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Determinants of Proenvironmental Attitudes in College Students

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Authors' contributions

This research is based on the honors thesis of Sarah C Robinson, who proposed and conducted the study and performed the analyses. Both authors contributed to the writing of the manuscript.

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ABSTRACT

This study examined socio demographic predictors of different forms of environmental attitudes (ecocentrism, anthropocentrism, and environmental apathy) among students from a variety of academic fields at a liberal arts institution. Apathy toward the environment was predicted by political conservatism and a higher education level among parents; anthropocentrism was also a function of participation in sports activities while growing up, political conservatism, and other demographic variables. Time spent in front of a screen (computer, television) positively predicted ecocentrism and negatively impacted apathy. The results confirm the importance of separating proenvironmental attitudes into two categories focusing on inherent value versus utilitarianism. We discuss the implications of these findings for the field of environmental education and on the future of society as a whole.

Keywords: Environmental attitudes; ecocentrism; anthropocentrism; environmental apathy.

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1. INTRODUCTION

The natural environment has been changing more and more since the first member of the species *Homo sapiens* began walking. However, human understanding and analysis of human-related environmental change is a relatively recent phenomenon, beginning formally with studies needed to show the necessity of the Clean Air Act of1963 and the Clean Water Act of 1972 to the formation of the Environmental Protection Agency in 1970 [1]. Yet, many to this day deny that people have a deleterious influence on the environment, and many more remain apathetic to environmental concerns. Why are some individuals motivated to protect the natural environment, while others seem indifferent to the challenges of preserving the natural environment and species diversity?

Several biological and psychological theories have been posited to explain the human interaction with nature. In his 1984 work *Biophilia*, Wilson [2] noted that the desire to affiliate with nature is innate, adaptive, and genetically advantageous for humans. He further argued that an affiliation with nature was a necessary component of the evolution of humans and that humans derive aesthetic benefits from interacting with nature. While there is some debate over whether biophilia is an inherent tendency [3], there is no question that it is a positive one. Walsh [4] summarizes evidence that access to nature is beneficial to health, cognition, and general well-being, and that its dearth is detrimental to human functioning. Other benefits include a sense of security, stress relief, and quick recovery from illness [5,6].

Biophilia comes in many different forms. Kellert [7] posits a typology of nine values that humans use to express the biophilic tendency to associate with nature. These expressions are utilitarian, naturalistic, ecologistic-scientific, aesthetic, symbolic, humanistic, moralistic, dominionistic and negativistic valuations of nature. With this delineation, it is easier to understand the myriad ways biophilia influences human attitudes and behaviors toward the environment. In an example drawn from Delavari-Edalat and Abdi [8], an individual with a utilitarian view might advocate for trees because wood products are useful to humans, whereas someone with a humanistic valuation of trees would advocate in their favor because such a person would advocate for all parts of the natural world. A moralistic individual would express an ethical discomfort with harming trees, a suburbanite may enjoy trees for their aesthetic contribution, but an individual with dominionistic values would consider the value of trees in relation to tree uses for his or her own life. Regardless of the motivation for environmental protect, biophilia—which is ultimately beneficial to humans—should theoretically manifest itself in socially-useful, communitarian behaviors seen in people across various cultures. Behaviors, however, may start with beliefs and attitudes.

1.1 Environmental Attitudes: Cocentrism, Anthropocentrism and Apathy

Thompson and Barton [9] developed the Proenvironmental Behavior Scale to delineate and measure different attitudes toward the environment. The scale categorizes people as ecocentric, anthropocentric, or environmentally apathetic, three categories which condense Kellert's essential nine values. Both ecocentric and anthropocentric individuals are positive toward the environment and environmental issues, but differ in their rationale for their thoughts.

Ecocentric individuals value nature for its intrinsic worth, supporting measures that protect natural resources merely because these resources exist independent of human manipulations and therefore have intrinsic values. In contrast, anthropocentric individuals value nature because it offers services to humanity, and believe that proenvironmental behaviors function so that humans can reap the best benefit from the natural world. The third category of environmental attitudes described by the research of Thompson and Barton is environmentally apathetic. Individuals who are environmentally apathetic generally do not assign any value to nature for any reason.

1.2 Environmental Attitudes and Behavior

Thompson and Barton [9] and Fransson and Garling [10] both found some evidence that people's relative ecocentric or anthropocentric tendencies show some relationship to their participation in proenvironmental behaviors. However, environmental concern, which refers to the emotion given to environmental problems [11], may *not* always translate into proenvironmental behavior [12]. While initial conceptions of proenvironmental behavior presented a linear progression of environmental knowledge leading to environmental awareness

[13], which was thought to then lead to proenvironmental behaviors, current research contradicts this assertion, as several studies have shown that *knowing* and *understanding* do not necessarily lead to *doing* [13,14].

Such discrepancies can be explained by the Theory of Reasoned Action [15], which suggests that individuals consider behaviors and their related consequences before engaging in them, and that the behaviors they choose to perform are ones associated with desirable outcomes. Attitudes do not determine behavior directly; rather they influence behavioral intentions, which in turn affect our actions [16,17]. Behavioral intent comes from two factors: thoughts/beliefs about the behavior (particularly as an individual evaluates his or her own abilities to engage in some behavior) and the perception of how important others see the behavior and the perceived social pressure associated with the behavior, known as subjective norms. The subjective norm associated with a behavior comes from the opinions of others and the degree to which the individual is motivated to be seen favorably by others.

To apply this theory to the current topic, we argue that in order for persons to exhibit ecocentric or anthropocentric behaviors, those persons must believe that the possible outcomes will be positive—so, then, they must see increased carbon dioxide sequestration and reduced erosion to be good things before deciding to recycle paper and purchase recycled paper products. However, it is unlikely that those behaviors will be performed unless they have the options available to them and also perceive that others will think highly of recycling and buying recycled materials and unless family and friends do the same. Only when those two factors are present will a person decide that recycling paper is a good idea, and choose to start recycling.

1.3 Origins and Components of Environmental Attitudes

The first meta-analysis of empirical studies that concerned environmental behavior was conducted by Hines et al [16]. The researchers summarized the research regarding aspects of social background, as well as individual personality and cognitive factors, which predict proenvironmental behavior.

1.3.1 Demographic variables related to environmental attitudes

Demographic factors are important in considering proenvironmental belief and behavior. Hines et al [16] did not find that sex predicts such behavior in any meaningful way, although women do tend to be more ecocentric than men [18,19] and thus it may be that sex is important as a predictor only in conjunction with age or education (e.g., highly-educated young women are most concerned about the environment [20]). Hines et al. [16] noted that younger and more educated people held more proenvironmental beliefs, but the effects they reported were very small. Indeed, neither formal education nor affluence leads to a more ecocentric orientation, although a lower income has been linked to anthropocentric values [18,21]. Moreover, informal educational experiences (such as dealing directly with pollution) have a greater impact on proenvironmental behavior than does formal education [13]. Mobley et al. [19] showed both conservative and liberal political ideologies predict certain types of proenvironmental behavior, with liberals more likely to engage in proenvironmental behaviors than moderates, although more recently Gromet, Kunreuther, and Larrick [22] showed clearly that self-identified political conservatives are strongly unsupportive of proenvironmental legislation actions.

1.3.2 Cognitive and personality correlates of environmental attitudes

Several personality and cognitive factors influence proenvironmental attitudes. The meta-analysis of Bamberg and Moser [23] revealed three social-cognitive beliefs necessary for engagement in proenvironmental behavior: the idea that protecting the environment is the right thing to do, that it is possible to do, and that doing so is ultimately of personal benefit. Conceptualizing that it is possible to effect change given the scope of environmental problems may also be at least partially a function of Locus of Control (LOC), a personality characteristic that describes our perceptions of whether we are able to bring change through our actions [24]. Having an internal LOC and believing that personal activity can impact the world does, not surprisingly, lead to more environmentally-responsible behaviors [10,16].

1.3.3 Experience with nature

Positive exposure to nature, particularly in childhood, may also contribute to a

proenvironmental orientation [13,21]. Outdoor recreation and nature participation during childhood have positive influences on proenvironmental behavior [13,18]. Wells and Lekies [25] found that children who frequently interacted with "wild nature" (hunting, camping, or hiking in natural areas) before the age of 11 displayed more proenvironmental behaviors and had strong ecocentric attitudes as adults. Interacting with nature is not limited to hiking, camping, and other "roughing it" venues, as simple activities including bird watching and gardening during childhood also lead to ecocentric and anthropocentric attitudes in adulthood [25]. People who live in rural areas tend to spend a lot of time outside and have a great appreciation for the natural environment [25]. Additionally, people who live in cities tend to drive less and walk more, allowing them to be active and develop an appreciation for green spaces when they have access to them [26].

1.3.4 Social cues for environmental behavior

The Theory of Reasoned Action argues that social cues are also important in the shaping of attitude-behavior consistency, and research confirms that the environmental attitudes of members of social groups influence the attitudes and behaviors of its members [16,24]. Family beliefs, followed by (in adolescence) friends, and then interactions with pro-environmental organizations in adulthood all contribute to environmental concern [13]. Several individuals have since capitalized on this knowledge (see for example Mackenzie-Mohr [24]), using social cues to influence other individuals to adopt more environmentally-responsible behaviors. These social cues may come from the media, either news or social. Students who spend a lot of time engaged in social media or who keep up with news in general are more likely to have a greater level of environmental concern than those who do not [17].

1.4 Rationale and Hypotheses

Previous research has revealed multiple factors that lead to proenvironmental attitudes and behaviors, although few studies have made the distinction of the type of environmental attitude and behavior in question. Additionally, time spent engaging in various activities throughout adolescence as predictors of proenvironmental behaviors has not been fully explored. This study is markedly different from previous ones because it disentangles types of environmental attitudes and also examines whether activities growing up influence the nature of a person's environmental attitude.

The purposes of this study were to examine how socio-demographic factors and adolescent activities predicted ecocentrism, anthropocentrism, and environmental apathy. We examined socio-demographic variables as they predict each of these types of environmental attitudes, hypothesizing that *apathy* would be predicted by affluence, suburbanism, and conservative political ideology. We further believed that *ecocentrism* would be likely among women, especially those with higher education, and among natural or environmental-science majors. *Anthropocentrism* was predicted to be more prevalent among men and those who had spent a lot of time outside, playing sports, while growing up.

2. MATERIALS AND METHODS

2.1 Participants

A convenience sample of 164 undergraduate students at Catawba College volunteered or received partial course credit in biology, psychology, and first-year seminar courses to participate. Table 1 shows the background of the participants according to sex, race, age, and other indicators.

2.2 Dependent Measures

2.2.1 The pro-environmental orientation scale

The Pro-Environmental Orientation Scale (PEOS; [9]) assesses the degree to which people are ecocentric, anthropocentric, and environmentally apathetic. The scale includes 25 statements about the environment, each of which is measured on a 5-point scale from *1* (strongly disagree) to *5* (strongly agree). Sample statements include "I find it hard to get too concerned about environmental issues" (apathetic), "I need time in nature to be happy" (ecocentric), and "Nature is important because of what it can contribute to the pleasure and welfare of humans" (anthropocentric). Thompson and Barton [9] reported internal reliabilities (Cronbach's Alpha) of 0.78 for ecocentrism, 0.67 for anthropocentrism, and 0.82 for environmental apathy. Our data showed internal reliabilities of 0.78 for ecocentrism, 0.61 for anthropocentrism and 0.88 for environmental apathy.

2.2.2 Locus of control

The Locus of Control scale (LOC [24]) measures how much control individuals perceive to have over their own lives. We used this scale because Hines et al. [16] noted that individuals with an internal LOC (i.e., those believe that they have complete control over what happens to them) are more likely to adopt environmentally-responsible behaviors, because they see that their actions do in fact make a difference in the world. The scale includes 10 questions, each with two alternatives for each representing an external or internal locus; one option must be chosen. A sample question has the options "People like me can change the course of world affairs if we make ourselves heard".

2.2.3 Participant background

Several research-driven questions on the instrument tapped participant background experiences in order to determine whether common denominators could predict proenvironmental behavior. These measures included the number of hours participants spent either in front of a television screen or computer monitor, outside playing sports, and outside just to be outside during an average week at ages six, nine, 12, 15, and 18. Other measures included political ideology, residence during adolescent years, parental education, experience of environmental education, and desire for children. Age, sex, and college major were also recorded. Demographic variables were coded as follows: political ideology was scored from 0 to 4, with 0 marked "very conservative" and 4 "very liberal." While no explicit definitions of conservative or liberal were provided, participants were from a state where there is a clear idea that liberal tends to mean Democrat and "left," whereas conservative tends to mean Republican and "right." Place of residence was coded as 0 for suburban areas, 1 for urban areas, and 2 for rural areas (because people in both urban and rural areas have a distinctly different use of the environment than do suburbanites). The level of education of both parents was coded from 0 (no high school education) to 6 (graduate degree), and parental income was estimated from several possible ranges. Dichotomous variables (participant sex, desire for children, college major/intended major, and environmental education) were coded as 0 or 1, with the higher end representing women, a plan to pursue the natural sciences, and positive responses.

Table 1. Background information of study participants

Variable		N	Percentage of respondents
Sex			
	Male	49	33.0
	Female	104	66.0
Age			
	18	32	21.3
	19	37	24.6
	20	34	22.6
	21	32	21.3
	22 +	15	10.1
Race			
	White	136	90.0
	African American	6	3.9
	Multi/Biracial	6	3.9
	Asian/Other	3	2.0
Political Ideology			
	Very liberal	10	6.1
	More liberal than most college students	28	17.1
	Neutral	65	39.6
	More conservative than most college students	40	24.4
	Very conservative	10	6.1
Major/Intended Major			
	Non-Science	104	63.4
	Science	37	22.6

Note. Ns do not total 154 due to missing data

2.3 Procedure

The instrument was completed electronically using the online survey tool kwiksurveys.com (Kwik Surveys, Kent, United Kingdom). After providing consent, participants completed the LOC scale, followed by the PEOS. The final questions assessed participant background and demographics, and required them to say how many hours per week they spent either outdoors or in front of an electronic device at certain ages in their lives.

The survey was available in an invitation-only online format for 16 days. Participants received an invitation via email after they indicated their willingness to participate (which served as informed consent), or when professors who were offering credit made their class rosters available.

2.4 Overview of Analyses

Self-reports of ideology, parental education/ income, desire for children, age, and the other variables were included in separate linear regressions to predict the three types of environmental attitudes. These regressions were also calculated separately for men and women participants.

Data for the number of hours respondents spent outside, in front of a screen, or playing sports at various ages were collapsed across those ages and then subjected to step-wise regressions to predict the criterion variables. These measures were combined this way because all three showed strong consistency across age (at six, nine, 12, 15, and 18 years). Specifically, intercorrelations among measures of hours spent outside at various ages, *r*s (149) = .40 to .93, all *p*s <.001, hours spent playing sports at various ages *r*s (149) = .46 to .87, all *p*s <.001 and of hours spent in front of electronic screens at various ages were all significant, *r*s(149) = .65 to .95, all *p*s < .001 (*df*s do not match total *N* because 13 participants did not complete all parts of these questions).

3. RESULTS

3.1 Sample Characteristics

Demographic background of the sample is reported in Table 1. Sex, age, race, political ideology, and major (science/non-science) are given as a function of percentage of the sample.

3.2 Predictors of Environmental Attitudes

3.2.1 Predictors of anthropocentrism

Anthropocentric attitudes in all participants were predicted by the variables measured $F(10, 153) = 2.62$, $MSE = .188$, $p = .006$. As can be seen in Table 2, political conservatism (β = -.17), self-identifying as a non-scientist (β = -.18), and being younger (β = -.21) all predicted the desire to protect nature so that it is available to serve human needs.

No variables predicted anthropocentric attitudes in men $F(9, 39) = .297$, $MSE = .133$, $p = .297$ (see Table 3); however anthropocentric attitudes in women were a function of the variables measured $F(10, 93) = 2.87$, $MSE = .208$, $p = .004$. Table 4 shows that political conservatism (β = -.20), self-identifying as a non-scientist (β = -.30), and being younger (β = -.28) were strong predictors.

Table 2. Predictors of anthropocentricity for all participants

Variables	β	t	Significance
Constant		0.42	0.67
Internal LOC	0.77	0.47	0.64
External LOC	0.77	0.47	0.64
Parental Education	0.08	0.95	0.34
Environmental Education	-0.10	-1.34	0.18
Area Where Raised	0.08	1.01	0.31
Household Income	0.68	0.83	0.41
Political Ideology	-0.17	-2.17	0.03
Desire for Children	-0.06	-0.68	0.50
Major	-0.18	-2.32	-0.02
Age	-0.21	-2.66	-0.01

Note. R = .382, ∆R2 = .146, ∆F = 2.62

Table 3. Predictors of anthropocentricity for men participants

Variables	β	t	Significance
Constant		1.86	0.07
Internal LOC	-0.22	-1.49	0.14
Parental Education	0.03	0.21	0.84
Environmental Education	0.20	1.18	0.25
Area Where Raised	0.30	1.88	0.07
Household Income	-0.03	-0.19	0.86
Political Ideology	-0.12	-0.70	0.49
Desire for Children	-0.10	-0.65	0.52
Major	0.05	0.31	0.76
Age	0.34	2.25	0.30

Note. R = .472, ΔR^2 = .223, ∆F = 1.25

Table 4. Predictors of anthropocentricity for women participants

Variables	β	t	Significance
Constant		0.64	0.67
Internal LOC	0.37	0.28	0.81
External LOC	0.29	0.20	0.85
Parental Education	0.04	0.40	0.69
Environmental Education	-0.16	-1.67	0.10
Area Where Raised	0.07	0.71	0.48
Household Income	0.15	1.40	0.16
Political Ideology	-0.20	-2.17	0.03
Desire for Children	-0.08	-0.71	0.48
Major	-0.22	-2.20	0.03
Age	-0.28	-2.80	0.01

Note. R = .485, ΔR2 = .236, ΔF = 2.87

Table 5. Predictors of environmental apathy for all participants

Variables	β	t	Significance
Constant		1.71	0.09
Internal LOC	-2.12	-1.30	0.20
External LOC	-2.01	-1.23	0.22
Parental education	0.16	1.96	0.05
Environmental education	0.09	1.15	0.25
Area where raised	0.05	0.61	0.55
Household income	-0.12	-1.45	0.15
Political ideology	-0.27	-3.45	0.00
Desire for children	-0.04	-0.44	0.66
Major	-0.11	-1.42	0.16
Age	-0.10	-1.26	0.21

Note. R = .386, ΔR^2 = .149, ΔF = 2.68

3.2.2 Predictors of environmental apathy

Environmental apathy in all participants was significantly predicted by the variables measured F(10, 153) = 2.68, MSE = .382, p = .005. Table 5 reveals that participants with highly educated parents (β = .16) and political conservatism (β = -.27) both predicted a general apathetic outlook toward the environment and environmental issues. As can be seen in Table 6, none of the variables predicted environmental apathy in men F(9, 39) = .343, MSE = .532, p = .343. A lower household income (β = -.22) and political conservatism (β = -0.33) were significant predictors for women F(10, 93) = .013, MSE = .343, p = .013, as shown in Table 7.

3.2.3 Predictors of ecocentrism

As seen by the data displayed in Tables 8 and 9, none of the variables measured significantly predicted ecocentrism for all participants *F*(10, 153) = 1.42, *MSE* = .282, *p* = .176, or for men participants alone, *F*(9, 39) = .379, *MSE* = .303, *p* = .379. Table 10 shows a marginally-significant equation for women participants, *F*(10, 93) = 1.76, *MSE* = .286, *p* = .079. Only political liberalism (β = .248) significantly predicted the desire to protect nature for its intrinsic worth.

Table 6. Predictors of environmental apathy for men participants

Variables	β	t	Significance
Constant		-0.38	0.71
Internal LOC	-0.12	-0.78	0.44
Parental Education	0.18	1.12	0.27
Environmental Education	0.28	1.66	0.11
Area Where Raised	0.01	0.09	0.93
Household Income	0.09	0.50	0.62
Political Ideology	-0.09	-0.51	0.61
Desire for Children	-0.04	-0.26	0.80
Major	-0.13	-0.84	0.41
Age	0.11	0.73	0.47

Note. R = .460, ΔR^2 = .212, ΔF = 1.17. External LOC showed no relationship to apathy and was excluded from the model (i.e., its β is zero)

Table 7. Predictors of environmental apathy for women participants

Variables	β	t	Significance
Constant		1.75	0.08
Internal LOC	-1.88	-1.24	0.22
External LOC	-1.81	-1.19	0.24
Parental education	0.09	0.90	0.37
Environmental education	-0.00	-0.02	0.99
Area Where Raised	0.06	0.61	0.55
Household income	-0.22	-2.06	0.04
Political ideology	-0.33	-3.50	0.00
Desire for children	0.30	0.27	0.79
Major	-0.02	-0.23	0.82
Age	-0.18	-1.70	0.09

Note. R = .454, ΔR^2 = .207, ΔF = 2.42

Table 8. Predictors of ecocentricity for all participants

Variables	β	t	Significance
Constant		0.56	0.57
Internal LOC	0.03	0.02	0.99
External LOC	0.08	0.04	0.97
Parental Education	0.03	0.36	0.72
Environmental Education	0.02	0.22	0.83
Area Where Raised	0.15	1.89	0.06
Household Income	0.05	0.53	0.59
Political Ideology	0.17	2.05	0.04
Desire for Children	0.01	0.08	0.94
Major	0.15	1.82	0.07
Age	0.06	0.73	0.47

Note. R = .291, ΔR^2 = .085, ΔF = 1.42

Table 9. Predictors of ecocentricity for men participants

Variables	β	t	Significance
Constant		4.43	0.00
Internal LOC	-0.06	-0.42	0.68
Parental Education	-0.04	-0.26	0.80
Environmental Education	-0.21	-1.23	0.23
Area Where Raised	0.26	1.64	0.11
Household Income	-0.28	-1.60	0.12
Political Ideology	-0.14	-0.83	0.41
Desire for Children	0.01	0.05	0.96
Major	0.01	0.08	0.93
Age	-0.16	-1.01	0.32

Note. R = .451, ΔR2 = .204, ΔF = 1.11

Table 10. Predictors of ecocentricity for women participants

Variables	β	t	Significance
Constant		0.57	0.57
Internal LOC	-0.13	-0.08	0.93
External LOC	-0.04	-0.02	0.98
Parental Education	0.11	1.00	0.32
Environmental education	0.08	0.84	0.40
Area where Raised	0.12	1.14	0.26
household Income	0.14	1.32	0.19
Political ideology	0.25	2.56	0.01
Desire for children	-0.03	-0.25	0.80
Major	0.16	1.60	0.12
age	0.12	1.10	0.27

Note. R = .399, ΔR2 = .159, ΔF = 1.76

3.2.4 Anthropocentrism, environmental apathy and ecocentrism as a function of childhood and adolescent activities

Stepwise regressions using adolescent activities (as means across five ages) to predict environmental attitudes were calculated, with responses from men and women collapsed for these regressions. The results are summarized in Table 11. Anthropocentrism was significantly predicted by more time playing sports (β = .184), $F(3, 153) = 5.44$, $MSE = .210$, $p = .021$. Environmental apathy was significantly predicted by *less* time participants spent in front of electronic screens at various ages (β = -.184), $F(3, 153) = 5.42$, $MSE = .428$, $p = .021$, while ecocentrism was significantly predicted by *more* time spent in front of electronic screens (β=.160), $F(3, 153) = 4.08$, $MSE = .296$, $p = .045$.

4. DISCUSSION

Our results showed that several socio-demographic factors predicted attitudes toward the natural environment, and support the assertion that a pro-environmental attitude is not a singular construct, but is instead a function of different motivations for different people. Environmental apathy was shown in students who had highly-educated parents and who considered themselves to be politically conservative; however, for women environmental apathy was also seen in those participants who, relative to the sample, grew up in lower-income households. Politically-conservative students were more likely to be anthropocentric, as were those students who were younger and not studying science. A trend for ecocentric attitudes in politically-liberal women was noted. None of the factors examined in this study predicted environmental attitudes in men, owing in all likelihood to the relatively small number of men ($n = 49$) who participated. In regard to childhood and adolescent activities, the more time students reported playing sports predicted an anthropocentric attitude toward the environment, and, contrary to our hypotheses, screen time predicted ecocentric attitudes, yet those who did *not* engage in screen time (television, video games, or using a computer) had an apathetic attitude toward the environment.

Younger, more conservative, athletes (primarily women) who were non-science majors saw importance in protecting natural areas *because* of the services they provide to humans. The personal characteristics that predict anthropocentrism may be a function of the timing

Table 11. Predictors of environmental attitudes based on adolescent activities

Variables	Attitude predicted	β	t	Significance
Time in front of screens	Apathy	-.184	2.23	.021
Time playing sports	Anthropocentrism	.182	2.26	.026
Time in front of screens	Ecocentrism	.160	2.02	.045

and place of the study. Most students (46%) were 18- or 19-years old in their first semester of college, and few overall (24%) were majoring in the natural sciences. While most of the students self-identified as politically neutral, about 70% of teens consider their political ideology to be about the same as one or both of their parents [27]. Participants in this study were primarily from North Carolina, a historically-conservative state that gave electoral votes to Republican candidates in eight of the past nine presidential races, and which is the home of many conventional and conservative persons [28]. It is possible that younger participants—only recently on their own—had more conservative views than their parents.

As predicted, college students who played outdoor sports while growing up appreciated the services nature provides. Someone who appreciates a flat open field because it allows for games of soccer or football may be more likely to be in favor of other natural areas that also serve a purpose for humans [9].

Apathy toward the environment was seen in students who had conservative political ideologies and parents who were more educated. Similar to related findings [18] women coming from a lower-income home (relative to the sample) indicated an apathetic attitude. In addition, students who reported lower screen time in adolescence did not have strong feelings toward the environment. Given that this attitude was also found in students who reported household income lower with respect to the rest of the sample, it is possible that these individuals did not have access to a plethora of electronic devices. For lower-income women, attention for environmental quality may have been a luxury to be indulged only after the basic needs have been met [29]. Students with more educated parents had an apathetic attitude toward the environment, but, then, *awareness* and understanding of world problems do no not always translate into *behaviors* to solve those problems [13,18].

It is not surprising that political conservatism predicted both apathy toward environmental causes as well as the tendency to favor the environment for the goods and services humans can extract from it. Political conservatism is negatively related to beliefs about the importance of environmental conservation [22], which can be seen in current debates over mining for natural resources, hydraulic fracturing, and mountaintop removal as good avenues to obtain energy for human benefit. Related research [30,31] has also shown that self-identified conservatives prefer order, stability, and tradition; they dislike social change, and are likely to deny scientific findings that threaten a worldview (e.g., global climate change). Feygina and colleagues [30] note that politically-conservative people adhere more strongly to a world-view that justifies current social systems, needing institutions to be stable, and a have desire to protect the status quo. According to Feygina and her colleagues, acknowledging that environmental issues exist would disrupt the status quo, therefore it is easier for conservative persons to remain apathetic toward them.

This study showed relatively few predictors of ecocentrism, perhaps because our sample simply did not include many of those who are traditionally ecocentric: liberal college students. We found a trend for women who identify themselves as politically liberal have ecocentric attitudes toward the environment, which is consistent with prior research [20, 29]. Liberals are more open [28] and less concerned for a structured and predictable system, being more comfortable with change [30]. There were few liberal people in this study. It is possible that the age of the participants is the reason for the lack of ecocentrism in women. Berenguer et al [20] found that highly-educated young women are likely to be concerned about the environment, but our the age range of our participants was narrow, and Berenguer did not differentiate the nature of the proenvironmental concern.

The amount of time participants in this study spent outside for the sheer pleasure of being outside was not a predictor of ecocentrism. Instead, ecocentric attitudes were shown to be predicted by time spent *inside* watching television, playing video games, and using a

computer--findings that were unexpected and unlike those of other researchers [21,25]. Several explanations may be offered for these findings. First, fact-based television use and environmental activities are related [32]; so, if the respondents watched National Geographic or public television, that may explain their ecocentric tendencies, as prosocial television content can encourage positive behaviors [17]. Second, screen time may decrease other behaviors (e.g., driving; [33]) and increase virtual contact and online social events. Finally, heavy screen uses may be prefer digital versions of print media, thereby demonstrating to themselves, by choosing this behavior, that pro-environmental choices are preferable [34].

4.1 Implications for Environmental Education and Environmental Attitudes

Together our data, framed within the Theory of Reasoned Action, suggest three possible options for shaping environmental attitudes. Recall that the likelihood of engaging in some behavior may be a function of the peer group attitudes (or subjective norms) coupled with the verbal commitment to make a change [16]. The subjective norm associated with a behavior comes from the opinions of others and the degree to which a person desires to remain in the group. The individual is motivated to comply with the opinions of others. Therefore, one option to cultivate pro-environmental attitudes is to consider the norms of the peer group, and then reshape or recast environmental problems. Many people, particularly political conservatives, are unwilling to endorse ecocentrism as a reason to embrace environmental attitudes. For example, Feygina et al [30] found that presenting increased protective environmental measures, such as prohibiting development in areas with endangered species, in such a way as to make them appear to be the patriotic thing to do, more individuals with a strong sense of patriotism were likely to be supportive of those measures. Gromet et al [22] demonstrated that when an expensive, energy-saving light bulb was 'pitched' as energy conserving with a pro-environment saving message, politically-conservative people were less likely to buy it; they bought the expensive light bulb that made no references to the pro-environment benefits of the light bulb. Thus, recognizing that ecocentrism is not appealing to everyone as a reason for environmental protection is one step in changing attitudes, and presenting environmental problems outside of this realm may increase biophilic tendencies.

Behaviors will follow attitudes only if the outcomes of enhanced environmental understanding are desirable; and, more importantly, acting on those attitudes is a function of the company we keep. Therefore, a second possible solution is to present environmentally-friendly concepts and practices in such a way as to make them appear as though other people in the target peer group find them desirable. The desire to exhibit attitudes exhibited by other group members will result in the adoption of the practices by members of the group. It may be easier to present anthropocentric (rather than ecocentric) reasons for adopting a pro-environment attitude, particularly if your group is not ecocentric in general. Thus, for example, a program that makes the outcomes appear desirable to college students could be one that mentions the increased job opportunities that alternative energies provide, such as engineers to design solar panels or technicians to install wind turbines.

Third, uniform environmental education is unlikely to produce great proenvironmental behavior change. Both Wells and Lekies [25] and Ewert et al. [21] suggest that the reason that environmental education has little impact on pro-environmental attitudes can be explained by the formality of it, and the likelihood that persons who chose environmental education may very already have strong pro-environmental beliefs, and have few attitudes to change. Both studies found that active, spontaneous interactions with nature, such as hiking or collecting insects, are much more likely to lead to proenvironmental attitudes during adulthood. One key, then, in environmental education is to make available, easy, and salient any opportunities for pro-environmental *behavior,* particularly because students' attitudes toward the environment is a function of their most recent recollection of behavior toward the environment [34]. Thus, offering opportunities for experiences in natural settings, especially those that are unstructured and allow for spontaneous interaction with nature can result in proenvironmental attitudes [18,21,25]—either ecocentric *or* anthropocentric. If persons in the peer group have these proenvironmental attitudes because all members have had these formative experiences, then the social approval component is built in for future, more sophisticated proenvironmental behavior.

This tactic has the best chance of being successful, but will require the most effort on the part of environmental educators, teachers, and (especially) parents. On the other hand, it describes possibilities likely only among the middle class, who have such choices.

5. CONCLUSION

In sum, the results of our study add to the growing discourse that attempts to explain why different people treat the natural environment differently. While our self-report method was similar to those of previous researchers [12,18,21] it is an improvement on survey-based studies through its treatment of ecocentrism and anthropocentrism as two distinct attitudes, rather than grouping them together as proenvironmental attitudes. Understanding how to present proenvironmental opinions to different people as beneficial and social acceptable will increase the likelihood that these behaviors will be adopted by more and more people. Once the model is set, other people will follow. These changes will take time to permeate society, but in time environmental apathy can become a relic of an unsustainable civilization.

ETHICAL APPROVAL

Participants were treated in accordance with American Psychological Association guidelines for the ethical treatment of humans, and the research protocol was approved by the Catawba College Institutional Review Board. Participants' willingness and consent for the study was ascertained through their access to the web portal; a screen at the end of the protocol allowed them a final option to have their data discarded with no penalty.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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