Community College Students' Understanding and Perceptions of Evolution

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Spring 2022

ACKNOWLEDGEMENTS

To my family, I owe an enormous amount of thanks for their support and love through my time in master's school. To the Social Perceptions of Science Lab, I thank them for their time and devotion to biology education research. Finally, I thank Dr. John Dubois and his support for the six years of schooling that lead me to three degrees, two theses, and a love for botany. Without these people I would not be where I am today.

"For truly, I say to you, if you have faith like a grain of mustard seed, you will say to this mountain, 'Move from here to there,' and it will move, and nothing will be impossible for you."

Matthew 17:20

ABSTRACT

Learning about evolution is a foundational part of introductory biology education (Brownell et al., 2014). In evolution education research, most studies are conducted at four-year universities, leaving community colleges understudied. Our study investigates the understanding and acceptance of evolution of community college compared to university students and what factors are related to community college student evolution acceptance. We conducted a survey of 2288 university students and 202 community college students in Arizona and California. The survey included questions about interest in evolution, along with understanding and acceptance of microevolution, macroevolution, and human evolution. We ran multiple linear regressions controlling for state and major to identify potential differences between community college and university students. Community college students had a similar interest, but lower understanding of evolution compared to university students. Community college students also had a lower acceptance of microevolution and human evolution and a higher perceived conflict with evolution and their religion. Unlike among university students, community college student understanding of evolution is not associated with acceptance of human evolution or macroevolution, but we found the strongest factor relating to all three is religiosity. Instructors moving forward could use Religious Cultural Competence in Evolution Education (ReCEE) to help increase student acceptance and understanding of evolution at community colleges.

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INTRODUCTION

Evolution is a foundational concept in introductory biology. It can be found among the five main learning concepts of college biology: structure and function; information flow, exchange, and storage; pathways and transformations of energy and matter; systems; and evolution (Brewer et al., 2011). These concepts are fundamental in the building blocks of biology education, but what is often overlooked in biology education is the difference between understanding and acceptance of the core concept of evolution.

Evolution is considered a controversial subject among students in introductory biology classes (Brem et al., 2003; Sinatra et al., 2003). Evolution can be seen as contradictory to student religious or cultural beliefs, which can lead to a student's discouragement in understanding or acceptance (Barnes et al., 2021; Dunk & Wiles, 2018). While a student may understand evolution, it does not mean that the student accepts the concept as true (Hermann, 2012). Students may also accept and understand some aspects of evolution, but not others. For instance, students tend to accept microevolution (small changes in populations overtime) more than macroevolution (the evolution of different species) and human evolution (Barnes, Dunlop, et al., 2020; Barnes, Supriya, et al., 2020). In evolution education, understanding refers to a student's ability to comprehend the subject and know the meaning of evolutionary concepts. In contrast, acceptance refers to whether a student thinks that evolution is a biological reality. It has been found that students can understand evolution without completely accepting the concept as true (Barnes et al., 2021; Hermann, 2012). Be that as it may, even high school teachers who are required to teach evolution struggle with acceptance and understanding of the subject. Some teachers feel uncomfortable teaching the subject because of their own personal religious beliefs

and worries about offending students during instruction (Griffith & Brem, 2004). Some teachers may have low levels of evolution acceptance and understanding themselves (Nehm et al., 2009).

Dozens of studies have explored university students' evolution acceptance and factors influencing their acceptance. However, studies on community college students are more often observational and do not make comparisons to university students. These descriptive studies look at student attitudes towards learning evolution (Dorner & Scott, 2016; Flower, 2006), how cultural border crossing intervention may influence student evolution acceptance (Green & Delgado, 2021), and address religious background and belief in creationism's effect on performance in biology and evolution education (McKeachie et al., 2002). They do not often compare evolution understanding and acceptance of community college students to university students. Additionally, these studies on community college student perceptions of evolution are often only in one geographic region. Religious demographics are a major factor of evolution acceptance and religious populations are variable in different geographic regions, making geographic region an important factor impacting results. Yet, the acceptance and understanding of evolution of university students has been well studied. University students have reported perceived conflict between their religious identities and acceptance of evolution during evolution instruction (Barnes, Truong, et al., 2017; Winslow et al., 2011). Researchers have also found that the factors influencing evolution acceptance in university students are religious background and perceived conflict with religion and evolution more than their religiosity, religious affiliation, understanding of evolution, and demographics (Barnes et al., 2021). Interestingly, the data found about the relationship between understanding and acceptance of evolution in university students is inconsistent. Some studies have shown that there is a strong relationship between a student's understanding and acceptance (Dunk et al., 2017; Lombrozo et al., 2008; Rutledge & Warden,

2000; Trani, 2004) while others have shown there is little or no relationship (Athanasiou & Papadopoulou, 2012; Cavallo et al., 2011; Griffith & Brem, 2004; Sinatra et al., 2003). However, in these studies, researchers have chosen different evolution surveys. This leaves uncertainty in the comparability of the studies. To that same end, community college and university populations tend to be dissimilar, leaving researchers to wonder the comparability and application of university studies to community college student populations (Schinske et al., 2017). Presumably, there are no studies that have explored factors that influence evolution education outcomes in community college introductory biology populations.

Community college student populations are more demographically diverse than university student populations. They are found to have a higher average age, are more likely to be first generation students, are more likely to identify as Black, Hispanic, or indigenous, and are more likely to come from a lower socioeconomic backgrounds (AACC, 2021). These demographic characteristics tend to be associated with a lower understanding and acceptance of evolution. Students with parents that have a lower education background tend to have a lower acceptance of evolution (Barnes et al., 2019). Students of color, particularly Black students, trend towards a lower acceptance of evolution due to higher religiosity among this population (Barnes et al., 2020; Sbeglia & Nehm, 2019). The research that has been done about university students in evolution education may not be transferable to community college students as a result of these demographic differences.

About fifty percent of four-year university students attended community college (AACC, 2021), however they are rarely included in biology education research. A majority of students who attend community college are underrepresented minorities, including Black, Hispanic, and indigenous persons (Schinske et al., 2017). Because evolution is one of the five foundational

concepts of biology, it is an imperative subject needed for moving forward to upper division biology courses at university. More and more in curriculum development, instructors are being asked to base their classroom practices on evidence. The rarity of community college student research has made it difficult for instructors to develop curriculum that is relevant to their student population. This study can be used by community college instructors to develop evolution instruction with relevant literature.

CURRENT STUDY

This study looks at how evolution acceptance, understanding, interest, and perceived conflict with religion may be different between community college and university student populations. This study also explores whether religiosity and understanding of evolution are related to evolution acceptance among community college students, and whether the variables that affect university student acceptance of evolution are related to community college student acceptance of evolution. The results may help inform community college instruction about evolution.

Research Questions

1. To what extent is interest in evolution, understanding of evolution, acceptance of evolution, and perceived conflict with evolution and students' religions different between community college and university students?
2. To what extent is community college students' understanding of evolution and their religiosity related to their evolution acceptance?

METHODS

Survey Context and Population

The data in this study was collected from a larger nationwide study looking into the influence of instructor use of Religious Cultural Competence in Evolution Education (ReCCEE) on student evolution outcomes. Cultural competence is the ability of persons of different cultures to communicate to one another effectively and ReCCEE provides a framework meant to help secular instructors teach evolution to students of faith (Barnes & Brownell, 2017). The ReCEE framework includes practices to help reduce perceived conflict between a student and their religious identity. We collected data in over 14 states for the larger study. However, the data collection included both community college and university students in similar geographic regions and this gave us the opportunity to do an exploratory analysis of potential differences between these populations. Therefore, pre-instruction data was used to compare the differences between the two populations.

In similar geographic regions of central Arizona and northern California, we surveyed 202 community college students and 2,288 university students between the fall of 2018 and fall of 2020. We compared the responses from the community college students to the responses of the university students. Students surveyed came from 15 introductory biology courses (seven community college and eight university; 11 major's and four non-majors). The community college students surveyed often transfer to the universities found in the same geographic region of the sample. In an effort for students to easily transfer credits from community college to university, the community colleges and universities of this study have articulation agreements that are designed to be equivalent to introductory courses at both institutions. **Table 1**

demonstrates a breakdown of the characteristics of each course, along with the sample size and response rate.

Instructors asked students to complete the online survey before any instruction about evolution and were awarded extra credit as an incentive to complete it. Students following the link to the survey completed a consent form. Students were told that their responses would be kept confidential and would not be seen by an instructor. Skipping questions was allowed. The survey took approximately ten minutes to complete. All activities were approved by Arizona State University's Institution Review Board protocol 8191.

Table 1: Characteristics of each course sampled for this study.

Course	Institution Type	State	Majors	n	Response Rate
1	Community College	AZ	Majors	79	87%
2	Community College	AZ	Majors	48	50%
3	Community College	CA	Majors	18	60%
4	Community College	CA	Majors	17	85%
5	Community College	CA	Majors	4	17%
6	Community College	CA	Majors	19	73%
7	Community College	CA	Nonmajors	17	57%
8	University	AZ	Majors	115	74%
9	University	AZ	Majors	110	70%
10	University	AZ	Majors	126	79%
11	University	AZ	Nonmajors	388	90%
12	University	AZ	Nonmajors	128	48%
13	University	AZ	Nonmajors	179	56%
14	University	CA	Majors	171	55%
15	University	CA	Majors	1071	82%

Survey Measures

The variables measured in this study include interest in evolution, understanding of evolution, acceptance of evolution, and a student's perceived conflict between evolution and their religion.

Other demographic variables collected in the survey include parental education level, religiosity, whether the student was a biology major, gender, age, and race/ethnicity, which were all presented at the end of the survey. Information was also collected about religious denomination. Survey questions can be found in **Appendix I**. Each measure used in the analyses is described below in the order presented in the survey.

Interest in Evolution

We measured student interest in evolution because it has been found that academic interest develops a more motivating and engaging learning environment for students (Harackiewicz et al., 2016; Hidi & Harackiewicz, 2000). In our study, interest is defined by the extent to which students are aspiring to pursue coursework, research, or careers related to evolution. Using a previously published instrument with validation evidence, we measured student interest in evolution (Barnes, Roberts, et al., 2021). To determine the extent to which they are interested, students were asked to evaluate the following on a scale of 0 (not at all) to 10 (very much): if they would be interested in (1) taking a course about evolution, (2) conducting undergraduate research in evolution, (3) involving evolution in their career path, and (4) becoming an evolutionary biologist ($\alpha = 0.88$).

Understanding of Evolution

The understanding of evolution can be defined as a student's proper conceptual grasp on evolutionary theory and their ability to answer questions about evolutionary theory appropriately. From the previously published Evolutionary Attitudes Literacy instrument (EALS), we used two subscales to measure students' evolution understanding (Hawley et al., 2011). This survey gave true or false based questions, with an "I don't know enough to answer" option to avoid

answering correctly by guessing. The percentage of correct answers was the score for a student's understanding of evolution.

EALS has been used by other evolution education studies (Dunk et al., 2017) and shown reliability and validity evidence among college students (Hawley et al., 2011). In the items of this survey, evolution understanding and evolution acceptance do not seem to conflate (Barnes et al., 2019), a significant criticism of many evolution understanding instruments in evolution research. ($\alpha = 0.59$, which is typically considered acceptable for a test that measures content knowledge of a domain (see, e.g., (Carlson et al., 2010), pp. 136–138)).

Acceptance of Evolution

Compared to evolution understanding, evolution acceptance specifically indicates whether a student sees evolution as a scientifically valid concept. Though a student may understand evolution, it is possible that they do not accept evolution (Hermann, 2012). A student's acceptance of evolution can be different for microevolution, macroevolution, and human evolution (Barnes, Dunlop, et al., 2020; Nadelson & Southerland, 2012; Sbeglia & Nehm, 2019). The Inventory of Student Evolution Acceptance (I-SEA), which has previous validity evidence for university students, was used in our survey to measure the three different constructs of evolution acceptance (Nadelson & Southerland, 2012; Sbeglia & Nehm, 2019). The constructs used a five-point Likert scale based question scheme with eight items by which a student agreed or disagreed. (α (microevolution) = 0.83); (α (macroevolution) = 0.84); (α = (human evolution) = 0.90).

Perceived Conflict and Religious Affiliation

We used a recently published study about students' perceived conflict between their personal religion and evolution (Barnes et al., 2021) in our study to measure perceived conflict. This survey has four constructs within perceived conflict of a student's religion and evolution. The four constructs included perceived conflict with their belief in God and evolution, perceived conflict with their religious beliefs and evolution, perceived conflict with their religious teachings and evolution, and perceived conflict about evolution within their religious community. In each category, each student was asked a Likert-scale based question and asked to respond from (1) strongly disagree to (5) strongly agree. Students were also asked to report their religious affiliation. This section of the survey was only presented to students who indicated that they were religious since the items are only valid for students with religious beliefs. (α (perceived conflict with God) = 0.94); (α (perceived conflict with beliefs) = 0.94); (α (perceived conflict with teachings) = 0.94); (α (perceived conflict within religious community) = 0.95).

Religiosity

We measured religiosity using a survey previously published with validity evidence for university students (Cohen et al., 2008). In this measure, a student's religiosity is defined by survey items determining the strength of their religious identity and their degree of participation in religious activities. Each question item was based on a Likert scale from 1 (strongly disagree) to 5 (strongly agree). Every student's composite average score was calculated from the four items ($\alpha = 0.87$).

Demographics

Students were also asked to complete a demographic portion of the survey that reported race/ethnicity, age, gender, and parental education status. Questions can be found in **Appendix I.**

Analyses

In the analyses, only complete student survey responses were used with less than 5% of the data missing for each item. The analysis was completed using SPSS Version 26, and the data and syntax are included in the **Appendix I**. Significance was determined if $p < 0.05$. However, p-values can be misleading as a result can be statistically significant, yet not meaningful. We have provided violin plots to illustrate the distribution of data among community college students and university students for each outcome variable. For each variable of interest, we reported unstandardized coefficients and p-values. Full regression tables with coefficients, p-values, and confidence intervals for all variables in the analyses can be found in the **Appendix I**.

We used multiple linear regressions to investigate differences between community college and university students, as we can control for potentially confounding variables of state and major. We controlled for state because populations in Arizona tend to have lower acceptance of evolution compared to populations in California. We also controlled for major because biology majors tend to have a higher acceptance of evolution then non-majors. Outcome variables included microevolution acceptance, macroevolution acceptance, human evolution acceptance, understanding of evolution, perceived conflict with religious beliefs and evolution, perceived conflict with belief in God and evolution, perceived conflict with religious teachings and evolution, and perceived conflict in one's religious community about evolution.

Full regression equations are below:

interest in evolution ~ state + major + institution type

microevolution acceptance ~ state + major + institution type

macroevolution acceptance ~ state + major + institution type

human evolution acceptance ~ state + major + institution type

conflict with religious beliefs ~ state + major + institution type

conflict with religious community ~ state + major + institution type

conflict with belief in God ~ state + major + institution type

conflict within religious teachings ~ state + major + institution type

Since university and community colleges usually differ on their demographics, we wanted to see if this was also true among our sample. So, we ran binary logistic regressions to determine demographic differences between community college students and university students in our sample. These regressions included student race/ethnicity (Asian, BIPOC, multiracial, and white (reference group)), parental education (no college (reference group), some college- no four year degree, and four-year degree or higher), religiosity, religion (no religion (reference group), other religion, and Christian), age, and gender (woman and man (reference group)) as predictor variables and whether the student was in community college as the predictor. Our regression equation was:

institution type ~ race + parent education + religiosity + religious affiliation + age + gender

To determine the relationships between evolution acceptance, religiosity, and understanding of evolution, we selected only for community college students, and we ran linear regressions with microevolution, macroevolution, and human evolution acceptance as outcome variables with student evolution understanding and religiosity as predictors. State was used as a control variable to avoid confounding variables. This process was repeated with only university students selected. The regression equations were as followed:

microevolution acceptance ~ evolution understanding + religiosity + state + major

macroevolution acceptance ~ evolution understanding + religiosity + state + major

human evolution acceptance ~ evolution understanding + religiosity + state + major

We performed regression diagnostics to make sure statistical assumptions of this method (i.e., the error term follows an independent identical normal distribution with constant variance) were adequately met and ensuring the fitted linear model results adequately represent the data (i.e., checking linearity, multicollinearity, and influential points (Kutner et al., 2005)).

RESULTS

Population

Of the population that completed the survey from California and Arizona, 202 were community college students and 2,288 students were university students. When looking at gender, 65.5% identified as women, 32.7% identified as men, and 1.0% identified as non-binary and 0.2% identified as other. As for race and ethnicity, 32.2% of students identified as white, 31.1% of students identified as Asian, 25.0% of students identified as Black, Hispanic, or Indigenous, and 11.6% of students identified as multiracial. When surveyed for religious affiliation, 39.7% identified with no religion, while 39.9% identified with Christianity, 15.9% identified with another religion, and 4.5% decline to state their religious affiliation. Students in this survey were both biology majors and non-majors, with 63.9% identifying with biology as their major and 36.1% identifying with a different major.

Community college students in our sample were more likely to identify as Black, Hispanic, or Indigenous, albeit, less likely to identify as Asian. Compared to university students, they were more likely to associate with a religion other than Christianity and identify as first-

generation students. In terms of age, community college students were found to be notably older. Community college and university students were not significantly different in levels of gender or religiosity. **Table 2** specifically breaks down community college and university students by demographics.

Table 2: Demographics of students disaggregated by whether they attend university or community college and results of binary logistic regressions predicting community college attendance.

	University % (n = 2288)	**Community College % (n = 202)**
Race/ethnicity		
*Asian	32.5%	9.4%
*Black/Hispanic/Indigenous	23.2%	38.6%
multiracial	11.1%	13.9%
[ref]white	31.8%	35.6%
[a]no answer	2.1%	2.5%
Gender		
woman	65.1%	69.8%
[ref]man	33.6%	29.9%
[a]non-binary	1.1%	0%
[a]other	0.2%	0%
[a]no answer	0.6%	0.5%
Religion		
Christian	39.6%	44.1%
*other religion	16.5%	8.9%
[ref]no religion	39.6%	40.1%
[a]no answer	4.3%	6.9%
Parent Education		
*no college	21.2%	33.2%
*some college	16.7%	30.2%
[ref]Bachelor's or higher	60%	34.2%
[a]no answer	2.1%	2.5%
Continuous variables		
*mean age (SD)	19.17 (4.23)	22.61 (5.38)
mean religiosity (SD) range = 1-5	2.97 (1.10)	2.97 (1.11)

*community college students were found to be statistically significantly different from university students in binary logistic regressions ($p < .05$)
[ref]reference group in binary logistic regression predicting attendance at community colleges
[a]groups were not included in binary logistic regressions due to low sample size

Finding 1: Community college and university students had a similar level of interest in evolution; however, community college students displayed a lower understanding of evolution.

In this study, community college students demonstrated a similar level of interest in evolution compared to university students ($\beta = -.015$, $p = .478$). Community college students scored ~8% lower compared to university students on their understanding of evolution ($\beta = -.080$, $p = 0.000$). **Figure 1** illustrates the distribution of evolution interest and evolution understanding score by institution type.

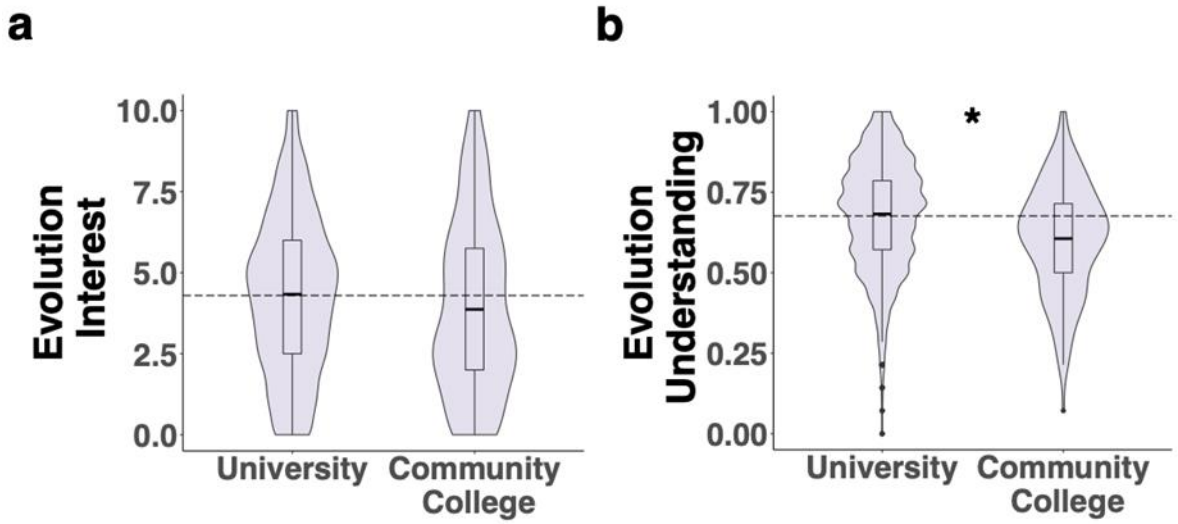

Figure 1: Violin plots of students' (a) interest in evolution (n (university) = 2,098; n (community college) = 181) and (b) evolution understanding (n (university) = 2,288; n (community college) = 200) broken down by institution type. The shape of the violin shows the density distribution for the data at that point on the y-axis. The average of the data is represented by the horizontal line, and boxplot represents the upper and lower quartiles. *$p < 0.05$ determined by linear regression

Although community college and university students in our sample may be similarly interested in taking evolution courses, doing evolution research, and including evolution in their career path, these results show that community college students may have a lower understanding of evolution compared to university students in their introductory biology courses.

Finding 2: Community college students have a slightly lower acceptance of microevolution and human evolution as compared to university students but display a similar level of macroevolution acceptance.

In this model, community college students in our sample displayed a slightly lower acceptance of microevolution ($\beta = -0.088$, $p = 0.031$, CI = -0.167, -0.008) and human evolution ($\beta = -0.111$, $p = 0.046$, CI = -0.219, -0.002). For macroevolution acceptance, differences between community college and university students did not reach statistical significance ($\beta = -0.049$, $p = 0.277$, CI = -0.137, 0.039). **Figure 2** illustrates the distribution of microevolution, macroevolution, and human evolution acceptance by institution type.

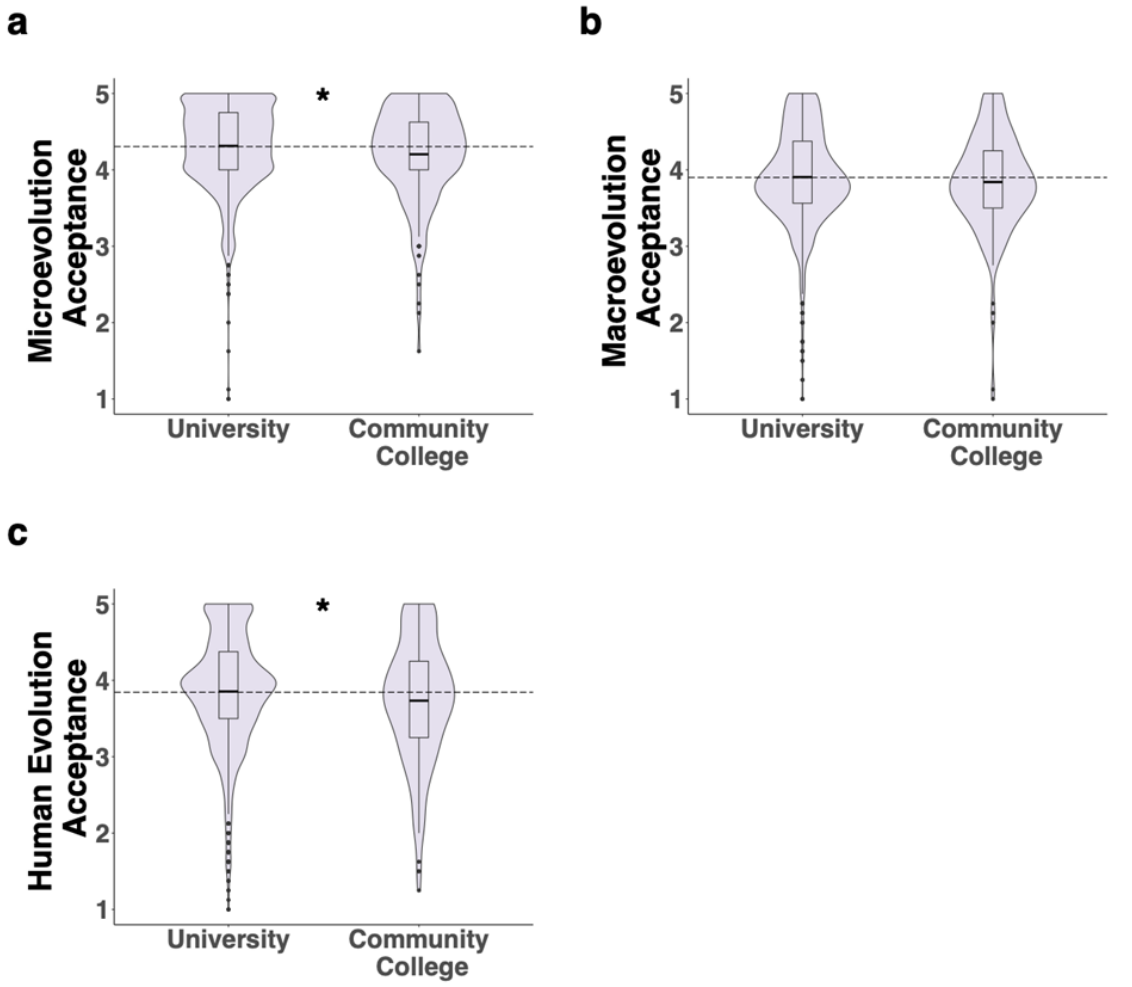

Figure 2: Violin plots of students' scores of (a) microevolution acceptance (n (university) = 2,285; n (community college) = 201), (b) macroevolution acceptance (n (university) = 2,285; n (community college) = 202), and (c) human evolution acceptance (n (university) = 2,286; n (community college) = 202), separated by institution type. The shape of the violin shows the density distribution for the data at that point on the y-axis. The average of the data is represented by the horizontal line, and boxplot represents the upper and lower quartiles. *$p < 0.05$ determined by linear regression

Although the community college students in our sample displayed a slightly lower acceptance of evolution compared to the university students in our sample, the differences were small and not statistically significant for macroevolution acceptance.

Finding 3: Community college students perceive more conflict with their religious beliefs in their religious communities about evolution as compared to university students.

In all four measures of perceived conflict between evolution and religion, community college students had a higher average score compared to university students. Community college students had a statistically significant higher perceived conflict with evolution in both their religious beliefs ($\beta = 0.195$, $p = 0.035$, CI = 0.014, 0.376) and religious community ($\beta = 0.220$, $p = 0.021$, CI = 0.033, 0.407). The analyses for perceived conflict between evolution and religious teachings ($\beta = 0.179$, $p = 0.067$, CI = -0.012, 0.371) and perceived conflict between evolution and their belief in God ($\beta = 0.139$, $p = 0.129$ CI = -0.040, 0.318) were on average higher, but these differences were not statistically significant. **Figure 3** illustrates the distribution of perceived conflict by institution type.

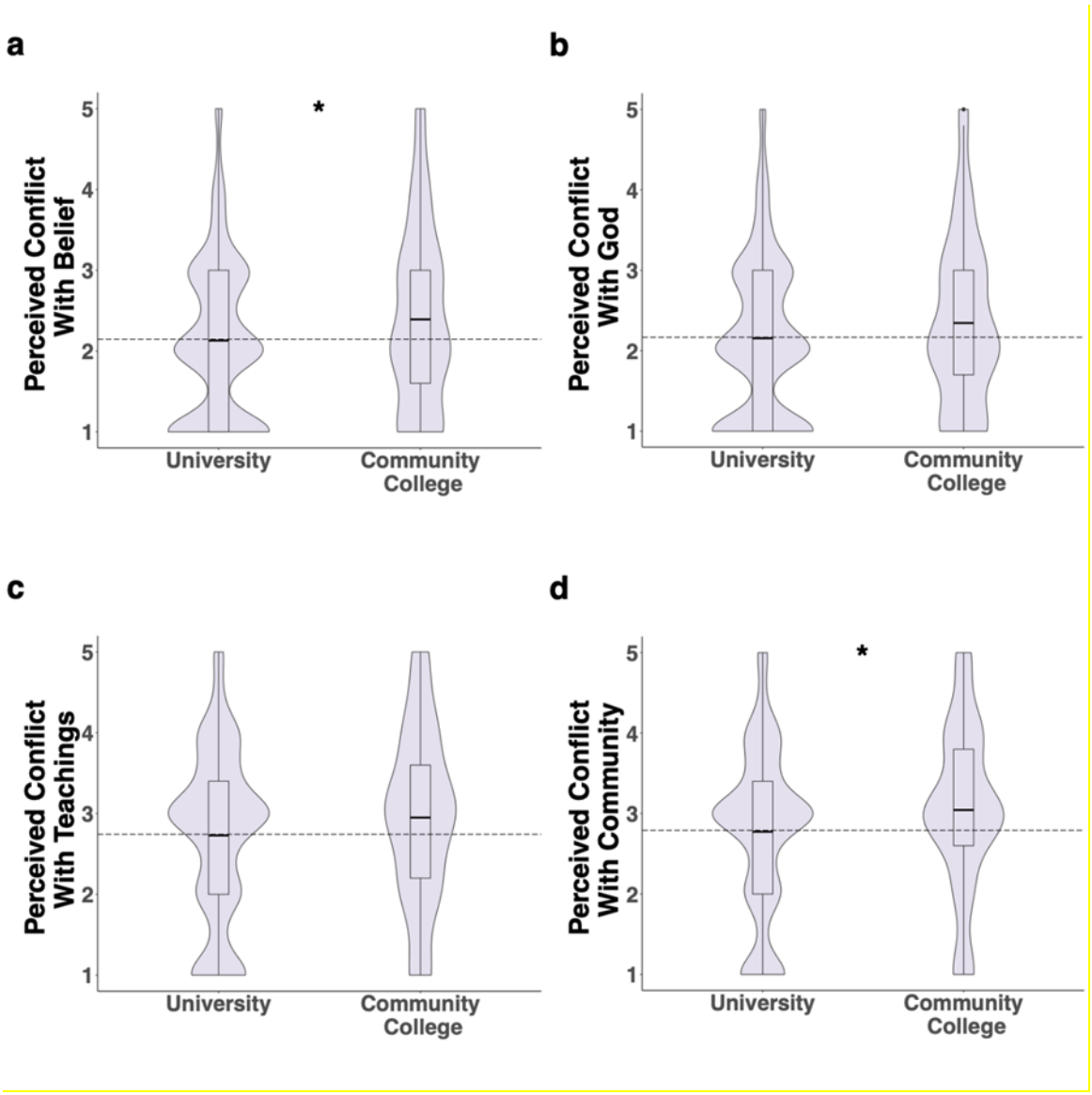

Figure 3: Violin plots of students' perceived conflict with evolution and (a) their religious beliefs (n (university) = 1,818; n (community college) = 123), (b) their belief in God (n (university) = 1,816; n (community college) = 124), (c) their religious teachings (n (university) = 1,817; n (community college) =124) and (d) within their religious community (n (university) = 1,818; n (community college) = 124) separate by institution type. The shape of the violin shows the density distribution for the data at that point on the y-axis. The average of the data is represented

by the horizontal line, and boxplot represents the upper and lower quartiles. *$p < 0.05$ determined by linear regression

Community college students in our sample showed to have slightly higher levels of perceived conflict with evolution and their religion, but these differences were minute. In tandem, the differences in conflict with evolution and belief in God along with conflict with evolution and religious teachings were not found to be statistically significant.

Finding 4: Community college student understanding of evolution is not associated with acceptance of human evolution or macroevolution. The strongest factor relating all three evolution acceptance constructs is religiosity.

Considering community college students only, the factors related to acceptance of evolution displayed that understanding of evolution was not related to human evolution acceptance ($\beta = 0.310$, $p = 0.295$, CI = -0.272, 0.893), or macroevolution acceptance ($\beta = 0.036$, $p = 0.883$, CI = -0.439, 0.510). However, evolution understanding showed to be related to microevolution acceptance ($\beta = 0.609$, $p = 0.014$, CI = 0.125, 1.092). This contrasts what was found for university students in our sample, wherefrom understanding of evolution was related to their human evolution acceptance ($\beta = 1.064$, $p < 0.000$, CI = 0.905), macroevolution acceptance ($\beta = 0.922$, $p < 0.000$, CI = 0.788, 1.055), and microevolution acceptance ($\beta = 1.025$, $p < 0.000$, CI = 0.904, 1.146). Similarly, for community college and university students, religiosity showed to be the strongest factor related to human evolution acceptance ($\beta = -0.348$, $p < 0.000$, CI = -0.440, -0.256), macroevolution acceptance ($\beta = -0.232$, $p < 0.000$, CI = -0.307, -0.157), and

microevolution acceptance (β = -0.120, p = 0.002, CI = -0.197, -.0044). **Table 3** displays regression coefficients of each factor for community college and university students.

	Human Evolution Acceptance		Macroevolution Acceptance		Microevolution Acceptance	
	Community College	University	Community College	University	Community College	University
State	-0.064	0.029	-0.104	-0.009	-0.044	0.006
Evolution Understanding	0.337	1.067*	0.078	0.926*	0.634*	1.033*
Religiosity	-0.354*	-0.248*	-0.241*	-0.156*	-0.125*	-0.077*

Table 3: Unstandardized beta coefficients from regressions predicting acceptance of human evolution, macroevolution, and microevolution among community college and university students only. *p < 0.05.

In this finding, acceptance of microevolution can be positively predicted by evolution understanding in community college students, but evolution understanding does not significantly infer acceptance of human evolution and macroevolution. In university students, it can be seen that evolution understanding and religiosity were related to acceptance of macroevolution, microevolution, and human evolution.

DISCUSSION

This study is the first in biology education research that directly compares community college and university student understanding and acceptance of evolution and explores factors of influence. We discovered there to be some similarities between the two populations of students

and some differences that may be important for the creation of religiously inclusive curriculum by community college instructors.

As the results displayed, students in community colleges had a similar level of interest in evolution as university students. Additionally, community college students were only slightly less accepting and understanding of evolution. This could mean that community college educators can potentially use university student studies to understand community college students' evolution interest, understanding, and acceptance. However, they must use caution in the creation of their curriculum based on their geographic region as religiosity is found to be different in different parts of the country.

We found that the variables looked at in this study affect the populations of the two institutions differently. For community college students, religiosity was a strong predictor of their acceptance of microevolution, macroevolution, and human evolution. Jointly, perceived conflict with religion was found to be higher for community college students compared to university students. Acceptance of microevolution, macroevolution, and human evolution were all found to be related to evolution understanding for university students, but evolution understanding for community college students was not related to macroevolution or human evolution acceptance. Given the results, having discussions about how evolution and religion don't have to be in conflict may benefit community college students. In our study, the perceived conflict scale cannot be used as a variable to predict acceptance because the sample size (n=123). Be that as it may, it has been found that perceived conflict is the biggest factor influencing university evolution acceptance (Barnes, Supriya, et al., 2021). As community college students have displayed a higher perceived conflict with religion and evolution, this population of students may benefit from forthright conversation about the compatibility of the two concepts.

Religious Cultural Competence in Evolution Education (ReCEE) is recommended to embolden biology instructors who are not very religious to become better at teaching students who are religious and reduce perceived conflict with evolution (Barnes & Brownell, 2017). By using this teaching methodology, instructors can help students recognize their personal perceived conflict, and may come to a conclusion that their conflict may simply be misunderstanding. Real conflict would be the belief that God/god(s) created species separate from one another. This ideology contradicts the evolutionary theory stating there is one common ancestor. However, there are also many examples of perceived conflict that students think is real but is not. Roughly half of student believe that you must be an atheist to accept evolution (Barnes, Dunlop, et al., 2020). What is often unexplained is that science and evolution are agnostic in terms of religion and the supernatural, not atheistic. Similarly, students that believe evolution is a system created by God do not hold a perceived conflict with evolution. Many students do not know their religion's position on evolution, when many religions are either supportive or neutral on the subject (Manwaring et al., 2015). A manner of relief in a student's perceived conflict is including examples of religious evolutionary biologists and religious leaders in evolution instruction (Barnes, Elser, et al., 2017; Holt et al., 2018). These changes to evolution instruction have shown to be effective for university student perceived conflict and may show to be especially effective for community college students due to their higher perceived conflict and strong religiosity. Evidence that culturally competent practices are effective with community college students exists. One study used culturally competent practices, discovering the instruction was effective at increasing acceptance and understanding of evolution while compared to a classroom that did not received culturally competent instruction (Green & Delgado, 2021). It has also been found that

instructors at Christian institutions, whether at a community college or 4-year university, are less likely to use culturally competent practices (Barnes & Brownell, 2016, 2018).

Limitations

In this study, the student population was found in only two states in the southwest and west coast. The results may not be comparable for students found in other regions of the United States, especially students in the southeast where religiosity is higher. Additionally, the sample size of the community college student population was low, though it was adequate to determine differences between the institution populations. For the perceived conflict measure it was a particularly small sample size and may not have had the power needed to achieve some significant differences. In turn, the sample size prevented us from testing the association of perceived conflict with religion and evolution on evolution acceptance for both the community college and university student populations. Because of the small class sizes of community college classes, we would need to survey from more than the fifteen classes that were surveyed for this study. This demonstrates one of the obstacles of collecting quantitative research on community college students. Accordingly, it displays the need for more community college research collaborations.

CONCLUSION

In our study, we found that there are both similarities and differences between community college and university student acceptance and understanding of evolution. These findings can be used to guide community college instructors in the creation of inclusive curriculum. We found that interest in evolution is similar for community college and university students and that there are some differences in their acceptance and understanding of evolution, though they are small. Community college students showed to have a higher perceived conflict with their religion and

evolution as compared to university students. However, their understanding was not found to be related to their acceptance of macroevolution and human evolution, unlike university students. The religiosity of community college students presented as strongly related to their acceptance of evolution. The results of our study show that community college and university students can have a low acceptance and understanding of evolution but have different variables that affect their perception of evolution. Moving forward, instructors could use Religious Cultural Competence in Evolution Education (ReCEE) to reduce conflictual student perception. An area of future study in evolution education research is the role of perceived conflict with religion and race/ethnicity in community college student acceptance and understanding of evolution.

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APPENDIX I

Survey questions analyzed

Survey

Understanding of Evolution

This portion of the survey is meant to determine how much you understand about current evolutionary theory as proposed by scientists. Please answer the following questions based on your understanding of evolution.

Please choose whether each statement is true, false, or you don't know enough to answer based on your **understanding of evolution**:

1. Individuals don't evolve, species do.
2. Evolution is a progression towards more advanced species.
3. Mutations occur all the time.
4. Species evolve to be perfectly adapted to their environments.
5. In most groups of organisms, more offspring are born than survive.
6. Mutations can be passed down to the next generation.
7. More genetic variability makes a population more resistant to extinction.
8. Natural selection is the same thing as evolution.
9. The characteristics an organism acquires during their lifetime are often genetically passed down to their offspring.
10. Natural selection is the only cause of evolution.
11. The more recently species share a common ancestor, the more closely related they are.
12. Evolution means progression towards perfection.
13. Natural selection is a random process.
14. Natural selection means that only the smartest and physically strongest organisms survive.

Interest in Evolution

Please rate the following on a scale from 0 (not at all) to 10 (very much):

1. If you could, to what extent would you be interested in taking an elective course on evolution in the future?
2. If you could, to what extent would you be interested in doing research on evolution as an undergraduate?
3. To what extent can you see yourself studying evolution as part of your career?
4. To what extent can you see yourself becoming an evolutionary biologist?

Acceptance of Human Evolution

Please indicate whether you agree or disagree with the following statements, **based on your personal opinion**. (5-pt Likert-scale)

1. I think there is reliable evidence to support the theory that describes how humans were derived from ancestral primates.
2. I think that humans adapt, but they have not/do not evolve.
3. I think that the physical structures of humans are too complex to have evolved.

4. I think that humans and apes share an ancient ancestor.

5. I think that humans evolve.
6. I think that humans do not evolve; they can only change their behavior.
7. I think the many characteristics that humans share with other primates (i.e., chimpanzees, gorillas) can be best explained by our sharing a common ancestor.
8. I think physical variations in humans (i.e., eye color, skin color) were derived from the same processes that produce variation in other groups of organisms.

Acceptance of Macroevolution

Please indicate whether you agree or disagree with the following statements, **based on your personal opinion**. (5-pt Likert-scale)

1. I think that new species evolved from ancestral species.
2. I think that the fossil evidence that scientists use to support evolutionary theory is weak and inconclusive.
3. I think there are a large number of fossils found all around the world that support the ideas that organisms evolve into new species over time.
4. I think all complex organisms evolved from single-celled organisms.
5. I think that new species evolve from a lot of small changes occurring over relatively long periods of time.
6. I think there is little or no observable evidence to support the theory that describes how one species of organism evolves from a different ancestral form.
7. I think the forms and diversity of organisms have changed dramatically over time.
8. I think that all organisms come from a single common ancestor.

Acceptance of Microevolution

Please indicate whether you agree or disagree with the following statements, **based on your personal opinion**. (5-pt Likert-scale)

1. I think that organisms, as they exist now, are perfectly adapted to their natural environments and so will not continue to change.
2. I think all groups of organisms will continue to change.
3. I think there are a large number of examples of organisms that have undergone evolutionary changes within the species (i.e., antibiotic resistance in bacteria, production of new strains of the flu virus).
4. I think that species were created to be perfectly suited to their environment, so they do not change.
5. I don't accept the idea that a species of organism will evolve new traits over time.
6. I think there is an abundance of observable evidence to support the theory describing how variations within a species can happen.
7. I think that species exist today in exactly the same shape and form in which they always have.
8. I think there is overwhelming evidence supporting the theory of evolution to explain how variations in a species develop over time.

Perceived Conflict

The following questions are meant to help us understand the extent to which your religious beliefs and religious culture may disagree with aspects of evolution. There are no right or wrong answers to these questions. We are only interested in your genuine experience so that we can improve biology education for all students. (5-pt Likert-scale)

1. My belief in God makes it harder to believe that all of life on Earth evolved from ancient microscopic life.
2. My belief in God makes it harder to believe that humans evolved from ancient ape ancestors.
3. My belief in God makes it harder to believe that non-human life evolved from previous different species.
4. My belief in God makes it harder to believe that humans have changed over time due to evolution.
5. My belief in God makes it harder to believe that non-human life has changed over time due to evolution.
6. The teachings of my religion contradict that all of life on Earth evolved from ancient microscopic life.
7. The teachings of my religion contradict that humans evolved from ancient ape ancestors.
8. The teachings of my religion contradict that non-human life evolved from previous different species.
9. The teachings of my religion contradict that humans have changed over time due to evolution.
10. The teachings of my religion contradict that non-human life has changed over time due to evolution.
11. My religious community does not believe that all of life on Earth evolved from ancient microscopic life.
12. My religious community does not believe that humans evolved from ancient ape ancestors.
13. My religious community does not believe that non-human life evolved from previous different species.
14. My religious community does not believe that humans have changed over time due to evolution.
15. My religious community does not believe that non-human life has changed over time due to evolution.
16. My personal religious beliefs make it harder to believe that all of life on Earth evolved from ancient microscopic life.
17. My personal religious beliefs make it harder to believe that humans evolved from ancient ape ancestors.
18. My personal religious beliefs make it harder to believe that non-human life evolved from previous different species.
19. My personal religious beliefs make it harder to believe that humans have changed over time due to evolution.
20. My personal religious beliefs make it harder to believe that non-human life has changed over time due to evolution.

Religious Affiliation

I most closely identify as:

- Buddhist
- Christian
- Hindu
- Jewish
- Muslim
- I don't identify with a religion
- Option not available, please describe _____
- Prefer not to answer

If “I don’t identify with a religion” is chosen:

- I most closely identify as:
- Atheist (believes that God does not exist)
- Agnostic (does not have a definite belief about whether God exists or not)
- Option not available, please describe: _____
- Prefer not to answer

Religiosity

Please indicate how much you agree or disagree with the following statements: (5-pt Likert-scale)

1. I attend religious services regularly (when they are available)
2. I believe in God
3. I consider myself a religious person
4. I consider myself a spiritual person

Major

Is your major in biology? (includes biomedical sciences, biology and society, conservation biology, genetics, neurobiology/physiology/behavior, microbiology, medical microbiology, molecular bioscience, neuroscience)

- Yes
- No
- I'm not sure (please describe): _____

Gender

I most closely identify as:

- Woman
- Man

- Nonbinary

- Decline to state
- Please describe your gender identity if the best option is not listed: _____

Race/ethnicity:

What is your race/ethnicity? Please select all that apply.

- Asian (East Asian, Southeast Asian, South Asian, West Asian, Middle Eastern)
- Black
- Latinx
- Native American, American Indian, or Alaskan Native
- Native Hawaiian or Other Pacific Islander
- White
- Decline to state
- Option not available, please describe: _____

Full regression tables and omnibus statistics for all analyses conducted

REGRESSIONS FOR DIFFERENCES BETWEEN CC AND UNIVERSITY STUDENTS

Table 1: Summary of linear regression results using evolution understanding as the dependent variable.Adjusted $R^2 = 0.030$, $F (3, 2484) = 26.383$, $p < 0.001$. Variables that are significant at the 0.05 level are bolded.

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
	B	Std. Error	Beta			Lower Bound	Upper Bound
(Constant)	0.685	0.007		98.471	.000	0.671	0.698
Major	0.029	0.007	0.081	4.031	.000	0.015	0.043
State	-0.039	0.007	-0.113	-5.651	.000	-0.053	-0.026
Institution Type	-0.051	0.013	-0.08	-3.983	.000	-0.076	-0.026

Dependent Variable: Evolution Understanding

Table 2: Summary of linear regression results using microevolution acceptance as the dependent variable. Adjusted $R^2 = 0.006$, $F (3, 2482) = 6.240$, $p < 0.001$. Variables that are significant at the 0.05level are bolded.

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
	B	Std. Error	Beta			Lower Bound	Upper Bound
(Constant)	4.292	0.022		194.443	.000	4.248	4.335
Major	0.061	0.023	0.053	2.638	0.008	0.016	0.106
State	-0.04	0.022	-0.037	-1.828	0.068	-0.083	0.003
Institution Type	-0.088	0.04	-0.044	-2.162	0.031	-0.167	-0.008

Dependent Variable: Microevolution Acceptance

Table 3: Summary of linear regression results using macroevolution acceptance as the dependent variable. Adjusted $R^2 = 0.003$, $F (3, 2483) = 3.785$, $p = 0.010$. Variables that are significant at the 0.05level are bolded.

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
	B	Std. Error	Beta			Lower Bound	Upper Bound
(Constant)	3.907	0.025		158.384	.000	3.859	3.955
Major	0.039	0.026	0.031	1.521	0.128	-0.011	0.089
State	-0.06	0.025	-0.049	-2.431	0.015	-0.108	-0.012
Institution Type	-0.049	0.045	-0.022	-1.087	0.277	-0.137	0.039

Dependent Variable: Macroevolution Acceptance

Table 4: Summary of linear regression results using human evolution acceptance as the dependent variable. Adjusted $R^2 = 0.003$, $F(3, 2484) = 2.448$, $p = 0.062$. Variables that are significant at the 0.05level are bolded.

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
	B	Std. Error	Beta			Lower Bound	Upper Bound
(Constant)	3.854	0.03		127.2	.000	3.794	3.913
Major	0.026	0.032	0.016	0.418	0.418	-0.036	0.087
State	-0.036	0.03	-0.024	0.232	0.232	-0.095	0.023
Institution Type	-0.111	0.055	-0.041	0.046	0.046	-0.219	-0.002

Dependent Variable: Human Evolution Acceptance

Table 5: Summary of linear regression results using evolution interest as the dependent variable. Adjusted $R^2 = 0.056$, $F(3, 2275) = 45.794$, $p < 0.001$. Variables that are significant at the 0.05 level arebolded.

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
	B	Std. Error	Beta			Lower Bound	Upper Bound
(Constant)	3.863	0.101		38.073	.000	3.664	4.062
Major	1.054	0.104	0.209	10.129	.000	0.85	1.258
State	-0.441	0.1	-0.091	-4.418	.000	-0.637	-0.246
Institution Type	-0.132	0.185	-0.015	-0.71	0.478	-0.495	0.232

Dependent Variable: Evolution Interest

Table 6: Summary of linear regression results using perceived conflict with God as the dependent variable. Adjusted $R^2 = 0.012$, $F(3, 1936) = 9.138$, $p < 0.001$. Variables that are significant at the 0.05level are bolded.

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
	B	Std. Error	Beta			Lower Bound	Upper Bound
(Constant)	2.099	0.044		47.924	.000	2.013	2.185
Major	-0.045	0.047	-0.022	-0.956	0.339	-0.137	0.047
State	0.208	0.045	0.105	4.613	.000	0.119	0.296
Institution Type	0.139	0.091	0.035	0.519	0.129	-0.04	0.318

Dependent Variable: Perceived Conflict with God

Table 7: Summary of linear regression results using perceived conflict with religious beliefs as the dependent variable. Adjusted $R^2 = 0.022$, $F(3, 1937) = 15.272$, $p < 0.01$. Variables that are significant at the 0.05 level are bolded.

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
	B	Std. Error	Beta			Lower Bound	Upper Bound
(Constant)	2.065	0.044		46.918	.000	1.978	2.151
Major	-0.065	0.047	-0.031	-1.386	0.166	-0.157	0.027
State	0.265	0.045	0.132	5.855	.000	0.176	0.354
Institution Type	0.195	0.092	0.148	2.115	0.035	0.014	0.376

Dependent Variable: Perceived Conflict with Belief

Table 8: Summary of linear regression results using perceived conflict between evolution and religious teachings as the dependent variable. Adjusted $R^2 = 0.011$, $F(3, 1937) = 7.982$, $p < 0.001$. Variables that are significant at the 0.05 level are bolded.

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
	B	Std. Error	Beta			Lower Bound	Upper Bound
(Constant)	2.654	0.047		56.682	.000	2.563	2.746
Major	-0.015	0.05	-0.007	-0.306	0.76	-0.113	0.083
State	0.205	0.048	0.097	4.269	.000	0.111	0.3
Institution Type	0.179	0.098	0.042	1.835	0.067	-0.012	0.371

Dependent Variable: Perceived Conflict with Teachings

Table 9: Summary of linear regression results using students' perceived conflict with evolution among their religious community as the dependent variable. Adjusted $R^2 = 0.023$, $F(3, 1938) = 76.797$, $p < 0.001$. Variables that are significant at the 0.05 level are bolded.

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
	B	Std. Error	Beta			Lower Bound	Upper Bound
(Constant)	2.657	0.046		58.183	.000	2.568	2.747
Major	-0.005	0.049	-0.022	-0.099	.921	-0.101	0.091
State	0.292	0.047	0.141	6.230	.000	0.200	0.385
Institution Type	0.220	0.095	0.052	4.176	.021	0.033	0.407

Dependent Variable: Perceived Conflict with Community

Table 10: Summary of binary logistic regression results using institution type as the dependent variableand race/ethnicity as the predictor variable, *Cox & Snell* R^2 = .025, (χ^2 (3) = 61.212, p < .001). Variables that are significant at the 0.05 level are bolded.

							95% Confidence Intervals for Exp(B)	
	B	**Std. Error**	**Wald**	**df**	**Significance (p-value)**	**Exp(B)**	**Lower Bound**	**Upper Bound**
White (ref)			44.664	3	.000			
Asian	-1.373	0.263	27.232	1	.000	0.253	0.151	0.424
[a]PEER	0.375	0.173	4.682	1	.030	1.455	1.036	2.043
Multiracial	0.088	0.234	0.140	1	.708	1.092	0.690	1.728
Constant	-2.293	0.124	343.788	1	.000	0.101		

[a]Persons historically Excluded due to their Race/Ethnicity (Black, Hispanic, Indigenous)

Table 11: Summary of binary logistic regression results using institution type as the dependent variableand religion as the predictor variable, *Cox & Snell* R^2 = .004, (χ^2 (2) = 8.726, p = .013).

							95% Confidence Intervals for Exp(B)	
	B	**Std. Error**	**Wald**	**df**	**Significance (p-value)**	**Exp(B)**	**Lower Bound**	**Upper Bound**
No religion (ref)			7.495	2	.017			
Other religion	-0.629	0.268	5.519	1	.019	0.533	0.316	0.901
Christian	0.096	0.161	0.360	1	.548	1.101	0.804	1.509
Constant	-2.416	0.116	433.929	1	.000	0.089		

Table 12: Summary of binary logistic regression results using institution type as the dependent variableand parent education as the predictor variable, *Cox & Snell* R^2 = .021, (χ^2 (2) = 51.077, p < .001).

							95% Confidence Intervals for Exp(B)	
	B	**Std. Error**	**Wald**	**df**	**Significance (p-value)**	**Exp(B)**	**Lower Bound**	**Upper Bound**
> Bachelor's (ref)			48.487	2	.000			
No college	1.008	0.179	31.575	1	.000	2.741	1.928	3.897
Some college	1.153	0.185	38.826	1	.000	3.167	2.204	4.551
Constant	-2.990	0.123	587.297	1	.000	0.050		

Table 13. Summary of binary logistic regression results using institution type as the dependent variableand religiosity as the predictor variable, *Cox & Snell* R^2 = .000, (χ^2 (1) = .002, p = .965).

							95% Confidence Intervals for Exp(B)	
	B	**Std. Error**	**Wald**	**df**	**Significance (p-value)**	**Exp(B)**	**Lower Bound**	**Upper Bound**
Religiosity	-0.003	0.066	0.002	1	.965	0.997	0.875	1.136
Constant	-2.419	0.210	132.307	1	.000	0.089		

Table 14: Summary of binary logistic regression results using institution type as the dependent variableand gender as the predictor variable, *Cox & Snell* R^2 = .000, (χ^2 (1) = 1.206, p = .272).

							95% Confidence Intervals for Exp(B)	
	B	**Std. Error**	**Wald**	**df**	**Significance (p-value)**	**Exp(B)**	**Lower Bound**	**Upper Bound**
Woman (Man ref)	-0.175	0.160	1.184	1	.277	0.840	0.613	1.150
Constant	-2.358	0.088	716.069	1	.000	0.095		

Table 15: Summary of binary logistic regression results using institution type as the dependent variableand age as the predictor variable, *Cox & Snell* R^2 = .038, (χ^2 (1) = 97.381, p = .000).

							95% Confidence Intervals for Exp(B)	
	B	**Std. Error**	**Wald**	**df**	**Significance (p-value)**	**Exp(B)**	**Lower Bound**	**Upper Bound**
Age	0.177	0.019	87.274	1	.000	1.194	1.150	1.239
Constant	-5.987	0.396	228.711	1	.000	0.003		

REGRESSIONS OF FACTORS RELATED TO COMMUNITY COLLEGE STUDENT EVOLUTON ACCEPTANCE

Table 16: Summary of linear regression results using human evolution acceptance as the dependentvariable for community college students only. Adjusted $R^2 = 0.263$, $F(4, 195) = 18.717$, $p < 0.001$.

Variables that are significant at the 0.05 level are bolded.

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
	B	Std. Error	Beta			Lower Bound	Upper Bound
(Constant)	4.564	0.279		16.375	.000	4.014	5.113
State	-0.067	0.104	-0.040	-0.642	0.522	-0.273	0.139
Understanding	0.310	0.295	0.074	1.143	0.255	-0.244	0.917
Religiosity	-0.354	0.046	-0.488	-7.619	.000	-0.445	-0.2
Major	0.110	0.100	0.068	1.099	0.273	-0.087	0.307

Dependent Variable: Human Evolution Acceptance

Table 17: Summary of linear regression results using macroevolution acceptance as the dependentvariable for community college students only. Adjusted $R^2 = 0.206$, $F(4, 195) = 13.877$, $p < 0.001$. Variables that are significant at the 0.05 level are bolded.

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
	B	Std. Error	Beta			Lower Bound	Upper Bound
(Constant)	4.496	0.227		19.822	.000	4.048	4.943
State	-0.110	0.085	-0.084	-1.291	0.198	-0.277	0.058
Understanding	0.036	0.240	0.010	0.148	0.883	-0.439	0.510
Religiosity	-0.232	0.038	-0.408	-6.105	.000	-0.307	-0.157
Major	0.177	0.081	0.139	2.178	0.031	0.017	0.338

Dependent Variable: Macroevolution Acceptance

Table 18: Summary of linear regression results using microevolution acceptance as the dependentvariable for community college students only. Adjusted $R^2 = 0.108$, $F(4, 194) = 7.004$, $p < 0.001$.
Variables that are significant at the 0.05 level are bolded.

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
	B	Std. Error	Beta			Lower Bound	Upper Bound
(Constant)	4.163	0.231		18.003	.000	3.707	4.619
State	-0.047	0.087	-0.037	-0.537	0.592	-0.218	0.125
Understanding	0.609	0.245	0.178	2.482	0.014	0.125	1.092
Religiosity	-0.120	0.039	-0.220	-3.094	0.002	-0.197	-0.044
Major	0.104	0.083	0.085	1.250	0.213	-0.060	0.268

Dependent Variable: Microevolution Acceptance

REGRESSIONS OF FACTORS RELATED TO UNIVERSITY STUDENT EVOLUTON ACCEPTANCE

Table 19: Summary of linear regression results using human evolution acceptance as the dependent variable for university students only. Adjusted $R^2 = 0.225$, $F(4, 2281) = 166.508$, $p < 0.001$. Variables thatare significant at the 0.05 level are bolded.

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
	B	Std. Error	Beta			Lower Bound	Upper Bound
(Constant)	3.840	0.075		50.900	.000	3.692	3.988
State	0.030	0.028	0.020	1.077	0.282	-0.024	0.084
Understanding	1.064	0.081	0.248	13.171	.000	0.905	1.222
Religiosity	-0.249	0.013	-0.371	-19.845	.000	-0.273	-0.224
Major	0.013	0.029	0.008	0.441	0.659	-0.044	0.070

Dependent variable: Human Evolution Acceptance

Table 20: Summary of linear regression results using macroevolution acceptance as the dependent variable for university students only. Adjusted $R^2 = 0.173$, $F(4, 2280) = 120.196$, $p < 0.001$. Variables thatare significant at the 0.05 level are bolded.

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
	B	Std. Error	Beta			Lower Bound	Upper Bound
(Constant)	3.730	0.064		58.525	.000	3.605	3.855
State	-0.008	0.023	-0.007	-0.346	0.730	-0.054	0.038
Understanding	0.922	0.068	0.263	13.514	.000	0.788	1.055
Religiosity	-0.156	0.011	-0.284	-14.780	.000	-0.177	-0.136
Major	0.016	0.025	0.013	0.666	0.506	-0.032	0.064

Dependent variable: Macroevolution Acceptance

Table 21: Summary of linear regression results using microevolution acceptance as the dependent variable for university students only. Adjusted $R^2 = 0.149$, $F(4, 2280) = 100.799$, $p < 0.001$. Variables thatare significant at the 0.05 level are bolded.

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
	B	Std. Error	Beta			Lower Bound	Upper Bound
(Constant)	3.815	0.058		66.313	.000	3.702	3.928
State	0.009	0.021	0.008	0.414	0.679	-0.033	0.050
Understanding	1.025	0.062	0.328	16.625	.000	0.904	1.146
Religiosity	-0.078	0.010	-0.160	-8.167	.000	-0.097	-0.059
Major	0.033	0.022	0.029	1.509	0.131	-0.010	0.077

Dependent variable: Microevolution Acceptance

SPSS syntax for analyses

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*Descriptive statistics

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  /TABLE BY cc > state [COUNT F40.0]
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SPLIT FILE SEPARATE BY cc.

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DISPLAY=LABEL
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MAXIMUM, MINIMUM, RANGE, STDDEV, COUNT F40.0]
    + pconbelief [MEAN, MAXIMUM, MINIMUM, RANGE, STDDEV, COUNT F40.0]
    + pconteach [MEAN, MAXIMUM, MINIMUM, RANGE, STDDEV, COUNT F40.0] + pconcom
[MEAN,MAXIMUM, MINIMUM, RANGE, STDDEV, COUNT F40.0]
    + evoint [MEAN, MAXIMUM, MINIMUM, RANGE, STDDEV, COUNT F40.0]
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  /CRITERIA CILEVEL=95.

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SPLIT FILE SEPARATE BY state.

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evoundDISPLAY=LABEL
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    + micro [MEAN, MAXIMUM, MINIMUM, RANGE, STDDEV, COUNT F40.0] +
pcongod [MEAN,MAXIMUM, MINIMUM, RANGE, STDDEV, COUNT F40.0]
    + pconbelief [MEAN, MAXIMUM, MINIMUM, RANGE, STDDEV, COUNT F40.0]
    + pconteach [MEAN, MAXIMUM, MINIMUM, RANGE, STDDEV, COUNT F40.0] + pconcom
[MEAN,MAXIMUM, MINIMUM, RANGE, STDDEV, COUNT F40.0]
    + evoint [MEAN, MAXIMUM, MINIMUM, RANGE, STDDEV, COUNT F40.0]
    + evound [MEAN, MAXIMUM, MINIMUM, RANGE, STDDEV, COUNT F40.0]
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  /CRITERIA

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Are there differences between community college and university student evolution understanding, evolution acceptance, evolution interest, and perceived conflict with their religion?

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REGRESSION
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  /NOORIGIN
  /DEPENDENT micro
  /METHOD=ENTER biomajor state cc
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  /RESIDUALS NORMPROB(ZRESID).

REGRESSION
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  /DEPENDENT macro
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  /DEPENDENT human
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REGRESSION
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  /NOORIGIN
  /DEPENDENT evoint
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  /NOORIGIN
  /DEPENDENT pcongod
  /METHOD=ENTER biomajor state cc
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  /RESIDUALS NORMPROB(ZRESID).

REGRESSION
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  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT pconbelief
  /METHOD=ENTER biomajor state cc
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  /NOORIGIN
  /DEPENDENT pconteach
  /METHOD=ENTER biomajor state cc
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  /RESIDUALS NORMPROB(ZRESID).

REGRESSION
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  /NOORIGIN
  /DEPENDENT pconcom
  /METHOD=ENTER biomajor state cc
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*What are factors related to community college student evolution acceptance?*

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filter_$.
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  /NOORIGIN
  /DEPENDENT human
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  /RESIDUALS NORMPROB(ZRESID).


REGRESSION
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  /NOORIGIN
  /DEPENDENT macro
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  /RESIDUALS NORMPROB(ZRESID).


REGRESSION
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  /NOORIGIN
  /DEPENDENT micro
  /METHOD=ENTER state evound religiosity biomajor
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  /RESIDUALS NORMPROB(ZRESID).


FILTER
OFF.USE
ALL.
EXECUTE
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```

What are factors related to university student evolution acceptance?

```
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'Selected'.FORMATS filter_$ (f1.0).
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filter_$.
EXECUTE.

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  /NOORIGIN
  /DEPENDENT human
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  /RESIDUALS NORMPROB(ZRESID).


REGRESSION
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  /NOORIGIN
  /DEPENDENT macro
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REGRESSION
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  /NOORIGIN
  /DEPENDENT micro
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OFF.USE
ALL.
EXECUTE
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Differences between university and community college demographics

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LOGISTIC REGRESSION VARIABLES cc
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Reliability

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RELIABILITY
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evound9F evound10F evound11T evound12F evound13F evound14F
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