns	38	10	7	6	2	63	
	% in respect to Grand Total	60.32	15.87	11.11	9.52	3.17		100

* Total number of responders can vary because participants were allowed to skip questions and/or end survey voluntarily at any time

Table S9. Acceptance of Evolution and Creationism by Educators of Prospective Teachers Affiliated with Religious Institutions, United States (N = 62*)

US Region	Division per Region	Accept Evolution Openly	Accept Evolution Privately	No Opinion	Creationist Openly	Creationist Privately	Total Region	% of Grand Total
Region 1 NORTHEAST								
	Division 1 New England	6	0	0	0	0		
	Division 2 Mid Atlantic	3	0	0	0	1		
	Sub total Region	9	0	0	0	1	10	16.13
	% of Total Region	90.00	0.00	0.00	0.00	10.00		
Region 2 MIDWEST								
	Division 3 East North Central	2	1	0	0	0		
	Division 4 West North Central	2	1	4	0	0		
	Sub total Region	4	2	4	0	0	10	16.13
	% of Total Region	40.00	20.00	40.00	0.00	0.00		
Region 3 SOUTH								
	Division 5 South Atlantic	4	4	1	6	0		
	Division 6 East South Central	1	1	1	3	1		
	Division 7 West South Central	1	0	0	3	0		
	Sub total Region	6	5	2	12	1	26	41.94
	% of Total Region	23.08	19.23	7.69	46.15	3.85		
Region 4 WEST								
	Division 8 Mountain	6	0	0	3	0		
	Division 9 Pacific	0	1	2	4	0		
	Sub total Region	6	1	2	7	0	16	25.81
	% of Total Region	37.50	6.25	12.50	43.75	0.00		
							Grand Total	
	Total columns	25	8	8	19	2	62	
	% in respect to Grand Total	40.32	12.90	12.90	30.65	3.23		100

* Total number of responders can vary because participants were allowed to skip questions and/or end survey voluntarily at any time

Table S10. Acceptance of Evolution and Creationism by Educators of Prospective Teachers, Female and Male Comparison, United States (N = 358*)

Sex %	Accept Evolution Openly	Accept Evolution Privately	No Opinion	Creationist Openly	Creationist Privately	Total Rows	% of Grand Total
Females	122	22	29	30	12	215	60.06
%	56.74	10.23	13.49	13.95	5.58		
Males	86	15	14	23	5	143	39.94
%	60.14	10.49	9.79	16.08	3.50		
						Grand Total	
Total Columns	208	37	43	53	17	358	
% in respect to Grand Total	58.10	10.34	12.01	14.80	4.75		

* Total number of responders can vary because participants were allowed to skip questions and/or end survey voluntarily at any time

Table S11. The 'Likelihood of Evolution' as Seen by Educators of Prospective Teachers, United States (N = 410*)

US Region	Division per Region	Definitely True	Probably True	Do Not Know	Probably False	Definitely False	Total Region	% of Grand Total
Region 1 NORTHEAST								
	Division 1 New England	35	14	3	0	1		
	Division 2 Mid Atlantic	8	4	1	1	0		
	Sub total Region	43	18	4	1	1	67	16.34
	% of Total Region	64.18	26.87	5.97	1.49	1.49		
Region 2 MIDWEST								
	Division 3 East North Central	16	16	2	0	1		
	Division 4 West North Central	25	20	3	1	0		
	Sub total Region	41	36	5	1	1	84	20.49
	% of Total Region	48.81	42.86	5.95	1.19	1.19		
Region 3 SOUTH								
	Division 5 South Atlantic	38	21	1	2	7		
	Division 6 East South Central	19	22	5	3	6		
	Division 7 West South Central	23	10	3	5	8		
	Sub total Region	80	53	9	10	21	173	42.20
	% of Total Region	46.24	30.64	5.20	5.78	12.14		
Region 4 WEST								
	Division 8 Mountain	34	7	4	4	3		
	Division 9 Pacific	15	13	1	0	5		
	Sub total Region	49	20	5	4	8	86	20.98
	% of Total Region	56.98	23.26	5.81	4.65	9.30		
							Grand Total	
	Total columns	213	127	23	16	31	410	
	% in respect to Grand Total	51.95	30.98	5.61	3.90	7.56		100

* Total number of responders can vary because participants were allowed to skip questions and/or end survey voluntarily at any time

Table S12. The 'Likelihood of Evolution' as Seen by Female and Male Educators of Prospective Teachers, United States (N = 358*)

Sex %	Definitely True	Probably True	Do Not Know	Probably False	Definitely False	Total Rows	% of Grand Total
Females	102	77	13	7	16	215	60.06
%	47.44	35.81	6.05	3.26	7.44		
Males	76	36	7	10	14	143	39.94
%	53.15	25.17	4.90	6.99	9.79		
						Grand Total	
Total Columns	178	113	20	17	30	358	
% in respect to Grand Total	49.72	31.56	5.59	4.75	8.38		

* Total number of responders can vary because participants were allowed to skip questions and/or end survey voluntarily at any time

Table S13. Educators of Prospective Teachers' Level of Concern about the Controversy '*Evolution vs. Creationism vs. Intelligent Design* ,' United States (N = 508*)

US Region	Division per Region	Very Concerned	Some How Concerned	Not Concerned	Debate is Trivial	No Opinion	Total Region	% of Grand Total
Region 1 NORTHEAST								
	Division 1 New England	29	27	6	3	5		
	Division 2 Mid Atlantic	9	7	3	0	1		
	Sub total Region	38	34	9	3	6	90	17.72
	% of Total Region	42.22	37.78	10.00	3.33	6.67		
Region 2 MIDWEST								
	Division 3 East North Central	22	13	12	2	1		
	Division 4 West North Central	29	18	5	3	2		
	Sub total Region	51	31	17	5	3	107	21.06
	% of Total Region	47.66	28.97	15.89	4.67	2.80		
Region 3 SOUTH								
	Division 5 South Atlantic	44	25	13	5	3		
	Division 6 East South Central	28	21	12	1	1		
	Division 7 West South Central	38	15	4	2	0		
	Sub total Region	110	61	29	8	4	212	41.73
	% of Total Region	51.89	28.77	13.68	3.77	1.89		
Region 4 WEST								
	Division 8 Mountain	25	19	9	3	1		
	Division 9 Pacific	17	18	4	3	0		
	Sub total Region	42	37	13	6	1	99	19.49
	% of Total Region	42.42	37.37	13.13	6.06	1.01		
							Grand Total	
	Total columns	241	163	68	22	14	508	
	% in respect to Grand Total	47.44	32.09	13.39	4.33	2.76		100

* Total number of responders can vary because participants were allowed to skip questions and/or end survey voluntarily at any time

Table S14. Educators of Prospective Teachers' Views about Intelligent Design (or '*Intelligent Design Is* ...'), United States (N = 471*)

US Region	Division per Region	Religious Doctrine	Not Scientific	Scientific Theory	No opinion	Alternative to Evolution	Total Region	% of Grand Total
Region 1 NORTHEAST								
	Division 1 New England	25	26	5	4	2		
	Division 2 Mid Atlantic	6	5	3	3	0		
	Sub total Region	31	31	8	7	2	79	16.77
	% of Total Region	39.24	39.24	10.13	8.86	2.53		
Region 2 MIDWEST								
	Division 3 East North Central	14	16	8	4	2		
	Division 4 West North Central	18	15	8	11	3		
	Sub total Region	32	31	16	15	5	99	21.02
	% of Total Region	32.32	31.31	16.16	15.15	5.05		
Region 3 SOUTH								
	Division 5 South Atlantic	37	21	13	9	3		
	Division 6 East South Central	19	11	18	5	5		
	Division 7 West South Central	22	7	13	10	3		
	Sub total Region	78	39	44	24	11	196	41.61
	% of Total Region	39.80	19.90	22.45	12.24	5.61		
Region 4 WEST								
	Division 8 Mountain	20	16	10	6	4		
	Division 9 Pacific	14	12	6	7	2		
	Sub total Region	34	28	16	13	6	97	20.59
	% of Total Region	35.05	28.87	16.49	13.40	6.19		
							Grand Total	
	Total columns	175	129	84	59	24	471	
	% in respect to Grand Total	37.15	27.39	17.83	12.53	5.10		100

* Total number of responders can vary because participants were allowed to skip questions and/or end survey voluntarily at any time

Table S15. Views about '*What Should Be Taught in the Science Class*' among Educators of Prospective Teachers, United States (N = 471*)

US Region	Division per Region	Evolution	Equal Time	Do not know	Creationism	Intelligent Design	Total Region	% of Grand Total
Region 1 NORTHEAST								
	Division 1 New England	50	8	4	0	0		
	Division 2 Mid Atlantic	12	3	2	0	0		
	Sub total Region	62	11	6	0	0	79	16.77
	% of Total Region	78.48	13.92	7.59	0.00	0.00		
Region 2 MIDWEST								
	Division 3 East North Central	32	9	3	0	0		
	Division 4 West North Central	35	15	5	0	0		
	Sub total Region	67	24	8	0	0	99	21.02
	% of Total Region	67.68	24.24	8.08	0.00	0.00		
Region 3 SOUTH								
	Division 5 South Atlantic	52	22	5	2	2		
	Division 6 East South Central	30	21	3	2	2		
	Division 7 West South Central	30	15	2	5	3		
	Sub total Region	112	58	10	9	7	196	41.61
	% of Total Region	57.14	29.59	5.10	4.59	3.57		
Region 4 WEST								
	Division 8 Mountain	38	15	3	0	0		
	Division 9 Pacific	29	9	0	2	1		
	Sub total Region	67	24	3	2	1	97	20.59
	% of Total Region	69.07	24.74	3.09	2.06	1.03		
							Grand Total	
	Total columns	308	117	27	11	8	471	
	% in respect to Grand Total	65.39	24.84	5.73	2.34	1.70		100

* Total number of responders can vary because participants were allowed to skip questions and/or end survey voluntarily at any time

New England Science Public: Series Evolution 2(1): 1-92 © 2014
ISSN 2326-0971

Table S16. Preference for Science Courses with Evolutionary Content among Educators of Prospective Teachers, United States (N = 471*)

US Region	Division per Region	Include Humans	Exclude Humans	Do Not Know	Avoid Evolution	Never Include Evolution	Total Region	% of Grand Total
Region 1 NORTHEAST								
	Division 1 New England	57	2	2	1	0		
	Division 2 Mid Atlantic	15	0	2	0	0		
	Sub total Region	72	2	4	1	0	79	16.77
	% of Total Region	91.14	2.53	5.06	1.27	0.00		
Region 2 MIDWEST								
	Division 3 East North Central	38	0	4	2	0		
	Division 4 West North Central	50	2	2	1	0		
	Sub total Region	88	2	6	3	0	99	21.02
	% of Total Region	88.89	2.02	6.06	3.03	0.00		
Region 3 SOUTH								
	Division 5 South Atlantic	74	1	5	2	1		
	Division 6 East South Central	47	3	6	0	2		
	Division 7 West South Central	38	4	10	0	3		
	Sub total Region	159	8	21	2	6	196	41.61
	% of Total Region	81.12	4.08	10.71	1.02	3.06		
Region 4 WEST								
	Division 8 Mountain	47	5	2	1	1		
	Division 9 Pacific	35	2	2	2	0		
	Sub total Region	82	7	4	3	1	97	20.59
	% of Total Region	84.54	7.22	4.12	3.09	1.03		
							Grand Total	
	Total columns	401	19	35	9	7	471	
	% in respect to Grand Total	85.14	4.03	7.43	1.91	1.49		100

* Total number of responders can vary because participants were allowed to skip questions and/or end survey voluntarily at any time

New England Science Public: Series Evolution 2(1): 1-92 © 2014
ISSN 2326-0971

Table S17. Educators of Prospective Teachers' Views About the Statement '*Creationism Is a Valid Scientific Alternative to Evolutionary Explanations for the Origin of Species* ,' United States (N = 411*)

US Region	Division per Region	Strongly Agree	Agree	Disagree	Strongly Disagree	No Opinion	Total Region	% of Grand Total
Region 1 NORTHEAST								
	Division 1 New England	0	4	4	41	4		
	Division 2 Mid Atlantic	1	1	4	7	1		
	Sub total Region	1	5	8	48	5	67	16.30
	% of Total Region	1.49	7.46	11.94	71.64	7.46		
Region 2 MIDWEST								
	Division 3 East North Central	1	5	8	19	2		
	Division 4 West North Central	3	3	13	26	4		
	Sub total Region	4	8	21	45	6	84	20.44
	% of Total Region	4.76	9.52	25.00	53.57	7.14		
Region 3 SOUTH								
	Division 5 South Atlantic	9	4	14	40	2		
	Division 6 East South Central	9	8	14	23	2		
	Division 7 West South Central	7	7	4	27	4		
	Sub total Region	25	19	32	90	8	174	42.34
	% of Total Region	14.37	10.92	18.39	51.72	4.60		
Region 4 WEST								
	Division 8 Mountain	5	4	7	34	2		
	Division 9 Pacific	4	1	6	22	1		
	Sub total Region	9	5	13	56	3	86	20.92
	% of Total Region	10.47	5.81	15.12	65.12	3.49		
							Grand Total	
	Total columns	39	37	74	239	22	411	
	% in respect to Grand Total	9.49	9.00	18.00	58.15	5.35		100

* Total number of responders can vary because participants were allowed to skip questions and/or end survey voluntarily at any time

Table S18. Educators of Prospective Teachers' Views About the Statement '*It Is Possible to Offer an Excellent Biology College-Course with* No Mention of Darwin or Evolution,' United States (N = 411*)

US Region	Division per Region	Strongly Agree	Agree	Disagree	Strongly Disagree	No Opinion	Total Region	% of Grand Total
Region 1 NORTHEAST								
	Division 1 New England	1	3	9	36	4		
	Division 2 Mid Atlantic	0	0	5	8	1		
	Sub total Region	1	3	14	44	5	67	16.30
	% of Total Region	1.49	4.48	20.90	65.67	7.46		
Region 2 MIDWEST								
	Division 3 East North Central	1	0	10	20	4		
	Division 4 West North Central	1	2	20	23	3		
	Sub total Region	2	2	30	43	7	84	20.44
	% of Total Region	2.38	2.38	35.71	51.19	8.33		
Region 3 SOUTH								
	Division 5 South Atlantic	4	3	20	41	1		
	Division 6 East South Central	1	6	22	26	1		
	Division 7 West South Central	5	4	11	28	1		
	Sub total Region	10	13	53	95	3	174	42.34
	% of Total Region	5.75	7.47	30.46	54.60	1.72		
Region 4 WEST								
	Division 8 Mountain	1	1	16	33	1		
	Division 9 Pacific	3	2	10	18	1		
	Sub total Region	4	3	26	51	2	86	20.92
	% of Total Region	4.65	3.49	30.23	59.30	2.33		
							Grand Total	
	Total columns	17	21	123	233	17	411	
	% in respect to Grand Total	4.14	5.11	29.93	56.69	4.14		100

* Total number of responders can vary because participants were allowed to skip questions and/or end survey voluntarily at any time

Table S19. Educators of Prospective Teachers' Views About the Statement '*Many reputable scientists View Creationism and Intelligent Design Valid Alternatives to Evolution* ,' United States (N = 411*)

US Region	Division per Region	Strongly Agree	Agree	Disagree	Strongly Disagree	No Opinion	Total Region	% of Grand Total
Region 1 NORTHEAST								
	Division 1 New England	2	6	11	28	6		
	Division 2 Mid Atlantic	1	0	5	4	4		
	Sub total Region	3	6	16	32	10	67	16.30
	% of Total Region	4.48	8.96	23.88	47.76	14.93		
Region 2 MIDWEST								
	Division 3 East North Central	0	7	9	15	4		
	Division 4 West North Central	1	12	14	13	9		
	Sub total Region	1	19	23	28	13	84	20.44
	% of Total Region	1.19	22.62	27.38	33.33	15.48		
Region 3 SOUTH								
	Division 5 South Atlantic	7	10	16	32	4		
	Division 6 East South Central	6	17	13	17	3		
	Division 7 West South Central	6	11	10	19	3		
	Sub total Region	19	38	39	68	10	174	42.34
	% of Total Region	10.92	21.84	22.41	39.08	5.75		
Region 4 WEST								
	Division 8 Mountain	3	13	8	25	3		
	Division 9 Pacific	4	4	10	14	2		
	Sub total Region	7	17	18	39	5	86	20.92
	% of Total Region	8.14	19.77	20.93	45.35	5.81		
							Grand Total	
	Total columns	30	80	96	167	38	411	
	% in respect to Grand Total	7.30	19.46	23.36	40.63	9.25		100

* Total number of responders can vary because participants were allowed to skip questions and/or end survey voluntarily at any time

Table S20. Educators of Prospective Teachers' Views About the Statement '*Almost All Scientists Reject Creationism and Intelligent Design as Valid Accounts for the Origin of Species*,' United States (N = 411*)

US Region	Division per Region	Strongly Agree	Agree	Disagree	Strongly Disagree	No Opinion	Total Region	% of Grand Total
Region 1 NORTHEAST								
	Division 1 New England	19	17	9	2	6		
	Division 2 Mid Atlantic	3	3	3	0	5		
	Sub total Region	22	20	12	2	11	67	16.30
	% of Total Region	32.84	29.85	17.91	2.99	16.42		
Region 2 MIDWEST								
	Division 3 East North Central	10	13	4	1	7		
	Division 4 West North Central	10	16	11	4	8		
	Sub total Region	20	29	15	5	15	84	20.44
	% of Total Region	23.81	34.52	17.86	5.95	17.86		
Region 3 SOUTH								
	Division 5 South Atlantic	20	23	15	7	4		
	Division 6 East South Central	8	14	22	9	3		
	Division 7 West South Central	10	12	16	7	4		
	Sub total Region	38	49	53	23	11	174	42.34
	% of Total Region	21.84	28.16	30.46	13.22	6.32		
Region 4 WEST								
	Division 8 Mountain	13	16	13	5	5		
	Division 9 Pacific	12	10	6	2	4		
	Sub total Region	25	26	19	7	9	86	20.92
	% of Total Region	29.07	30.23	22.09	8.14	10.47		
							Grand Total	
	Total columns	105	124	99	37	46	411	
	% in respect to Grand Total	25.55	30.17	24.09	9.00	11.19		100

* Total number of responders can vary because participants were allowed to skip questions and/or end survey voluntarily at any time

Table S21. Educators of Prospective Teachers' Views About the Statement '*Evolution Is the Unifying Theme of All Sciences*,' United States (N = 411*)

US Region	Division per Region	Strongly Agree	Agree	Disagree	Strongly Disagree	No Opinion	Total Region	% of Grand Total
Region 1 NORTHEAST								
	Division 1 New England	13	15	5	5	15		
	Division 2 Mid Atlantic	2	5	4	0	3		
	Sub total Region	15	20	9	5	18	67	16.30
	% of Total Region	22.39	29.85	13.43	7.46	26.87		
Region 2 MIDWEST								
	Division 3 East North Central	6	16	6	1	6		
	Division 4 West North Central	12	16	5	3	13		
	Sub total Region	18	32	11	4	19	84	20.44
	% of Total Region	21.43	38.10	13.10	4.76	22.62		
Region 3 SOUTH								
	Division 5 South Atlantic	11	21	11	8	18		
	Division 6 East South Central	3	19	17	8	9		
	Division 7 West South Central	11	7	12	9	10		
	Sub total Region	25	47	40	25	37	174	42.34
	% of Total Region	14.37	27.01	22.99	14.37	21.26		
Region 4 WEST								
	Division 8 Mountain	10	11	8	8	15		
	Division 9 Pacific	2	4	8	7	13		
	Sub total Region	12	15	16	15	28	86	20.92
	% of Total Region	13.95	17.44	18.60	17.44	32.56		
							Grand Total	
	Total columns	70	114	76	49	102	411	
	% in respect to Grand Total	17.03	27.74	18.49	11.92	24.82		100

* Total number of responders can vary because participants were allowed to skip questions and/or end survey voluntarily at any time

Table S22. Reactions by Educators of Prospective Teachers to Alternative Definitions of Evolution, United States (N = 411*)

US Region	Division per Region	Gradual Process Universe Changes TRUE	Gradual Process Universe Changes FALSE	SUM	Directional Process Unicellular Turn Multicellular TRUE	Directional Process Unicellular Turn Multicellular FALSE	SUM
Region 1 NORTHEAST							
	Division 1 New England	50	3	53	21	32	53
	Division 2 Mid Atlantic	13	1	14	8	6	14
	Sub total Region	63	4	67	29	38	67
	% of Total Region	94.03	5.97		43.28	56.72	
Region 2 MIDWEST							
	Division 3 East North Central	30	5	35	17	18	35
	Division 4 West North Central	48	1	49	24	25	49
	Sub total Region	78	6	84	41	43	84
	% of Total Region	92.86	7.14		48.81	51.19	
Region 3 SOUTH							
	Division 5 South Atlantic	58	11	69	17	52	69
	Division 6 East South Central	51	5	56	16	40	56
	Division 7 West South Central	34	15	49	17	32	49
	Sub total Region	143	31	174	50	124	174
	% of Total Region	82.18	17.82		28.74	71.26	
Region 4 WEST							
	Division 8 Mountain	42	10	52	15	37	52
	Division 9 Pacific	27	7	34	6	28	34
	Sub total Region	69	17	86	21	65	86
	% of Total Region	80.23	19.77		24.42	75.58	
	Total columns	353	58		141	270	
	% in respect to Grand Total	85.89	14.11		34.31	65.69	

Table S22. *continues next page...*

* Total number of responders can vary because participants were allowed to skip questions and/or end survey voluntarily at any time

...**Table S22.** *Continued*

Monkeys, Chimps Turn Into Humans TRUE	FALSE	SUM	Random Origin of Life TRUE	FALSE	SUM	Inheritance of Acquired Traits TRUE	FALSE	SUM	Total Region	% of Grand Total
7	46	53	18	35	53	31	22	53		
2	12	14	5	9	14	13	1	14		
9	58	67	23	44	67	44	23	67	67	16.30
13.43	86.57		34.33	65.67		65.67	34.33			
6	29	35	13	22	35	27	8	35		
11	38	49	13	36	49	40	9	49		
17	67	84	26	58	84	67	17	84	84	20.44
20.24	79.76		30.95	69.05		79.76	20.24			
8	61	69	14	55	69	46	23	69		
7	49	56	15	41	56	39	17	56		
5	44	49	11	38	49	33	16	49		
20	154	174	40	134	174	118	56	174	174	42.34
11.49	88.51		22.99	77.01		67.82	32.18			
5	47	52	8	44	52	32	20	52		
1	33	34	12	22	34	21	13	34		
6	80	86	20	66	86	53	33	86	86	20.92
6.98	93.02		23.26	76.74		61.63	38.37			
									Grand Total	
52	359		109	302		282	129		411	
12.65	87.35		26.52	73.48		68.61	31.39			100

* Total number of responders can vary because participants were allowed to skip questions and/or end survey voluntarily at any time

New England Science Public: Series Evolution 2(1): 1-92 © 2014
ISSN 2326-0971

Table S23. Reactions by Educators of Prospective Teachers to Diverse Statements about Evolution, United States (N = 411*)

US Region	Division per Region	Organisms Descend from Ancestors		SUM	Humans Are Apes		SUM	Hominid Fossil Record Is Poor		SUM
		TRUE	FALSE		TRUE	FALSE		TRUE	FALSE	
Region 1 NORTHEAST										
	Division 1 New England	51	2	53	29	24	53	6	47	53
	Division 2 Mid Atlantic	11	3	14	8	6	14	3	11	14
	Sub total Region	62	5	67	37	30	67	9	58	67
	% of Total Region	92.54	7.46		55.22	44.78		13.43	86.57	
Region 2 MIDWEST										
	Division 3 East North Central	28	7	35	19	16	35	7	28	35
	Division 4 West North Central	41	8	49	25	24	49	11	38	49
	Sub total Region	69	15	84	44	40	84	18	66	84
	% of Total Region	82.14	17.86		52.38	47.62		21.43	78.57	
Region 3 SOUTH										
	Division 5 South Atlantic	53	16	69	33	36	69	15	54	69
	Division 6 East South Central	40	16	56	15	41	56	21	35	56
	Division 7 West South Central	36	13	49	17	32	49	12	37	49
	Sub total Region	129	45	174	65	109	174	48	126	174
	% of Total Region	74.14	25.86		37.36	62.64		27.59	72.41	
Region 4 WEST										
	Division 8 Mountain	40	12	52	26	26	52	13	39	52
	Division 9 Pacific	28	6	34	15	19	34	7	27	34
	Sub total Region	68	18	86	41	45	86	20	66	86
	% of Total Region	79.07	20.93		47.67	52.33		23.26	76.74	
	Total columns	328	83		187	224		95	316	
	% in respect to Grand Total	79.81	20.19		45.50	54.50		23.11	76.89	

Table S23. continues next page...

* Total number of responders can vary because participants were allowed to skip questions and/or end survey voluntarily at any time

...***Table S23.*** *Continued*

Evolution Cannot Explain Consciousness TRUE	FALSE	SUM	Universe Tuned to Embrace Humans TRUE	FALSE	SUM	Total Region	% of Grand Total
17	36	53	22	31	53		
6	8	14	10	4	14		
23	44	67	32	35	67	67	16.30
34.33	65.67		47.76	52.24			
13	22	35	19	16	35		
20	29	49	39	10	49		
33	51	84	58	26	84	84	20.44
39.29	60.71		69.05	30.95			
30	39	69	40	29	69		
31	25	56	39	17	56		
18	31	49	30	19	49		
79	95	174	109	65	174	174	42.34
45.40	54.60		62.64	37.36			
22	30	52	30	22	52		
14	20	34	21	13	34		
36	50	86	51	35	86	86	20.92
41.86	58.14		59.30	40.70			
						Grand Total	
171	240		250	161		411	
41.61	58.39		60.83	39.17			100

* Total number of responders can vary because participants were allowed to skip questions and/or end survey voluntarily at any time

Table S24. Reactions by Educators of Prospective Teachers to Diverse Statements about the Earth, Moon, Solar System and the Universe, United States (N = 411*)

US Region	Division per Region	Earth / Moon Billions yrs Old		SUM	Continents Move Over Millions yrs		SUM	Evolution Applies to the Universe		SUM
		TRUE	FALSE		TRUE	FALSE		TRUE	FALSE	
Region 1 NORTHEAST										
	Division 1 New England	47	6	53	53	0	53	32	21	53
	Division 2 Mid Atlantic	13	1	14	14	0	14	12	2	14
	Sub total Region	60	7	67	67	0	67	44	23	67
	% of Total Region	89.55	10.45		100.00	0.00		65.67	34.33	
Region 2 MIDWEST										
	Division 3 East North Central	33	2	35	32	3	35	23	12	35
	Division 4 West North Central	44	5	49	49	0	49	46	3	49
	Sub total Region	77	7	84	81	3	84	69	15	84
	% of Total Region	91.67	8.33		96.43	3.57		82.14	17.86	
Region 3 SOUTH										
	Division 5 South Atlantic	62	7	69	64	5	69	48	21	69
	Division 6 East South Central	49	7	56	50	6	56	41	15	56
	Division 7 West South Central	41	8	49	45	4	49	30	19	49
	Sub total Region	152	22	174	159	15	174	119	55	174
	% of Total Region	87.36	12.64		91.38	8.62		68.39	31.61	
Region 4 WEST										
	Division 8 Mountain	50	2	52	50	2	52	29	23	52
	Division 9 Pacific	33	1	34	33	1	34	18	16	34
	Sub total Region	83	3	86	83	3	86	47	39	86
	% of Total Region	96.51	3.49		96.51	3.49		54.65	45.35	
	Total columns	372	39		390	21		279	132	
	% in respect to Grand Total	90.51	9.49		94.89	5.11		67.88	32.12	

Table S24. *continues next page...*

* Total number of responders can vary because participants were allowed to skip questions and/or end survey voluntarily at any time

...**Table S24.** Continued

Our Sun Is Center of Universe TRUE	FALSE	SUM	Catastrophic Collision Earth-Asteroid Will Happen TRUE	FALSE	SUM	Total Region	% of Grand Total
13	40	53	27	26	53		
2	12	14	6	8	14		
15	52	67	33	34	67	67	16.30
22.39	77.61		49.25	50.75			
12	23	35	9	26	35		
14	35	49	24	25	49		
26	58	84	33	51	84	84	20.44
30.95	69.05		39.29	60.71			
15	54	69	35	34	69		
12	44	56	20	36	56		
13	36	49	25	24	49		
40	134	174	80	94	174	174	42.34
22.99	77.01		45.98	54.02			
15	37	52	27	25	52		
4	30	34	18	16	34		
19	67	86	45	41	86	86	20.92
22.09	77.91		52.33	47.67			
						Grand Total	
100	311		191	220		411	
24.33	75.67		46.47	53.53			100

* Total number of responders can vary because participants were allowed to skip questions and/or end survey voluntarily at any time

Table S25. Educators of Prospective Teachers' Reactions When They '*Hear About Evolution...* ' United States (N = 471*)

US Region	Division per Region	Appreciate Factual Explanations	No Difference Due to Harmony	Do not know	Scientists are Wrong	Discomfort	Total Region	% of Grand Total
Region 1 NORTHEAST								
	Division 1 New England	48	11	2	0	1		
	Division 2 Mid Atlantic	9	4	4	0	0		
	Sub total Region	57	15	6	0	1	79	16.77
	% of Total Region	72.15	18.99	7.59	0.00	1.27		
Region 2 MIDWEST								
	Division 3 East North Central	33	7	2	1	1		
	Division 4 West North Central	35	15	4	1	0		
	Sub total Region	68	22	6	2	1	99	21.02
	% of Total Region	68.69	22.22	6.06	2.02	1.01		
Region 3 SOUTH								
	Division 5 South Atlantic	50	23	3	5	2		
	Division 6 East South Central	25	18	2	9	4		
	Division 7 West South Central	30	10	2	7	6		
	Sub total Region	105	51	7	21	12	196	41.61
	% of Total Region	53.57	26.02	3.57	10.71	6.12		
Region 4 WEST								
	Division 8 Mountain	36	11	1	7	1		
	Division 9 Pacific	27	7	0	6	1		
	Sub total Region	63	18	1	13	2	97	20.59
	% of Total Region	64.95	18.56	1.03	13.40	2.06		
							Grand Total	
	Total columns	293	106	20	36	16	471	
	% in respect to Grand Total	62.21	22.51	4.25	7.64	3.40		100

* Total number of responders can vary because participants were allowed to skip questions and/or end survey voluntarily at any time

NE Science Public

New England Science Public: Series Evolution (ISSN 2326-0971) is published yearly by New England Science Public and the New England Center for The Public Understanding of Science at Roger Williams University.

New England Science Public: Series Evolution publishes original, hypothesis-testing research articles, comprehensive reviews, current trends articles, conceptual viewpoints that challenge traditional scientific consensus and advance knowledge, and data and meta-data analytical studies in evolution and its directly related disciplines and sub disciplines (e.g. cosmic evolution, organisms and evolution of biodiversity, the continuum micro-to-macro evolution, systems biology applied to evolution, ecology and evolutionary biology, behavior and ethology, cognition and perception, philosophy of science/ evolution, history of science/ evolutionary theory, the evolution of technology, the evolution of cultures and languages, evolutionary psychology and medicine, educational assessment about evolution in the classroom, evaluation and research in the communication of evolutionary principles to all audiences). The *Series* aims at translating complex and technical research –conducted by specialized scholars— into documents that can be understood and used by other scholars in academia, professionals outside academia, communicators of science, and educators to disseminate knowledge, promote evolution literacy and the public understanding of science.

Although authors can propose themes and manuscripts for potential publication, most contributions to the *Series* are by invitation to specialists in the fields listed above. For consultation about potential article contributions to the *Series*, send statement of interest and rationale to ***editor_NE_SciPublic@rwu.edu***

Publisher New England Center for the Public Understanding of Science, Roger Williams University, One Old Ferry Road, Bristol, Rhode Island 02809, United States, ***NE_SciPublic@rwu.edu*** phone (401) 254-3137

NE Science

Public

...an initiative for the public understanding of science

New England Science Public: Series Evolution
ISSN 2326-0971