

ECOCENTRISM AND ANTHROPOCENTRISM: MORAL REASONING ABOUT ECOLOGICAL COMMONS DILEMMAS

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Abstract

When do humans extend their ethical scope to include nature? Anthropocentrism and ecocentrism are two ways of understanding an extension of ethics to nature. In an anthropocentric ethic nature deserves moral consideration because how nature is treated affects humans. In an ecocentric ethic nature deserves moral consideration because nature has intrinsic value. In two experiments participants ($n=91$ and 84) generated moral reasoning responses to ecological moral dilemmas. The reasoning was coded as ecocentric, anthropocentric, or nonenvironmental (i.e., social contracts, truthfulness). Individual differences and situational variables were examined in relation to moral reasoning about ecological dilemmas. Pro-environmental attitudes were related to more ecocentric and anthropocentric and less nonenvironmental reasoning. The presence of information about the impact of ecological damage on the environment, especially a more “wild” environment, elicited more ecocentric reasoning, while the presence of a social commitment elicited more nonenvironmental moral reasoning. The implications of the research for conflicts over environmental commons dilemmas are discussed.

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Ecocentrism and Anthropocentrism: Moral Reasoning about Ecological Dilemmas

There is as yet no ethic dealing with man's relation to land and to the animals and plants which grow upon it... The extension of ethics to this third element in human environment is...an evolutionary possibility and an ecological necessity. (Leopold, 1949, pp. 238–9)

Aldo Leopold, sometimes called the father of environmental ethics, expressed these ideas over 50 years ago in his revolutionary essay “The Land Ethic.” Today we have clearly not accomplished the “ecological necessity” he called for. Environmental crises, such as species extinction, global warming, air and water pollution, and wild land destruction, are some of the most important problems currently facing our society. How we deal with these problems largely depends on how we perceive our relationship with the land. Do we view nature as property for us to use however we wish for our own benefit, or does nature have intrinsic value, value aside from its usefulness to humans? A half-century after Leopold

gave us his land ethic, just how far and in what ways have our land ethics developed?

The purpose of this project is to examine some issues in how people extend ethics to the natural environment. Environmental ethics was given a central place in debate among scientists by Hardin (1968) who argued that the human race is faced with the dilemma of how to prevent overuse and depletion of natural resources when individuals desire to maximize their gains. As noted by Dawes (1980), many environmental issues can be construed as social dilemmas:

- a) each individual receives a higher payoff for a socially defecting choice (e.g., having additional children, using all the energy available, polluting his or her neighbors) than for a socially cooperative choice, no matter what the other individuals in the society do, but b) all individuals are better off if all cooperate than if all defect (p. 169).

In the present research we examine moral reasoning about social dilemmas centered on environmental issues.

Environmental ethics is based on the idea that morality ought to be extended to include the rela-

tionship between humans and nature. Although the field has its roots in the early writings of John Muir, Albert Schweitzer, and Aldo Leopold, environmental ethics only more recently began to gain support in the 1960s with the growing popularity of the environmental movement. The journal *Environmental Ethics* was founded in 1979 and is devoted entirely to the topic.

There are a number of different ways to understand an extension of moral consideration to nature (Nash, 1989). For example, is the extension individualistic or holistic? In other words are individual plants and animals given moral consideration, or is morality only extended to whole species or ecosystems? Another distinction is whether the extension is rights based or responsibility based; in other words does nature have the right to be protected or do humans simply have a responsibility to protect nature? Perhaps the most important distinction is whether the moral extension is anthropocentric or ecocentric because this determines what is the focus of the environmental ethic—humans or nature.

The term 'anthropocentric' was first coined in the 1860s, amidst the controversy over Darwin's theory of evolution, to represent the idea that humans are the center of the universe (Campbell, 1983). Anthropocentrism considers humans to be the most important life form, and other forms of life to be important only to the extent that they affect humans or can be useful to humans. In an anthropocentric ethic, nature has moral consideration because degrading or preserving nature can in turn harm or benefit humans. For example, using this ethic it would be considered wrong to cut down the rainforests because they contain potential cures for human diseases.

What is referred to here as an 'ecocentric' ethic comes from the term first coined 'biocentric' in 1913 by an American biochemist, Lawrence Henderson, to represent the idea that the universe is the originator of life (Campbell, 1983). This term was adopted by the so-called 'deep ecologists' in the 1970s to refer to the idea that all life has intrinsic value (Nash, 1989). In an ecocentric ethic nature has moral consideration because it has intrinsic value, value aside from its usefulness to humans. Using this ethic, for example, one could judge that it would be wrong to cut down the rainforests because it would cause the extinction of many plant and animal species.

Very few studies in the past have addressed the concepts of anthropocentrism and ecocentrism. A distinction between these two concepts was first brought into social science research by Dunlap and Van Liere (1977) in a comment on Heberlein's (1972)

article, 'Land Ethic Realized.' Dunlap and Van Liere claimed that Heberlein was examining '...the consequences [environmental] problems can have for human beings—rather than the total (nonhuman as well as human) environment' (p. 204). In our terms, Dunlap and Van Liere were claiming that Heberlein was examining anthropocentrism rather than ecocentrism. Nevertheless, Heberlein's application of Schwartz's (1977) norm-activation theory of altruism to explain pro-environmental attitudes and behaviors led to further research using this model which finally did extend into examinations of ecocentrism in a study by Stern, Dietz, and Kalof (1993). Stern and colleagues expanded the assumption in Schwarz's model that people have a general altruistic value orientation to include value orientations that are egoistic and biospheric (ecocentric) as well. Meanwhile, Dunlap and Van Liere (1978) went on to incorporate ecocentric and anthropocentric items into their New Environmental Paradigm scale, a commonly used measure of pro-environmental attitudes.

Two other studies have also measured these two constructs as aspects of environmental attitudes. Dreger and Chandler (1993) developed an anthropocentrism scale, and Thompson and Barton (1994) developed both ecocentric and anthropocentric scales. Thompson and Barton found that people agreed more strongly with ecocentric than with anthropocentric attitude statements. However, the two studies used different conceptualizations of anthropocentrism. For example, six of the 12 items in Dreger and Chandler's (1993) anthropocentrism scale refer to the superiority of humans as compared to animals. In principle, believing that humans are superior to animals could be independent of an environmental ethic of preservation of natural resources because natural resources are valuable to humans. In contrast, in Thompson and Barton's anthropocentrism scale, items refer to either the consequences of environmental degradation for humans (e.g., loss of rain forest will restrict development of new medicines), or refer directly to human welfare as a motive for ecological conservation. Thompson and Barton's constructs are closely related to the kinds of ethical reasoning examined in the present study. However, Thompson and Barton assessed the constructs as attitudes, whereas the present study examines the use of these constructs in ethical reasoning about environmental dilemmas.

In a more directly related study, Kahn (1997) interviewed children and coded ecocentric and anthropocentric moral reasoning responses to an ecological disaster (the Exxon oil spill of 1989).

Kahn found that use of both types of reasoning increased with age. Even with the oldest children he tested (eighth graders), anthropocentric reasoning continued to be used with higher frequency than ecocentric reasoning (58% vs 20% of reasons given). The Exxon oil spill was an environmental disaster. Whether similar results would be obtained with ecological dilemmas that are not disasters or with adults is not known. In light of these findings on ethical reasoning about ecological disasters, and in light of the past research on ecocentrism and anthropocentrism as scale-measured values or attitudes (but not spontaneously produced ethical reasoning), the first goal of Experiment 1 was to measure the ecocentrism and anthropocentrism in adults' reasoning about ecological moral dilemmas and to determine the relative frequency of use of each type of ethic.

A second goal of the research was to explore how important aspects of the content of ecological dilemmas would influence moral reasoning. Because anthropocentric ethics focus on how nature affects humans, we hypothesized that if the impact of environmental damage on humans were enhanced in a dilemma, participants would use more anthropocentric reasoning. In turn, since an ecocentric ethic values nature for nature's sake, we hypothesized that if the impact of environmental damage on nature were enhanced, participants would use more ecocentric reasoning. By examining these situational influences, our study differs from past work on anthropocentric and ecocentric reasoning. However, it is related to the research applying Schwartz's (1977) norm-activation theory. Norm activation theory states that an awareness of consequences of environmental damage will compel a person who believes his or her actions can ameliorate those consequences to feel a sense of moral obligation to act. In this research, we are examining the object of that moral obligation and hypothesize that an emphasis on consequences to humans will lead to a human object of moral obligation, while an emphasis on consequences to nature will lead to an ecocentric object.

A third goal of Experiment 1 was to examine the role of environmental attitudes as an individual difference variable that might account for differences in use of one type of ethic over the other. Axelrod (1994) found that participants' dominant value orientations (e.g., economic, social) influenced which reasons they chose as important in making decisions about ecological dilemmas. In this study we expected that environmental attitudes would relate to use of ecocentric and anthropocentric reasoning.

Finally, we were interested in how different dilemma topics would influence moral reasoning. For example, would a dilemma over 'wild' land elicit more ecocentric reasoning than a dilemma over agricultural land? Results from Experiment 1 led us to explore dilemma topic differences in more depth in Experiment 2.

Experiment 1

Methods

Participants. The participants were 91 (70 females, 21 males, mean age of 18.95 years) undergraduates enrolled in introductory psychology classes at the University of Wisconsin–Madison. They received extra credit for participating.

Materials and design. The stimuli consisted of ecological moral dilemmas modified from previous studies (Axelrod, 1994; Beringer, 1994). The dilemmas were modified in order to make the natural environment more central to the story and in order to add the experimental manipulations. Four dilemma topics were used: overgrazing a commons, logging old growth stands, cutting firewood in a protected forest, and building a new landfill (the dilemmas are reproduced in Appendix A). In the dilemmas the main characters were set in situations in which they could support or not support actions that damage the environment. Within the dilemmas two factors were manipulated in a 2×2 factorial design: 1) additional information on how the environmental damage would impact the environment was either added or not, and 2) additional information on how the environmental damage would impact humans was either added or not. Dilemma topic was a within-subjects factor and information enhancement was manipulated between-subjects. The order of the dilemmas was counterbalanced with a latin squares design, and participants were randomly assigned to one of the four conditions of information enhancement.

In addition to the dilemmas, participants also answered the Environmental Attitudes Scale (EAS) (Ebenbach, Moore, & Parsil, 1998; Ebenbach, 1999). The 17-item EAS was used because it distinguishes between internally and externally motivated pro-environmental attitudes in a way similar to the distinction made in recent studies of racial prejudice (Plant & Devine, 1998) and in older studies of religiosity (Allport & Ross, 1967; Donahue, 1985). The EAS internal dimension is a better measure of

environmental attitudes and a better predictor of pro-environmental behaviors than environmental attitude scales that do not take attitude motivations into account (Ebenbach, 1999). The scale has good internal reliability (EAS-Internal Cronbach's alpha = 0.90; EAS-External alpha = 0.85) and test-retest reliability over a 12-week time period (EAS-Internal $r(72) = 0.77$, $p < 0.001$; EAS-External $r(72) = 0.45$, $p < 0.001$). The EAS internal scores also correlate appropriately with other environmental attitudes scales (Dunlap & Van Liere, 1978) and measures of pro-environmental behavior (Maloney & Ward, 1973), providing evidence for the validity of the scale (Ebenbach, 1999; Ebenbach, Moore & Parsil, 1998). The full scale is reproduced in Appendix B.

Procedure. Small groups of participants ($n = 2$ to 8) met for one session with an experimenter and answered the packet of materials individually in writing. For each moral dilemma they were asked to decide whether the main character should or should not support or perform an environmentally damaging action. They were then asked to list and explain four factors they had considered most important in making their decision. All individuals listed at least one consideration, and seven was the maximum number listed for any one dilemma. They answered the EAS following the dilemmas.

The moral considerations given by the participants were coded into three categories: ecocentric, anthropocentric, and nonenvironmental. The criteria were similar to those of Kahn (1997). For example, a response was categorized as ecocentric if it referred to the rights or intrinsic value of nature or proposed protecting nature for nature's sake. A response was coded as anthropocentric if it proposed preserving nature to benefit humans or because humans cannot survive without nature, and the non-environmental category was used when a response referred to social contracts, guilt, or truthfulness. An example of an ecocentric consideration is, 'Plants and animals that live there would have to find a new habitat'. An example of an anthropocentric consideration is, 'Additional cattle will deplete the land of its resources, and make it unusable for many years to come'. An example of a nonenvironmental consideration is, 'Steve should honor the 'unwritten' commitment. Trust is very important...' Twenty percent of the questionnaires were coded by a second rater for reliability (percent agreement = 85.6). Disagreements were resolved by using the decisions of the primary coder.

Results

A 2 (Impact on Environment Information) \times 2 (Impact on Humans Information) \times 3 (Moral Considerations Category) mixed ANOVA was conducted with frequency of use of each consideration category as the dependent variable. There was a significant main effect for Moral Consideration Category, $F(2, 172) = 123.79$, $p < 0.01$. Participants did not use significantly more anthropocentric than ecocentric moral reasoning ($M = 3.98$, $S.D. = 2.18$; $M = 3.40$, $S.D. = 2.15$ respectively), but did use significantly more nonenvironmental moral reasoning ($M = 8.82$, $S.D. = 2.73$) than either anthropocentric or ecocentric reasoning. The presence of information about the impacts of environmental damage on humans had no effect on moral considerations, $F < 1$.

There was also a significant interaction between Impact on Environment Information and Moral Consideration Category, $F(2, 172) = 21.18$, $p < 0.01$. This result supports our second hypothesis that providing details of the impacts of environmental damage would influence participants' use of eco- and anthropocentric considerations. The means presented in Figure 1 show that when additional information about environmental impacts was present in the dilemmas, participants used more eco- and anthropocentric moral considerations but fewer nonenvironmental considerations compared to when the information was absent. One surprising aspect of the results is that the presence of information about

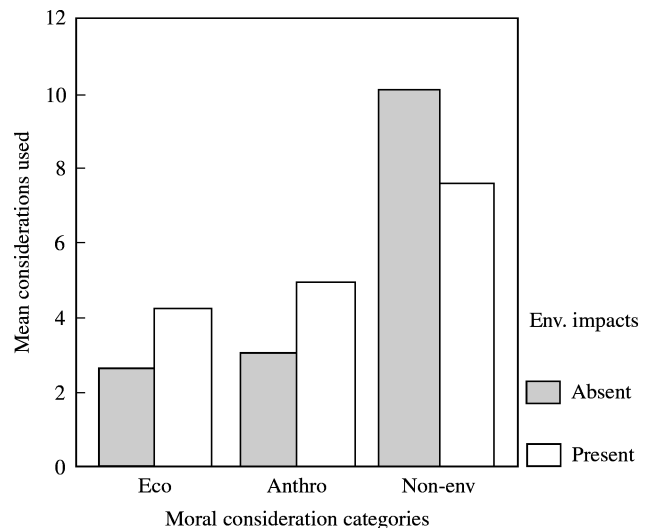


FIGURE 1. Mean number of ecocentric (eco), anthropocentric (anthro) and nonenvironmental (non-env) moral considerations used as a function of environmental information enhancement in ecological dilemmas.

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environmental damage led to an increase in the use of anthropocentric moral considerations.

The results also showed that environmental attitudes were correlated with the type of moral reasoning used. Higher pro-environmental scores on the internal scale of the attitudes questionnaire were positively correlated with both eco- and anthropocentrism ($r=0.35$ and 0.30 respectively, $p<0.01$) but were negatively correlated with use of non-environmental moral considerations ($r=-0.40$, $p<0.01$). The external environmental attitude scale did not correlate significantly with any of the three types of moral reasoning ($r_s=0.05$, 0.09 , and -0.09 for ecocentric, anthropocentric, and nonenvironmental moral reasoning, respectively).

In order to examine the joint influences of internal environmental attitudes and the manipulated environmental information on the use of different moral reasoning types, hierarchical multiple linear regression was used (Cohen & Cohen, 1983). (In hierarchical regression the increment in the R^2 due to each independent variable is obtained after all other independent variables have been entered in the regression equation.) The presence of information on environmental impacts had significant positive effects on use of both eco- and anthropocentric moral reasoning ($\Delta R^2=0.14$, $\beta=0.33$, $p<0.01$; $\Delta R^2=0.14$, $\beta=0.38$, $p<0.01$ respectively) and significant negative effects on use of nonenvironmental reasoning ($\Delta R^2=0.22$, $\beta=-0.47$, $p<0.01$). Internal environmental attitudes also had effects on moral reasoning, a result which supports our hypothesis that individual differences in environmental attitudes might account for differences in use of ecocentric, anthropocentric, or nonenvironmental moral reasoning. Specifically, internal environmental attitudes had significant positive effects on both the use of eco- and anthropocentric moral considerations ($\Delta R^2=0.05$, $\beta=0.25$, $p<0.05$, $R^2=0.09$, $\beta=0.30$, $p<0.01$ respectively) and had significant negative effects on use of nonenvironmental considerations ($\Delta R^2=0.08$, $\beta=-0.30$, $p<0.01$).

Lastly, the effects of dilemma topic on use of ecocentric moral reasoning were tested in a 2 (Environmental Information Enhancement) \times 2 (Human Information Enhancement) \times 4 (Dilemma Topic) mixed ANOVA with mean number of ecocentric moral considerations as the dependent variable. There was a significant main effect for dilemma topic, $F(1, 86)=14.25$, $p<0.01$. Fewer ecocentric moral considerations were used in the overgrazing dilemma than in the other three dilemmas (see Figure 2). This finding is of particular interest because Hardin (1968) used a grazing dilemma to illustrate the "tragedy of the commons."

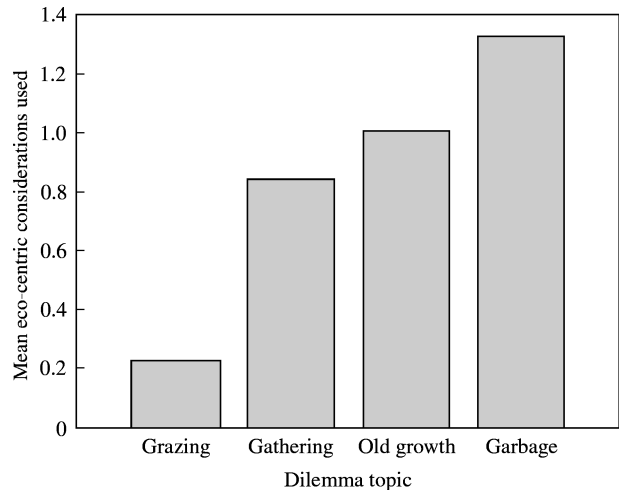


FIGURE 2. Mean number of ecocentric moral considerations used by participants as a function of ecological dilemma topic.

Discussion

The results of Experiment 1 reveal that ecological dilemmas most frequently elicit moral reasoning that is not related to the environment but to human relationships (e.g., social contracts, guilt, truthfulness). However, when ethics are extended to the environment, both ecocentric and anthropocentric reasoning are used with equal frequency. The use of all three types of moral reasoning is influenced strongly by information about the impact of ecological damage on the environment but not by information about the impact on humans. As predicted, environmental impacts information did cause participants to use more ecocentric moral reasoning, but that information also caused an increase in use of anthropocentric reasoning, something that was not hypothesized. It seems that providing information on the environmental impacts of actions did induce the participants to think more about the environment, but it did not affect *how* they were thinking about the environment.

Perhaps how people think about the environment (ecocentrically or anthropocentrically) has more to do with individual differences in attitudes than with situational variables. However, the individual difference variable we investigated in Experiment 1, internally motivated pro-environmental attitudes, was positively correlated with use of both ecocentric and anthropocentric moral reasoning. The items on the environmental attitude scale that we used were not intended to distinguish between environmental attitudes that are ecocentric or anthropocentric. Based on the results of Experiment 1, participants with internally motivated pro-environ-

mental attitudes found validity in both ecocentric and anthropocentric moral considerations in ecological moral dilemmas. This study's inability to separate proponents of ecocentric and anthropocentric reasoning is in agreement with a related finding in Stern and Dietz (1995). In measuring value orientations, Stern and Dietz reported that could not differentiate biospheric (ecocentric) from altruistic (anthropocentric) values. They hypothesized that the clear distinction between these two concepts that exists in theory may not exist in the minds of people in the general population but perhaps would exist in a population of environmental activists.

Experiment 2

The results of Experiment 1 also raised interesting questions about the differences among the ecological dilemmas. The overgrazing dilemma elicited fewer ecocentric considerations than the other dilemmas, even when environmental impact information was present. This result is interesting, especially in light of the extent to which Hardin's original overgrazing dilemma has become paradigmatic in discussions of ecological issues in general and ecological moral dilemmas in particular (see Dawes, 1980; Gardner & Stern, 1996). The overgrazing dilemma contains two features not present in the other dilemmas: a) an emphasis on social conflict, and b) no emphasis on land-use conflict. In the dilemma the main character had a commitment to his peers, and the environmental damage was to land that was not "untouched" by humans but used for agriculture. In contrast, in the other dilemmas social commitments were much less salient, and the damage was done to protected, preserved, or pristine nature areas. The results from Experiment 1 prompted us to conduct Experiment 2 in which we manipulated both the social and land-use conflicts in the overgrazing dilemma. We hypothesized that a dilemma containing a social conflict would make ecocentric reasoning less likely, and a dilemma depicting damage to a more "wild" ecosystem (emphasis on land-use conflict) would make ecocentric reasoning more likely. Such situational factors have general importance because they arise to different degrees in real world conflicts over environmental issues.

Methods

Participants. The participants were 84 undergraduates (36 females, 46 males, 2 gender unreported;

mean age = 18.99 years) enrolled in introductory psychology classes at the University of Wisconsin-Madison. They received extra credit for participating.

Materials and design. The stimuli consisted of an ecological moral dilemma on the topic of overgrazing a commons, modified from Experiment 1. Within the original overgrazing dilemma two factors were manipulated in a 2×2 factorial design: 1) A social conflict was presented or not; and 2) A land-use conflict was enhanced or not (see Appendix C). For the social conflict factor, the main character either shares a commons with other ranchers with whom he has a commitment not to overgraze the land (social conflict present) or he alone grazes an area of land (social conflict not present). For the land use conflict, the grazing area is either land in the mountains of a diverse national forest that has never been grazed before (land-use conflict enhanced) or private land that has been grazed for many years (land-use conflict not enhanced). Both factors were tested within subjects and counterbalanced with a latin squares design. Thus, each participant responded to four separate dilemmas.

Procedure. Small groups of participants met for one session with an experimenter and answered the questionnaires individually in writing. For each dilemma they decided whether the main character should or should not buy additional cattle. They were then asked to list and explain four factors they had considered most important in making their decision; however, in the coding process the number of different factors mentioned was not limited to four. Finally, participants were asked if the main character's dilemma was 'moral' and why or why not. Following the dilemmas, they answered the EAS.

The moral considerations were coded, using the same methods from Experiment 1, into ecocentric, anthropocentric, and non-environmental moral consideration categories. Twenty percent of the questionnaires were coded by a second rater for reliability (percent agreements = 88.3). Disagreements were resolved by using the decision of the primary coder.

Results

A 2 (land-use Conflict) \times 2 (Social Conflict) within subjects ANOVA with the number of ecocentric moral considerations as the dependent variable was conducted to test the hypothesis that land-use and social conflict information would influence use of ecocentric reasoning. There was a main effect for Land-use Conflict, $F(1, 81) = 14.54$, $p < 0.01$, and a

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main effect for Social Conflict, $F(181) = 17.05$, $p < 0.01$. When a social conflict was present in the moral dilemma, participants used less ecocentric moral reasoning compared to when it was absent ($M = 1.07$, $S.D. = 0.08$; $M = 1.40$, $S.D. = 0.11$ respectively). Also, participants used more ecocentric reasoning when a land-use conflict was emphasized compared to when it was not ($M = 1.38$, $S.D. = 0.10$; $M = 1.09$, $S.D. = 0.09$ respectively). When no land-use conflict was combined with a social conflict, participants used the least amount of ecocentric moral reasoning (see Figure 3). This latter result replicates the environmental impacts information condition of Experiment 1.

In order to compare the differential effects of social and land-use conflicts on all three types of moral reasoning, a 2 (Social Conflict) \times 2 (Land-use Conflict) \times 3 (Moral Consideration Category) repeated measures ANOVA was conducted, with number of considerations in each category as the dependent variable. There was a significant interaction between Social Conflict and Moral Consideration Category, $F(2, 162) = 27.20$, $p < 0.01$. Although the presence of a social conflict caused less use of ecocentric reasoning, it induced more use of non-environmental reasoning, and had no effect on anthropocentric reasoning (see Figure 4). There was also a significant interaction between Land-use Conflict and Moral Considerations, $F(2, 162) = 3.9$, $p < 0.05$. A dilemma with a land-use conflict elicited more ecocentric considerations but there was no effect of land use conflict on use of non-environmental or

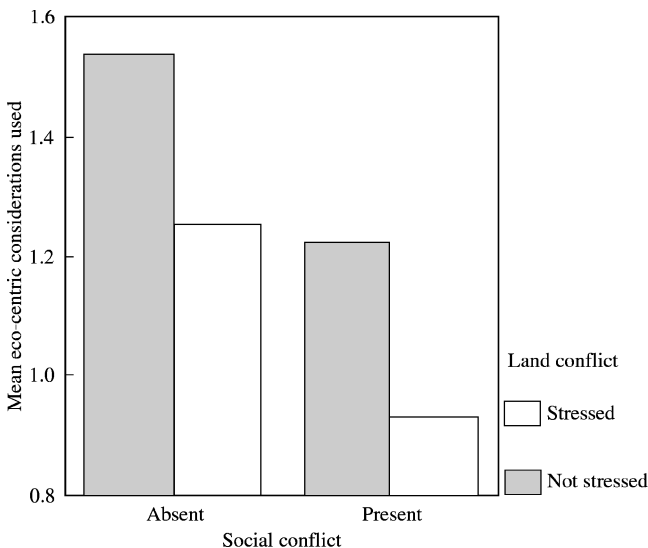


FIGURE 3. The effect of social conflict and land-use conflict on participant's use of ecocentric moral considerations.

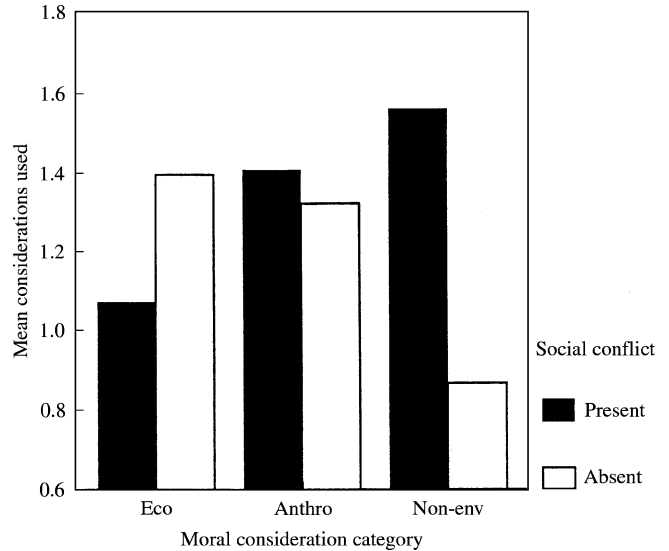


FIGURE 4. Mean number of ecocentric (eco), anthropocentric (anthro), and nonenvironmental (non-env) moral considerations used as a function of social-conflict presence in a grazing dilemma.

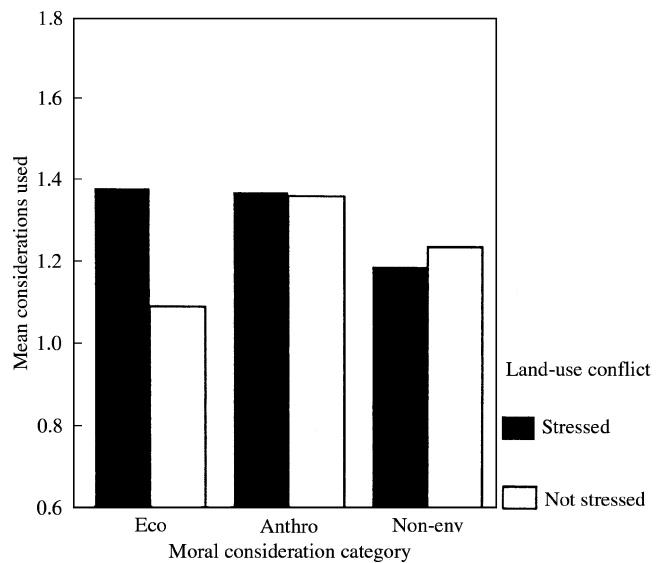


FIGURE 5. Mean number of ecocentric (eco), anthropocentric (anthro), and nonenvironmental (non-env) moral considerations used as a function of stressing the land-use conflict in a grazing dilemma.

anthropocentric reasoning (see Figure 5). There was also no main effect of Moral Consideration Category. Overall, participants did not use significantly more nonenvironmental reasoning than eco- and anthropocentric reasoning.

As in Experiment 1, internal pro-environmental attitudes again correlated negatively with use of

non-environmental moral reasoning ($r = -2.37$, $p < 0.01$). However, the EAS internal scale did not correlate significantly with ecocentric and anthropocentric moral reasoning (although the correlations were in the positive direction, $r = 0.19$ and 0.13 respectively, n.s.).

Discussion

The results from Experiment 2 help to explain the differences that were found between the grazing dilemma and the other dilemmas in Experiment 1. The presence of a social conflict and absence of an emphasis on land-use conflict caused participants to reason less ecocentrically, but these same variables had no effect on use of anthropocentric reasoning. This result is consistent with Experiment 1 because anthropocentrism was used as frequently in the grazing dilemma of Experiment 1 as in the other three dilemmas. Perhaps the land-use conflict had no effect on anthropocentric reasoning because regardless of whether land is pristine or used for agriculture, it is still useful to humans in some way (i.e., for recreation or food production). The social conflict manipulation also had no effect on the use of anthropocentric reasoning. Including an explicit social conflict does not detract from anthropocentric reasoning because anthropocentrism includes a focus on both people and the environment. On the other hand, nonenvironmental thinking is only focused on people, so when a social conflict is absent, this type of reasoning is no longer elicited as frequently.

Non-environmental reasoning was not more commonly used overall than ecocentric or anthropocentric reasoning in Experiment 2, in contrast to Experiment 1. This is most likely due to the inclusion of additional environmental impact information in all versions of the dilemmas in Experiment 2. In Experiment 1, the additional environmental impact information was found to increase use of ecocentric and anthropocentric reasoning and to decrease use of non-environmental reasoning.

General Discussion

The present research shows that both individual differences and situational variables are important factors related to the expression of environmental ethical reasoning. Internally motivated pro-environmental attitudes were negatively associated with use of nonenvironmental moral reasoning and positively associated with use of ecocentric and anthropo-

centric reasoning. Our results also show a very strong influence of situational variables on environmental ethical reasoning. Inclusion of information about environmental impacts elicited more ecocentric and anthropocentric and less nonenvironmental moral reasoning. It is clearly more difficult to take the interests of the environment into consideration if those interests and the effects on them are either not known or not salient. For example, a person who does not know that over-fertilizing city lawns has a negative impact on nearby waterways would not perceive lawn fertilization as an ecological dilemma and would not take the waterways into consideration when making decisions about applying fertilizer.

A second situational variable found to be important was an emphasis on a land-use conflict. Land-use conflict evoked more ecocentric reasoning. A land-use conflict between pristine land vs degraded land causes more of a focus on the damaging effects to the environment, perhaps because this damage is viewed as more extreme. In contrast, when the conflict is over agricultural land versus degraded agricultural land, the environmental damage may be viewed as less extreme, and therefore more acceptable. Also, it is possible that agricultural land may not be viewed as a part of nature by some individuals. Because ecocentric reasoning requires a focus on the intrinsic value of nature, without viewing agricultural land as nature there can be no ecocentric reasoning. The final important situational variable was the presence of social conflict issues, which elicited less ecocentric and more non-environmental reasoning. Salient social issues seem to attract people's focus away from thinking about land issues.

One limitation on the generalizability of this research is that the sample consisted of college students who strongly endorsed pro-environmental attitudes (the mean on the 1 to 9 scale for internal pro-environmental attitudes was 6.50). In view of this, it is perhaps even more impressive that such striking effects of the situational variables were obtained. It would be interesting to study the use of ecocentric and anthropocentric ethical reasoning in samples of other populations, such as the general public, environmental activists, and those who use natural areas for recreation (hunters, anglers, hikers, campers, mountain bikers, etc.). It is likely that ecocentric and anthropocentric reasoning will vary among such interest groups because such groups have been shown to differ in their evaluation of recreational impacts on nature (Shindler & Shelby, 1993).

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Another potential limitation of our study is that the participants were not necessarily personally familiar with the dilemmas we used. Would they have used the same moral reasoning when considering personal decisions about ecological dilemmas? One way to find out would be to use dilemmas based on environmental issues that college students are more likely to encounter and make decisions about, such as food consumption habits or use of campus natural areas. Another alternative would be to have the participants generate environmental dilemmas from their own experiences and then explain their moral reasoning (although a problem with this is the wide variability among individuals in the types of events that would be posed as ecological dilemmas). Past moral reasoning research based on Kohlberg's approach has shown that real-life dilemmas provided by participants elicit different moral orientations than hypothetical dilemmas (Walker, 1989). Therefore, it is possible that real-life ecological dilemmas may also elicit different types of environmental ethical reasoning than hypothetical dilemmas. Such a result would be consistent with our findings that situational variables in the dilemmas have a strong influence on the environmental moral reasoning shown. If participants were to report or invent their own ecological moral dilemmas (as was done for non-environmental moral reasoning in Walker, 1989), the dilemmas would be likely to vary in many ways including the degree to which they include social contracts, violations of law, impacts on humans, as well as known impacts on nature itself. Thus, the present research may provide an approach for predicting why familiar dilemmas may evoke reasoning that differs from that shown in unfamiliar moral dilemmas. A careful content analysis of the dilemmas produced by participants might reveal a focus on different aspects of the situation (specifically, human relationships vs nature itself) that are shown by our research to be powerful influences on environmental moral reasoning.

This study makes valuable strides forward by experimentally examining ecocentrism and anthropocentrism in the context of moral dilemmas, since up until recently these concepts have been studied, and minimally at that, with correlational studies of attitudes and values. Studies of ethical reasoning for environmental dilemmas are very important because most real world environmental issues can be considered to be social dilemmas, social traps (Dawes, 1980), or "tragedies of the commons" (Hardin, 1968). Examples given by Dawes (1980) include air pollution caused by auto traffic and world overpopulation. Such issues are highly controversial, both in

the U.S. and globally. The present research shows that both individual differences and situational factors influence the type of moral reasoning an individual may bring to bear on a tragedy of the commons. These results have importance for social conflicts that arise around specific environmental issues. Where knowledge or beliefs about the environmental impacts differ between so-called 'stakeholders,' our research provides reason to expect differences in moral reasoning. Those who believe the environmental impacts of a project are lower would be expected to emphasize non-environmental moral issues such as social contracts, whereas those who believe that environmental impacts are large would be expected to emphasize both the morality of damaging nature and the impacts on humans of damage to nature. Thus, satisfactory conflict resolution is not likely to result from simply bringing stakeholders together to negotiate because they are speaking in different moral voices.

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Note

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Appendix A

Information contained within the brackets represents the information enhancement manipulation. Enhanced information on impacts to the environment is to the left of the slash, and enhanced information on impacts to humans is to the right of the slash. When no information was enhanced, the bracketed sentences were left out.

Grazing

A common area of grazing land is shared by ten ranchers. All the ranchers know that the common grazing land is the perfect size for the total amount of cattle that they collectively own. [If all the ranchers bought extra cattle they would overgraze the land, causing plant cover depletion, soil infertility and erosion, and the pollution of nearby waterways./ If all the ranchers bought extra cattle they would run each other out of business.] The ranchers have an ‘unwritten’ commitment not to overuse the common grazing land. Though all the ranchers are business associates, they rarely socialize and are not really friends with each other. One of the ranchers, Steve, comes across a special deal where he can purchase a number of additional cattle for a very low price.

Should Steve purchase additional cattle?

Old Growth

Up until recently a large area of old growth forest has been set aside as parkland in a small town in British Columbia. Now the local lumber company, which owns the forest land, is planning a clear-cut harvest of the old growth trees. It has been a low period for the town and this new project means jobs and income for a number of years. Marie has lived in this town all her life. Most of Marie’s friends and previous co-workers are very excited about the new harvest and want to see the project happen. Both Marie and her husband were recently laid off by the company and will be rehired when this new harvest begins. [However, she has learned that about 98% of old growth forests in North America have already been destroyed and that the unique old

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growth ecosystem is home to many rare species that cannot survive in other habitats. /However, she has learned that the jobs created by the harvest will only last until all the trees are cut, a few years, at which time Marie and her husband will again be laid off.]

Should Marie actively support or oppose the harvest?

Garbage

A regional area in the Midwest has a beautiful nature preserve [that supports a diverse ecosystem of native plant and animal species/that is a very popular place for recreational activities.] But this region also has a growing problem with what to do with the people’s garbage. The landfill site is almost at capacity. The local governmental department of waste management has developed two proposals to deal with the situation. The first is to build a second landfill site. The best location for the new site is the nature preserve. [If the landfill is sited here it would completely destroy the preserve’s ecosystem. / If the landfill is sited here it would decrease property values of the many neighboring residences.] However, the land already belongs to the district and no new fees would be required under this proposal. The second proposal would involve creating a new collection system that would force all people to separate their garbage a into seven categories—six for recycling and one for composting. Substantial fines would be charged to anyone who doesn’t abide by the new regulations. Additionally, the residents of the greater regional area would be charged with a monthly fee in order to pay for the added costs necessary to run this waste collection system. Sarah and Kurt, residents of the area, will participate in a public vote on this issue next week.

Should Sarah and Kurt vote for building the new landfill or vote to establish the new collection system?

Gathering Firewood

In a rural area, a government forest preserve has been set up as part of a project to restore the mountain forests. The forests are rapidly disappearing because so much wood is needed by the village people for cooking and heating. On the mountain slopes that have been deforested, the soil is being washed away by the heavy rains which makes it very difficult for young tree seedlings to grow into mature trees. [As a result the deficient forest is unable to support a diverse and healthy animal population. / As a result the deficient forest is unable to support

the firewood needs of the community.] Past the forest preserve there is a designated firewood gathering area. The local women all have the daily job of walking up the steep mountain slopes toward the designated area to cut firewood for use in cooking and heating. This task grows harder over time because the women have to go farther and farther before they can obtain enough wood for their families’ needs. One of the women, Sandy, hikes past the nearby forest preserve and thinks to herself, “My task would be so much easier if I could only cut those trees.” She would then be able to bring back some extra wood to sell. However, she knows that it is against the law to take trees from the preserve, and that anyone who is caught doing so will be severely punished. But she also knows the forest ranger has gone to the city for a few days. She wonders, “Perhaps today I will cut just one tree.”

Should Sandy cut a tree from the government forest?

Appendix B

EAS

Please read the following statements carefully, and, in the space provided, rate your agreement with each of the statements, on a scale from 1–9 (1 = strongly disagree, 5 = neither agree nor disagree, 9 = strongly agree).

strongly disagree	neither agree nor disagree	strongly agree
----------------------	-------------------------------	-------------------

- | | | | | | | | | | |
|--|----|-----|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| | 1. | _I_ | I try hard to carry my pro-environmental beliefs over into all the other parts of my life. | | | | | | |
| | 2. | _N_ | I try to appear pro-environmental to please others, but I really don’t believe environmental issues are important. | | | | | | |
| | 3. | _I_ | Because of my personal values, I believe that ignoring environmental matters is OK. | | | | | | |
| | 4. | _E_ | I try to act pro-environmentally because of pressure from others. | | | | | | |
| | 5. | _N_ | Although today’s PC (Politically Correct) standards pressure me to express pro-environmental views, I don’t really believe the environment is threatened. | | | | | | |
| | 6. | _I_ | When it comes to questions about the environment, I feel driven to know the truth. | | | | | | |

7. -E- If I did something that might harm the environment, I would be concerned that others would be angry with me.
8. -E- I do not attempt to appear pro-environmental to others.
9. -I- According to my personal values, ignoring human impacts on the larger ecosystem is OK.
10. -E- It is not important for me to appear pro-environmental to others.
11. -I- I am motivated by my personal beliefs to try to protect the environment.
12. -I- The interrelatedness of all living things in the ecosystem is something I have never felt personally compelled to consider.
13. -E- I try to express only my pro-environmental views in order to avoid negative reactions from others.
14. -I- What happens to the larger ecosystem, beyond what happens to humans, doesn't make much difference to me.
15. -I- I have not found it essential to try to protect the larger ecosystem, beyond what happens to humans.
16. -E- Because of today's PC (Politically Correct) standards, I try to appear pro-environment.
17. -E- It is personally important to me to try to protect the larger ecosystem, beyond what happens to humans.

Appendix C

Information contained within the brackets represents the land use conflict manipulation. Enhanced land-use conflict is to the left of the slash and not enhanced land-use conflict is to the right of the slash.

Social Conflict

[A national forest in the mountains of the western U.S. supports a diverse and sensitive ecosystem of

native plant and animal species and is a very popular place for recreational activities. An area of the national forest that was never previously used for grazing has recently been leased to ten ranchers. / An area of private land in the western U.S. has a long history of grazing use and is currently shared by ten ranchers.] All the ranchers have been informed that the common grazing area is the perfect size for the total amount of cattle that they collectively own. If all the ranchers bought extra cattle they would overgraze the land, causing plant cover depletion, soil infertility and erosion, and the pollution of [nearby waterways within the national forest. /nearby waterways.] They would also run each other out of business. The ranchers have an 'unwritten' commitment not to overgraze the land. One of the ranchers, Steve, comes across a special deal where he can purchase a number of additional cattle at a very low price.

Should Steve purchase additional cattle?

No Social Conflict

[A national forest in the mountains of the western U.S. supports a diverse and sensitive ecosystem of native plant and animal species and is a very popular place for recreational activities. An area of the national forest that was never previously used for grazing has recently been leased to a local rancher, Steve. / An area of private land in the western U.S. has a long history of grazing use and is currently used by a local rancher, Steve.] Steve has been informed that the grazing area is the perfect size for the total amount of cattle that he owns. Extra cattle would overgraze the land, causing plant cover depletion, soil infertility and erosion, and the pollution of [nearby waterways within the national forest./ nearby waterways.] Steve comes across a special deal where he can purchase a number of additional cattle at a very low price.

Should Steve purchase additional cattle?

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