

Demographics of Conservation Majors at UC Berkeley

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Abstract In the United States, ethnic minorities are often more heavily affected by environmental degradation than non-minority ethnic groups, so it would be desirable that ethnic minorities were also more heavily represented in academic majors that address the environment and conservation. In this study, I investigate the demographics of conservation majors in relation to other majors at UC Berkeley, as well as investigating the demographics of what motivates students to choose their majors. I surveyed seniors at UC Berkeley in the spring of 2003. The results of this study found that men and lower income students are underrepresented in conservation majors, that conservation majors are more likely to choose a major for ethical reasons, and that non-conservation majors are more likely to choose a major for economic reasons. Although no significant results were found for minorities, this study indicates a need for further investigation of minorities in conservation and environmentally related fields.

Introduction

African American and Hispanic (which I will refer to as ethnic minorities) people are disproportionately of low socioeconomic status (SES) and they also live in higher proportions in urban areas as compared to other ethnicities (ERS 1995). Because of this, ethnic minorities are often affected the most by environmental degradation (Cole 2001). Highly urban areas are often very industrialized, and their inhabitants are exposed to harmful levels of pollution. However, these urban ethnic minorities often place environmental concern very low (seventh on average out of ten choices in one survey) on the list of important issues in America today, with the economy raking as most important (Rockland 1995). Nonetheless, it is important for those who are affected by environmental degradation to be involved in environmental and conservation fields in order to inform and represent their communities. This is why it is pertinent to investigate the representation of ethnic minorities in conservation majors, and the factors that may motivate students to choose conservation majors.

Demographics of Major Choice The Educational Research Service (1995) has found that low socio-economic standing is more frequent among African American and Hispanic people as compared to other ethnicities (ERS 1995). Trusty (2000) found that people of lower SES often choose a major based on future economic welfare. In addition, low SES students are often more heavily recruited by the “Power Fields” of law and medicine than by other fields of study (Charland 2002). These studies suggest that if low-income students are missing from conservation majors, it may be due to a perceived lack of financial rewards from such majors. This might result in an apparent lack of African American and Hispanic students in conservation majors, when more fundamentally there is a lack of low-income students in conservation majors.

In addition to income, many studies have found that gender may play a role in why a person chooses to study what they study. Eccles (1994) has found that women are more likely to study something based on personal ethics and which might improve the world their children live in, while men are more likely study something that would enable them to support their future family. While conservation majors may provide poor economic opportunity, they offer an opportunity to help improve the quality of the world in which we live. This could result in a lack of men, not women, in conservation majors, as opposed to the usual pattern for sciences in general, where women tend to be lacking.

Demographics of Majors In the United States, African Americans and Hispanics are underrepresented in higher education as a whole. In addition, in the math and sciences, African Americans, Hispanics, and women are underrepresented in attainment of bachelor's degrees (QEMMSEN 1992). This study investigates whether differential representation based on income gender, or ethnicity exists in conservation related majors at UC Berkeley, and what the motivating factors for that may be.

There is a large amount of research on both the question of major choice as related to demographics (Eccles 1994, Dawson-Threat 1996, Trusty 1998, Trusty 2000), and on the question of environmental concern as related to demographics (Stern 1993, Nord 1998). However, there is apparently little research dealing with demographics of conservation majors. Trusty (2000) has found a relation between socioeconomic status and major choice and Eccles (1994) has related choice of major to values a person associates with that major. There has been a link found between having environmental concern and selecting a conservation major, but there was no link found between environmental behavior and major choice, nor was any causation found (Ewert 2001).

In my study, I looked at the demographics of conservation majors in relation to other majors at UC Berkeley. I also investigated the demographics of the factors that influence students to choose their majors. From this, I developed a typology of which demographic groups are influenced most by the various factors involved in major selection. I investigated if the demographics of major choice line up with the demographics of majors; if conservation majors are more likely to choose a major for ethical reasons, and women and higher income students are more likely to choose a conservation major, then as the previous studies indicate, women and higher incomes students should be more likely to choose a major for ethical reasons.

This study examines three hypotheses. My first two hypotheses deal with the demographics of major choice. My first hypothesis is that conservation students will be more likely than other students to rank ethics as more important than economics in choosing a major. My second hypothesis is that lower income students and men will be more likely than higher income students and women to rank economics as more important than ethics in choosing a major. My third hypothesis deals with demographics of majors, and is that men and lower income students will be underrepresented in conservation majors as compared to other majors.

Methods

Data Collection Male and female college seniors were surveyed via email and written survey at the University of California, Berkeley, in the beginning of the spring semester of 2003. UC Berkeley is a public university located in the San Francisco Bay Area, with an undergraduate enrollment of 23,267 students.

For this study, I chose to collect data by surveying seniors because seniors are the least likely group to switch majors. To select students to be surveyed, I began by dividing the majors between conservation and non-conservation majors, based on the descriptions of the majors in the UC Berkeley General Catalogue 2001/2003. I classified a major as a conservation major if the description in the catalogue stated that the major included work concerning the environment, ecology, or conservation. The conservation majors I chose are Environmental Science, Conservation and Resource Studies, Molecular Environmental Biology, Environmental Earth Science, and Forestry.

Conservation majors were surveyed by email. I emailed the survey to the appropriate major advisor, who then forwarded the survey to their students, with the subject heading of the email as "Survey for Seniors." The students then forwarded the completed surveys back to me. For non-conservation majors, I distributed paper copies of the survey (with slight changes reflecting the change in distribution method) on Sproul Plaza, a popular tabling and flyering location on the UC Berkeley campus. I surveyed Monday through Thursday, March 17-20th, 2003, from noon until 3 pm. I offered a free candy bar as an incentive for completing the survey. I surveyed conservation majors and non-conservation majors differently because the advisors for non-conservation majors decided at the last minute that they would not be able to forward my survey. Flyering was the only last minute way to collect data on non-conservation majors.

My survey was designed with the advice of Manish Desai (2002 pers. comm.) and Mike Piazza (2002 pers. comm.). The ethnic group categories were based on groupings used by UC Berkeley in their data (Office of Student Research website). The factors for choosing a major (question 2) were partially based on Eccles (1994), and partially based on discussion with my peers. The survey can be found in the appendix. Question 1 is to identify the major, in order to classify it as conservation or non-conservation. Question 2 is meant to determine how important economics and ethics were relative to each other in the students choice of major. Question 2

pertains to the demographics of major choice. Questions 3 through 6 are meant to collect basic demographic information.

Statistical Analysis I analyzed the data using Mann-Whitney U tests, t-tests, and Chi Squared Analysis.

In the survey, the students were asked to rank six factors from most to least important, according to what was important to them when they chose their major. I then assigned values to the factors according to the student's rankings; the first (most important) factor listed was given six points, the last (least important) factor was given one point. I then calculated the spread between the student's rank for ethics and economics by subtracting the value given to factor "B" (economics) from the value given to factor "C" (ethics). I will refer to this value as spread; if the value is negative, students felt economics were more important than ethics in choosing a major, and if the value is positive, the student felt that ethics were more important than economics in choosing their major.

I began my analysis by examining my data for normality. Although the ranking given to economics and to ethics was fairly normally distributed, the values for the spread appeared to be bimodal. The first two sets of statistics were to investigate the demographics of major choice, and the last set was to investigate the demographics of majors. The first set of analyses I performed was three Mann-Whitney U tests. They examined the relationship between gender and spread, income type and spread, and major type and spread. The second set of statistics I performed were t-tests. They examined the relationship between the rank of economics and the rank of ethics with gender, income type, and major type. The last statistics I performed were Chi Squared analyses; they examined the relationships between ethnicity and major type, gender and major type, and income (high or low income) and major type.

Results

I received a total of 121 responses to my survey which is 2 percent of the senior class; 37 were conservation majors, 80 non-conservation majors, and 4 no response major types. There were 77 females and 42 males.

Demographics of Major Choice Of the three Mann-Whitney U tests I performed, one was significant. The mean spread score for women ($x = 0.640 \pm 2.613$) was not significantly different from the mean spread score for men ($x = 0.073 \pm 2.668$; $U^1 = 1747$, $n_{\text{females}} = 75$,

$n_{\text{males}}=41$, $p=0.22$). Figure 1. shows the mean spread for different income groups; a positive value means that ethics was more important; a negative value means economics was more important. Income type (high or low) was not associated with spread ($U^1=1791$, $n_{\text{high}}=61$, $n_{\text{low}}=56$, $p=0.65$).

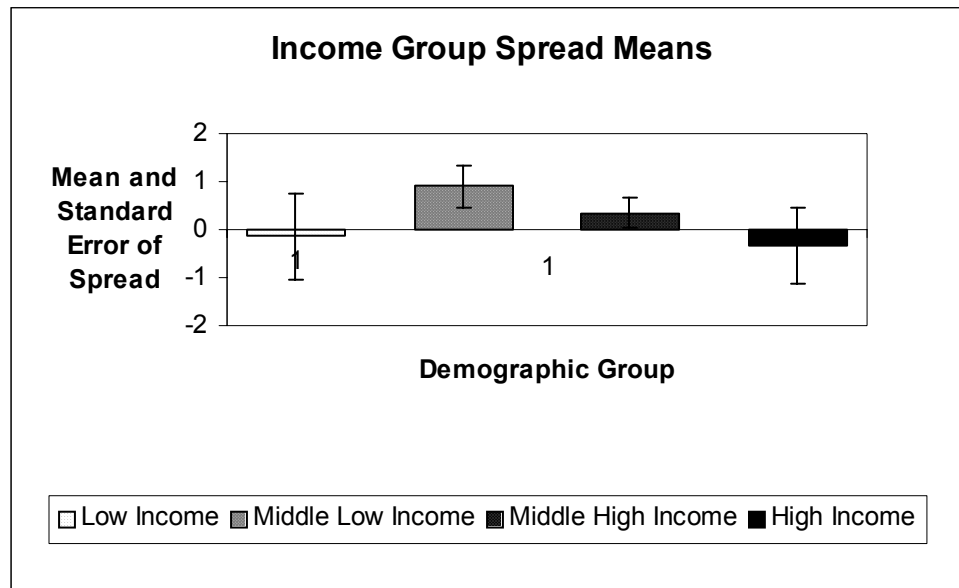


Figure 1.

The mean spread of conservation majors ($x=1.846 \pm 2.134$) was significantly higher than the mean spread of non-conservation majors ($x= -0.316 \pm 2.520$; $U^1= 2203$, $n_{\text{con}}= 39$, $n_{\text{non}}=76$, $p<0.0001$).

The mean score for ethics for females ($x= 3.95 \pm 2.28$) was not significantly different from males ($x=3.46 \pm 2.62$; $t=1.58$, $n_{\text{females}}=74$, $n_{\text{males}}=39$, $p=0.116$). The mean score for economics for females ($x=3.17 \pm 2.22$) was not significantly different from males ($x=3.28 \pm 2.73$; $t=-0.344$, $n_{\text{females}}=74$, $n_{\text{males}}=39$, $p=0.732$). The mean score for ethics for high-income students ($x=3.64 \pm 2.26$) was not significantly different that that of low-income students ($x=3.92 \pm 2.59$; $t= -0.969$, $n_{\text{high}}=59$, $n_{\text{low}}=55$, $p=0.335$). The mean score for economics for high-income students ($x=3.32 \pm 2.26$) was not significantly different from that of low-income students ($x=3.12 \pm 2.39$; $t=1.06$, $n_{\text{high}}=59$, $n_{\text{low}}=55$, $p=0.289$). The mean score for ethics for conservation majors ($x=4.52 \pm 1.71$) was significantly higher than that of non-conservation majors ($x=3.36 \pm 2.37$; $t=4.18$, $n_{\text{con}}=38$, $n_{\text{non}}=74$, $p=6.89E-05$). The mean score for economics was for conservation majors ($x=2.61 \pm$

1.92) was significantly lower than that of non-conservation majors ($x=3.49\pm 2.25$; $t= -3.12$, $n_{\text{con}}=38$, $n_{\text{non}}=75$, $p=0.00245$).

Demographics of Majors Of the three Chi Squared statistics that I performed, two had significant results. Ethnicity was not associated with major type ($X^2 = 0.33$, $df=1$, $p>0.25$) Gender was associated with major type; females were more likely to be in conservation majors than men ($X^2= 8.24$, $df=1$, $p= 0.005$). The p value was 0.005, making it a significant statistic at a 95% confidence level. Income type (high or low) was associated with major type; high-income students were more likely to choose non-conservation majors ($X^2= 3.95$, $df=1$, $p=0.05$)

Discussion

Overall, I found that although the demographic trends of majors that I hypothesized were supported by my statistical findings, my hypothesis concerning the demographics of major choice was not all not supported by my statistics. I found that women and higher income students tend toward conservation majors, and I found that conservation majors tend to choose their majors for ethical reason more than economic reasons, and more so than non-conservation majors. However, I did not find that women and higher income students tended to choose their major for ethical reasons more than economic reasons. Basically, I did find demographic trends in majors, but, like Ewert (2001), I did not succeed in pinpointing a cause.

Demographics of Major Choice My first hypothesis, that conservation majors would be more likely than non-conservation majors to choose their major for ethical reasons was supported by my statistics. My second hypothesis was not supported by my statistics. My statistics did not show that men and lower income students were more likely than women and higher income students to rank economics as more important than ethics in choosing a major.

Although I was unable to find a correlation between major choice motivation and gender or income level, Trusty (2000) found that people of lower socio-economic status tended to choose majors for economic reasons. So it is possible that lower income students at UC Berkeley are motivated to choose majors for economic reason, and I was unable to locate that trend due to compromises in my sampling. There were many compromises in my data collection due to my limited abilities. I collected conservation and non-conservation data in two separate ways, which could have skewed the data. Because every conservation student received an email survey, they had a much greater chance of responding to my survey than those who were flyer'd; to put

another way, flyering on Sproul plaza did not give me the chance to give a survey to every non-conservation major while emailing the conservation major students did give me a chance to give every conservation major a flyer. Because of this, conservation majors represented 31% of my sample size, although they are closer to 4% of the student body. If I had relied on flyering to collect all my surveys, I would not have received enough conservation surveys to report my statistics accurately. This sacrifice had to be made in order to obtain a larger sample size. Ideally, I would have been able to generate a random list of seniors and email them all the exact survey. I did not, however, have the resources available to do so.

The other possibility is that Trusty looked at socio-economic status, which takes into account the interaction between ethnicity and income, where as I looked at income and ethnicity separate. This means that there could possibly be an interacting factor leading to economic motivations that I missed by looking at income and ethnicity separately.

The work of Eccles (1994) also supports my second hypothesis, which I was unable to support with my statistics. Eccles found that women were more likely to choose a major which would make the world a better place, and that men were more likely to choose a major that would enable them to support their future family. Although I would personally classify what Eccles found to be women's motivation as ethical, and men's as economic, there is a possibility that the students who completed my survey would not classify motivations the same as I did. What this means is that the trends that Eccles observed may have been present in my sample, but that the students who took my survey interpreted that factors that I provided as motivation for major choice in such a way that the trend was not made apparent. My own personal interpretation and biases in writing the survey and the students' interpretations in reading the survey could have led masking any possible trends.

Demographics of Majors As I have already discussed, my hypothesis concerning the demographics of majors was supported by my statistics. Men and lower income students were more likely to be a non-conservation major. However, my statistics did not find that ethnic minorities were more likely to be non-conservation majors. There are two possible reason for this. The first is that ethnic minorities are not under represented in conservation majors, and that income level is the root factor that causes the visible lack of ethnic minorities in conservation majors (assuming that ERS 1995 is correct and ethnic minorities tend to be of lower incomes). The second possibility is lack of power. The ratio of conservation to non-conservation majors of

non-ethnic minority students was 35:68, which is roughly 1:2. The ratio of conservation to non-conservation students of ethnic minority students was 4:12, or 1:3, which is smaller than 1:2, (the ratio of non-ethnic minorities). With my sample size and the power of my statistics, the ratio for ethnic minorities would have had to have been 1:15 to have been found significant, which is a very small ratio. So although I have no statistical proof, I also have little power to determine if ethnic minorities are underrepresented in conservation majors; the ratio indicates that they may indeed be.

Conclusion When developing my hypotheses, I based my second hypothesis concerning decision making processes on previously found trends along gender lines and economic lines (Eccles 1994, Trusty 2000). From that, I developed my first and third hypothesis. The results of my study are interesting because my second hypothesis, the one based on others work, was not supported, and that my first and third hypotheses (which were developed from my own personal speculation based on the second hypothesis) were supported. This leads me to believe that possibly the trends I suggested in the second hypothesis do exist and that I was unable to uncover them due to error. I am also led to the conclusion that the decision making process involved in selecting a major is not as simple as plugging in economic and ethnic background, as well as gender, and arriving at a major selection. Life experiences can often interact in ways that are not predictable or quantifiable

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Appendix

Demographic Survey of Academic Majors

I, Jada Nys, am a senior in the Environmental Science major working on a senior research thesis. I invite you to take part in my research by filling in this survey for me. Involvement is completely voluntary. Any data collected will be completely confidential. I am the only person who will see your filled in survey, and it will be deleted, along with your email address, as soon as it has been received, and your responses have been entered. Once this has been done, there will be no way that I, or any other person, will be able to trace your responses to you. There are no risks involved with completing this survey

This survey is designed to aid in the investigation of why people choose the majors they do and why certain demographic groups are represented in certain majors. Your taking the time to complete this survey is greatly appreciated. If you have any questions concerning my research or this survey, please email them to: jnys@uclink4.berkeley.edu. If you have any question regarding your treatment or rights as a participant in this research project, please contact the University of California at Berkeley's, Committee for Protection of Human Subjects at 510/642-7461, subjects@uclink.berkeley.edu. You give your consent to take part in my research by returning the following survey to me.

Instructions For Survey:

1. Click on the forward button in your email program
2. Insert jnys@uclink4.berkeley.edu in the "To" line
3. *Within the text* of the forwarded message, please complete the survey below as it applies to you
4. Type your answer in the body of the forwarded message, directly to the right of where it says **Please Type Answer Here:**

Survey

Question 1. What is your declared major? If double major, indicate which major you consider more central in your life.

Answer for Questions 1. Please Type Answer Here:

Question 2. The following are some reasons why a student might choose a major:

- A. Family Influence: Any form of influence from any family member
- B. Economic motives: The ability of your major to ensure a certain economic income
- C. Ethical or moral reasons- Your major agreed with your ethics or morals
- D. Interest: Interest in your major, or belief in your ability to complete the major
- E. Prerequisites: classes you had already taken satisfied major requirements
- F. Other: any other reasons that may have been important to you

Please list the above reasons for choosing a major in order of importance to you with the first reason you list being the most important reason for your choice of major, and the last being the least important reason for you choosing a major. Please include all 6 reasons in your list. An example would be:

A, C, E, B, D, F,

Where A=Family as the most important reason that you chose your major, and F=Other as the least important reason that you chose your major.

List for Question 2. Please Type Answer here:

Question 3. What is your gender?

1. Female
2. Male

Answer for Question 3. Please Type Answer Here:

Question 4. Of the following, what is the ethnic group that you most closely identify yourself with?

1. Asian, Asian-American, Pacific Islander
2. African American, Black
3. Hispanic, Chicano, Latino
4. White, Caucasian
5. Native American
6. Other

(Answer 1,2,3,4,5, or 6)

Answer for Question 4. Please Type Answer Here:

Question 5. For the majority of your life before enrollment at UCB, what type of region did you live in?

1. Rural
2. Suburban
3. Urban

Answer for Question 5. Please Type Answer Here:

Question 6. For the majority of your life before enrollment at UCB, what was the income category of the household you lived in?

1. Lower Income
2. Lower Middle Income
3. Upper Middle Income
4. Upper Income

(Answer 1,2,3 or 4)

Answer for Question 6. Please Type Answer Here: