Self-Reported Attitudes, Concerns, and Behaviors Related to Global Environmentalism: Can a Mandatory Class Make a Difference?

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SELF-REPORTED ATTITUDES, CONCERNS, AND BEHAVIORS RELATED TO
GLOBAL ENVIRONMENTALISM:
CAN A MANDATORY CLASS MAKE A DIFFERENCE?

by

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B.S. May 2004, Old Dominion University
M.S. May 2006, Old Dominion University

A Thesis Submitted to the Faculty of
Old Dominion University in Partial Fulfillment of the
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May 2006

Approved by:

[Signatures]

[Names: Jennifer A. Morrow (Director), Bryan E. Porter (Member), Janis Sanchez-Hudles (Member), Shana Pribesh (Member)]
The purpose of the study was to determine what initial attitudes and behaviors first-year college students had about the environment and how they changed as a result of taking a required global environmentalism course. A second goal in this study was to learn whether there were differences in environmental attitudes and behaviors based on gender and ethnicity. Participants in this study were first-year students at Old Dominion University enrolled in a mandatory general education course, *New Portals to Appreciating the Global Environment* (GEN 101). An online survey was completed that measured the participants' attitudes and behaviors related to the environment at the beginning and end of the semester. Repeated Measures ANOVAs were performed in order to test for differences in attitudes, concerns, and behaviors based on time (pretest, posttest). Between subjects ANOVAs were used to test for differences in attitudes, concerns, and behaviors based on gender (male, female) and ethnicity (Black/African-American, Asian/Pacific Islander, Hispanic, and Caucasian). Hierarchical multiple regressions with interactions were used to determine which variables (i.e., gender, ethnicity, pretest scores, and their interactions) serve as predictors of environmental attitudes and behaviors.
Results showed that there were significant changes in all of the dependent variables. However, only three of the dependent variables increased as hypothesized: students’ pro-environmental group involvement, the frequency at which students utilize pro-environmental products, and the frequency at which students engage in other pro-environmental activities. All other variables significantly decreased over the semester. The second hypothesis was not supported as gender differences were not found. The third hypothesis was only partially supported as a significant ethnicity difference for environmental concern was found. Blacks reported significantly more environmental concern than Hispanics. Pretest scores for each measure as well as pretest environmental concern scores served as significant predictors of posttest scores for all measures. Implications of this research are discussed.
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INTRODUCTION

Overview of the Problem

People in the United States consume at a rate that would require approximately 7.5 earths to sustain the world population if everyone in the world lived as the average American does. So why is it that so few Americans engage in environmentally friendly behaviors (e.g., recycling, energy conservation)? Many researchers have tried to answer this question (Derksen & Gartrell, 1993; Finger, 1994). Old Dominion University has decided to try to change this trend by requiring all first-year students to enroll in a global environmentalism course. The global environmentalism course utilizes an interdisciplinary teaching style (involving seven professors from different colleges within the university) in order to teach the students about a variety of environmental topics (e.g., cost-benefit analysis, global climate change, and sustainable development). The literature is abundant with studies that look at the effect of community recycling and how to improve participation in such plans (Hopper & Neilsen, 1991; Lasana, 1992). However, little research exists that focuses on the impact of mandatory environmental courses for 1st year college students. This study proposed to determine what initial attitudes, concerns, and behaviors students have about the environment and how their attitudes, concerns, and behaviors differ based on time (before and after taking a global environmentalism course), gender, and ethnicity. A second goal in this study was to learn which variables (i.e., gender, ethnicity, pretest scores) are significantly related to attitudes and behaviors concerning the global environment.

The model journal used in the preparation of this thesis was the Journal of Psychological Assessment.
Theoretical Framework

We can understand the relationship between attitudes and behaviors through the use of Fishbein and Ajzen's Theory of Reasoned Action (1975). According to this theory, people are rational, deliberate thinkers that act on the basis of what they know. Fishbein and Ajzen explained that attitudes toward a behavior are influenced by an individual's beliefs that a behavior leads to certain outcomes and their feelings concerning these outcomes. They also stated that an individual's beliefs about the opinions of specific individuals or groups concerning the behavior and that individual's motivation to comply with these particular terms influences what the person holds as their subjective norm. Fishbein and Ajzen defined a person's subjective norm as perceived pressure from society to act in a certain manner. Finally, they theorized that a combination of the person's attitude toward the behavior and their subjective norm influences their intention to engage in the behavior, which leads to actual engagement in the behavior.

However, as part of Ajzen's Theory of Planned Behavior (1985), a third variable that influences behavioral intentions was added to the model. This variable, perceived behavioral control is similar to the concept of self-efficacy. According to Ajzen, perceived behavioral control refers to the idea that people consider how capable they are of performing a behavior, if they are at all, when they determine their intentions. If a person feels that a certain behavior is beyond their personal control, then they will decide that they do not intend to engage in that behavior.

An important component of Fishbein and Ajzen's Theory of Reasoned Action is how they specify the appropriate way to measure attitudes and behaviors when the goal is to use attitudes to predict behaviors. They stated that because "general" attitudes only
predict “general” behaviors and “specific” attitudes only predict “specific” behaviors, researchers must use measures of attitudes and behaviors that are compatible. General attitudes were described as attitudes toward people, objects, and issues. For example, your general attitude towards cooking will predict how often you choose to cook in different situations and over long periods of time. However, your attitude towards cooking will not predict, at least as well, how likely you are to cook with a microwave oven, a specific behavior. General behavior was described as measures of all of the actions that can be taken toward the target (which is what the action is directed at).

A fourth term Fishein and Ajzen developed was multiple-act behavioral criteria, which refers to measures that include a wide variety of behaviors related to an attitude. The idea behind using various activities related to a target to measure attitudes toward a certain behavior is that not all people engage in all behaviors towards a certain target, so it is important to measure more than one type of behavior (i.e., many specific behaviors) when trying to determine one’s attitude toward that general behavior.

More recently, Kilbourne, Beckmann, and Thelen (2002) have proposed another model to look at more specific variables that influence one’s behavior such as political, economical, and technological variables. The proposed model is referred to as the socioeconomic domain of the dominant social paradigm (DSP), which was based on two earlier paradigms - the original dominant social paradigm (Pirages & Ehrlich, 1974) and the new environmental paradigm or NEP (Dunlap & van Liere, 1978). The original DSP, has been described as “the values, metaphysical beliefs, institutions, habits, etc. that collectively provide social lenses through which individuals and groups interpret their social world” (Cotgrove, p.7, as cited in Kilbourne et al., 2002)
Kilbourne and colleagues’ (2002) DSP model takes into account three new dimensions of the DSP: politics, technology, and economics. When testing this model, Kilbourne et al. found that these dimensions are negatively related to measures of environmental concern. Therefore, the common assumption among researchers of the environment, that increases in peoples’ concern about the environment will be accompanied by increases in environmentally friendly behaviors, is not supported by this model. Instead, the model suggests that there are precursor conditions such as liberal democracy, technological optimism, and a liberal economic perspective (self-interest as the sole motivator of behavior) that affect individuals’ environmental attitudes as well as how much they state that they are willing to change. One finding that was similar to the previous literature was that when peoples’ concern about the environment increases so do their behavioral intentions.

Attitudes Toward and Concerns about the Environment

Environmental attitudes have been described as the individual’s beliefs, values, and feelings (i.e., pro or con; favorable or unfavorable) with regard to particular aspects of the environment or issues related to it (Hines, Hungerford, & Tomera, 1987). Another phrase that is similar to attitudes toward the environment is concerns about the environment, which can be described as “an individual’s degree of emotional reaction to his or her comprehension of reported damages to the environment and/or humans” (Ostman & Parker, 1988, p.3). Many studies have focused on people’s attitudes and concerns associated with the environment and how these attitudes differ as a function of variables such as college major, ethnicity, gender, and environmental risk (Hodgkinson &
Innes, 2001; Morrone, Manci, & Carr, 2001; Parker & McDonough, 1999; Poortinga, Steg, & Vlek, 2002; Wehrmeyer & McNeil, 2000).

On such study by Hodgkinson and Innes (2001) studied the differences in environmental attitudes and ecological beliefs of 399 first-year college students from various disciplines. Results showed that students with more liberal majors such as environmental studies and sociology persistently displayed stronger optimistic attitudes and beliefs about the environment than students with other majors, whereas students majoring in more conservative majors such as computer studies, law, commerce, and the other majors scored lower on both the NEP scale (Dunlap & Van Liere, 1978) and the EAS (Forgas & Jolliffe, 1994). The significant interaction between the NEP, EAS, and major shows that responses to the measures varied by discipline.

Poortinga and colleagues (2002) surveyed a randomly selected a sample of Dutch households and found that participants differing in concern about the environment varied substantially in their preferences for environmental management strategies aimed at household energy use. The participants who had a high environmental risk concern preferred government regulation and behavioral change strategies as opposed to the market-oriented solutions and technical strategies the participants with low environmental risk concerns preferred.

Environmental attitudes have also been the focus of many studies that looked at variables such as economic factors, geographic location and feelings of environmental responsibility, and environmental education courses (Armstrong & Impara, 1991; Bright, Barro, & Burtz, 2001; Bright & Tarrant, 2002; Kemmelmeier, Krol, & Kim, 2002; Roth & Perez, 1989; Syme, Nancarrow, & Jorgensen, 2002). Kemmelmeier and associates
(2002) tested the relationships between environmental attitudes, post-materialist values, and economic factors at both the individual and societal levels using data provided by the 1993 International Social Survey Programme. Results revealed that average support for the environment and economic conditions were strongly related at the societal level. However, this relationship, which was also found at the individual level, was somewhat variable. Kemmelmeier et al. explained that people with economic affluence have an easier time shifting their attention from their personal needs to the needs of the environment. Therefore, proenvironmental attitudes can be predicted by an individual’s level of economic affluence.

Concerning geographic location and feelings of environmental responsibility, Syme and colleagues (2002) surveyed residents from four cities in Australia to determine what variables influenced the residents’ feelings of responsibility towards the environment. Locality and geographic context were found to serve as important determinants of the residents’ perceived environmental responsibility. However, no simple differences such as proximity to waterways or city population could easily be identified. Syme et al. also found that residents with higher education and those who reported engaging in more water purification type behaviors tended to report having a responsibility for areas beyond their neighborhoods. Bright et al. (2001) looked at the effect of attitude importance, concerning three different geographic levels (i.e., local open space in Chicago, natural areas in the Midwestern United States, and tropical rainforests), on interattitude consistency among a random sample of residents of Chicago. Results showed that residents’ attitudes did not differ concerning environmental issues of high importance across the three geographic levels. However, the residents’ attitudes did differ
on the low issue-importance topics (i.e., residents cared more about restoration of national or global natural areas than restoring local natural areas).

There have been a number of articles focusing on students' attitudes after taking an environmental course. Armstrong and Impara (1991) found that both college students who took the environmental education program, NatureScope, which they were assigned to by the researchers, and students who were in the control group did not significantly differ in their attitudes toward the environment. Bright and Tarrant (2002) studied college students' complexity of thinking and attitudes about an environmental issue before and after they had completed a writing course that involved writing about a specific environmental issue. Results showed that college students that reported having moderate to ambivalent attitudes concerning the environmental issue wrote significantly more complex essays that did students who had more stable attitudes. Also, the direction of the students' attitudes was not related to the complexity of the writing. However, the students who took the course showed significantly more critical thinking about the environmental issue than students enrolled in a comparable writing course that was not environmentally based. These studies provide evidence to support the notion that educational programs that focus on the environment are effective in changing students' attitudes and awareness. However, it is important to note that more courses of this type are needed in order to raise awareness about the environment. Although the literature focusing on college students' attitudes towards the environment is plentiful, many of the studies lack samples of students that are made up of an entire entering class of first-year college students. The current study adds to the literature in that, unlike much of the previous research
(Armstrong & Impara, 1991; Bright & Tarrant, 2002), a sample of diverse students which are from a large class of first-year students were used.

**Environmental Behaviors**

Environmental behaviors have been the focus of a plethora of studies dealing with various populations, such as recreational boaters, recyclers and non-recyclers, neighborhood residents, and college students. Cottrell (2003) examined predictors of general responsible environmental behavior or (GREB) among recreational boaters. Cottrell found that among the three variables (i.e., professed knowledge of environmental issues, environmental concern, and verbal commitment) verbal commitment (best predictor) and professed knowledge of environmental issues were the only significant predictors of GREB. In Lasana’s (1992) longitudinal study it was found that respondents who recycled were more likely to be homeowners, between the age of 40 and 64, and have at least 7–12 years of education. Lasana also found that residents’ attitudes toward a recycling program significantly predicted their behavior. In other words, the residents who recycled expressed a stronger need for community recycling than did non-recyclers. Hopper and Neilsen (1991) measured the recycling behaviors, social norms, personal norms, and awareness of consequences (level of importance the respondents associated with various reasons for recycling) of recycling of residents from a large urban neighborhood both before and after their participation in a community recycling program. Results showed that residents only recycled as part of the program when both a social norm to recycle and a personal norm to recycle were present. Furthermore, the personal norm to recycle only converted into recycling when the residents’ awareness of the consequences associated with recycling was high. Hopper and Neilsen determined that
social norms, personal norms, and awareness of consequences needed to be present in order for the residents to participate in the recycling program. Thapa (2000) surveyed 450 college students and found that among environmentally friendly behaviors, students participated most in recycling and least in campus activism. These studies provide a great deal of information about the type of people who choose to engage in environmentally friendly behaviors, cite many predictors of these behaviors, and utilize a wide variety of samples. However, there are scant studies that focus on environmental behaviors of college students who have completed an environmental course.

*Impact of Courses on Environmental Attitudes and Behaviors*

The impact of environmental courses on students' attitudes towards the environment and on their involvement in environmentally friendly behaviors usually manifests through an increase in knowledge. Knowledge about the environment can be described as "an individual's ability to recognize and accurately describe specific environmental topics that have been featured in the mass media" (Ostman & Parker, 1988, p. 3). Research by Morrone and associates (2001) suggests that a better indicator of environmental concern may be found in ideologies or worldviews, rather than knowledge about the environment. Pooley and O'Connor (2000) suggest that environmental educators should focus on providing students with information on the various environmental attitudes, emotions and beliefs held by people on both sides of environmental issues when creating programs designed to change students' environmental attitudes, emotions and beliefs instead of focusing on environmental knowledge. However, many studies simply look at different environmental education programs' ability to increase the knowledge of the students who take these courses rather
than focusing on the ability of environmental knowledge to significantly predict environmental concern.

In one such study, Armstrong and Impara (1991) compared two types of groups, experimental groups, which received NatureScope, a K-7 environmental education supplement developed by the National Wildlife Federation, and a control group on a knowledge test from at both pretest and posttest (assignment to each group was decided by the researchers). When comparing scores on students' knowledge of each of the weekly topics, the experimental group scored higher than the control group on the knowledge test in all but one case. Leeming, Dwyer, Porter, and Cobern (1993) reviewed the literature on environmental education studies and found that, among the 14 studies that focused on environmental knowledge of the 34 studies reviewed, only half of these (7 studies) found that their programs had significant positive effects on the participants' knowledge. Leeming et al. explain that the lack of significant findings in many of the studies reviewed is often due to problems related to experimental design or data analysis.

In a study by Smith-Sebasto (1995), undergraduate students who either took an environmental studies course for non-majors or an introductory history course were administered a survey that assessed their perceived knowledge of the categories of environmentally responsible behavior (ERB). Smith-Sebasto found that the students who completed the environmental course had a higher perception of knowledge of the categories of ERB. Roth and Perez (1989) looked at environmental knowledge of 12th grade students from the Dominican Republic who had not previously taken an environmental course. The results showed that the students' average score was a low 51% (average score was not compared to other similar students), which demonstrates a
deficiency in their knowledge of environmental issues. These studies display a trend for environmental education programs to increase students' knowledge about the environment and they reinforce the notion that environmental education programs are needed. However, it is important to understand that there are a variety of types of programs and it is not certain which type of program best meets the students' needs. One limitation of these studies is that they do not research how knowledge about the environment/environmental awareness is related to their attitudes toward the environment or how many environmentally friendly behaviors they engage in.

**Demographic Predictors of Environmental Attitudes and Behaviors**

Gender and ethnicity have been identified in a number of research studies as demographic predictors of environmental attitudes, concerns, and behaviors (Chanda, 1999; Klineberg, McKeever, & Rothenbach, 1998; Morrone et al., 2001; Parker & McDonough, 1999; Shichao, 2003; Steel, 1996; Wehmeyer & McNeil, 2000). Chanda (1999) surveyed 250 households in Botswana and found that men were more aware of both environmental quality and socioeconomic issues than women. However, gender was a poor predictor of environmental concern. Based on the results of the 1078 surveys collected by Shichao (2003) in China, a significant difference was found between men and women concerning their recycling behaviors. Schicao found that 55% of the women collected some type of recyclable, whereas 41% of men reported not caring about recycling, and only 20% of them collected some type of recyclable. Gender was found to be a better predictor of environmental behaviors than all levels of education or age. The results of Klineberg et al.'s (1998) study showed that women were more prepared than men to pay the economic or regulatory costs of environmental protection, showed more
support for pro-environment choices with respect to government intervention, and were more likely to reject the suggestion that pollution control measures are unfair to industry than men.

Wehrmeyer and McNeil (2000) found a number of gender differences concerning pharmaceutical employees' attitudes toward the environment. Among these differences was the finding that the women in the organization scored higher on the factor of conscientious activism than men from the same organization. It was also noted that women were much less likely to adopt the idea that technology is capable of and will in the future solve all environmental problems. Another finding in Wehrmeyer and McNeil's study was that both genders scored similarly on measures of corporate environmentalism. However, men's attitudes were shown to be more influenced by their occupational status in the organization. Steel (1996) determined that environmentally protective behaviors were more likely to be carried out by women than men. Also, gender differences between older cohorts were found to be greater than younger cohorts.

Concerning the relationship between ethnicity and environmental concern, Morrone et al. (2001) found that members of minority ethnicities report higher levels of environmental concern than did the other groups in their study (i.e., low income individuals and students from an introductory environmental health class) and they also were the most likely to pay attention to environmental issues reported in the media even though they reported not believing they were very knowledgeable about the environment. The students (all ethnicities) from the introductory environmental health class reported a similar level of concern about the environment as minorities (from the community). However, they tended to rank higher than minorities on the knowledge about the
environment. In a similar study with different results, Parker and McDonough (1999) found that both African Americans and Caucasians showed environmental concern in their attitudes. However, each of these groups exhibits environmentalism in different ways. Unfortunately, these differences are difficult to interpret due to the fact that African American participants reported having more concern for the environment when responding to some items and less concern when responding to other items. African Americans and Caucasians differed regarding issues such as problems associated with litter and overpopulation. Also, concerning specific environmental issues, African Americans exhibited more environmental concern, while Caucasians were more inclined to exhibit higher levels of environmental concern regarding abstract concepts. Parker and McDonough (1999) also looked at differences in African Americans’ and Caucasians’ environmental behavior. They found that both ethnic groups reported participating occasionally to frequently in environmentally responsible behaviors. However, each group engaged in environmental behavior in a different manner (i.e., African Americans scored higher on the Environmental Issue Scale, Caucasians scored higher on the Environmental Behavior Index). Powerlessness and environmental behavior had a stronger relationship for African Americans than Caucasians suggesting that powerlessness serves as a barrier to engaging in environmental behaviors for many African Americans. This finding may explain many of the differences that occur between ethnicities concerning involvement in environmentally friendly behaviors. Although previous studies have compared gender differences in a variety of populations (e.g., Africans, Chinese, pharmaceutical employees, and students from environmental courses and minorities) and various ethnicities with each other, more research is needed that
focuses on gender and ethnicity differences among college students in an environmental class.

*Description of Old Dominion University’s Mandatory Global Environmentalism Course*

The global environmentalism course that is the focus of the current study, formally known as New Portals to Appreciating the Global Environment (NewPAGE), is a general education requirement for first-year students at Old Dominion University. NewPAGE has been described as, “... a multidisciplinary course with units of study (themes) developed by each college in the University. The course is designed to introduce students to the complexities and interrelationships of natural, societal, philosophical, aesthetic, engineering, educational, and health issues of our global environment. (NewPAGE website)” It also provides the students with the opportunity to study key environmental issues and the general policy decisions associated with them. In turn, students learn how these issues affect their current and future well being. Students must attend a one-hour lecture and two 50-minute discussion sections a week.

*Goals of the Study*

There are two goals in the proposed research. *First*, the researcher intended to determine what initial attitudes and behaviors students have about the environment and how they change as a result of the required global environmentalism course. *Second*, the researcher planned to learn which variables (i.e., gender, ethnicity, and pretest attitude and behavior scores) were significantly related to attitudes toward the environment and involvement in environmentally friendly behaviors. Various studies have been conducted that look at community recycling plans and environmental education programs (Armstrong & Impara, 1991; Lasana, 1992; Roth & Perez, 1989; Simmons, 1991; Smith-
Sebasto, 1995), but few studies exists that focus on the impact of mandatory environmental courses for 1st year college students.

Most research looking at environmental attitudes involves elementary school students, residents from various communities, seniors in high school, and samples of college students with varying year-in-school statuses. However, the literature lacks studies that look at the effect of environmental education programs on first-year college students. The studies that have looked at predictors of environmental attitudes and behaviors have varied in their results. For this reason, it is important to examine how various demographic variables relate to environmental attitudes and behaviors.

**Major Hypotheses**

*Hypothesis 1* - Students' environmental attitudes, concerns, and behaviors will positively change after having taken a global environmentalism course. It was expected that positive attitudes, the amount of concern toward the environment, and environmentally friendly behaviors would significantly increase from pretest to posttest.

*Hypothesis 2* – It was expected that women would report more positive attitudes toward the environment, more concern about the environment, and engage in more environmentally friendly behaviors than men after taking the global environmentalism course.

*Hypothesis 3* - It is expected that minority students (African-American/Black, Asian/Pacific Islander, and Hispanics) will report more positive attitudes toward the environment, more concern for the environment and engage in more environmentally friendly behaviors than Caucasians after taking the global environment course.
Research Question - We also conducted analyses to determine which of the variables (i.e., gender, ethnicity, and pretest attitude, concern, and behavior scores) were the best predictors of posttest environmental attitudes, concerns, and behaviors.
METHOD

Participants

Participants in this study were 1125 first-year students (686 females, 439 males) attending Old Dominion University that enrolled in NewPAGE during the Spring semester of 2005. Caucasian students represented 58.8% of the participants, followed by Black/African-American students (29.5%), Asian/Pacific Islanders (7.9%), and Hispanics (4.1%). Refer to Table 1 and 2 for more information on characteristics of participants. This study was approved by the Old Dominion University Institutional Review Board and followed all American Psychological Association (2002) guidelines.

Table 1
Frequency Table of Gender and Ethnicity (N = 1125)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Men</th>
<th>Women</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
</tr>
<tr>
<td>Ethnicity</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>African-American</td>
<td>83</td>
<td>7.4</td>
<td>249</td>
</tr>
<tr>
<td>Asian/Pacific Islander</td>
<td>37</td>
<td>3.3</td>
<td>48</td>
</tr>
<tr>
<td>Caucasian</td>
<td>302</td>
<td>26.8</td>
<td>360</td>
</tr>
<tr>
<td>Hispanic</td>
<td>17</td>
<td>1.5</td>
<td>29</td>
</tr>
</tbody>
</table>
Table 2
Characteristics of Participants \( (N = 1125) \)

<table>
<thead>
<tr>
<th>Variable</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>College</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sciences</td>
<td>439</td>
<td>39.1</td>
</tr>
<tr>
<td>Non-Sciences</td>
<td>508</td>
<td>45.2</td>
</tr>
<tr>
<td>Undecided</td>
<td>176</td>
<td>15.7</td>
</tr>
<tr>
<td><strong>Age</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>21</td>
<td>1.9</td>
</tr>
<tr>
<td>18</td>
<td>798</td>
<td>71.2</td>
</tr>
<tr>
<td>19</td>
<td>265</td>
<td>23.6</td>
</tr>
<tr>
<td>20</td>
<td>21</td>
<td>1.9</td>
</tr>
<tr>
<td>21</td>
<td>6</td>
<td>.5</td>
</tr>
<tr>
<td>22+</td>
<td>10</td>
<td>.9</td>
</tr>
<tr>
<td><strong>Marital Status</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Single, never married</td>
<td>1106</td>
<td>98.7</td>
</tr>
<tr>
<td>Married</td>
<td>11</td>
<td>1.0</td>
</tr>
<tr>
<td>Separated or divorced</td>
<td>3</td>
<td>.3</td>
</tr>
<tr>
<td>Widowed</td>
<td>1</td>
<td>.1</td>
</tr>
<tr>
<td><strong>Relationship Status</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Single, not in a committed relationship</td>
<td>644</td>
<td>57.4</td>
</tr>
<tr>
<td>Single, in a committed relationship</td>
<td>445</td>
<td>39.7</td>
</tr>
</tbody>
</table>
Table 2 Continued

<table>
<thead>
<tr>
<th>Variable</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Living with a partner</td>
<td>22</td>
<td>2.0</td>
</tr>
<tr>
<td>Married</td>
<td>10</td>
<td>.9</td>
</tr>
</tbody>
</table>

Current Residence

<table>
<thead>
<tr>
<th>Residence</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residence hall/dorm</td>
<td>689</td>
<td>61.5</td>
</tr>
<tr>
<td>Apartment, house, condo</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Not with parents)</td>
<td>77</td>
<td>6.9</td>
</tr>
<tr>
<td>Fraternity/sorority house</td>
<td>2</td>
<td>.2</td>
</tr>
<tr>
<td>Live with parents</td>
<td>352</td>
<td>31.4</td>
</tr>
</tbody>
</table>

Measures

A 17-page survey was given to participants at pretest and posttest, which asked for a variety of background questions such as, “How old are you, in years?”, “What is your sex?”, and “What is your marital status?” It also asked questions that assess the following constructs. Refer to Appendices C and F for these measures.

*New Ecological Paradigm - NEP.* The Revised NEP (Dunlap, Van Liere, Mertig & Jones, 2000) is a 15-item measure, which assesses attitudes towards the environment. The 15 items are combined into a single composite scale. Principle component analysis was conducted to determine if there were subscales. The previous internal consistency for this scale was .83. The internal consistency alpha coefficient for the current study was .75 at pretest and .85 at posttest. Dunlap et al. (2000) reported that the NEP has criterion validity, content validity, and construct validity. The 15 items are directed at how
respondents think people impact the environment and both the present and future condition of the earth (e.g., Plants and animals have as much right as humans to exist). Items are rated on a 5-point scale with the response choices: 1 - Strongly Disagree, 2 - Mildly Disagree, 3 - Unsure, 4 - Mildly Agree, and 5 - Strongly Agree. Higher scores indicate stronger positive attitudes toward the environment.

Environmental Concerns – ECS. Students’ level of concern with the environment was determined using the 21-item Environmental Concern Scale (Adapted from Survey of Public Attitudes to Quality of Life and to the Environment: 2001, by the Department of Environment Food and Rural Affairs, in England). Items are collapsed into one composite score. Respondents use a 5-point scale to rate the level of concern with the environment: 0 – Not heard of, 1 - Not at all concerned, 2 - Not very concerned, 3 - Fairly concerned, and 4 - Very concerned. Items rated include environmental topics such as; Acid rain, Climate Change/global warming, Decay of Inner Cities, Disposal of hazardous waste, Pollution, Traffic, etc. No information concerning the internal consistency or validity of this measure was reported in the previous study. The internal consistency alpha coefficient for the current study was .94 at pretest and .97 at posttest.

Environmental Behaviors – EB. The Modified Environmental Behavior Index (Milbrath, 1984) assesses how frequently people engage in various environmental behaviors. Among the behaviors included in this 18-item measure are conventional environmentally-friendly behaviors (i.e., picking up litter, recycling, reduce plastic use), environmental behaviors that display a stronger sense of dedication to protection of the environment (i.e., joining an environmental group, use of natural products, eating organic food), as well as behaviors that are more political in nature (writing a congressman on an
environmental issue, joining an environmental protest/demonstration, contacting
government agencies for environmental information). Items are collapsed into a single
composite score. Individuals use a 5-point scale is used to rate each item: 0 - Never, 1 -
Very infrequently (less than once a year), 2 - Infrequently (less than once every 6
months), 3 - Sometimes (once a month-every 6 months), and 4 - Often (several times a
month or more). No information concerning the internal consistency or validity of this
measure was reported.

Procedure

During the spring 2005 semester, students in this mandatory class had the choice of
completing seven online surveys or summarizing three articles as part of the NewPAGE
course requirements. Data from the first and the seventh surveys were used in this study.
Students earned 15 points (1st survey), and 20 points (7th survey) for the completion of
each of these surveys in order to fulfill 35 of the 50 points in the NewPAGE course that
have been allotted for surveys. The online surveys took students around 45 minutes each
to complete.

Students' unique identification numbers (UIN) were required on each survey, so
that the researchers could track student participation as well as link the data from each
survey with other data collected from the students (e.g., grades, credits) by Institutional
Research. All information the students reported on the surveys was kept confidential and
the findings were reported in group, not individual formats. Students were allowed to opt
out of participating in the completion of the surveys. 1525 students completed the pretest
and 1360 students completed the posttest. 1229 students completed both the pretest and
the posttest. They were also able to discontinue their participation at any point merely by
closing the survey browser window. A description of the study protocol preceded each survey (see Appendices A and B).

Description of Analyses

The researcher calculated descriptive statistics and frequencies in order to determine if there were any outliers and to detect any missing data. Assumptions of repeated measures analysis of variance and between subjects analysis of covariance (i.e., missing data, homogeneity of variance, and absence of outliers), principle component analysis (i.e., adequate spread, linearity), and multiple regression (i.e., linearity, interval/ratio data) were addressed.

To address Hypothesis 1, six repeated measures analyses of variance were performed to determine students' attitudes/concerns about the environment and how often they engage in environmentally friendly behaviors after taking the global environmentalism course. Students' attitudes and concerns about the environment and frequency students engaged in environmentally friendly behaviors served as the dependent variables.

To address Hypothesis 2, after controlling for pretest scores, six between subjects ANCOVAs were performed to determine if there were any gender differences in students' attitudes/concerns about the environment and how often they engaged in environmentally friendly behaviors after taking the global environmentalism course. For the between subjects ANCOVAs, gender (male, female) served as the independent variable. Students' attitudes and concerns about the environment and frequency students engage in environmentally friendly behaviors served as the dependent variables.
To address Hypothesis 3, after controlling for pretest scores, six between subjects ANCOVAs were performed to determine if there were any ethnicity differences in students' attitudes/concerns about the environment and how often they engaged in environmentally friendly behaviors after taking the global environmentalism course. For the between subjects ANCOVAs, ethnicity (African-American/Black, Asian/Pacific Islander, Caucasian, Hispanic) served as the independent variable. Students' attitudes and concerns about the environment and frequency students engaged in environmentally friendly behaviors served as the dependent variables.

To address the research question, three hierarchical multiple regressions were performed. The dependent variables in this regression were posttest environmental attitude score, posttest environmental concern score, and posttest environmental behavior scores. These analyses assessed whether any of these individual variables were significantly related to environmental posttest attitudes, concerns, and behaviors. For environmental attitudes, concerns, and behaviors, precourse NEP, ECS, and EB scores were also used as predictors. For Step 1, the researcher entered gender, ethnicity, pretest attitude score, pretest concern score, and pretest behavior scores into the regression analysis.
RESULTS

Preliminary Analyses

Assumptions of repeated measures analysis of variance and between subjects analysis of covariance (i.e., missing data, homogeneity of variance, and absence of outliers), principle component analysis (i.e., adequate spread, linearity), and multiple regression (i.e., linearity, interval/ratio data) were addressed. Levene’s tests were used to test for homogeneity of variance. Heterogeneity of variance was found for some of the analyses. However, analysis of variance is robust to violation of this assumption (Tabachnick & Fidell, 2001). The researcher calculated descriptive statistics and frequencies in order to determine if there were any outliers and to detect any missing data. Few missing values (less than 5%) were present in the dataset and fewer that 2% of the scores for any of the measures were outliers, so it was decided to keep these data as is in the dataset. Refer to Table 3 for means and standard deviations for all dependent variables.

Table 3
Descriptive Table of Participant Characteristics

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>N</th>
<th>M</th>
<th>SD</th>
<th>Skewness</th>
<th>Kurtosis</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Attitudes toward the Environment</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pretest</td>
<td>1077</td>
<td>3.42</td>
<td>.47</td>
<td>.07</td>
<td>-.02</td>
</tr>
<tr>
<td>Posttest</td>
<td>1049</td>
<td>3.28</td>
<td>.47</td>
<td>.36</td>
<td>.59</td>
</tr>
</tbody>
</table>
Table 3 Continued

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>$N$</th>
<th>$M$</th>
<th>$SD$</th>
<th>Skewness</th>
<th>Kurtosis</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Concerns about the Environment</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pretest</td>
<td>1125</td>
<td>3.68</td>
<td>.55</td>
<td>-.65</td>
<td>2.22</td>
</tr>
<tr>
<td>Posttest</td>
<td>1125</td>
<td>3.53</td>
<td>.69</td>
<td>-.87</td>
<td>1.65</td>
</tr>
<tr>
<td><strong>Environmentally Friendly Behaviors</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Utilize Pro-Environmental Behaviors</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pretest</td>
<td>1100</td>
<td>2.26</td>
<td>1.03</td>
<td>.46</td>
<td>-.78</td>
</tr>
<tr>
<td>Posttest</td>
<td>1089</td>
<td>2.27</td>
<td>1.02</td>
<td>.41</td>
<td>-.73</td>
</tr>
<tr>
<td>Pro-Environmental Group Involvement</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pretest</td>
<td>1101</td>
<td>1.64</td>
<td>.82</td>
<td>1.69</td>
<td>2.49</td>
</tr>
<tr>
<td>Posttest</td>
<td>1086</td>
<td>1.88</td>
<td>.93</td>
<td>1.01</td>
<td>.07</td>
</tr>
<tr>
<td>Other Pro-Environmental Activities</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pretest</td>
<td>1073</td>
<td>2.14</td>
<td>.79</td>
<td>.75</td>
<td>.19</td>
</tr>
<tr>
<td>Posttest</td>
<td>1069</td>
<td>2.27</td>
<td>.84</td>
<td>.41</td>
<td>-.37</td>
</tr>
<tr>
<td>Recycling</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pretest</td>
<td>1123</td>
<td>3.64</td>
<td>1.38</td>
<td>-.61</td>
<td>-.94</td>
</tr>
<tr>
<td>Posttest</td>
<td>1118</td>
<td>3.47</td>
<td>1.36</td>
<td>-.41</td>
<td>-1.07</td>
</tr>
</tbody>
</table>
**Principle Components Analyses**

The first set of Principle Components Analyses (PCAs) were conducted on the NEP scale using varimax rotation. Although the two and three factor solutions accounted for adequate variance (i.e., greater than 50% total variance), they yielded low reliabilities and included fewer items. The one factor solution, which included all 15 items, accounted for 27.56% of the variance. Therefore, it was decided to retain the NEP as a unidimensional construct. This is consistent with previous research on the NEP which has also used one factor (Dunlap, Van Liere, Mertig & Jones, 2000).

A PCA with varimax rotation was conducted on the ECS Scale. In the two factor solution, the percent of variance accounted for (61.25%) was higher than in the one factor solution (50.43%). However, it was decided to keep only one factor for this scale for conceptual reasons.

Principle Components Analyses with varimax rotation were also conducted for the EBS. A three factor solution yielded high reliabilities and made the best sense conceptually. One single-item, “recycle”, which did not load well on any of the factors, was retained as a dependent variable because the researcher thought it was an important item to include as an outcome variable. The total variance accounted for by these three factors was 63.68%. The internal consistency alpha coefficients for the environmental behavior subscales in the current study are as follows; Utilize Pro-Environmental Products subscale (.79 at pretest, .84 at posttest), Pro-Environmental Group Involvement (.88 at pretest, .90 at posttest), and Other Pro-Environmental Activities (.84 at pretest, .87 at pretest).
Changes in Environmental Attitudes and Concerns

In order to test the first hypothesis, which stated students' environmental attitudes, environmental concerns, and environmental behaviors would significantly increase from pretest to posttest, six repeated measures analyses of variance were performed. To assess whether students' attitudes toward the environment changed over the course of the semester a repeated measures ANOVA was performed. This analysis yielded significant results, $F(1, 1002) = 90.27, p < .001$, partial $\eta^2 = .01$, power $= .70$. Students' attitudes toward the environment significantly decreased from pretest ($M = 3.41, SD = .48$) to posttest ($M = 3.28, SD = .47$). Refer to Table 3 for means and standard deviations for all repeated measures ANOVAS.

A repeated measures ANOVA was used to test whether there was a change in students' environmental concerns. Results showed that there was a significant decrease in students' environmental concerns $F(1, 1124) = 58.38, p < .001$, partial $\eta^2 = .05$, power $= 1.00$. Students' concerns toward the environment significantly decreased from pretest ($M = 3.68, SD = .55$) to posttest ($M = 3.53, SD = .69$).

Environmental Behaviors

Refer to Table 4 for frequencies of students' environmental behaviors at pretest and posttest.

To assess whether there was a significant change in the frequency at which students utilized pro-environmental products, a repeated measures ANOVA was conducted. Results showed that there was not a significant change in the frequency at which students utilize pro-environmental products $F(1, 1065) = .04, ns$. Students'
tendency to utilize pro-environmental products did not significantly change from pretest to posttest.

Table 4
Frequency Table of Environmental Behaviors at Pretest and Posttest

<table>
<thead>
<tr>
<th>Behavior</th>
<th>Sometimes/Often at Pretest</th>
<th>Sometimes/Often at Posttest</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>( n )</td>
<td>%</td>
</tr>
<tr>
<td>Recycle</td>
<td>671</td>
<td>59.7%</td>
</tr>
<tr>
<td>Compost</td>
<td>236</td>
<td>21.2%</td>
</tr>
<tr>
<td>Reduce Plastic Use</td>
<td>304</td>
<td>27.3%</td>
</tr>
<tr>
<td>Pick Up Litter</td>
<td>526</td>
<td>47.1%</td>
</tr>
<tr>
<td>Join Environmental Groups</td>
<td>97</td>
<td>8.7%</td>
</tr>
<tr>
<td>Garden</td>
<td>269</td>
<td>24.2%</td>
</tr>
<tr>
<td>Use Natural Products</td>
<td>286</td>
<td>25.7%</td>
</tr>
<tr>
<td>Attend Rallies</td>
<td>66</td>
<td>5.9%</td>
</tr>
<tr>
<td>Buy Organic Foods</td>
<td>247</td>
<td>22.1%</td>
</tr>
<tr>
<td>Give Money to Support</td>
<td>111</td>
<td>9.9%</td>
</tr>
<tr>
<td>Environmental Group</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Switch Products for</td>
<td>152</td>
<td>13.5%</td>
</tr>
<tr>
<td>Environmental Reason</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Buy Products in recyclable</td>
<td>272</td>
<td>24.3%</td>
</tr>
<tr>
<td>Packaging</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clean-Up Event/Drive</td>
<td>176</td>
<td>15.8%</td>
</tr>
<tr>
<td>Contact Community/Gov.</td>
<td>74</td>
<td>6.6%</td>
</tr>
<tr>
<td>About Environment</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
A repeated measures ANOVA was conducted to assess whether there was a significant change in students' involvement in pro-environmental groups over the semester. This analysis showed that there was a significant increase in students' involvement in pro-environmental groups $F(1, 1064) = 66.62, p < .001$, partial $\eta^2 = .06$, power = 1.00. Students' involvement in pro-environmental groups significantly increased from pretest ($M = 1.64, SD = .82$) to posttest ($M = 1.88, SD = .93$).

To assess whether there was a significant change in the frequency at which students engage in other pro-environmental activities (e.g., compost, reduce plastic use), a repeated measures ANOVA was performed. Results showed that there was a significant increase in the frequency at which students engage in other pro-environmental activities $F(1, 1019) = 21.73, p < .001$, partial $\eta^2 = .02$, power = 1.00. Students' tendency to engage
in other pro-environmental activities significantly increased from pretest \((M = 2.15, SD = .79)\) to posttest \((M = 2.27, SD = .84)\).

A repeated measures ANOVA was performed to assess whether there was a significant change in the frequency at which students recycle. This analysis showed that there was a significant decrease in the frequency at which students recycle \(F(1, 1115) = 21.70, p < .001, \text{ partial } \eta^2 = .02, \text{ power } = 1.00\). Students' recycling significantly decreased from pretest \((M = 3.64, SD = 1.38)\) to posttest \((M = 3.47, SD = 1.36)\).

**Gender Differences in Posttest Environmental Attitudes and Concerns**

In order to test the second hypothesis, which stated that women were expected to report more concern about the environment and engage in more environmentally friendly behaviors than men after taking the course, six between subjects analyses of covariance were performed. A between subjects ANCOVA was performed to determine whether there were gender differences in students' attitudes toward the environment after having taken the course on global environmentalism. Results revealed that there were no significant differences between genders concerning attitudes toward the environment, after controlling for pretest scores \(F(1, 1000) = .05, ns\). This shows that there is no significant difference between men and women on attitudes toward the environment after taking the course. Table 5 provides the means and standard deviations for students' attitudes toward the environment by gender. ANOVA results are presented in Table 6.

In order to test if there were any gender differences in students' concern about the environment after taking the course, a between subjects ANCOVA was conducted. There were no significant differences between genders regarding environmental concerns, after controlling for pretest scores \(F(1, 1122) = .17, ns\). This shows that there is not a
significant difference between men and women on environmental concerns at the end of the semester. Table 7 provides the means and standard deviations for students' concern about the environment by gender. ANOVA results are presented in Table 8.

Table 5
Posttest Environmental Attitudes by Gender

<table>
<thead>
<tr>
<th>Gender</th>
<th>n</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Males</td>
<td>413</td>
<td>3.29</td>
<td>.49</td>
</tr>
<tr>
<td>Females</td>
<td>636</td>
<td>3.27</td>
<td>.46</td>
</tr>
</tbody>
</table>

Table 6
Source Table for Posttest Environmental Attitudes by Gender

<table>
<thead>
<tr>
<th>Source</th>
<th>df</th>
<th>F</th>
<th>partial $h^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pretest Environmental Attitudes (cv)</td>
<td>1</td>
<td>431.39***</td>
<td>.09</td>
</tr>
<tr>
<td>Gender</td>
<td>1</td>
<td>.05</td>
<td>.00</td>
</tr>
<tr>
<td>Error</td>
<td>1000</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*** $p < .001$.

Gender Differences in Environmental Behaviors

When testing to determine if there were any gender differences in students' environmental behaviors after taking the course, four between subjects ANCOVAs were
performed. Concerning the frequency at which students utilize pro-environmental products, results revealed that there were no significant gender differences, after controlling for pretest scores $F(1, 1063) = .49, ns$. This shows that there is not a significant difference between men and women on the frequency at which students utilize pro-environmental products at the end of the semester. Table 9 provides the means and standard deviations for the frequency at which students utilize pro-environmental products by gender. ANOVA results are presented in Table 10.

Table 7
Posttest Environmental Concern by Gender

<table>
<thead>
<tr>
<th>Gender</th>
<th>n</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Males</td>
<td>439</td>
<td>3.55</td>
<td>.68</td>
</tr>
<tr>
<td>Females</td>
<td>686</td>
<td>3.51</td>
<td>.70</td>
</tr>
</tbody>
</table>

Table 8
Source Table for Posttest Environmental Concern by Gender

<table>
<thead>
<tr>
<th>Source</th>
<th>df</th>
<th>$F$</th>
<th>partial $\eta^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pretest Environmental Concern (cv)</td>
<td>1</td>
<td>296.24***</td>
<td>.04</td>
</tr>
<tr>
<td>Gender</td>
<td>1</td>
<td>.17</td>
<td>.00</td>
</tr>
<tr>
<td>Error</td>
<td>1122</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*** $p < .001$. 


Table 9  
*Posttest Utilize Pro-Environmental Products by Gender*

<table>
<thead>
<tr>
<th>Gender</th>
<th>n</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Males</td>
<td>421</td>
<td>2.27</td>
<td>1.03</td>
</tr>
<tr>
<td>Females</td>
<td>668</td>
<td>2.27</td>
<td>1.01</td>
</tr>
</tbody>
</table>

Table 10  
*Source Table for Posttest Utilize Pro-Environmental Products by Gender*

<table>
<thead>
<tr>
<th>Source</th>
<th>df</th>
<th>F</th>
<th>partial $\eta^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pretest Utilize Pro-Environmental Products (cv)</td>
<td>1</td>
<td>403.24***</td>
<td>.08</td>
</tr>
<tr>
<td>Gender</td>
<td>1</td>
<td>.49</td>
<td>.00</td>
</tr>
<tr>
<td>Error</td>
<td>1063</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*** $p < .001$.  

A between subjects ANCOVA was used to assess whether there were any gender differences in students' pro-environmental group involvement at the end of the semester. No significant gender differences were found, after controlling for pretest scores $F(1, 1062) = .12, ns$. This shows that there is not a significant difference between men and women concerning students' pro-environmental group involvement after taking the
course. Table 11 provides the means and standard deviations for students’ pro-
environmental group involvement by gender. ANOVA results are presented in Table 12.

Table 11
Posttest Pro-Environmental Group Involvement by Gender

<table>
<thead>
<tr>
<th>Gender</th>
<th>n</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Males</td>
<td>419</td>
<td>1.86</td>
<td>.93</td>
</tr>
<tr>
<td>Females</td>
<td>667</td>
<td>1.89</td>
<td>.93</td>
</tr>
</tbody>
</table>

To assess whether there were any gender differences in the frequency at which students engage in other pro-environmental activities after taking the course, a between subjects ANCOVA was performed. Results showed that there were no significant gender differences, after controlling for pretest scores $F(1, 1017) = .30, ns$. This shows that there is not a significant difference between men and women concerning the frequency at which students engage in other pro-environmental activities at the end of the semester.

Table 13 provides the means and standard deviations for the frequency at which students engage in other pro-environmental activities by gender. ANOVA results are presented in Table 14.

A between subjects ANCOVA was used to assess whether there were any gender differences in the frequency at which students recycle after taking the course. No significant gender differences were found, after controlling for pretest scores $F(1, 1113) = .06, ns$. This shows that there is not a significant difference between men and women
concerning the frequency at which students recycle at the end of the semester. Table 15 provides the means and standard deviations for the frequency at which students recycle by gender. ANOVA results are presented in Table 16.

Table 12
*Source Table for Posttest Pro-Environmental Group Involvement by Gender*

<table>
<thead>
<tr>
<th>Source</th>
<th>df</th>
<th>F</th>
<th>partial η²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pretest</td>
<td>1</td>
<td>240.10***</td>
<td>.03</td>
</tr>
<tr>
<td>Pro-Environmental Group Involvement (cv)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td>1</td>
<td>.12</td>
<td>.00</td>
</tr>
<tr>
<td>Error</td>
<td>1062</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

***p < .001.

Table 13
*Posttest Other Pro-Environmental Activities by Gender*

<table>
<thead>
<tr>
<th>Gender</th>
<th>n</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Males</td>
<td>441</td>
<td>2.26</td>
<td>.83</td>
</tr>
<tr>
<td>Females</td>
<td>658</td>
<td>2.27</td>
<td>.85</td>
</tr>
</tbody>
</table>
Table 14
Source Table for Posttest Other Pro-Environmental Activities by Gender

<table>
<thead>
<tr>
<th>Source</th>
<th>df</th>
<th>F</th>
<th>partial $\eta^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pretest Other Pro-Environmental Activities (cv)</td>
<td>1</td>
<td>343.39***</td>
<td>.02</td>
</tr>
<tr>
<td>Gender</td>
<td>1</td>
<td>.30</td>
<td>.00</td>
</tr>
<tr>
<td>Error</td>
<td>1017</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*** $p < .001$.

Table 15
Posttest Recycling by Gender

<table>
<thead>
<tr>
<th>Gender</th>
<th>n</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Males</td>
<td>435</td>
<td>3.46</td>
<td>1.36</td>
</tr>
<tr>
<td>Females</td>
<td>683</td>
<td>3.47</td>
<td>1.36</td>
</tr>
</tbody>
</table>

Ethnic Differences in Posttest Environmental Attitudes and Concerns

For the third hypothesis, which stated that minority students were expected to report more concern for the environment and engage in more environmentally friendly behaviors than non-minorities after having taken the course on global environmentalism, six between subjects ANCOVAs were performed. A between subjects ANCOVA was performed to assess whether there were any ethnic differences in students’ attitudes
toward the environment after taking the course. Results revealed that there were no
significant differences between ethnicities, after controlling for pretest scores $F(3, 998) =
1.53, ns$. This shows that there is no significant difference between ethnicities on attitudes
toward the environment at the end of the semester. Table 17 provides the means and
standard deviations for students’ attitudes toward the environment by ethnicity. ANOVA
results are presented in Table 18.

Table 16
Source Table for Posttest Recycling by Gender

<table>
<thead>
<tr>
<th>Source</th>
<th>df</th>
<th>$F$</th>
<th>partial $\eta^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pretest Recycle (cv)</td>
<td>1</td>
<td>652.05***</td>
<td>.14</td>
</tr>
<tr>
<td>Gender</td>
<td>1</td>
<td>.06</td>
<td>.00</td>
</tr>
<tr>
<td>Error</td>
<td>1113</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*** $p < .001$.

In order to assess whether there were any ethnic differences in students’ concern
about the environment at the end of the semester, a between subjects ANCOVA was
performed. Significant differences between ethnicities were found, after controlling for
pretest scores $F(3, 1120) = 3.25, p < .05, \eta^2 = .00$. This shows that there is a significant
difference between ethnicities on environmental concerns after taking the course. Results
of a Tukey HSD test revealed that Blacks/African-Americans ($M = 3.59, SD = .69$) and
Caucasians ($M = 3.51, SD = .68$) reported significantly more concern for the environment
than Hispanics ($M = 3.27, SD = .95$). All other pairwise comparisons were non-significant. Table 19 provides the means and standard deviations for students' concern about the environment by ethnicity. ANOVA results are presented in Table 20.

Table 17
*Posttest Environmental Attitudes by Ethnicity*

<table>
<thead>
<tr>
<th>Ethnicity</th>
<th>n</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Black/African-American</td>
<td>313</td>
<td>3.27</td>
<td>.48</td>
</tr>
<tr>
<td>Asian/Pacific Islander</td>
<td>82</td>
<td>3.28</td>
<td>.40</td>
</tr>
<tr>
<td>Hispanic</td>
<td>42</td>
<td>3.17</td>
<td>.42</td>
</tr>
<tr>
<td>Caucasian</td>
<td>612</td>
<td>3.29</td>
<td>.48</td>
</tr>
</tbody>
</table>

*Ethnic Differences in Environmental Behaviors*

When testing to determine if there were ethnic differences in students' environmental behaviors after taking the course, four between subjects ANCOVAs were performed. Concerning the frequency at which students utilize pro-environmental products, no significant differences were found, after controlling for pretest scores $F(3, 1061) = .49, ns$. This shows that there were no significant differences between ethnicities on frequency at which students utilize pro-environmental products at the end of the semester. Table 21 provides the means and standard deviations for the frequency at which students utilize pro-environmental products by ethnicity. ANOVA results are presented in Table 22.
Table 18
Source Table for Posttest Environmental Attitudes by Ethnicity

<table>
<thead>
<tr>
<th>Source</th>
<th>df</th>
<th>F</th>
<th>partial $\eta^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pretest Environmental Attitude (cv)</td>
<td>1</td>
<td>434.14***</td>
<td>.09</td>
</tr>
<tr>
<td>Ethnicity</td>
<td>3</td>
<td>1.53</td>
<td>.00</td>
</tr>
<tr>
<td>Error</td>
<td>998</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*** $p < .001$.

Table 19
Posttest Environmental Concerns by Ethnicity

<table>
<thead>
<tr>
<th>Ethnicity</th>
<th>n</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Black/African-American</td>
<td>332</td>
<td>3.59a</td>
<td>.69</td>
</tr>
<tr>
<td>Asian/Pacific Islander</td>
<td>85</td>
<td>3.57ab</td>
<td>.65</td>
</tr>
<tr>
<td>Hispanic</td>
<td>46</td>
<td>3.27b</td>
<td>.95</td>
</tr>
<tr>
<td>Caucasian</td>
<td>662</td>
<td>3.51ab</td>
<td>.68</td>
</tr>
</tbody>
</table>

Note: Means having the same subscript are not significantly different from each other according to the Tukey HSD test.
Table 20
Source Table for Posttest Environmental Concerns by Ethnicity

<table>
<thead>
<tr>
<th>Source</th>
<th>df</th>
<th>F</th>
<th>partial η²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pretest Environmental Concern (cv)</td>
<td>1</td>
<td>296.45***</td>
<td>.04</td>
</tr>
<tr>
<td>Ethnicity</td>
<td>3</td>
<td>3.25*</td>
<td>.00</td>
</tr>
<tr>
<td>Error</td>
<td>1120</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* p < .05. *** p < .001.

Table 21
Posttest Utilizes Pro-Environmental Products by Ethnicity

<table>
<thead>
<tr>
<th>Ethnicity</th>
<th>n</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Black/African-American</td>
<td>323</td>
<td>2.28</td>
<td>.98</td>
</tr>
<tr>
<td>Asian/Pacific Islander</td>
<td>83</td>
<td>2.24</td>
<td>1.04</td>
</tr>
<tr>
<td>Hispanic</td>
<td>46</td>
<td>2.21</td>
<td>1.11</td>
</tr>
<tr>
<td>Caucasian</td>
<td>637</td>
<td>2.27</td>
<td>1.02</td>
</tr>
</tbody>
</table>

A between subjects ANCOVA was used to test whether there were any ethnicity differences in students' pro-environmental group involvement after taking the course. No significant ethnicity differences were found, after controlling for pretest scores $F(3, 1060) = .51, ns$. This shows that there were no significant differences between ethnicities concerning students' pro-environmental group involvement at the end of the semester.
Table 23 provides the means and standard deviations for students’ pro-environmental group involvement by ethnicity. ANOVA results are presented in Table 24.

Table 22
*Source Table for Posttest Utilizes Pro-Environmental Products by Ethnicity*

<table>
<thead>
<tr>
<th>Source</th>
<th>df</th>
<th>F</th>
<th>partial $r^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pretest Utilize Pro-Environmental Products (cv)</td>
<td>1</td>
<td>403.53***</td>
<td>.00</td>
</tr>
<tr>
<td>Ethnicity</td>
<td>3</td>
<td>.49</td>
<td>.00</td>
</tr>
<tr>
<td>Error</td>
<td>1061</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*** $p < .001$.

To assess whether there were any ethnicity differences in the frequency at which students engage in other pro-environmental activities after taking the course, a between subjects ANCOVA was conducted. No significant ethnic differences were found, after controlling for pretest scores $F(3, 1015) = .76, ns$. This shows that there were no significant differences between ethnicities concerning the frequency at which students engage in other pro-environmental activities at the end of the semester. Table 25 provides the means and standard deviations for the frequency at which students engage in other pro-environmental activities by ethnicity. ANOVA results are presented in Table 26.

A between subjects ANCOVA was used to test whether there were any ethnicity differences in the frequency at which students recycle after taking the course. No
significant difference between ethnicities was found, $F(3, 1111) = 1.10, ns$. This shows that there were no significant differences between ethnicities concerning the frequency at which students recycle at the end of the semester. Table 27 provides the means and standard deviations for the frequency at which students recycle by ethnicity. ANOVA results are presented in Table 28.

Table 23
Posttest Pro-Environmental Group Involvement by Ethnicity

<table>
<thead>
<tr>
<th>Ethnicity</th>
<th>n</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Black/African-American</td>
<td>318</td>
<td>1.89</td>
<td>.94</td>
</tr>
<tr>
<td>Asian/Pacific Islander</td>
<td>84</td>
<td>1.80</td>
<td>.91</td>
</tr>
<tr>
<td>Hispanic</td>
<td>44</td>
<td>1.89</td>
<td>1.01</td>
</tr>
<tr>
<td>Caucasian</td>
<td>640</td>
<td>1.88</td>
<td>.93</td>
</tr>
</tbody>
</table>

Predicting Posttest Environmental Attitudes and Concerns

Concerning the research question we asked, “Which variables (i.e, gender, ethnicity, pretest environmental attitude, pretest environmental concern, pretest utilize pro-environmental products, pretest pro-environmental group involvement, pretest other pro-environmental activities, and pretest recycling) tend to be the best predictors of environmental attitudes, concerns, and behaviors?” six standard multiple regressions were conducted. The data on ethnicity were dummy coded so that there were two groups: minority group members (Asians/Pacific Islanders, Blacks/African-Americans,
Hispanics) and non-minority group members (Caucasians). This was done in order to maintain parsimony.¹

Table 24  
*Source Table for Posttest Pro-Environmental Group Involvement by Ethnicity*

<table>
<thead>
<tr>
<th>Source</th>
<th>df</th>
<th>F</th>
<th>partial $\eta^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pretest</td>
<td>1</td>
<td>241.04***</td>
<td>.03</td>
</tr>
<tr>
<td>Pro-Environmental Group Involvement (cv)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ethnicity</td>
<td>3</td>
<td>.17</td>
<td>.00</td>
</tr>
<tr>
<td>Error</td>
<td>1060</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

** *** $p < .001$.**

Posttest attitude toward the environment was used as the dependent variable for the first multiple regression. The set of variables accounted for 31.6% of the posttest environmental attitude variance, $R = .57$, $F(8, 926) = 55.02$, $p < .001$. Pretest environmental attitude accounted for the most variance ($\beta = .48$, $sr^2 = .19$) in students' posttest environmental attitude, followed by pretest environmental concern ($\beta = .12$, $sr^2 = .01$), and pretest recycle ($\beta = .07$, $sr^2 = .00$). As pretest environmental attitudes, pretest environmental concern, and pretest recycle increased, there was a significant increase in

¹ We tested to see if adding the interactions among the predictors would significantly improve the model fit. However, there was not a significant change from Step 1, which included the individual predictors, to Step 2, which included the individual predictors as well as their interactions.
posttest environmental attitudes. Gender, ethnicity, pretest utilize pro-environmental products, pretest pro-environmental group involvement, and pretest other pro-environmental activities scores did not significantly predict posttest environmental attitudes scores. Refer to Table 29 for the posttest environmental attitudes multiple regression.

Table 25
Posttest Other Pro-Environmental Activities by Ethnicity

<table>
<thead>
<tr>
<th>Ethnicity</th>
<th>n</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Black/African-American</td>
<td>320</td>
<td>2.28</td>
<td>.82</td>
</tr>
<tr>
<td>Asian/Pacific Islander</td>
<td>81</td>
<td>2.20</td>
<td>.84</td>
</tr>
<tr>
<td>Hispanic</td>
<td>45</td>
<td>2.31</td>
<td>.83</td>
</tr>
<tr>
<td>Caucasian</td>
<td>623</td>
<td>2.27</td>
<td>.85</td>
</tr>
</tbody>
</table>

Posttest concern about the environment was used as the dependent variable for the second multiple regression. The set of variables accounted for 23.9\% of the posttest environmental concern variance $R = .50, F(8, 984) = 39.86, p < .001$. Pretest environmental concern ($\beta = .33; sr_i^2 = .09$) accounted for the most variance in this model, followed by pretest environmental attitude ($\beta = .19, sr_i^2 = .03$), and pretest other pro-environmental activities ($\beta = .12, sr_i^2 = .00$). As pretest environmental concern, pretest environmental attitudes, and pretest other pro-environmental activities increased, posttest environmental concerns increased. Gender, ethnicity, pretest utilize pro-environmental.
products, pretest pro-environmental group involvement, and pretest recycle scores were not significant predictors of posttest environmental concern scores. Refer to Table 30 for the posttest environmental concern multiple regression.

Table 26
Source Table for Posttest Other Pro-Environmental Activities by Ethnicity

<table>
<thead>
<tr>
<th>Source</th>
<th>df</th>
<th>F</th>
<th>partial $\eta^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pretest Other Pro-Environmental Activities (cv)</td>
<td>1</td>
<td>344.68***</td>
<td>.02</td>
</tr>
<tr>
<td>Ethnicity</td>
<td>3</td>
<td>.33</td>
<td>.00</td>
</tr>
<tr>
<td>Error</td>
<td>1065</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*** $p < .001$.

Table 27
Posttest Recycling by Ethnicity

<table>
<thead>
<tr>
<th>Ethnicity</th>
<th>n</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Black/African-American</td>
<td>328</td>
<td>3.47</td>
<td>1.30</td>
</tr>
<tr>
<td>Asian/Pacific Islander</td>
<td>85</td>
<td>3.39</td>
<td>1.37</td>
</tr>
<tr>
<td>Hispanic</td>
<td>46</td>
<td>3.00</td>
<td>1.52</td>
</tr>
<tr>
<td>Caucasian</td>
<td>659</td>
<td>3.51</td>
<td>1.37</td>
</tr>
</tbody>
</table>
Table 28
Source Table for Posttest Recycling by Ethnicity

<table>
<thead>
<tr>
<th>Source</th>
<th>df</th>
<th>F</th>
<th>partial η²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pretest Recycle (cv)</td>
<td>1</td>
<td>646.22***</td>
<td>.14</td>
</tr>
<tr>
<td>Ethnicity</td>
<td>3</td>
<td>2.19</td>
<td>.01</td>
</tr>
<tr>
<td>Error</td>
<td>1118</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*** p < .001.

Table 29
Predictors of Posttest Environmental Attitudes

<table>
<thead>
<tr>
<th>Posttest Environmental Attitudes</th>
<th>B</th>
<th>β</th>
<th>sr₂</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pretest Environmental Attitude</td>
<td>.47</td>
<td>.48***</td>
<td>.19</td>
</tr>
<tr>
<td>Pretest Environmental Concern</td>
<td>.11</td>
<td>.13***</td>
<td>.01</td>
</tr>
<tr>
<td>Pretest Recycle</td>
<td>.00</td>
<td>.07*</td>
<td>.00</td>
</tr>
</tbody>
</table>

Note: R = .33 and Adj. R² = .32.
Note: N = 934.
*p < .05. ***p < .001.
Predicting Posttest Environmental Behaviors

Posttest score for utilize pro-environmental products was used as the dependent variable for the third multiple regression. The set of variables accounted for 28.6% of the posttest utilize pro-environmental products variance, $R = .54$, $F (8, 956) = 49.17$, $p < .001$. Pretest utilize pro-environmental products accounted for the most variance in the model ($\beta = .41$, $sr^2 = .10$), followed by pretest environmental concern ($\beta = .07$, $sr^2 = .00$). As pretest utilize pro-environmental products and pretest environmental concern increased, posttest utilize pro-environmental products increased. Gender, ethnicity, pretest environmental attitudes, pretest pro-environmental group involvement, pretest other pro-environmental activities, and pretest recycle scores did not significantly predict posttest utilize pro-environmental products scores. Refer to Table 31 for the posttest utilize pro-environmental products multiple regression.

Posttest scores for pro-environmental group involvement were used as the dependent variable for the fourth multiple regression. The set of variables accounted for 19.8% of the posttest pro-environmental group involvement variance, $R = .45$, $F (8, 952) = 30.56$, $p < .001$. Pretest pro-environmental group involvement accounted for the most variance in the model ($\beta = .37$, $sr^2 = .05$), followed by pretest environmental concern ($\beta = .08$, $sr^2 = .00$). As pretest pro-environmental group involvement and pretest environmental concern increased, posttest pro-environmental group involvement increased. Gender, ethnicity, pretest environmental attitudes, pretest utilize pro-environmental products, pretest other pro-environmental activities, and pretest recycling scores did not significantly predict posttest pro-environmental group involvement scores.
Refer to Table 32 for the posttest pro-environmental group involvement multiple regression.

Table 30
*Predictors of Posttest Environmental Concerns*

<table>
<thead>
<tr>
<th>Posttest Environmental Attitudes</th>
<th>B</th>
<th>(\beta)</th>
<th>(sr^2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pretest Environmental Attitude</td>
<td>.27</td>
<td>.19***</td>
<td>.03</td>
</tr>
<tr>
<td>Pretest Environmental Concern</td>
<td>.42</td>
<td>.33***</td>
<td>.09</td>
</tr>
<tr>
<td>Pretest Other Pro-Environmental Activities</td>
<td>.11</td>
<td>.12*</td>
<td>.00</td>
</tr>
</tbody>
</table>

*Note:* \(R = .26\) and Adj. \(R^2 = .24\).

*Note:* \(N = 992\).

\(*p < .05. \ **p < .001.\)

Posttest score for other pro-environmental activities was used as the dependent variable for the fifth multiple regression. The set of variables accounted for 25.6% of the posttest other pro-environmental activities variance, \(R = .51, F(8, 937) = 41.58, p < .001\).

Pretest other pro-environmental activities accounted for most of the variance in the model (\(\beta = .39, sr^2 = .05\)), followed by pretest environmental concern (\(\beta = .09, sr^2 = .01\)). As pretest environmental concern and pretest other pro-environmental activities increased,
posttest other pro-environmental activities increased. Gender, ethnicity, pretest environmental attitudes, pretest utilize pro-environmental products, pretest pro-environmental group involvement, and pretest recycling scores did not significantly predict posttest other pro-environmental activities scores. Refer to Table 33 for the other pro-environmental activities multiple regression.

Table 31
Predictors of Posttest Utilize Pro-Environmental Products

<table>
<thead>
<tr>
<th>Posttest Environmental Attitudes</th>
<th>B</th>
<th>β</th>
<th>sr_{i}^{2}</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pretest Environmental Concern</td>
<td>.13</td>
<td>.07***</td>
<td>.00</td>
</tr>
<tr>
<td>Pretest Utilize Pro-Environmental Products</td>
<td>.40</td>
<td>.41*</td>
<td>.00</td>
</tr>
</tbody>
</table>

*Note:* R = .30 and Adj. R^2 = .29.

*Note:* N = 964.

* p < .05. ***p < .001.

Posttest score for recycling was used as the dependent variable for the sixth multiple regression. The set of variables accounted for 38.7% of the posttest recycling variance R = .62, F(8, 978) = 77.19, p < .001. Pretest recycle accounted for most of the variance in the model (β = .57, sr_{i}^{2} = .29), followed by pretest pro-environmental group involvement (β = -.09, sr_{i}^{2} = .00); and pretest environmental concern (β = .06, sr_{i}^{2} = .00).
As pretest recycle and pretest environmental concern increased posttest recycling increased. As pretest pro-environmental group involvement increased posttest recycling decreased. Gender, ethnicity, pretest environmental attitude, pretest utilize pro-environmental products, pretest other pro-environmental activities scores did not significantly predict posttest recycling scores. Refer to Table 34 for the recycle multiple regression.

Table 32
Predictors of Posttest Pro-Environmental Group Involvement

<table>
<thead>
<tr>
<th>Posttest Environmental Attitudes</th>
<th>B</th>
<th>( \beta )</th>
<th>( sr_1^2 )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pretest Environmental Concern</td>
<td>.14</td>
<td>.08*</td>
<td>.00</td>
</tr>
<tr>
<td>Pretest Pro-Environmental Group Involvement</td>
<td>.42</td>
<td>.37***</td>
<td>.05</td>
</tr>
</tbody>
</table>

Note: \( R^2 = .22 \) and Adj. \( R^2 = .20 \).
Note: \( N = 960 \).
* \( p < .05 \). *** \( p < .001 \).
SUMMARY

This study focused on differences in first-year college students’ attitudes, concerns, and behaviors related to the environment after having taken a mandatory course on the environment. The first hypothesis stated that students would show an increase in attitudes and concern toward the environment as well as engage in more environmentally friendly behaviors from the beginning of the semester to the end of the semester. This hypothesis was partially supported as two out of the six dependent variables (i.e., pro-environmental group involvement, and other pro-environmental activities) significantly increased over time. Students’ attitudes toward the environment, concerns about the environment, and the frequency at which students recycled significantly decreased from the beginning to the end of the semester. Students’ tendency to utilize pro-environmental products did not significantly change from the beginning to the end of the semester.

One possible explanation for these findings is that students became more negative or apathetic towards the environment because the course was a mandatory general education class. Their dislike of the course may have translated into less positive environmental attitudes and concerns (Morrow, Pribesh et al., 2005). They may have decided that they did not care as much about the content of the course, but still engaged in the environmentally friendly behaviors because they were now more aware of things that they could do to help preserve the environment. This would explain the decrease in attitudes toward the environment and concerns about the environment while students’ pro-environmental group involvement and frequency at which they engaged in other pro-
environmental activity increased. The only environmental behavior that students engaged in significantly more at the beginning of the semester than at the end was recycling. However, this may be explained by the fact that many students may not have access to recycling facilities. Concerning on-campus students, although there are recycling bins for paper in most of the computer labs, recycling bins are not available on each floor of the dorms. And for off-campus students, not all neighborhoods have curb-side recycling or any other type of recycling program. These results differ from previous literature (Thapa, 2000) which has found that, among behaviors surveyed, participants engaged most in recycling and least in campus activism.

The second hypothesis stated that women would report more positive attitudes toward the environment, more concern about the environment, and engage in more environmentally friendly behaviors than men after taking the global environmentalism course. This hypothesis was not supported as there were no significant differences between men and women concerning attitudes toward the environment, concern about the environment, or environmentally friendly behaviors. These results differ from the findings in previous research (Wehrmeyer & McNeil, 2000) which showed that gender differences were present when looking at pharmaceutical employees. However, this could be due to the fact that the current study looked at a different population, college students. Maybe at the college level, men and women have not yet acquired the knowledge about the environment that may lead to their differing opinions later in life. This possibility is supported by Steel’s (1996) study in which gender differences between older cohorts were found to be greater than younger cohorts. Shichao (2003) found similar results as only 5% of the 58 people in the study who were under 30 years old reported collecting
recyclables compared to the 45% of people 47 people who were more than 49 years old. Furthermore, most of them reported not caring about recycling or were against the recycling that their family members engaged in because it took extra time out of their routine. Also, according to Perry’s scheme of intellectual and ethical development (n.d.), students who are just entering college view both knowledge and truth from the perspective that there is either a right or wrong answer to everything. Perry refers to students at this stage as using dualistic thought (Position 2 of 9). According to Perry, it is not until the one of the later stages (Position 5 of 9) in his model that students are able to think from the perspective he refers to as contextual relativism. In this stage, students are able to view the world as relativistic and they let go of their dualistic way of thought for the most part. Perhaps the gender differences in students’ environmental attitudes, concerns, and behaviors may not be detectable until students reach this stage of contextual relativism.

The third hypothesis stated that minority students (African-American/Black, Asian/Pacific Islander, and Hispanics) would report more positive attitudes toward the environment, more concern for the environment and engage in more environmentally friendly behaviors than non-minorities after taking the global environment course. This hypothesis was partially supported as the only ethnicity difference found was between Blacks, Caucasians, and Hispanics for environmental concern. Blacks reported more environmental concern that Caucasians and Hispanics. There were no significant differences among ethnicities regarding students’ attitudes towards the environment, frequency at which they utilize pro-environmental products, pro-environmental group involvement, other pro-environmental activities, or recycling. This finding contradicts the
findings of previous research by Parker and McDonough (1999) in which it was found that feelings of powerlessness and environmental behavior had a stronger relationship for African Americans than Caucasians. This relationship suggests that feelings of powerlessness serve as a barrier to engaging in environmental behaviors for many African Americans. In other words, African Americans were more likely to engage in environmentally friendly behaviors if they felt that their doing so would make a difference.

Concerning the research question, “Which of the following variables (i.e., gender, ethnicity, and pretest attitude, concern, and behavior scores) are the best predictors of environmental attitudes, concerns, and behaviors?” two trends were evident in the results. The first trend was that each dependent variable was predicted by its pretest score. The second trend was that all dependent variables were related to students’ pretest environmental concern. These findings tell us that students’ environmental attitudes, concerns, and behaviors after having taken an environmental course are best predicted by the environmental attitudes, concerns, and behaviors that they bring with them at the beginning of the semester.

Limitations

This study was limited by the measures that were available. For instance, the environmental behaviors measure that was used asked students how often they performed each of the behaviors using a scale that included responses such as less than once a year, less than once every six months, and once a month to every six months. These responses refer to a time period longer than the semester that the students are enrolled in NewPAGE. Therefore, environmental behaviors that students performed well before
having taken the course are being measured, which may have caused the results to inaccurate. Another limitation of this study was that there was not a control group. Due to the fact that all first-year students were required to take the global environmentalism course, the researcher was unable to compare the environmental attitudes, concerns, and behaviors of first-year students who took the course with those who did not.

Another limitation of this study was the research design used in this study. The one-group pretest posttest design (i.e., o—x—o) has certain issues associated with it such as weak internal and external validity. In this type of design, there are a number of specific threats that the researcher must also be aware of (e.g., history, maturation, testing, instrumentation, interaction of testing and treatment). One final limitation of this study is that there was a three month period between the pretest and the posttest surveys. The results in this study may have been different had the posttest been conducted even later. Also, the researchers did not have the opportunity for a long term follow-up. It would have been interesting to survey the students again at six months and a year past the end of the course.

Implications

One point to consider was that 50% of the participants in this study were students who live with their parents. Therefore, there is a chance that their attitudes may be influenced by their parents. It would have been helpful to have asked the students if they felt their parents had a strong opinion about the NewPAGE course and if their opinion was influenced by their parents' opinions.

Future researchers should collect socio-economic status (SES) information on the students. It would have been interesting to see if students who were of a lower SES
recycled less as they may not have had access to as many resources as students of a higher SES. Even though the majority of the students were below the age of 21, students’ age could have also been used as a covariate in the analyses. Including older students may have increased the means of students’ attitudes and concerns toward the environment as well as the frequency at which they engage in environmentally friendly behaviors.

This study is important because the findings can be used by environmental educators to help understand which goals of their programs need to have more emphasis applied to them and how they can modify their program to better achieve these goals. For example, in the course this study focused on, students’ attitudes and concerns about the environment as well as their recycling over the semester. These findings were opposite of what the faculty involved with the course wanted (Morrow, Pribesh, et al. 2005). Of course, the finding that there were not any gender or ethnicity differences was not a bad discovery. In fact, it may be a good sign that this course had the same impact on everyone. These findings might provide information as to what facets of the NewPAGE pedagogy worked and did not work. Therefore, faculty can begin the process of carefully evaluating the pedagogical methods employed in the course.

Conclusions

In the future it would be interesting to study other variables that may be related to students’ environmental attitudes, concerns, and behaviors (e.g., age, commuter status, course credit load, college major). Each of these variables may further help to explain variance in the students’ environmental attitudes, concerns, and behaviors scores. Future research should attempt to include a control group in the research design if at all possible.
This would increase the internal validity of the findings in the study. It would also be interesting to compare college students who choose to take an elective environmentalism course to students who opt to take other electives which are not related to the environment instead.

In conclusion, requiring students to take a global environmentalism course in their first year of college had both positive and negative results in regards to environmental attitudes, concerns, and behaviors. Among the positive results were a significant increase in the frequency at which students utilize pro-environmental products, become or continue to stay involved in pro-environmental groups, and the frequency at which students engage in other pro-environmental activities. The negative results included finding that students’ environmental attitudes, concern, and recycling behaviors significantly decreased after having taken the course. However, these findings should help the faculty involved in this course in adjusting their pedagogy to best meet the students’ needs, in turn leading to a more successful global environmentalism course.
REFERENCES


Dear NewPAGE students:

We are interested in your feedback regarding the NewPAGE course in which you are currently enrolled. The evaluation team has developed a series of surveys that ask questions on your knowledge, attitudes, and behaviors regarding the environment as well as your attitudes and opinions about NewPAGE and the University environment. Surveys will take approximately 20-45 minutes to complete. These surveys are worth a total of 5% (50 points) of your grade. You DO NOT have to participate in these surveys in order to receive course credit (see NewPAGE course syllabus for information on alternatives). All surveys are confidential and all data will be reported in group, not individual, formats. All surveys are available online.

This project has been approved by Old Dominion University’s Institutional Review Board. It has been found to be exempt (04-076).

To take the Pre-course survey (15 points), please click on the website link below or type the address directly into your web browser. Make sure you have your University Identification Number (UIN) with you when you take the survey. You must enter your UIN number on the survey in order for us to record your course credit for completing the survey. Also, make sure you have the name of your NewPAGE discussion instructor with you because you will be asked to enter it on the survey.

The Pre-course survey will only be available from Friday 1/7 to Sunday 1/23. You must take the survey during that time in order to receive the 15 points.

Pre-Course Survey Website:

https://periwinkle.ts.odu.edu/surveys/DWPUS58

For more information please contact a member of the evaluation team.

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APPENDIX C

PRECOURSE SURVEY

Background Questions

1. What is your ODU student UIN Number: ______________? (This number must be entered in order to receive research credit).

2. What is the your NewPAGe discussion leader’s name?
   a. A list of names will be provided

3. What is your sex?
   a. Female
   b. Male

4. How old are you? _______ years

5. What is your marital status?
   a. Single, never married
   b. Married
   c. Separated or divorced
   d. Widowed

6. What is your relationship status?
   a. Single, not in a committed relationship
   b. Single, in a committed relationship
   c. Living with a partner
   d. Married

7. What is your religion?
   a. Catholic
   b. Protestant (e.g., Baptist, Episcopalian, Methodist)
   c. Jewish
   d. Muslim
   e. None
   f. Other ________________________________

8. Which of the following best describes your current place of residence?
   a. Residence hall/dorm (which one?) ________________________________
   b. Apartment, house, condo (not with parents)
   c. Fraternity/sorority house
   d. Live with parents
   e. Other (specify) ________________________________

9. Have you taken any classes on the Environment?
   a. Yes  If Yes, how many? ________________________________
   b. No
10. Are you currently involved in collegiate or intramural athletics?
   a. Yes
   b. No, but I’m thinking of getting involved soon
   c. No and I don’t plan on getting involved

11. Are you currently a member or a pledge in a fraternity/sorority?
   a. Yes
   b. No, but thinking of pledging soon
   c. No and I don’t have any plans to pledge

12. Are you currently involved in a campus social organization (e.g., dance club, surfing club)?
   a. Yes If yes, how many are you active in? ______________
   b. No, but planning on joining one soon
   c. No and I don’t have any plans to join one

13. Are you currently involved in any campus academic organizations/clubs (Golden Key Honor Society, Pre-Law Club)?
   a. Yes If yes, how many are you active in? ______________
   b. No, but planning on joining one soon
   c. No and I don’t have any plans to join one

14. What college is your major in?
   a. College of Arts and Letters
   b. College of Business and Public Administration
   c. Darden College of Education
   d. College of Engineering and Technology
   e. College of Health Sciences
   f. College of Sciences
   g. I am undecided
Instructions: Listed below are statements about the relationship between humans and the environment. For each one, please indicate whether you STRONGLY AGREE, MILDLY AGREE, are NEUTRAL, MILDLY DISAGREE or STRONGLY DISAGREE with it.

1 = Strongly Disagree  
2 = Mildly Disagree  
3 = Neutral  
4 = Mildly Agree  
5 = Strongly Agree

Do you agree or disagree that:
1. We are approaching the limit of the number of people the earth can support
2. Humans have the right to modify the natural environment to suit their needs
3. When humans interfere with nature it often produces disastrous consequences
4. Human ingenuity will insure that we do NOT make the earth unlivable
5. Humans are severely abusing the environment
6. The earth has plenty of natural resources if we just learn how to develop them
7. Plants and animals have as much right as humans to exist
8. The balance of nature is strong enough to cope with the impacts of modern industrial nations
9. Despite our special abilities humans are still subject to the laws of nature
10. The so-called "ecological crisis" facing humankind has been greatly exaggerated
11. The earth is like a spaceship with very limited room and resources
12. Humans were meant to rule over the rest of nature
13. The balance of nature is very delicate and easily upset
14. Humans will eventually learn enough about how nature works to be able to control it
15. If things continue on their present course, we will soon experience a major ecological catastrophe

Instructions: Please rate the following based on how often you perform each action:

1 = Never  
2 = Very infrequently (less than once a year)  
3 = Infrequently (less than once every 6 months)  
4 = Sometimes (once a month–every 6 months)  
5 = Often (several times a month or more)

1. Recycle
2. Compost
3. Reduce plastic use
4. Pick up litter
5. Join environmental groups
6. Garden
7. Use natural products (ex. Natural toothpaste, soap, shampoo)
8. Attend rallies
9. Buy organic foods
10. Give money to support an environmental cause
11. Switch products for environmental reasons
12. Purposefully buy products in recyclable packages
13. Participate in a clean-up event/drive
14. Contact community/government agencies to find out about pollution or other environmental concern
15. Write a congressman or other official concerning pollution or the environment
16. Read ecological publications
17. Display a pro-environmental sign, pin, bumper sticker, etc.
18. Join a pro-environmental protest or demonstration

(ECS; Department for Environment, Food, and Rural Affairs, 2001)

Instructions: Please rate how concerned you are with each of the items listed below:

1=Not heard of  2=Not at all concerned  3=Not very concerned
4=Fairly concerned  5=Very Concerned

1. How concerned are you about the environment in general. Would you say you are ...

1=Not at all concerned  2=Not very concerned
3=Fairly concerned  4=Very Concerned

2. How concerned are you about each of the following issues:
   a. Acid rain
   b. Climate Change/global warming
   c. Decay of Inner Cities
   d. Disposal of hazardous waste
   e. Effects of livestock methods (incl BSE)
   f. Fumes & smoke from factories
   g. Growing genetically modified crops
   h. Household waste disposal
   i. Losing Green Belt land
   j. Loss of plants and animals in the UK
   k. Loss of trees and hedgerows
   l. Noise
   m. Ozone layer depletion
   n. Pollution in bathing waters and on beaches
   o. Pollution in rivers
   p. Traffic congestion
   q. Traffic exhaust fumes & urban smog
   r. Tropical forest destruction
   s. Use of pesticides, fertilizers and chemical sprays
   t. Using up [America’s] natural resources
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To take the NewPAGE Postcourse Survey (20 points), please go to the website listed below. Make sure you have your University Identification Number (UIN) with you when you take the survey. You must enter your UIN number on the survey in order for us to record your course credit for completing the survey. Also, make sure you have the name of your NewPAGE discussion instructor with you because you will be asked to enter it on the survey.

The Postcourse survey will only be available from Saturday 4/23 to Sunday 5/1. You must take the survey during that time in order to receive the 20 points.

Postcourse Survey Website:

https://periwinkle.ts.odu.edu/surveys/RJZA2A

For more information please contact a member of the evaluation team.

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APPENDIX E
POSTCOURSE SURVEY FLYER

NewPAGE Postcourse Survey BlackBoard Announcement

Dear NewPAGE students:

We are interested in your feedback regarding the NewPAGE course in which you are currently enrolled. The evaluation team has developed a series of surveys that ask questions on your knowledge, attitudes, and behaviors regarding the environment as well as your attitudes and opinions about NewPAGE and the University environment. Surveys will take approximately 20-45 minutes to complete. These surveys are worth a total of 5% (50 points) of your grade. You DO NOT have to participate in these surveys in order to receive course credit (see NewPAGE course syllabus for information on alternatives). All surveys are confidential and all data will be reported in group, not individual, formats. All surveys are available online.

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APPENDIX F

POSTCOURSE SURVEY

Background Questions

1. What is your ODU student UIN Number: (This number must be entered in order to receive course credit).

2. What is your NewPAGE discussion leader’s name?

3. Do you intend to enroll at ODU in Fall 2005?
   a. Yes
   b. Maybe
   c. No, if no why not?

4. Do you intend to graduate with a degree from ODU?
   a. Yes
   b. Maybe
   c. No, if no why not?

5. What was your main reason for coming to ODU?

6. Overall, what is your opinion towards ODU?

   EVALUATION OF NEWPAGE (Created by the NewPAGE Evaluation Team)

   1 = much worse, 2 = worse, 3 = the same, 4 = better, 5 = much better

1. Compared to other General Education courses that you have taken here at Old Dominion University (i.e., Biology 108-109, Chemistry 101-102, Oceanography 106-107) how would you rate the:

   a. Interest in course material
   b. Interest in course material
   c. Difficulty of course material
   d. Relevance of course material to career plans
   e. Time spent completing homework
   f. Time spent on studying for exams/quizzes
   g. Time spent on reading class materials

   Scale = (1) Strongly Disagree, (2) Mildly Disagree, (3) Unsure, (4) Mildly Agree, and (5) Strongly Agree.

1. The online quiz questions accurately reflect the material covered in class and/or in the text.
2. The questions on the online quizzes were difficult.
3. The text regarding the reasons for a quiz answer being correct or incorrect were helpful.
4. The online quizzes were a fair assessment of how much I have learned in this course.
1. The class text was effective in providing me with the information I needed to understand topics covered in class.
2. The internet readings were effective in providing me with the supplementary information I needed to understand the material.
3. I feel that the discussion section was effective in helping me understand the material covered in lecture.
4. I feel that attending a discussion section helped improve my critical thinking skills through discussion and debates.
5. I feel that the activities in the discussion section were effective in reinforcing the material we learned in the lecture.

Scale = (1) Strongly Disagree, (2) Disagree, (3) Neutral, (4) Agree, and (5) Strongly Agree.

1. Did you encounter any problems accessing the online quizzes?
   Responses = every week (100% of the time), approximately 75% of the time, approximately 50% of the time, approximately 25% of the time, never.

2. If so, how often?
   Responses = Computer Lab (state which one), home, other.

3. Where were you when you experienced these technical problems?

4. If you experienced any problems accessing your online quiz, please explain them in the space provided below.

Scale = (1) Strongly Disagree, (2) Disagree, (3) Neutral, (4) Agree, and (5) Strongly Agree.

1. I am satisfied with being a part of a class with 1800 students.
2. I am satisfied with the number of students in my discussion section.
3. I am satisfied with the fact that this is a required course.
4. I feel that the teaching style of my teaching assistant was adequate in helping me learn.

Scale = (1) Strongly Disagree, (2) Mildly Disagree, (3) Unsure, (4) Mildly Agree, and (5) Strongly Agree.

1. I feel comfortable attending lectures in the Constant Convocation Center.
2. I prefer to attend lectures in a regular sized classroom.
3. I prefer to attend lectures in a lecture hall.
4. On average, I do not feel distracted during lectures in the Constant Convocation Center.
5. I can comfortably see the lecturer and the projector screen during class.
6. I do not have any trouble finding a seat in the Constant Convocation Center.

Scale = (1) Not at all, (2) Very Little, (3) Somewhat, (4) Substantially, (5) To a Great Extent

1. How beneficial have you found the NewPAGE course overall?
2. How effective has the NewPAGE course been in raising your awareness of environmental issues?
3. Has the NewPAGE course caused you to change any of your personal habits that affect the environment?
4. Has the NewPAGE course led you to reconsider any of your attitudes on environmental issues?
5. How has participating in the NewPAGE course affected your attitude towards ODU?
   a. Dramatically decreased it
   b. Slightly decreased it
   c. It hasn’t changed it
   d. Slightly improved it
   e. Dramatically improved it

6. What was your least favorite thing about the NewPAGE course?

7. What was your favorite thing about the NewPAGE course?

   (NEP; Dunlap, Van Liere, Mertig, & Jones, 2000)

Instructions: Listed below are statements about the relationship between humans and the environment. For each one, please indicate whether you STRONGLY AGREE, MILDLY AGREE, are NEUTRAL, MILDLY DISAGREE or STRONGLY DISAGREE with it.

1 = Strongly Disagree     2 = Mildly Disagree     3 = Neutral
4 = Mildly Agree          5 = Strongly Agree

Do you agree or disagree that:
1. We are approaching the limit of the number of people the earth can support
2. Humans have the right to modify the natural environment to suit their needs
3. When humans interfere with nature it often produces disastrous consequences
4. Human ingenuity will insure that we do NOT make the earth unlivable
5. Humans are severely abusing the environment
6. The earth has plenty of natural resources if we just learn how to develop them
7. Plants and animals have as much right as humans to exist
8. The balance of nature is strong enough to cope with the impacts of modern industrial nations
9. Despite our special abilities humans are still subject to the laws of nature
10. The so-called "ecological crisis" facing humankind has been greatly exaggerated
11. The earth is like a spaceship with very limited room and resources
12. Humans were meant to rule over the rest of nature
13. The balance of nature is very delicate and easily upset
14. Humans will eventually learn enough about how nature works to be able to control it
15. If things continue on their present course, we will soon experience a major ecological catastrophe

   (EB; Milbrath, 1984)

Instructions: Please rate the following based on how often you perform each action:

1 = Never
2 = Very infrequently (less than once a year)
3 = Infrequently (less than once every 6 months)
4 = Sometimes (once a month-every 6 months)
5 = Often (several times a month or more)

19. Recycle
20. Compost
21. Reduce plastic use
22. Pick up litter
23. Join environmental groups
24. Garden
25. Use natural products (ex. Natural toothpaste, soap, shampoo)
26. Attend rallies
27. Buy organic foods
28. Give money to support an environmental cause
29. Switch products for environmental reasons
30. Purposefully buy products in recyclable packages
31. Participate in a clean-up event/drive
32. Contact community/government agencies to find out about pollution or other environmental concern
33. Write a congressman or other official concerning pollution or the environment
34. Read ecological publications
35. Display a pro-environmental sign, pin, bumper sticker, etc.
36. Join a pro-environmental protest or demonstration

(ECS; Department for Environment, Food, and Rural Affairs, 2001)

Instructions: Please rate how concerned you are with each of the items listed below:

1 = Not heard of  
2 = Not at all concerned  
3 = Not very concerned  
4 = Fairly concerned  
5 = Very Concerned

1. How concerned are you about the environment in general. Would you say you are ...

1 = Not at all concerned  
2 = Not very concerned  
3 = Fairly concerned  
4 = Very Concerned

2. How concerned are you about each of the following issues:

a. Acid rain
b. Climate Change/global warming
c. Decay of Inner Cities
d. Disposal of hazardous waste
e. Effects of livestock methods (incl BSE)
f. Fumes & smoke from factories
g. Growing genetically modified crops
h. Household waste disposal
i. Losing Green Belt land
j. Loss of plants and animals in the UK
k. Loss of trees and hedgerows
l. Noise
m. Ozone layer depletion
n. Pollution in bathing waters and on beaches
o. Pollution in rivers
p. Traffic congestion
q. Traffic exhaust fumes & urban smog
r. Tropical forest destruction
s. Use of pesticides, fertilizers and chemical sprays
t. Using up [America’s] natural resources