A Study of the Factors That Influence Levels of Environmental Action

An honors thesis for the Department of Psychology

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Abstract

As the number of environmental problems in the world increases, it is important that the general public becomes more environmentally active to combat these problems. Since previous research has suggested that many factors are involved in creating environmental action, the purpose of this study was to examine these factors, particularly participation in Tufts environmental groups and the Tufts Environmental Studies major. Participants consisted of 314 Tufts University undergraduate and graduate students who took a survey to evaluate their levels of environmental action, environmental knowledge, accuracy of environmental perceptions, personal beliefs and personal values. Results suggest that the choice to participate in an environmental group leads to higher levels of environmental action, but that the choice to major in Environmental Studies does not have any impact on environmental action levels. Additionally, participants majoring in Environmental Studies did not have higher levels of environmental knowledge than non-majors. Unexpectedly, participants in environmental groups thought that environmental action was less important than participants who were not in environmental groups, despite higher levels of environmental action in the former.

A Study of the Factors That Influence Levels of Environmental Action

Psychologists have studied human behavior and action for hundreds of years. This search has focused on where behaviors stem from, what motivates people to take certain actions, what the consequences of these actions are and much more. One of the areas in which this research is particularly important is in the environmental movement because there is such a large gap between scientific knowledge about environmental problems and public action. For example, climate change is recognized as a legitimate problem by 97% of American scientists, and yet fewer Americans believe in it than five years ago (Harris, 2011). Due to this lack of belief in pressing environmental problems, many researchers have attempted to discover why some people participate in the environmental movement while others do not, in the hope that once these positive factors are discovered they can be replicated. One of the most important and influential ways that people participate in the environmental movement is through environmental actions, conscious decisions that are made to help the environment. These can include anything from recycling and using energy-saving light-bulbs, to planting a garden on a rooftop or buying a hybrid car. Since these actions are so diverse and are of different levels of difficulty, the decision to make them is likely influenced by a variety of factors. Many of these possible factors in creating environmental action have been suggested by other researchers and will be discussed in this paper. They include participation in an environmental group, environmental education, demographic predictors such as gender or income, beliefs about the environment, personal traits, the influence of others and accuracy of environmental perceptions. The current study was designed to see how these factors were related to levels of environmental action. Specific attention was paid to the effects of environmental education and participation in environmental

groups because previous research suggests that these two influences are particularly important.

Since liberal arts universities are often places where both environmental education and environmental groups can be found, the current study included a survey on the possible factors influencing environmental action that was given to Tufts students. For the purposes of this study, participants were divided into groups depending on whether they were currently participating in any environmental groups and whether they were majoring in Environmental Studies at Tufts.

Action

While the actions in this study were divided up based on level of difficulty, there are many other ways to classify and address them. One way to do this is based on scale. For example, environmental action can be performed on a scale as small as within a single home, such as water conservation or the purchasing of environmentally friendly products (Barr & Gilg, 2006). This level of action involves the decisions of individuals so it deals with a small scale. However, individuals are influenced by many things such as media or environmental groups, which will be discussed later. One step up from individual action in the home is environmental action within a community. For example, the Medford Energy Committee promotes energy efficiency and helps to bring renewable energy to the city (2012). This scale of environmental action is different because it includes individual participation but also provides the structural support of a group with clear leaders. While this requires more effort and planning, it also makes it possible to perform a larger type of environmental action that will have a greater impact. National or international environmental action organizations have the potential to achieve even bigger feats to save the environment, but this also means that each person within the group is not

as directly involved. For example, the Sierra Club has 1.2 million members so it carries a certain amount of political power, but not every one of the members are environmentally active and there is not a focus on one specific action (Sierra Club, 2012). However, it is possible to promote specific environmental action on an international scale as well as evidenced by the 7,347 organizations in 188 countries that worked to make rooftops more environmentally friendly by planting rooftop gardens, painting roofs white to slow global warming or insulating roofs to reduce energy loss (Matas & Halperin, 2010). All of these actions were performed on the largest environmental action day held on 10/10/10 (Matas & Halperin, 2010). As discussed in the book by Vivian and Ghai (1992) environmental action can also be of mixed scales such as a local grassroots campaign in Oaxaca, Mexico that addresses environmental issues within the whole country.

Another study differentiated between indirect and direct action (Jensen & Schnack, 1997)**.** Direct action contributes immediately to solving an environmental problem. An example would be volunteers who help to clean up beaches after an oil spill. Indirect action consists of convincing other people to start participating in pro-environmental behavior such as lobbying for a tax on fossil fuels. As discussed by Susan Owens (2000), the public should be active in environmental decisions and projects, but often have misconceptions that prevent them from doing so. They tend to distrust that the government can truly change the situation, yet are unwilling to recognize that they are inherently part of the problem. And unfortunately, the stance of the Republican party (Merchant, 2011) has not done much to help this situation by reinforcing the idea that climate change is not caused by humans. However, one way to combat this is to get people performing small environmentally friendly actions that will hopefully build into larger

decisions. Since the participants of the current study were all Tufts students, and thus were not likely to make decisions about buying hybrid cars or energy efficient appliances on a regular basis, most of the questions about environmental action in the survey focused on daily activities and salient political decisions. Additionally most of the questions focused on direct environmental actions such as recycling and composting, but a few were indirect actions such as voting for politicians that favor green initiatives.

Groups. According to previous research, people who participate in groups are much more likely to sustain the target behavior of the group. In the case of environmental groups these actions are usually focused on helping the environment, but the same holds true for fitness groups (Fritz, 2008). The importance of groups in determining if a movement or product succeeds is discussed in the book *The Tipping Point* by Malcolm Gladwell (2000). According to the author "close-knit groups have the power to magnify the epidemic potential of a message or idea," (Gladwell, 2000) because if one person in the group gets hold of an idea, such as the importance of composting, they have enough influence and contact with the other members to convince them as well. However, not all groups are equally effective at passing this information on in a way that makes it part of a larger movement. In fact, this process tends to work only with groups smaller than 150 members, (Gladwell, 2000) because after that it becomes difficult for everyone in the group to interact in a meaningful way. For example, if you worked in a factory with 1,000 people you would be unlikely to know each one of them and thus unlikely to pass information on to people in different parts of the factory. However, in smaller groups, even ones that are not for environmental purposes, you would be more likely to know exactly who would be interested in starting a farm share or company composting project. It is possible to create this

effect by having sub-groups within a larger group, but it is only effective if communication between the sub-groups is efficient. While groups must remain small to make sure that effective personal contact is maintained, small groups still benefit from working together (Gladwell, 2000). This idea was also discussed in a study by David Uzell (1999) who suggested that schools and communities that worked together on environmental concerns would achieve much more than either one could do on their own.

Groups can have an incredibly powerful influence over their members. They can also be found in almost every single realm of social interaction and can vary from a single friendship to the average of 120 friends that people have on Facebook (Facebook, 2012). Environmental groups also come in every shape and size and can be found scattered all over the globe. A study by Dalton (2005) looked at the participation in environmental groups over time in over 40 countries and found some interesting trends. First, contrary to a common belief that participation in the environmental movement has already reached its peak and is now waning, he found that in almost every single country participation has increased since 1980 and in many cases has doubled. As expected, the highest rates of participation were found in affluent countries, with the Netherlands topping the charts at 45.1% of its population participating in an environmental group. Even the average participation of 5.2% was impressive when we remember that political groups have an average of only 6.5% and women's groups only 4.9% of the population. Overall, affluent countries had an average of 12% participation while developing countries had an average of 4% (Dalton, 2005). This is likely due to the fact that affluent people have more time and money to spend on these movements, and also have the kind of education that would allow them to do so. However, more important was that affluent countries had access to more dense

communication structures and political freedom that allowed them to spread information about environmental issues quickly and effectively (Dalton, 2005). These countries also tended to be more urbanized so connecting with other people who would be interested in forming a group was much easier. The level of environmental degradation within the country was not a good predictor of participation of groups but the existence of a post materialistic philosophy that looks at the society as a whole and stresses quality of life was positively correlated with participation in environmental groups (Dalton, 2005). However, one problem with these and other studies is the definition of environmental group participation. It is unclear if simply belonging to the group counts or if it requires some personal action within the group which could be anything from sending in a check to the sierra club or leading a campaign.

One technique that has been used specifically and successfully within the environmental movement is community based social marketing. This concept is laid out clearly in the book *Fostering Sustainable Behavior* by Doug McKenzie- Mohr and William Smith (1999) and focuses on promoting group action. In general, they believe that people often do not know about an issue, think there are too many barriers, or think there are too few rewards. In order to change behavior these three things must first be changed. Some of the techniques suggested are to present information vividly, use prompts, employ social norms, use modeling, give feedback, provide incentives and make messages specific, clear, and tailored to the specific audience. While all of these techniques are successful in specific uses, getting commitment is one of the most important steps in getting people to actually change their behavior so that it is environmentally friendly. In order of increasing success, getting people to give a verbal individual commitment, written individual commitment, verbal group commitment, written

group commitment and getting other people outside the group to commit are all strategies that community based social marketing makes use of. According to the authors and numerous examples across the world, people who agree to change their behavior as part of a cohesive group are much more likely to continue this new pro-environmental behavior in the future compared to people who make individual or no commitment. As mentioned before, this trend has also been found to be very helpful to get people to exercise. Experts agree that "working out in a group provides support, accountability and structure" (Fritz, 2008), which are all instrumental in maintaining the behavior. It is believed that this is due to the pressures and norms enforced by the group. People are unwilling to go against these norms or appear inconsistent with the group's aims so they continue with the behavior, especially if they identify highly with the cause supported by the group (Jetten, Postmes, & McAuliff, 2002).

Environmental groups also provide a place where people can learn the skills necessary for changing their behavior and provide feedback, both positive and negative from other members of the group. The previous research done on environmental group participation was instrumental in developing the current research study and questionnaire. It is imperative that this impact of groups is studied so that if the influence of groups is truly a strong tool for getting people to be environmentally active it can be adequately funded and structured. Tufts has a wealth of environmental groups that participants can pick from. Some of these include the Tufts Energy Conference, the Sustainability Roundtable, Tufts Garden Club, Eco-reps, Tufts Against Plastic, Tufts Energy Forum, Tufts Mountain Club, Tufts Bikes and the Tufts Sustainability Collective. Many of the groups at Tufts fit into Gladwell's (2000) description of an effective group, because they contain fewer than 150 members. This is one of the main reasons that Tufts

students were used in this study. If environmental groups are truly important in increasing levels of environmental action in their participants, a University with many opportunities to join small environmental groups would provide the most relevant information. Additionally, while participation in national environmental groups is also likely important to the environmental action levels within a country, it was not within the scope of this study.

Education. Environmental education has traditionally been thought to be the single most important factor in predicting environmental action. For example, a study done by the EPA showed that air pollution was lower in areas where there were environmental education campaigns that addressed air quality in particular (EPA, 2012). However, it appears that traditional educational campaigns will not be enough to combat environmental problems because American adults have the same average knowledge about the environment and yet are often less environmentally active than adults in other countries (Weber & Stern, 2011). In fact, in some cases, giving all of the information about environmental problems may overwhelm students and make them feel that there is nothing they can realistically do to help (Nelson, 2011). According to the National Education and Training Program (Coyle, 2005), environmental knowledge is an important base, but is severely limited in its ability to increase environmental action. One of the most worrying implications of these studies is that the quantity and type of environmental education that is presented in high schools and universities may not be sufficient to help change behavior. Furthermore only a small percentage of higher learning institutions even have requirements for environmental classes, let alone programs that help promote environmental action directly (Rowe, 2005).

Another problem with environmental education is that it is focused most on the youngest

generations, but the majority of environmental problems require immediate action (Uzell, 1999). This study also discovered that contrary to the hopes of educators, teaching children about environmental issues and letting them bring the knowledge home to get their family involved is not effective. This is due mostly to the power differential in families where parents are seen as experts while children are viewed as novices. This relationship is shifting slightly due to the increasing reliance on technology, which children now begin using at a young age and tend to understand better than their older counterparts, but it still holds strong. However, when the schools formed a strong partnership with the local community by having community members visit the school to share their knowledge and having the school organize environmental events directly in the community, levels of environmental action and awareness increased (Uzell, 1999). This finding also holds true when other types of groups work together on environmental projects.

The type of environmental education is of the utmost importance when it comes to creating pro-environmental behavior. Most curricula teach about the environment, or about the importance of saving it, but few allow students to create real solutions (Uzell, 1999). An action competence model is most effective for teaching environmental solutions because it allows each student to go through the steps of researching, defining, testing, finding a solution, and implementing the solution for a specific problem. In this way the student learns that they can make a real difference. Another important aspect of this technique is employing hands-on learning in the social and political realm instead of the traditional scientific realm, because these are the places where the change will actually occur (Uzell, 1999). The aim is to create a school environment that mimics what students will face in the real world so that they are more equipped to have a true positive impact.

While most environmental action research is focused on students, it is also important to communicate this information to older generations as well. However, effectively communicating important scientific information to the public, particularly relating to climate change, can be a problem. The severity of this problem is such that, "whereas the scientific community believes that its accumulated evidence justifies substantial public concern about this phenomenon" the "American public does not appear to share that view" (Krosnick, Holbrook, Lowe & Visser, 2006). An important facet of this problem is called the curse of knowledge, in which people assume that everyone else knows what they know about a subject (Heath & Heath, 2007). For example, environmentalists often have a hard time effectively explaining the existence of climate change to people who do not believe in it, because they have spent so much time researching and discussing the subject. For this reason, many of the issues in the environmental and other movements have gotten lost because they were not communicated effectively.

Unfortunately, climate change is particularly difficult to accurately communicate and is often accompanied by misconceptions even without the curse of knowledge. One of the main reasons that climate change is difficult to explain is the fact that it mainly involves things that are intangible, namely greenhouse gases (Weber & Stern, 2011). Additionally, the scientific studies done to determine the rate and cause of climate change are usually based on a variety of experiments designed to look at minute differences in many areas that can then be used to predict future changes. On the other hand, most non-scientists rely on tangible changes to determine the validity of climate change, and since most Americans have not experienced any direct results of climate change, they have difficulty believing in its existence (Weber & Stern, 2011). Another issue that is commonly misunderstood is that even if all greenhouse gas emissions were stopped

today, climate change would not immediately stop due to the persistence of these gases in the atmosphere.

Even when it is possible to describe an environmental problem clearly, there must be an available platform from which to present this information. Krosnick et al. (2006) believe that the disconnect between accurate scientific information and public knowledge occurs because much of what people hear about the most pressing issues is controlled by the media, which has been shown to have a specific agenda. In fact, a study by Weber and Stern (2011) found that almost all of the information that Americans have received about climate change has been through some form of media and not directly from scientists. Since the media's main objectives are to retain viewers and attract advertisers, the programs mostly consist of sensationalized breaking news instead of well-researched stories that develop over time (Weber & Stern, 2011). In the case of climate change, this means that debates on the existence of climate change that do not exist in the scientific world are artificially created in the media. This is usually achieved by bringing on one of the few scientists skeptical of climate change or members of groups that deny its existence. The result is that the public thinks that the scientific community is still unsure about the dangers of climate change, while the opposite is in fact true (Weber & Stern, 2011). There is also a lesser influence of what issues are important from prominent political figures such as the president, but most of that guidance is also filtered through the media (Krosnick et al., 2006).

Differences in the way and frequency that climate change stories are reported in other countries may contribute to the higher rates of belief in this phenomenon in countries such as Japan, Argentina and Sweden (Weber & Stern, 2011). For example, about 81% of people in

Argentina polled believe in climate change (Weber& Stern, 2011) and many, including a group of indigenous women, are using global platforms such as global climate summits and the Inter Press Service (IPS) to speak about its potential impacts (Valente, 2011). In fact, it appears that the drastic divide between the scientific understanding of climate change and public opinion originated in America, but is now spreading to other countries, particularly England which may explain why now only 48% of people in the UK believe in climate change (Weber & Stern, 2011).

The effect of this lack of accurate information is even stronger if people begin with very little knowledge of the subject or a general ideology against environmental issues (Zia & Todd, 2010). If the true urgency of environmental problems is not effectively communicated to the general public, they will not place enough importance on the issue and instead focus on others. For this reason, the current study included a section on the survey that had people rank issues in terms of importance. Hopefully, the more informed a person is about the environment and the more they understand the importance of protecting it, the higher they will rate the issue. However, as discussed before, seeing the issue of environmental protection as important will not necessary mean that the same people follow through with environmental action.

Tufts, as an institution is fairly focused on environmental issues. Our Environmental Studies department is under new leadership and is currently growing as a program. However, despite a strong showing in the number of environmentally related classes, very few of them are focused specifically on promoting environmental action by teaching strategies to protect the environment. One important exception to this generalization is the Environmental Action: Shifting From Saying to Doing class that was run by Tina Woolston and analyzed by Dallase

Scott in her Masters thesis (2010). Scott compared the environmental action class to a traditional environmental class and found that while both groups improved overall in environmental literacy, behavior, responsibility, civic engagement and self-efficacy, the environmental action group improved more in environmental attitudes and environmental civic-engagement than the traditional class. While this does not definitively show that environmental action classes create more environmentally active students, it does show that they do play an important part in the process of becoming more active. Since the environmental action class was not offered at the time of this study, the current survey addressed the effect of environmental education as a whole.

Demographics. Understanding your audience is another important technique that is used in applying all types of psychology and more specifically in getting people to participate in the environmental movement. While participation in this movement includes people from a variety of demographics, there are some distinct trends. First, younger people are generally more likely to be pro-environmentally active, because they are less ingrained in social order and thus are less threatened by change (Fransson & Garling, 1999). However, this gap has lessened slightly in the last few years due to the fact that environmental issues are more widely publicized now by environmental groups. Upper and middle class people also tend to be more involved in the movement because they have the luxury of not having to worry as much about material needs. The study by Fransson and Garling (1999) also found that urban dwellers see the effects of environmental degradation more frequently, often in the form of pollution, so are more environmentally active. And, as expected, liberals tend to be more environmentally conscious than conservatives. These demographic trends were echoed in a book called *The Psychology of Environmental Problems* written by Deborah Winter and Susan Koger (2004), with the addition

that women are more involved because of their traditional role as caretaker. While these are obviously generalizations, they can be helpful in determining which groups should be targeted for different types of campaigns. Tufts students tend to fall into many of these demographics as they are generally young, upper or middle class as shown by the fact that only 34% of students receive a significant amount of financial aid (Campus Corner, 2012), and fairly liberal as evidenced by a quote from a member of the Tufts Republicans "we [Republicans] are outnumbered fairly harshly" (Quinn, 2011). Also, while the Medford campus is not located directly in the center of Boston, most students are assumed to be somewhat familiar with the area and its associated issues. Since young, upper or middle class, liberal, urban dwellers are more likely to be environmentally active (Fransson & Garling, 1999), these demographic trends imply that Tufts students should generally be more environmentally active than the average citizen. This makes them an ideal group with which to study the causes of environmental action because a large number are likely to be environmentally active but possibly for different reasons.

Beliefs. Some research suggests that what people believe about the environment and how emotionally connected they are with it has a significant impact on environmental action. For example, a study by Pooly and O'Connor (2000) found that both beliefs and emotions are important predictors of environmental actions and that this effect is even greater when the emotions are consistent with the beliefs. For example, people are more likely to buy sustainably harvested wood if they both understand the role that old growth forests have in mitigating climate change as well as feel emotionally connected to the plants and animals that reside there. Unfortunately, creating understanding and emotional connections to these issues is not easy. Many educational campaigns have tried and failed to do just that (Campaign for Old Growth,

2011). It has also been found that "attitudes formed through direct experience with an object tend to be affectively based, whereas attitudes that are formed on indirect experience seem to be cognitively based" (Millar & Millar, 1996). Additionally, many decisions are more influenced by affective and associative processing because these systems are evolutionarily older and take less time than analytic processes which must be learned and practiced (Weber & Stern, 2011). This is one of the problems in dealing with the issue of global climate change. Since its effects are mostly intangible, people have trouble connecting to the problem emotionally, and unfortunately by the time the effects of global warming become apparent to the general population, it will be too late to make the necessary changes. In order to address these beliefs about the environment and see how much they related to environmental action, a section was included in the survey that measured specific environmental beliefs.

Personal traits/learning styles. There are many reasons that people join the environmental movement and several are tied to internal pressures such as a sense of responsibility instead of external ones such as education. A study by Kollmuss and Agyeman (2002) looked at some of the things that predict environmental action more effectively than level of knowledge. They found that participation is determined by possibilities to act, locus of control, attitudes, verbal commitment and individual sense of responsibility. Altruism was also correlated with more pro-environmental actions, as were the existence of social norms and incentives. Many of these traits were echoed in other studies. For example, an experiment done by Hwang, Kim, and Jeng (2000) found that locus of control, the amount that people believe they can control events in their life, had a large impact on individual responsibility, which then played a part in how people intended to act. However, the intention to act was often overcome by

situational factors. This idea was further developed into the ipsative theory, discussed by Carmen Tanner (1999), which states that "individuals behavior may be constrained or hindered by lack of real or imagined opportunities." In this theory pro-environmental actions must be objectively possible in the sense that an individual must be able to perform them while taking into account time, income, social network, and social norms. They must also be salient for the individual, which means that they must occur to the person in the moment that the action needs to be done. For example, many people have the intention of using cloth grocery bags instead of plastic ones, but if this does not occur to them when they go food shopping, the action will not be carried out. Both of these barriers must be removed before the environmental action is performed consistently and on a large scale.

While environmental action requires change on a national and global level, it is also inherently tied to our beliefs, priorities, and social choices. There are many pressing issues in the world today that need to be addressed, so it is not reasonable to expect people to adhere to the environmental movement as the only one in which to put their time and energy. For this reason the survey also included sections on general priorities as well as reasons that participants thought that the environmental movement was important.

Influence of Others: Another thing that makes people switch to pro-environmental action is the influence of others. Louise Chawla (1999) studied people in Norway and Kentucky and came up with a list of reasons that people change their behavior to be more sustainable. Experiences in childhood were listed most as reasons for a love of nature, followed by influential people in their lives, which tended to be parents or siblings. These two influences were listed as forming the basis for caring about the environment, but true environmental action usually did not

begin until people joined environmental groups. In this setting their views were validated, but they were also provided with actual skills and tools to begin changing their behavior. This finding, and others that were discussed earlier, suggest that environmental groups are much more influential in promoting environmental action than previously believed. As already mentioned, education was listed as a reason, and education with an action component was most influential (Chawla, 1999). The present survey addresses these influences by including a question on personal history that relates to the environment. The importance of this question stems from the fact that it is possible that people who are environmentally active all had previous experiences that convinced them that the environmental movement is important and that participation in environmental groups or the environmental studies major was a continuation of this trend instead of a cause.

Environmental Perceptions: In addition to knowing about environmental problems, the way that people perceive them is also important in influencing environmental action. For example, pollution would be perceived as more important if one were to personally see pollution in a local lake instead of just in the news. A study by Weber and Stern (2011) found that people were much more likely to feel an obligation to act on an issue if they were aware of the negative consequences and felt responsible in some way. This idea was also discussed in a study by Fransson and Garling (1999) who stated that "people often react most strongly when they perceive that environmental degradation will negatively affect their health or is in line with deep personal beliefs." However, countries that are most harmed by environmental problems are also the ones that are the least involved in pro-environmental action (Dalton, 2005). This is most likely due to the fact that the poorest people in the world live in the least hospitable areas, many

of which are already being ravaged by the results of climate change, while also having the least amount of disposable income and time in which to organize environmental protection agencies. However, since most Tufts students are citizens of one of the most prosperous, powerful and environmentally degrading countries in the world, they are in an excellent place to become environmentally active. Even the international students have enough money and support to attend Tufts so they are in a good place to be environmentally active as well.

Wrap up. While previous research has established that all of these factors, and particularly environmental groups, are important in creating higher levels of environmental action, the magnitude of these effects and how they interact is still unknown. By carrying out the current research project I aimed to examine the environmental knowledge, environmental and personal beliefs, and environmental actions of Tufts students who are Environmental Studies majors, in an environmental group, both, or neither to determine exactly what this connection is. Specifically I hoped to determine if majoring in Environmental Studies at Tufts University is required for high levels of environmental action or if being in environmental groups alone can cause this change in behavior or sustain positive environmental behaviors.

By sending out a survey that measured environmental knowledge, environmental attitudes, personal beliefs, learning styles, personal history with environmental action and current environmental action I hoped to collect a pool of potentially helpful data. From this information, scores on each of the sections of the survey were compared between groups so that any differences could be examined. For example, if it is found that students who are not in environmental groups or environmental studies have a similar level of environmental knowledge and action to those who are, the data would suggest that changes need to be made in the curricula

to make the information stick more effectively. The survey also includes a section about learning styles designed with the help of the environmental studies department that may be able to help educators design their classes differently. Hopefully the analysis will also be able to point out differences between the types of people who are likely to join environmental groups and those who are not. For example, it may turn out that any correlation between group participation and action can be explained by the person who is likely to be active on their own is also likely to join or form a group dedicated to the environment.

I predicted that students in environmental groups would be more likely to be environmentally active than students who were not in environmental groups and that students who were environmental studies majors would be more environmentally active than students who were not environmental studies majors. However, I hypothesized that the effect of participation in environmental groups on increasing environmental action would be greater than the effect of environmental major. Additionally, I predicted that students who were both in environmental groups and majoring in environmental studies would be the most active. In terms of the other factors that may lead to environmental action, I predicted that participants in environmental groups would have stronger environmental beliefs, more accurate environmental perceptions and a stronger history with the environmental movement than participants who were not in an environmental group. I predicted that the same trends would be found for participants majoring in environmental studies when compared to participants who were not majoring in environmental studies.

If the data support any of these hypotheses, it could have important implications. First, it would support the idea that environmental education is not the most important, or only, way to

create environmentally active citizens, so educators should be encouraged to change their curricula accordingly. Second, once more research has established that group participation is important it would open up the idea for more funding to go towards environmental groups. Currently, the majority of faculty and monetary support goes toward education, but if environmental groups are found to be more important, some of this money could be redirected or additional funding could be sought. This would be especially true for middle schools and high schools where environmental groups are often non-existent. These changes would need to take place on an institutional level and are far beyond the reaches of this study, but hopefully if more and more research is done in this area, change will be made.

Method

Participants

The participants of this study consisted of 312 Tufts University students including 51 First year students, 84 Sophomores, 57 Juniors, 89 Seniors and 30 Graduate students. People under the age of 18 were not allowed to participate, and the survey was sent to both male and female students. After the surveys were collected the participants were separated into four groups, 55 environmental studies majors who also participated in environmental groups, ten environmental studies majors who were not in groups, 118 students only in environmental groups, and 121 who were neither in environmental groups nor were an environmental studies major. The former three groups made up the experimental groups and the latter was used as the control.

Materials

The current study consisted of a 29-question survey. The first page contained a consent form that explained the survey and asked all students who were under 18 years old to exit the survey. By pressing *continue* students gave consent and stated that they were not minors. Participants were then given the choice of entering their name and email address if they wished to be entered to win the prize of $100 that would be given to five randomly chosen participants. The following questions asked the grade level of the participant, if they were majoring in Environmental Studies, and which, if any, environmental groups they were a part of. The next fifteen questions were designed to determine the level of environmental knowledge that each participant possessed. The questions were compiled from multiple sources including previous environmental action surveys, and the National Wildlife Organization in order to ensure that they had been pretested. Each of these questions asked a single question about the environment, such as "what country produces the most carbon dioxide?" and then had five multiple-choice answers, one of which was "I don't know". These questions were all weighted evenly and were combined to determine the environmental knowledge score. The next two questions measured environmental action by asking about twenty regular activities. Participants had to rate how often they performed these environmental actions on a scale from "never" to "always" where never was zero points and always was five points. Negative actions were reverse scored and all of the scores for the actions were averaged to come up with a final environmental action score. Many of these actions were also based on ones found in environmental action surveys, and particularly the study done by Scott (2010). The following questions asked participants to rate statements about their personal history with the environmental movement, their personal beliefs

about the environment, their beliefs about themselves, and how important they thought environmental classes and environmental groups were on a scale from "strongly disagree" which was worth zero points to "strongly agree" which was worth five points. Finally, participants were asked if they thought that environmental action was important, and if so, why. The study did not contain any materials other than the survey and the software used to analyze it. Please refer to Appendix 1 for the complete survey.

Procedure

The survey was first pretested on a group of ten non-Tufts students to make sure it was functioning correctly and was then sent out using the program Constant Contact. Emails containing the link to the survey were sent to all Environmental Studies majors with the help of Ann Greaney, the program director. Emails were also sent to members of all of the known environmentally affiliated groups on the Tufts Medford campus which included Tufts Energy Conference, Student garden, Eco-reps, Tufts Against Plastic, Tufts Energy Forum, Tufts Mountain Club, Wilderness Orientation, Tufts Bikes and the Sustainability Collective. These emails were sent out to these specific people in order to get a good representation of the target groups of environmental studies majors, people in environmental groups, and people who are in both. To obtain a control group of Tufts students who were neither in environmental groups nor majoring in environmental studies, an announcement was posted on the student website Tuftslife with the link to the survey. This also served the purpose of reaching students who were in an environmental group that was not contacted or environmental majors who were not yet on the e-list. Once participants were contacted, they filled out the survey and had the option to enter their name for the chance to win a $100 Visa giftcard.

After the surveys were collected the data was analyzed using SPSS. In the analysis participants were split up into environmental major and non-environmental majors, as well as members of environmental groups and non-members. Knowledge, actions, perceptions and values were all analyzed in terms of major and group using T-tests. Two way ANOVAs were run as well, but the interaction effects were not statistically valid because the group of environmental majors who were not in environmental groups was too small. Correlations were run between all of the different sections on the survey.

Results

Actions

The environmental action score was compiled by averaging the scores of each action, which were based on a five point scale where 1 means "never" and 5 means "always". The environmental actions were organized into three levels; easy, medium, and hard. Easy actions consisted of things like recycling and picking up trash, medium actions included regularly taking public transportation, and hard actions included growing one's own food. Participants in environmental groups were significantly more environmentally active (M=3.38) than participants who were not (M=3.13), $F(1,247)= 3.99$, $p \leq .05$ (Figure 2). While neither easy (Figure 1) or medium (Figure 2) environmental actions were significant for either major or participation in groups, participants in environmental groups performed difficult environmental actions more often (M=2.87) than those not in groups (M=2.52), $F(1,247)= 4.80$, $p \leq .05$ (Figure 3 & 4). There was a marginal effect found for the level of involvement in environmental groups and difficult

actions, F(1,247)= 2.06, p=.051 (Figure 4). There was also a positive correlation between level of group involvement and environmental action, r=.28, p≤ .01 in which higher levels of group involvement were associated with higher levels of environmental action.

Groups

Participants who were part of an environmental group thought that group participation made them significantly more active (*M*=1.95) than those who were not part of a group (*M*=.30), F(1,247)=27.92, p≤ .01.

Knowledge

Environmental knowledge was scored by dividing the correct number of answers by the total number of questions, with 1 being a perfect score. There was no effect for environmental major or participation in environmental groups.

Demographics

There was an effect of college year on group involvement, F(4,244)=73.57, p≤ .01 in which Juniors were the most involved in environmental groups (*M*=3.93), followed by Seniors (*M*=3.38), Sophomores (*M*=2.64), Graduate Students (*M*=1.00), and First Years (*M*=.95) (Figure 5).

Beliefs/Values

Environmental majors valued environmental causes, such as protecting ecosystem services, marginally more (*M*=5.21) than participants who were not environmental majors (*M*=4.32), F(1,253)=3.81, p=.052 (Figure 6). However, environmental majors also valued non-

environmental causes such as promoting social justice, significantly more (*M*=4.18) than non-majors (*M*=4.07), F(1,253)=4.33, $p \leq .05$ (Figure 6). Participants in environmental groups did not differ significantly in how much they valued environmental or non-environmental causes from the participants who were not part of environmental groups.

As expected, participants who were part of environmental groups rated saving the environment as significantly more important (*M*=5.58) than participants who were not members of environmental groups (*M*=5.14), F(1,247)= 6.01, $p \leq .01$. Additionally, participants who were environmental majors also rated saving the environment as significantly more important (*M*=5.94) than participants who were not environmental majors (*M*=5.19), F(1,247)= 8.06, $p \leq .01$ (Figure 7).

Participants who were environmental majors rated environmental action as significantly more important (*M*=.98) than participants who were not majors (*M*=.61), F(1,247)= 591.96, $p \leq .01$. Participants who were not in environmental groups rated environmental action as significantly more important (*M*=.90) than participants who were in environmental groups (*M*=.54), F(1,247)=237.55, $p \leq .01$ (Figure 8).

Self-Efficacy/Personal Traits

Self-efficacy was positively correlated with environmental knowledge, r=.131, $p \leq .05$, as well as with environmental actions, r=.190, $p \leq .01$. Self efficacy was also positively correlated with a family that talked about environmental issues, r=.138, $p \leq .05$, the intention to come to Tufts to learn about the environment, r=.224, $p \leq .01$, and accurate environmental perceptions, r=.135, $p \leq .05$.

Environmental Perceptions

Environmental perceptions were also scored on a five-point scale where 1 stood for "strongly disagree" and 5 stood for "strongly agree." Participants in environmental groups had marginally more accurate environmental perceptions (M=3.79) than those who were not (M=3.66), $F(1,247)= 3.18$, $p=.076$ (Figure 9). Environmental action and accuracy of environmental perceptions were positively correlated, $r=.164$, $p\leq .01$, so higher levels of environmental action were tied to more accurate environmental perceptions. Accuracy of environmental perceptions was also positively correlated with involvement in environmental groups in high school, $r=.227$, $p\leq .01$, as well as with the intention to come to Tufts to learn more about the environment, $r=.160$, $p\leq .05$.

Classes

Participants who were environmental studies majors rated the addition of an environmental requirement as significantly more important (M=4.08) than participants who were not environmental majors (M=3.18), $F(1,247)= 21.59$, $p\leq .01$. Similarly, participants who were in environmental groups rated the addition of this requirement as more important (M=3.56) than participants who were not part of an environmental group (M=3.04), $F(1,247)= 5.53$, $p\leq .01$ (Figure 10).

Participants who were environmental studies majors rated the inclusion of sustainability issues in required classes as more important (M=4.59) than participants who were not environmental majors (M=3.50), $F(1,247)= 39.05$, $p\leq .01$. In contrast, participants who were not in environmental groups rated the addition of this requirement as more important (M=3.75) than

participants who were part of an environmental group (M=3.69), $F(1,247)= 38.30$, $p \leq .01$ (Figure 11).

Discussion

This study was designed to assess possible factors that would make Tufts students more likely to perform environmentally friendly actions. Since environmental education and participation in environmental groups were two of the factors discussed most in previous research, they were focused on more heavily in the current study. However, other factors such as demographics, beliefs, personal traits and environmental perceptions were also analyzed.

Hypotheses

The hypothesis that members of environmental groups would have higher levels of environmental action than participants who were not in environmental groups was supported by the data. This was particularly true for more difficult actions such as growing one's own food and always buying organic products. However, the hypothesis that environmental majors would be more environmentally active than non-majors was not supported by the data. In fact, majoring in environmental studies seemed to have no effect on levels of environmental action at all. The third prediction that participants who were in both environmental groups and majoring in environmental studies could not be analyzed because one of the groups was too small to obtain significant results.

Additionally, participants in environmental groups had marginally more accurate

environmental perceptions than participants who were not in environmental groups. Environmental majors valued environmental causes marginally more than participants who were not environmental majors However, they also valued non-environmental causes more than non-majors. Environmental majors also valued saving the environment and environmental action as more important than non-majors.

There were also several findings that were not directly predicted, but that were in line with the other expectations. For example, environmental action levels and accuracy of environmental perceptions were positively correlated so that participants with accurate perceptions also had higher levels of environmental action. Environmental action was also positively correlated with involvement in environmental groups in high school, the intention to come to Tufts to learn more about the environment, and self-efficacy. Environmental majors rated the addition of an environmental requirement as more important than non-majors. Similarly, members of environmental groups rated the addition of an environmental requirement as more important than non-members.

However, some of the hypotheses were not supported by the data. For example, participants in the environmental studies major did not know significantly more about the environment than non-majors, nor did participants in environmental groups know more about the environment than participants who were not in environmental groups. Participants in environmental groups did not value environmental causes more than participants who were not in environmental groups, although the former did value saving the environment specifically as more important than the latter. One of the most surprising results was that members of

environmental groups thought that environmental action was actually less important than non-members did.

Environmental Groups and Environmental Action

The implications of these data are very important. First, the results suggest that participation in environmental groups is highly connected to higher levels of environmental action. While this may not be an entirely causal relationship, in the sense that students who join environmental groups are also likely to want to be environmentally active, it is clear that being in an environmental group does correlate with higher levels of environmental action. This is particularly interesting in light of the results concerning environmental values and the importance of environmental action. If members of environmental groups thought that environmental values and environmental action were less important than people not in environmental groups, and yet still had higher levels of environmental action, it suggests that there is something about being in a group that promotes the actual actions instead of just the concept of action. Additionally, it supports the idea that environmental groups are more important than many other factors in creating environmental action because they can do so without the underlying values and education. Another possible explanation for this contradiction is that since many members of environmental groups are already performing these actions, they may believe that larger, more direct ways to address environmental problems, such as switching to alternative energy, are more important. Additionally, since Tufts has a very active environmental community and is striving to become greener as a University (Monaco, 2011), students who are interested in those topics are drawn to the school, thus creating a general

understanding of the importance of environmental action. This is also supported by the fact that on average, participants gave the importance of saving the environment a rating of 5.34 out of 8.

The type of action that groups seem to promote is also very interesting. Some studies, such as the one discussed by Jensen and Schnack (1997) differentiate between direct and indirect action. In the current study most of the questions in the action section pertained to direct action. Some of these included picking up trash, recycling, composting, taking public transportation, using recyclable bags, and refraining from eating meat. These direct actions are very important because they are concrete ways to help a cause that often seems rather intangible. There is also some speculation that these actions are instrumental in the process of becoming environmentally sustainable. Since composting and these other actions require that people take steps to change their lifestyle, it is hoped that they will work as a stepping stone to more complex and difficult actions. This has also been hypothesized of the easier environmental actions such as recycling and using recyclable grocery bags. While there is the chance that many people will use these actions to assuage their guilt about environmental degradation and do nothing else, there are many that will hopefully use these actions as a springboard to more difficult environmental actions.

This is where group involvement seems to really matter. The data suggest that group involvement is particularly effective at inducing environmental action when the action is more difficult. Since recycling and drinking from reusable containers are things that can be done by most people without training or additional information, they do not require the support of a group. However, the more difficult tasks such as growing one's own food and buying organic

require another layer of knowledge and incentive. It is possible that easier tasks help to get people invested in the environment enough to convince them to seek out other ways to get involved. At some point many of them may come upon environmental groups or look for specific ones that align with their interests. For example, in cities it is fairly difficult to grow one's own food due to lack of healthy soil, access to specific plants, and adequate space. So, if urban residents were interested in doing so, they would probably look to others who were interested in the same thing. A group dedicated to gardening, such as the Tufts Garden Club, would be the perfect venue to learn about gardening. It would also provide the type of support required to sustain this level of environmental action because it requires more effort than many of the other types of action such as recycling. This idea is backed up by the studies done that suggest that small, close knit groups where ideas are shared are the ones most likely to be effective in this type of aim (Gladwell, 2000).

Additionally, as discussed by Gladwell (2000) and many others, the type of group and level of participation are important. Many of the environmental groups at Tufts contain 15 or fewer active members and meet at regular intervals. Smaller groups tend to be more close knit and thus help sustain action better because the people in them tend to be more actively involved. This is supported by the marginal effect of high group involvement on difficult environmental actions, $F(1,247)= 2.06$, $p=.051$. Since there was a positive correlation between level of group participation and environmental action, it is clear that people who are more involved in environmental groups are also more likely to be environmentally active. Since this is a correlation, this could be due to the fact that the people who are more likely to be environmentally active are also more likely to be active in environmental groups, or that the

higher level of participation leads them to be more environmentally active. Additionally, people who are in leadership positions within the group would be more likely to be actively involved as well as more invested in the cause than members that were simply on the mailing list. However, since there were only a few participants who were leaders of environmental groups, there was not enough data to run statistically valid tests. Future research could look at environmental groups at several different colleges to collect enough information on group leaders.

Environmental Major and Environmental Action

The results of this study support previous research that suggested that the environmental studies major was not sufficient or necessary in increasing environmental action since environmental majors were not more environmentally active than non-majors. As discussed by Nelson (2011) it is also possible that too much knowledge of environmental problems may actually impede environmental action by making students feel that there is nothing they can realistically do to stop climate change. This may be the reason that the environmental major did not have any statistically significant effect on environmental action. It could be that environmental majors still care about environmental issues but are more realistic about the effects that their actions will have. After learning exactly what the problems with the environment are from the death of moss due to acid rain to the entire overarching issue of climate change, environmental studies students are then presented with possible solutions and the many reasons that each solution cannot work. While it is clear that there are some options, such as renewable energy, that are better than others, it is also clear the likelihood of getting the global economy to switch from carbon fuel is very slim.

It is for this reason that including action components in environmental education is so important. Traditionally, curricula teach about the environment and the importance of saving it, but rarely allow students to create their own solutions (Uzell, 1999). Instead Uzell suggests the action competence model in which students research a problem, run their own tests, come up with a solution and actually implement it. Luckily classes like Environmental Action: Shifting From Saying to Doing run by Tina Woolston and Dallase Scott are a start. However simply including action on its own may not be enough, and the number of schools that even have environmental classes is worryingly small (Rowe, 2005). For this reason, environmental education campaigns must be able to change the way that information is presented in order to incite more environmental action. As discussed before the authors Chip and Dan Heath (2007) make it very clear that the only information that will really stick with people is that which is presented in a simple, concrete, credible and emotionally connected to the recipient. In order to truly encourage environmental action, Tufts and other learning institutions would need to create classes that first give a basic understanding of environmental problems in a way that is concrete and not overwhelming and then immediately tie that information to real action potential. At least at Tufts, there is support from the students on this front. Approximately 91% of the students polled thought that environmental action was important, and participants rated the importance of including sustainability in already required classes as 4.05 on a scale of 5.

On the other hand, is it really the role of a university to tailor classes to create environmental action, or should it focus on giving a solid environmental education and let its students create their own action? This is a difficult question and one that will yield a very different answer depending on which university it is addressed to. In the case of Tufts, a

university that proudly claims to be one of the "top green schools in the nation" (TIE, 2012) and holds active citizenship as a priority (Tisch, 2009), it seems as though encouraging environmental action would be a logical next step from these two values. This does not necessarily mean that Tufts needs to have classes that specifically teach environmental action. As discussed earlier in this paper, environmental groups can play a significant role in creating environmental action, so the University could choose to support these groups instead of changing its curriculum.

Environmental Education and Knowledge

Another conclusion that can be drawn from the data in this study is that the environmental major at Tufts does not seem to cause a significant increase in environmental knowledge in environmental majors. It is likely that in general Tufts students are fairly well informed about the environment so the questions given on the survey were not enough to adequately judge environmental knowledge. Since there were only fifteen questions, they certainly did not cover all of the topics or levels of difficulty possible. Future studies could include participants other than Tufts students to determine if there is a wider breadth of environmental knowledge levels, or have a more intensive questionnaire to test more subtle differences.

On the other hand, even if the questionnaire was not subtle enough to pick up on differences in environmental knowledge between the groups of participants, it is still clear from this survey that participation in the environmental major had no effect on environmental action levels. This does not mean of course that this environmental education is not necessary and

sufficient for other important aims. In order to combat climate change and other environmental issues, we will need a lot of scientists to work on finding solutions and other environmentalists to build campaigns for greener policy decisions. While these people may not be the most environmentally active in their own lives, they will hopefully be instrumental in helping to save the planet. Just as not every dentist flosses, not every environmentalist composts.

The idea that education about environmental issues is important, but severely limited in making real change was discussed by many, including the National Education and Training Program (Coyle, 2005). However, as evidenced by the numerous education campaigns on everything from composting (US Composting Council, 2011) to global warming (Environmental News Service, 2006), it is clear that the shift to action based plans is not entirely complete.

Environmental Perceptions

The fact that the data shows that accuracy of environmental perceptions is linked to high levels of environmental action backs up previous research that these two are connected. However, since this is a correlation, it cannot be said that one leads to the other. It is likely that the same kind of person who would have accurate perceptions about the environment is also someone who would actively try and protect it because they would understand how much danger it is in. This goes back to the idea that if people both understand the importance of old growth forests and are emotionally attached to them, they are more likely to be willing to actively save them. Additionally, if people have interacted with the environment in a direct way, such as helping to pick up trash or plant a garden, they are more likely to carry attitudes about the environment that are more affectively based (Millar & Millar, 1996). Since environmental

groups are often connected to these types of actions, it makes sense that participants would be more emotionally tied to the environment and thus why there was a marginal effect for participation in an environmental group. In contrast, if participants had only or mostly interacted with the environment in an educational setting, it is likely that their attitudes toward it would be more cognitively based (Millar & Millar, 1996). This may explain why there was no effect for major on environmental beliefs. If major only increased cognitively based rather than emotionally based attitudes, it makes sense that it would have no effect on environmental beliefs because they are so tied to emotions.

It also makes sense that those who participated in environmental groups in high school and wanted to learn more about environmentalism would have reached more accurate environmental perceptions. Again, if participants were part of environmental groups in high school they were more likely to be actively involved with the environment in a direct sense. For example, my environmental club in high school went on field trips to study invasive species in local streams and traveled to Belize to study coral bleaching. Other clubs did things such as visit a National Wildlife Refuge and recycling center (GCSU, 2009), go on canoe biodiversity tours (Delaware Nature Society, 2011) or participate in an oyster restoration program (Chesapeake High School, 2011). All of these activities would be likely to make participants feel more emotionally connected with the environment and thus more likely to have accurate beliefs about it. Additionally, if they had become this invested in the environment, they would also probably want to learn as much as they could about it, and thus got to Tufts with the intention of learning more.

On the other hand, people with accurate environmental perceptions, would also be the

type of people who would want to join environmental groups and learn as much as they could about environmental issues. If someone understands the importance of something like composting and the positive effect it can have on the environment, it would make sense that they would be more likely to join a group devoted to this cause as well as want to learn more about what they can do. Conversely, if someone sees recycling as useless or part of a hopeless cause, they are not likely to join a group or try to learn more about it.

Other Correlations

While many of the correlations between different factors in creating environmental action were not explicitly predicted, they are still very interesting. For example, high levels of environmental action were correlated to positive personal beliefs. The implications of these findings are very important because they show that many of the factors that create environmental action are closely tied as well as being meaningful on their own. The connection between positive personal beliefs and high levels of environmental action is important because if students do not believe that they can make a real difference, they are very unlikely to become environmentally active (Uzell, 1999). Since many environmental actions require some level of life-style change, they require not only a belief that the cause is important, but also a more general sense that one can have a positive effect on the situation. A similar situation can be found with voting. If people think that their vote will not be counted or will not have an effect, they are much less likely to vote (NonprofitVOTE, 2011). For this reason, it is very important to foster a population that not only understands the environmental problems and solutions, but also

believes that they are capable of making a difference. One way to accomplish this would be to use social psychology and social marketing. For example, many people believe that there are too many barriers to being environmentally active, too few rewards, or simply do not know enough about the environmental movement to join it. Social marketing seeks to overcome these problems by using clear and memorable information, social norms modeling, feedback, incentives and group commitment (McKenzie & Smith, 1999). It is also possible that getting people to participate in small activities like recycling or an environmental survey will convince them that they are environmentally friendly, and they will tailor future decisions to remain consistent with this self-view (McKenzie & Smith, 1999).

The idea of self-efficacy in relation to environmental issues is also highly connected to the idea of locus of control. An experiment by Hwang, Kim, and Jeng (2000) found that likelihood and responsibility to act were very connected to locus of control. For example, if people feel as though they have some control over pollution or other environmental ills, they would be more likely to take responsibility to stop these problems. On the other hand, if they have an external locus of control, they are much more likely to sit back and wait for someone else to solve the problem. However, even people with an internal locus of control still need support and resources in order to overcome the barriers to environmental action (Tanner, 1999). This could be where a group could be important to provide these necessities.

A positive correlation was also found between high self efficacy and a family that talked about environmental issues, as well as with intention to come to Tufts and accurate environmental perceptions. The connection between high self efficacy and a family that talked about environmental issues makes sense because if people grow up knowing about the

environment and understanding its importance, they are less likely to be shocked into inaction when they are confronted with all of the environmental problems later in life. Additionally, the study by Louise Chawla (1999) showed that influence of family, particularly parents and siblings, is one of the top reasons that people list for their involvement in the environmental movement. Since the survey did not measure whether the stance of family members toward the environment was positive, only that it was discussed, it cannot be assumed that all of this influence was positive. However, since it is positively correlated with high self efficacy, the data suggest that the influence of family was likely mostly pro-environmental in the long run.

The positive correlation between high self efficacy and accurate environmental perceptions is very important. Theoretically, if people understand the actual state of the environment and believe that they can make a positive difference, they are more likely to perform meaningful environmental actions. While these findings are just correlations and more data need to be collected, they suggest some interesting trends. If it is true that the combination of self-efficacy and accurate environmental perceptions is one way to create environmental action, both self-efficacy and accurate environmental perceptions need to be strongly encouraged in environmental and other school programs. They should also be focused on in environmental groups.

Future of Environmental Classes

The findings of this study also shed some light on how Tufts students view the future of environmental education at the university. As expected, participants who were environmental majors rated the importance adding an environmental requirement to the Tufts curriculum as

higher than participants who were not environmental majors. Participants who were in environmental groups rated the importance of this requirement as higher than participants who were not. There was also a significant effect found for participation in the environmental studies major on the importance of including issues of sustainability in other classes, in which majors rated this inclusion as more important. While these results are important because they show that people in both groups and the environmental major would be supportive of more environmentally themed classes and lessons, the reaction of the non-majors and non-group participants is even more interesting. For the importance of an environmental class and for including sustainability issues in other required classes, both non-majors and participants who were not part of environmental groups gave averages that were all above three. Since the scale given has three as a midpoint, all of the groups were at least slightly in favor of an environmental requirement and adding sustainability to other requirements.

Study Limitations

While the results from this study show that the choice to be in an environmental group makes Tufts students more environmentally active, this may not translate to other universities, and almost certainly does not translate to the global population. This is one of the weaknesses of the current study. It may be true that the high baseline of environmental awareness that already exists in the students at Tufts University is what makes it possible for environmental groups to have such an effect on environmental action levels. However, this is less likely because there was no effect for group participation on environmental knowledge which suggests that awareness or knowledge of the environment is not necessarily a required base for environmental action.

On the other hand, the population of Tufts University is not at all an accurate representation of the population of the United States. Although a little under ¾ of the student population receives some form of financial aid and non-Caucasian students represent about half of the student body, Tufts and other elite universities are not particularly diverse in the sense that they are comprised mostly of students that come from middle or upper class, well-educated families (U.S. University Directory, 2009). As discussed above, these demographics when added to the fact that most of the students are young, fairly liberal, and live near city of Boston suggests that they are inherently more likely to be environmentally active than their less educated, conservative, rural, and working class counterpoints (Fransson & Garling, 1999). For this reason, the results of this study are most applicable to other elite liberal arts institutions. Since, as discussed above, only a small percentage of higher learning institutions even have requirements for environmental classes, let alone programs that help promote environmental action directly, (Rowe, 2005) change is still required to help these schools and their students become more environmentally active.

Another limitation of this study was that not all of the survey questions had been pretested, or used in the same order in other studies. Questions from other pretested studies were used as much as possible, but there were a few cases in which questions had to be added or taken from other sources in order to get at the desired information. For the questions used to evaluate environmental knowledge, the questions were taken either from the paper entitled *Shifting From Saying to Doing* by Dallasse Scott (2010) or from an environmental literacy test presented by the National Wildlife Society (2011). The questions were designed to be wide ranging and covered topics from stream pollution to greenhouse gases in order to get a general sense of environmental

literacy. However, in the interest of making the survey less time consuming for participants, only fifteen questions were included. It is possible that some people with high environmental knowledge levels happened to not know the answers to the fifteen questions asked and that participants with low environmental knowledge either guessed correctly or happened to know those answers and not others. Future studies could use a more extensive environmental literacy test or test this one against a more extensive one to make sure that it is predictive of environmental literacy despite having few questions.

The same limitations can be seen in the other sections of the survey. While most of the questions in each segment were taken from pretested and validated questionnaires, there were a few that had to be added to collect all of the necessary data. For example, the questions that asked about how participants thought the Tufts Environmental Studies major and environmental groups had affected their levels of environmental action were created just for this study. The same was true for the questions about whether Tufts should have an environmental requirement or require issues of sustainability in other classes. Overall, an effort was made to order questions in a way that would not lead the participant to any specific answer, and positive and negatively phrased questions were balanced where possible. Questions that asked directly about the influence of knowledge or groups on environmental action were at the end of the survey in order to not influence the participants. Despite these attempts it is very possible that the order of the questions on the survey had an effect on the answers. Future studies could have different versions of the questionnaire with different orders to make sure that order did not have an effect on the results.

Another limitation to this study was that the participants were not entirely randomly

chosen due to the fact that it was not possible to send the survey to the entire student body. Instead, the survey was sent to known environmental groups and the environmental studies e-list as well as posted on the Tufts student page. Since not every Tufts student regularly checks this page or is on one of the known e-lists, not every student had an equal chance of participating in the survey. Future studies could send surveys out to the entire school or find other ways to ensure that the process is more randomized.

The biggest limitation of this study was that the group of environmental studies majors who were not in any environmental groups was very small, which made it impossible to get statistically valid results of the interaction between environmental major and participation in environmental groups. Instead, any interaction effects were used only to suggest possible trends and were not statistically relevant. While this small group size made it difficult to analyze the data, it is actually a positive sign that it was so difficult to find environmental majors that were not in environmental groups. This difficulty means that these students are pairing environmental education with environmental group participation which, as discussed, should hopefully mean that they have the highest likelihood of being environmentally active.

Future Directions

While new environmental programs and especially action groups should be implemented as soon as possible in liberal arts colleges, it is even more important that programs are designed to effectively target other demographics. Since liberal university students and faculty are some of the people most likely to be environmentally active, it is imperative that we reach the other subsets of the population. While the research conducted for this study was focused on Tufts students, there is some evidence that at least the group participation effects will carry over to

other parts of the population. This idea is supported by research discussed in *The Tipping Point* (Gladwell, 2000) in which groups of under 150 people are the most effective at magnifying an idea and participating actively in a cause. Additionally, as previously discussed, when a group of students, faculty and community members worked together on a project, they were more likely to continue and succeed than if each of the groups worked alone (Uzell, 1999).

So, future research could look at exactly what type of groups would be effective for certain parts of the population. For example, groups that would work for inner city preschoolers would probably not be as effective for rural business owners. Part of this research could include analysis of existing environmental groups such as CitySprouts (2010) which is a Somerville based organization that aims to teach local children environmental stewardship through growing their own food. Eventually, future research could also lead to the creation of a guide for starting and sustaining different kinds of environmental groups. These guides could include both general ideas to make people more environmentally active but could also focus on specific environmental actions. For example, a guide for how to start a gardening group in a city would be very helpful, as this type of action tends to require techniques that are not common knowledge.

Future research could also track participation in environmental groups over time to measure the long term effects on environmental action levels because they were not within the scope of this study. Other studies could test a group of students before they start participating in environmental groups, while they are in them, and when they leave them in order to see the true effects of environmental groups over time. This would be very important because it would make it much clearer what the exact effects of environmental groups are, how quickly they occur, and

what other factors are involved. This would make it much easier to replicate important facets of environmental groups. It would also be useful to have a study look at how levels of environmental knowledge change after participating in an environmental education program to determine if these programs are actually increasing environmental knowledge and what actual impact this knowledge has on levels of environmental action.

Conclusion

While there are many limitations to this study and plenty of research to be done on the subject of environmental action, there are still several important conclusions. First, as discussed in recent literature, environmental education is not enough to produce environmental action. Instead, participation in environmental groups seems to be a much better predictor of pro-environmental action. This is very important because most schools and other institutions use traditional education to introduce students to environmental problems. The results from this and other studies suggest that an action component should be added to these classes in order to get people to really make a change. However, since many of our environmental problems are very pressing and time sensitive, this action component needs to be taught to adults as well as children. We need to use tools such as social marketing to get people invested and environmentally active. Only then do we have any chance of solving the multitude of environmental problems that face us.

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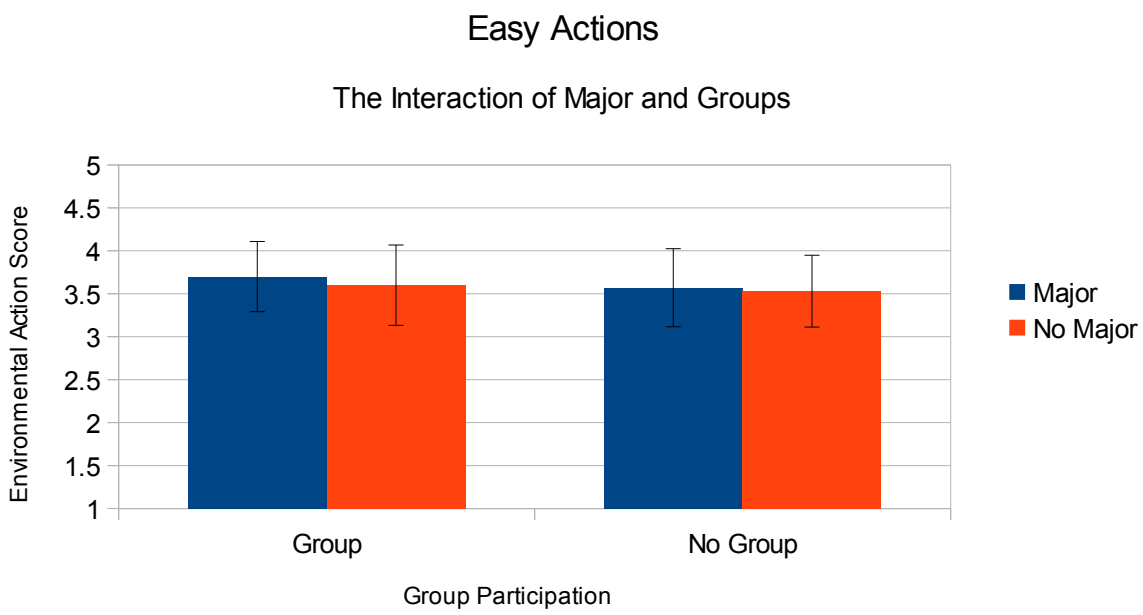

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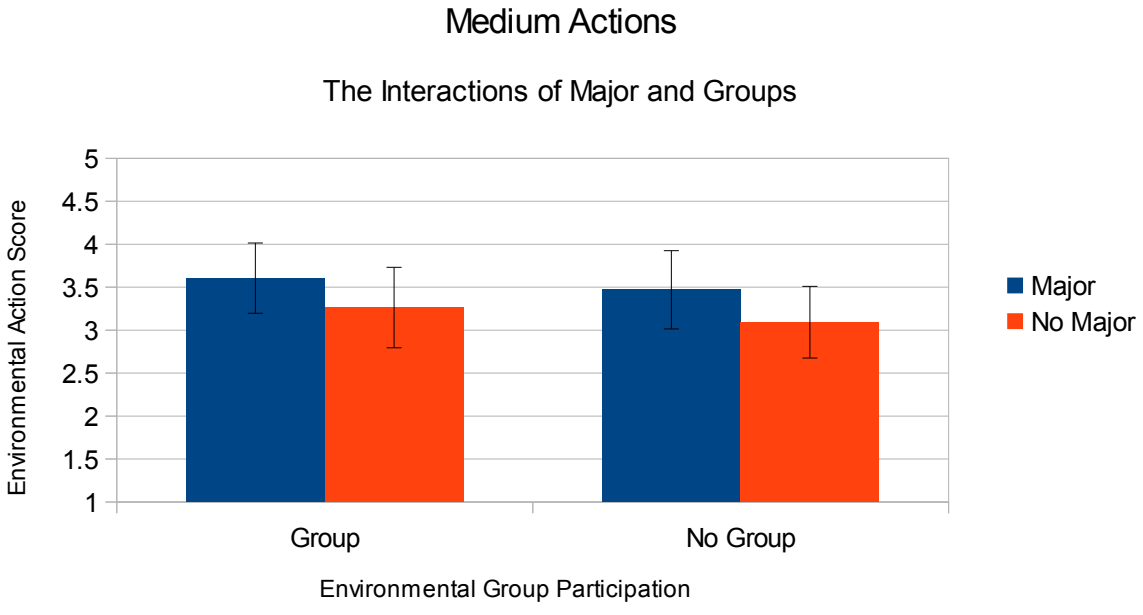

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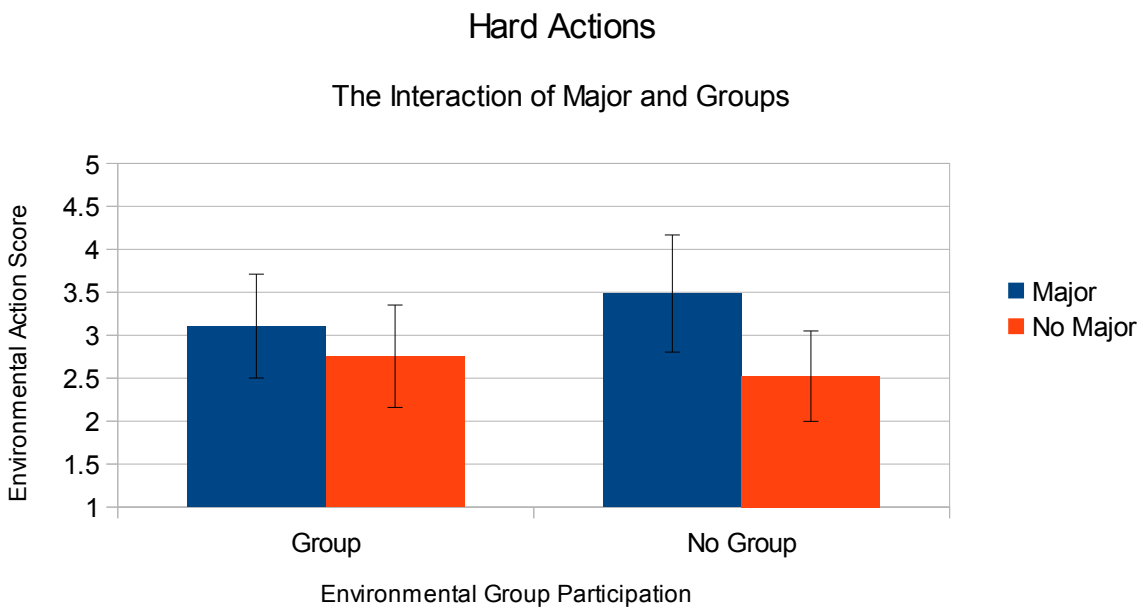

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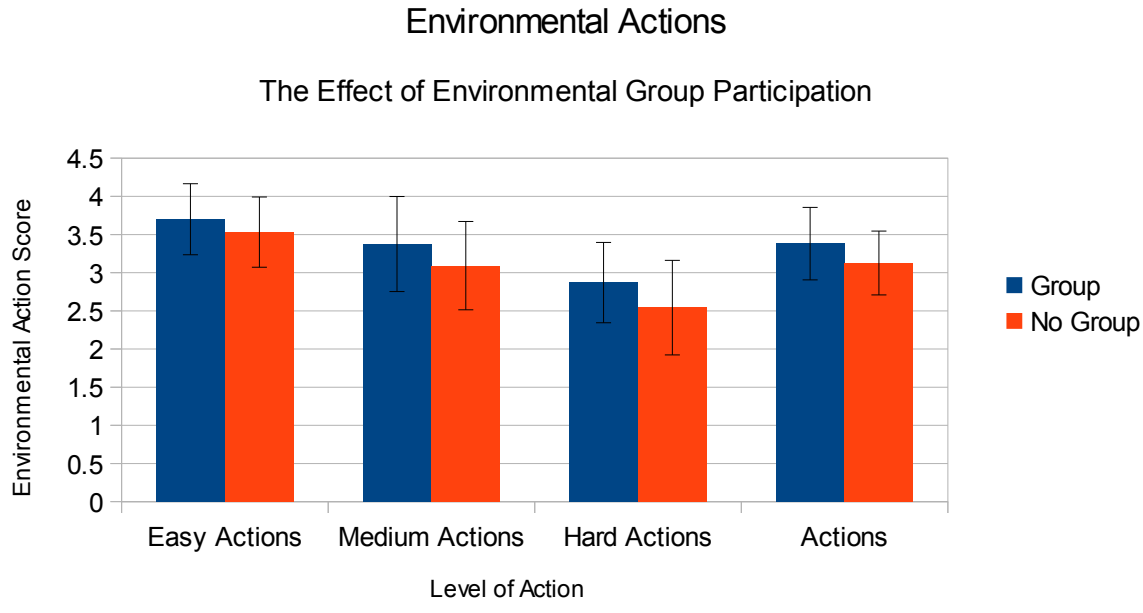

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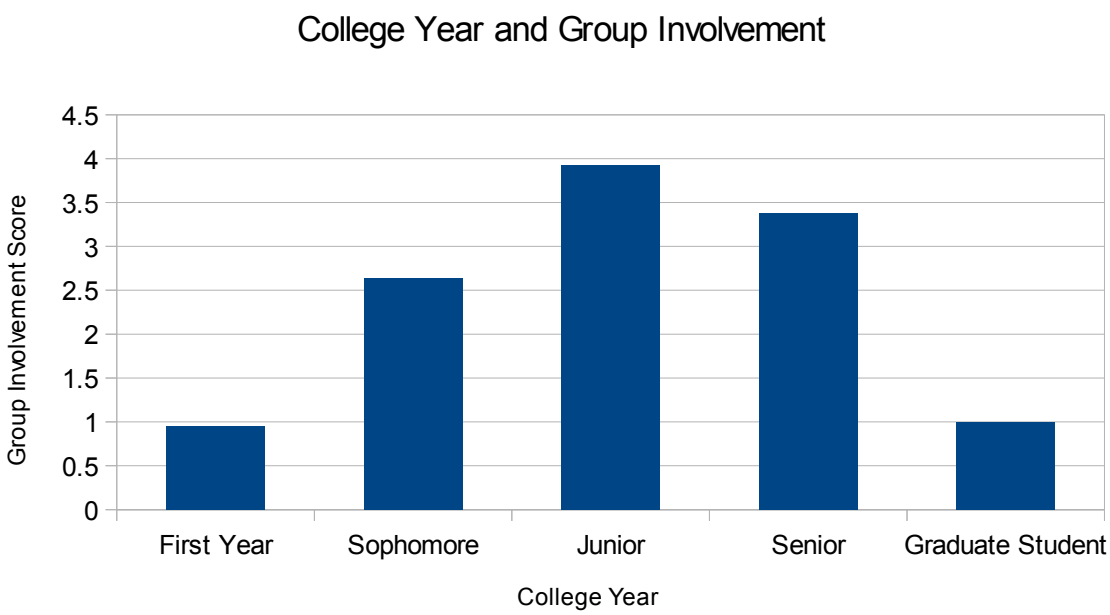
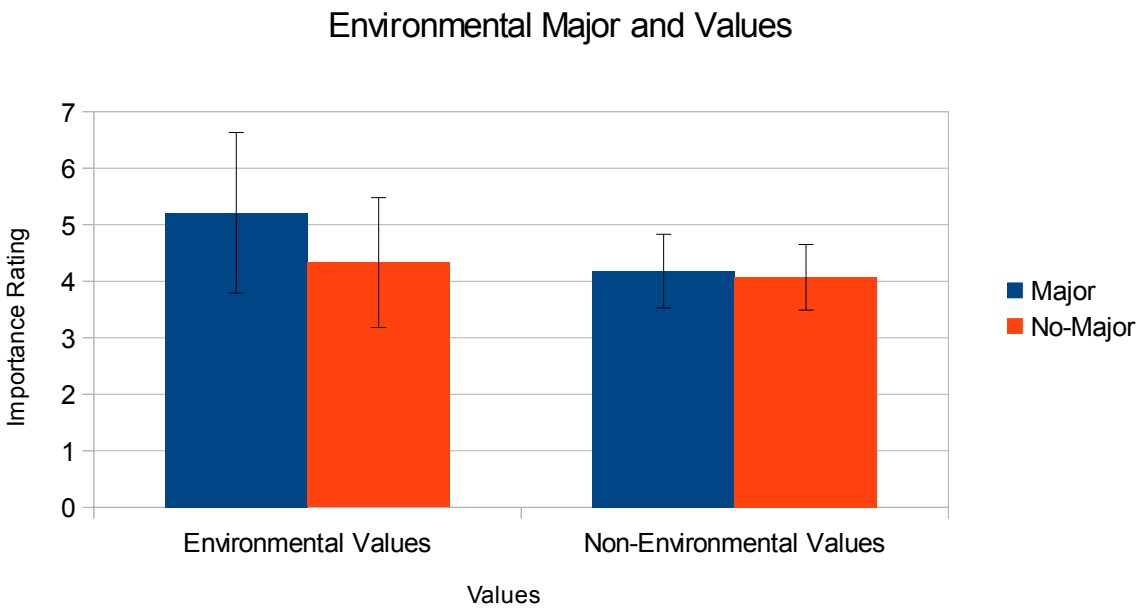

College Year and Group Involvement
Group Involvement Score
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
First Year
Sophomore
Junior
Senior
Graduate Student
College Year

Figure 6:



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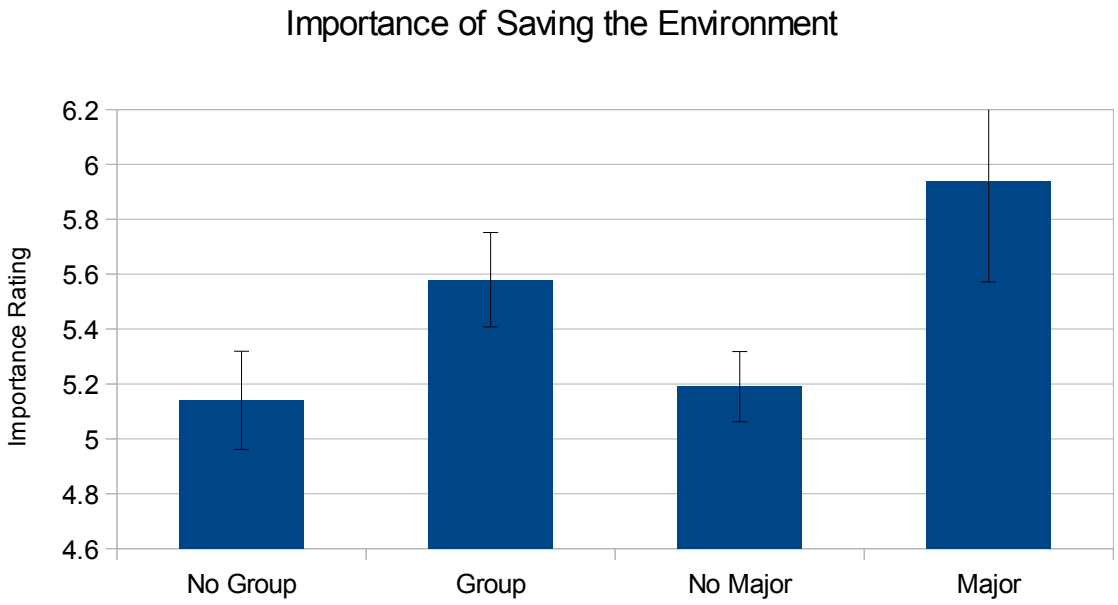

Importance of Saving the Environment
Importance Rating
6.2
6
5.8
5.6
5.4
5.2
5
4.8
4.6
No Group
Group
No Major
Major

Figure 8:

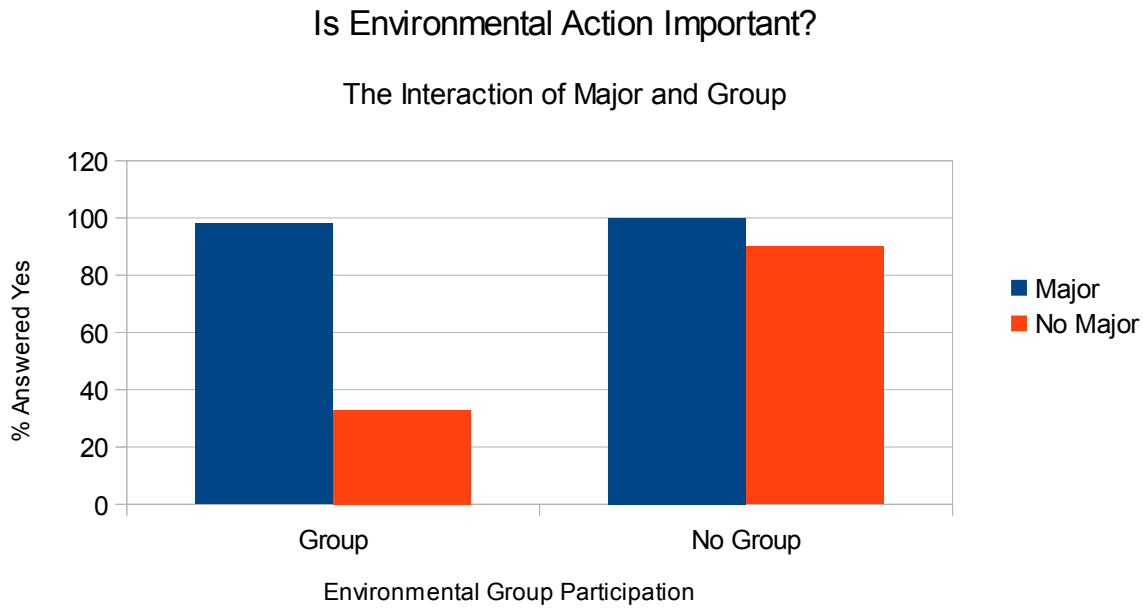
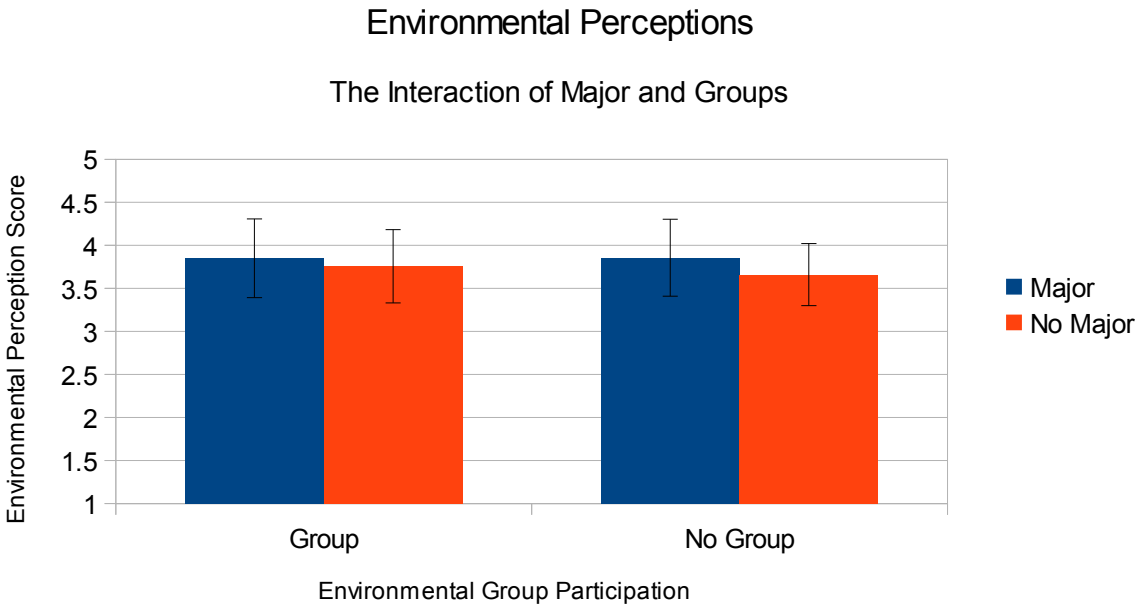

Is Environmental Action Important?
The Interaction of Major and Group
% Answered Yes
120
100
80
60
40
20
0
Group
No Group
Environmental Group Participation
Major
No Major

Figure 9:



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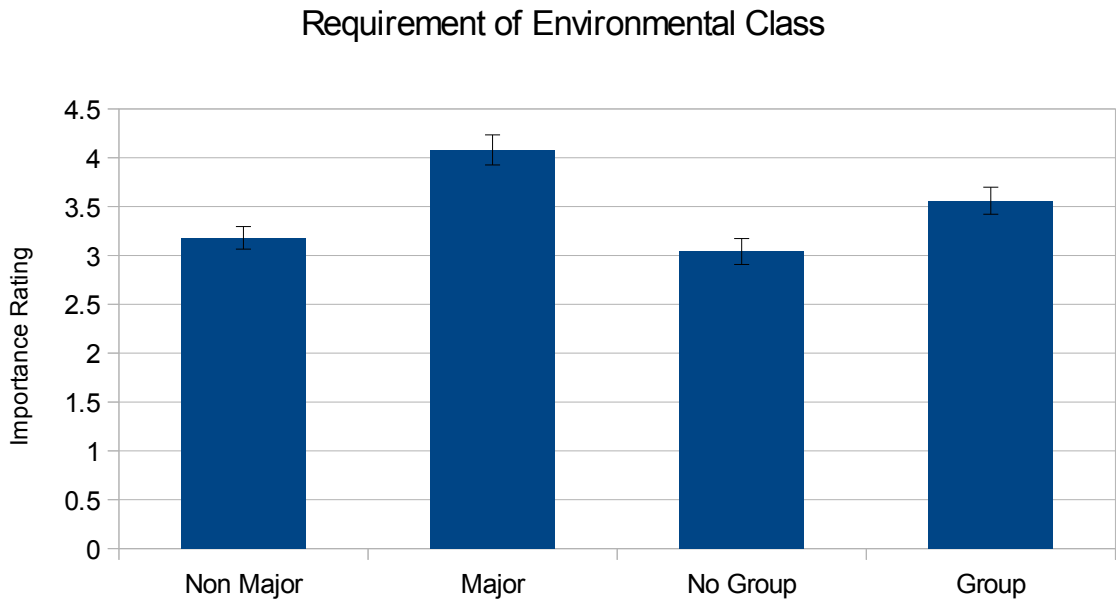
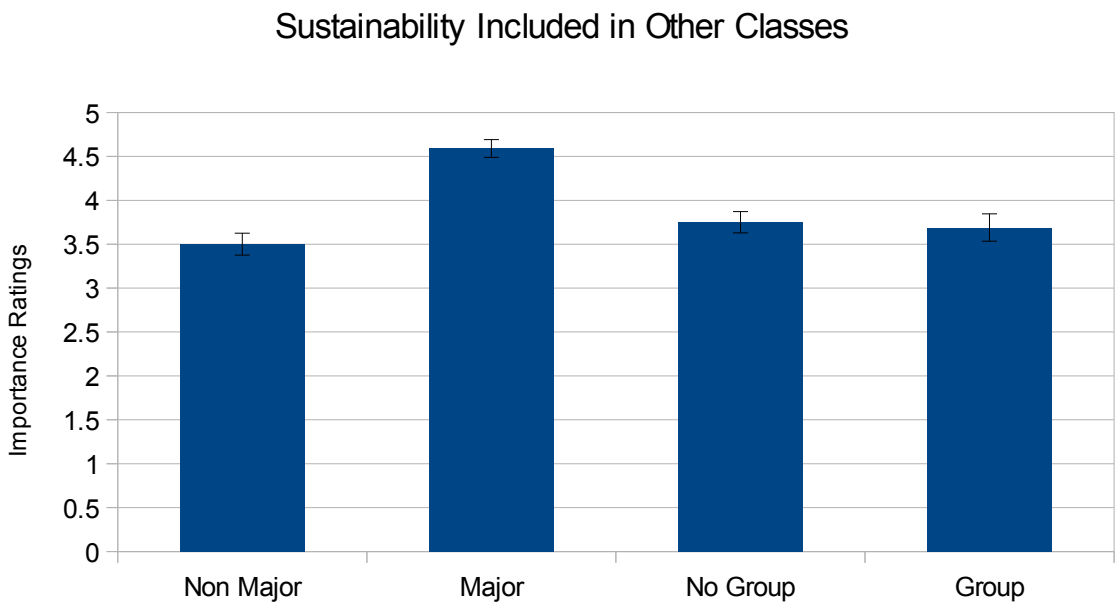


Fig

ure

11:



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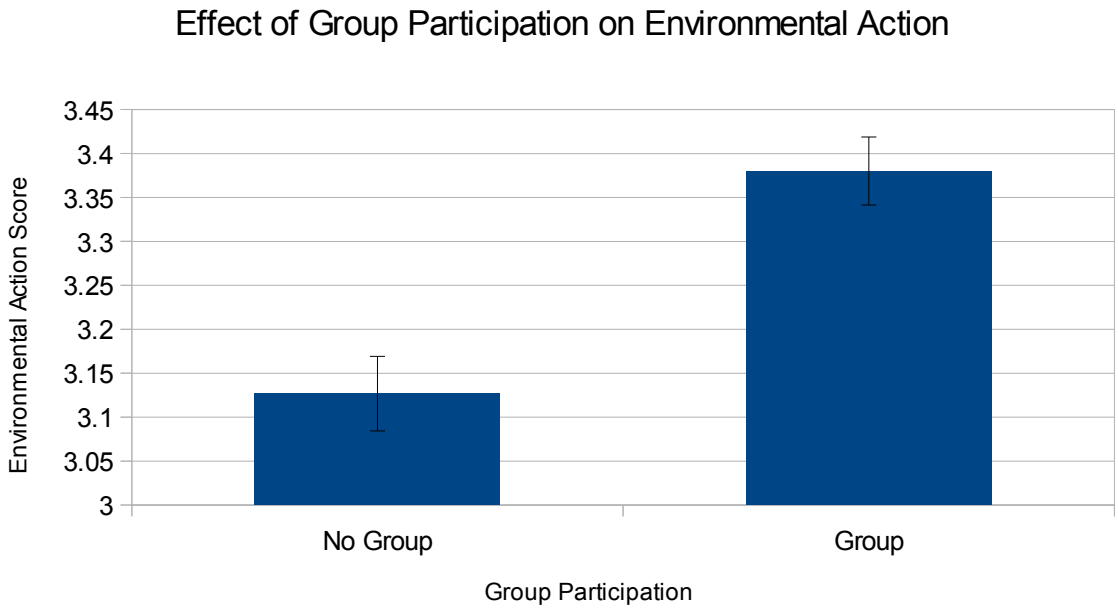

Effect of Group Participation on Environmental Action
Environmental Action Score
3.45
3.4
3.35
3.3
3.25
3.2
3.15
3.1
3.05
3
No Group
Group
Group Participation

Figur

e 13:

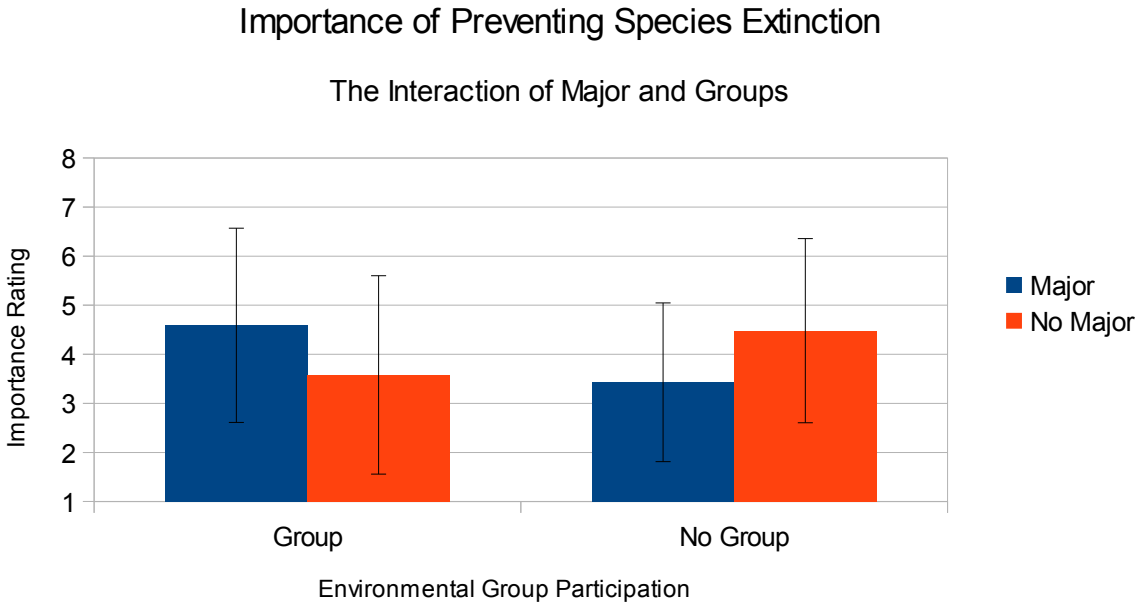
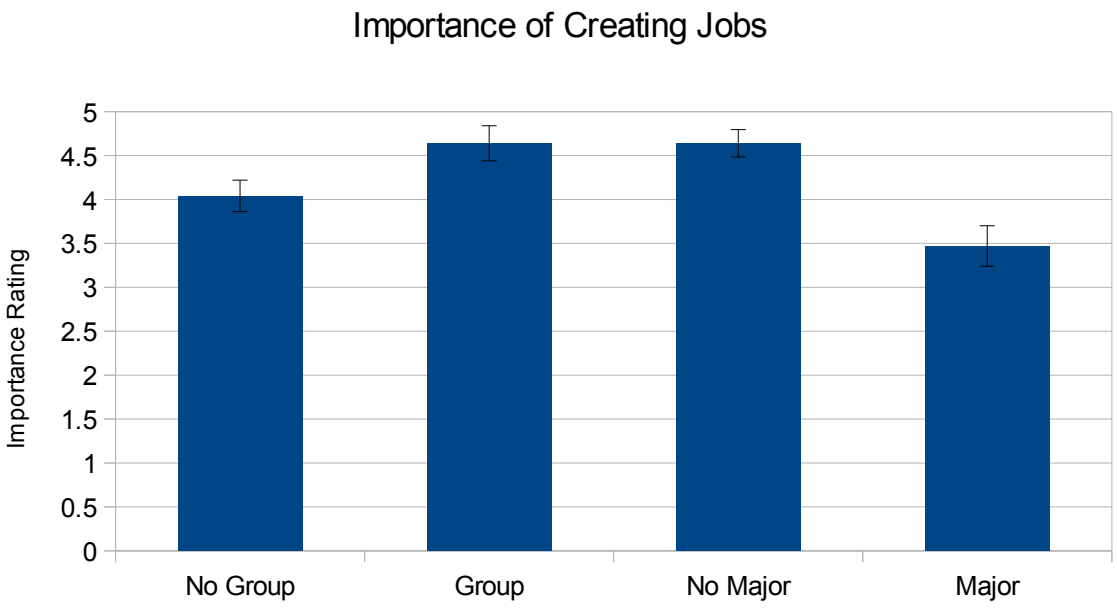

Importance of Preventing Species Extinction
The Interaction of Major and Groups
Importance Rating
8
7
6
5
4
3
2
1
Group
No Group
Environmental Group Participation
Major
No Major

Figure 14:



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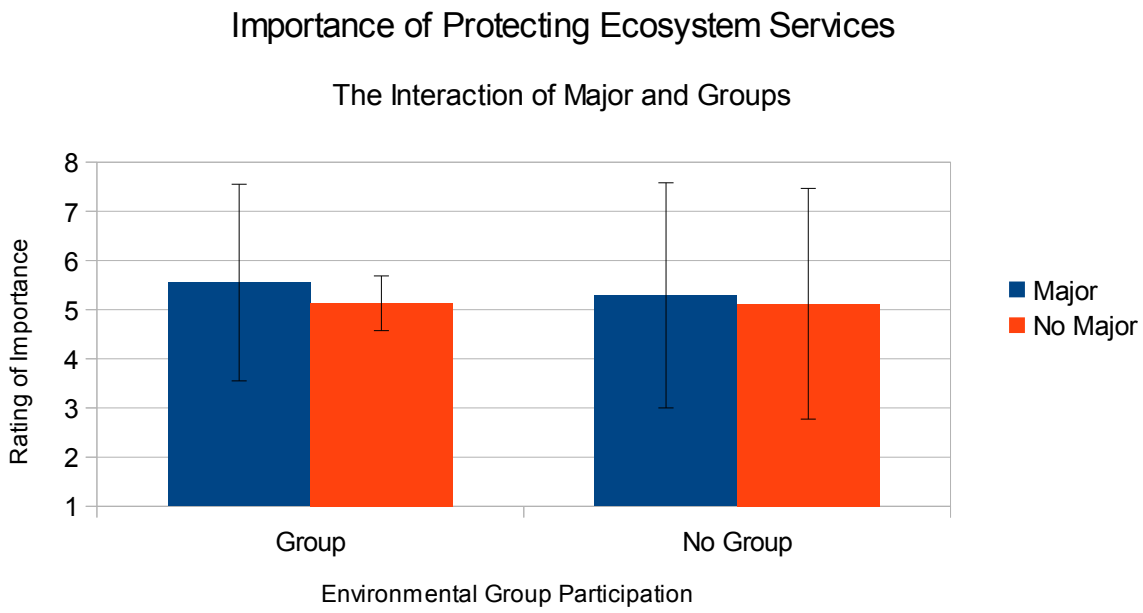
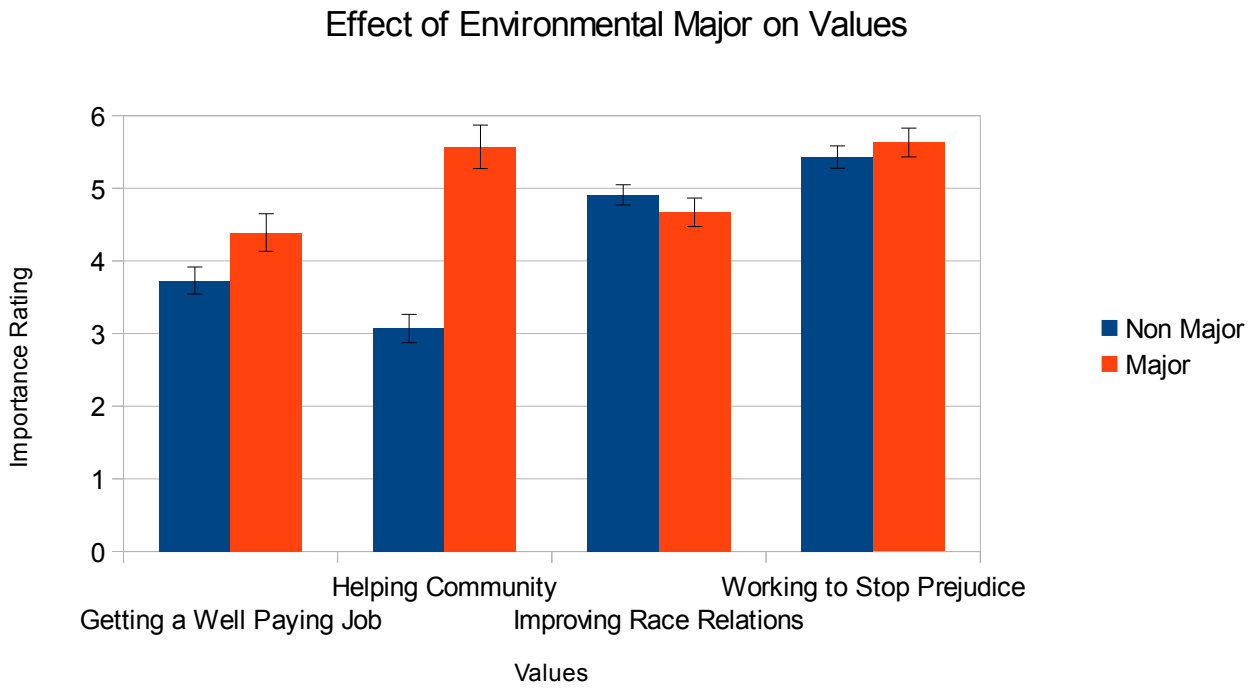

Importance of Protecting Ecosystem Services
The Interaction of Major and Groups
Rating of Importance
8
7
6
5
4
3
2
1
Group
No Group
Environmental Group Participation
Major
No Major

Figure 16:



Appendix 1:

Environmental Action at Tufts

Primary Investigator: Lydia Chevalier
Sponsoring department: Tufts Institute of the Environment

Purpose
The purpose of this study is to measure the effects of environmental education and environmental groups on environmental action.

Procedure
Participants who agree to participate will be asked to fill out the following survey. It should take no more than 10-15 minutes. Students who are chosen to receive the prize for participating will be contacted by email.

Risks
There are no known risks for this study.

Benefits

Participants may gain more environmental knowledge or learn about opportunities for environmental action. Five students will also be randomly selected to receive $100. If you wish to be entered to win this prize please provide your contact information. All personal information will remain confidential and will only be used for contacting prize winners.

If you have any questions please contact Lydia Chevalier at Lydia.Chevalier@tufts.edu, Professor Taylor at Holly.Taylor@tufts.edu or Tufts Institute of the Environment at antje.danielson@tufts.edu.

You must be at least 18 to complete this survey. If you are not, please exit the survey now.

If you wish to continue with this survey, please press continue to give consent.

Environmental Action Survey

Required Question(s)

Progress:

1.

Thank you very much for taking the time to complete this survey. It should take no more than 15 minutes and five students who complete the survey will be entered to win $100. This question is optional if you do not wish to be entered to win the prize.

First Name:

Last Name:

Email Address:

2. Are you currently majoring in Environmental Studies or plan on doing so in the future?

Yes

No

3. Have you participated in any of these environmental groups at Tufts?

Tufts Energy Conference
Sustainability Roundtable
Tufts Garden Club
Eco-reps
Tufts Against Plastic
Tufts Energy Forum
Tufts Mountain Club
Wilderness Orientation Program
Tufts Bikes
Tufts Sustainability Collective
Other

4. If so, what is the level of your participation? You may select as many as are applicable for the group you are most involved in.

Founder of group
Officer for group
Active in planning events ect.
Attends meetings regularly
Attends large group events
On mailing list
Not applicable

5. What year are you in college?

Freshman
Sophomore
Junior
Senior
Graduate Student

Environmental Action Survey

Progress:

6. Which country currently emits the most greenhouse gases?

India
China
Germany
The United States
Don't know

7. What is the most common source of pollution for rivers, streams, and oceans?

Acid rain
Direct dumping of hazardous materials
Runoff from farms, pavement, yards and other polluted land areas
Coal plants
Don't know

8. How is most of the electricity in the United States generated?

By burning fossil fuels
By using hydropower
Solar energy
Wind energy
Don't know

9. Which of the following is the greatest source of carbon monoxide in the United States?

Factories and businesses
Animals breathing
Motor vehicles
Decomposition of organics in landfills
Don't know

10. Waste added to bodies of water kills fish because it decomposes and

adds carbon dioxide to water
produces a bad smell
kills the plants that fish eat

uses up the oxygen required by fish to breathe
don't know

11. How long does it take for carbon dioxide in the atmosphere to disperse?

1 year
10 years
50 years
100 years
Don't know

12. Where does most of the waste in the United States end up?

Oceans
Incinerators
Recycling centers
Landfills
Don't know

13. Which of the following is NOT considered a greenhouse gas?

Carbon Dioxide
Carbon Monoxide
Methane
Nitrogen
Don't know

14. Which of the following is NOT a sustainable resource?

Wind
Solar energy
Natural gas
Hydropower
Don't know

15. Which of the following increases the acidity of rain?

Oxygen
Methane
Carbon
Sulfur dioxide
Don't know

16. Which of the following household wastes are considered hazardous?

Plastic packaging
Glass
Rechargeable batteries
Spoiled food
Don't know

17. What is the name of the primary federal agency that works to protect the environment in the United States?

Environmental Protection Agency (EPA)
Department of Agriculture
Greenpeace
Natural Resources Defense Council (NRDC)
Don't know

18. What is the most common cause of the extinction of a species?

Pesticide use
Habitat destruction
Over-hunting
Climate change
Don't know

19. What is the primary benefit of wetlands?

Promote flooding
Clean water before it enters other bodies of water

Keep undesirable animals out of developed areas
Provide good sites for landfills
Don't know

20. Which of the following is NOT a potential negative effect of wind power?

Bird and bat mortality.
Noise pollution.
Fossil fuels burned during transportation.
Increased mining for materials.
Excessive use of water during operation.

21.
Please select how often you do each of the following activities.

	Never	Rarely	Sometimes	Usually	Always
I wait until I have a full load to do laundry.					
I collect and recycle bottles, cans and paper.					
I compost.					
I take my own coffee/tea to work or school					
I prefer to drink bottled water rather than tap water					
I run the water for a time to get it to the correct temperature					
I put dead batteries in the trash					
I use recyclable bags while grocery shopping					
I buy individually wrapped pieces of food for convenience					
I eat meat					

22.
Please select how often you do each of these activities.

	Never	Rarely	Sometimes	Usually	Always
I buy locally grown food.					
I vote for politicians who support environmental groups.					
I drive to work.					
I donate time or money to organizations that work to save the environment.					

I leave my computer plugged in over night.
I use an air conditioner.
I grow my own food.
I take public transportation when possible.
I pick up trash that is left lying on the ground even though it is not mine.
I buy organic produce.

23.

Please select how accurate these statements are for you.

	Very false	Mostly false	Uncertain	Mostly true	Very true
My family talked about environmental issues when I was growing up.					
I enjoyed playing outside in nature when I was a child.					
I participated in environmental groups in middle school.					
I participated in environmental groups in high school.					
I came to Tufts with the intention of learning more about the environment.					
I enjoy doing outdoor activities such as hiking or kayaking.					

24.

How much do you agree or disagree with the following statements?

	Strongly disagree	Disagree	Unsure	Agree	Strongly Agree
The balance of nature is very fragile and easily disrupted.					
The oceans represent an unused area where we should dispose of our waste.					
My friends talk to me about environmental issues.					
Humans have the right to modify their environment to survive.					
We are approaching the number of people the earth can support.					

The earth has plenty of resources as long as we use them sustainably.
I do not hesitate to remind my friends not to engage in environmentally degrading behavior.
The conservation of natural resources should entirely be the government's job.
Nature is strong enough to cope with the changes that humans have made.
Plants and animals have as much right as people to exist.

25. How accurate are these statements for you?

	Very false	Somewhat false	Uncertain	Somewhat true	Very true
I believe I can make a difference in my community.					
When I am confronted with a problem I can usually think of several solutions.					
I learn best by doing group projects.					
I believe that environmental problems are too large to be solved by humans.					
I always try to get both sides of the story.					
My friends would describe me as a calm person.					
If someone opposes me I can usually figure out a way to get what I want.					
I have trouble following through on projects that I start.					
I listen to people talk carefully even when I already know I disagree with them.					
I learn best by attending lectures.					

26.
Please rank these actions in order of increasing importance.

(1 = Least)
Helping people in my community.
Working to stop prejudice.

Saving the environment.

Being active in my religion.

Protecting my country by serving in the military.

Getting a job that pays well.

Improving race relations.

Helping to protect animals.

27.

Please rate how accurate these statements are for you.

	Very false	Somewhat false	NA	Somewhat true	Very true
I believe being an Environmental Studies major has made me more environmentally active.					
I believe that an environmental class should be a requirement at Tufts.					
I believe that being part of an environmental group has made me more environmentally active.					
I believe that other classes should include aspects of sustainability in their curriculum.					

28.

Do you think being environmentally active is necessary?

Yes

No

29.

If so, please rank these reasons from least to most important.

(1 = Least)

Protecting ecosystem services (water, lumber, food)

Preserving the world for future generations

Protecting human health

Creating job opportunities

Providing incentives for new development and technology

Species extinction
Religious reasons
Social justice
- Comment:
-
  500 characters left.