The Effect of National Park Visitation on Environmental Awareness

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Abstract The Environmental Protection Agency (EPA) currently emphasizes formal environmental education (i.e. in a classroom setting), but informal environmental education (e.g. visiting a National Park) may also be an effective method of environmental education. This study explores the influence of visiting National Parks, National Recreation Areas, and National Monuments during different school grades on environmental attitude (e.g. supporting conservation) and behavior (e.g. recycling), collectively termed "awareness." Telephone surveys of 106 randomly chosen Californian residents measured visitation history to aforementioned National Park Service (NPS) units, environmental awareness, and formal environmental education as a confounding factor. Those who visited NPS units scored an average of 9% higher on environmental awareness than those who had no visitation history. There was a weak correlation between environmental attitude and behavior (r^2 0.18). Those who visited NPS units scored significantly higher on environmental attitude, but there was no significant difference on environmental behavior. These results show that while visiting NPS units significantly improves environmental attitude, it does not improve behavior, and the time in one's life when one visits a unit affects neither attitude nor behavior. Therefore, there is no compelling argument for the EPA to require schools to send students to NPS units; however, visits should be encouraged because they might raise environmental attitude.

Introduction

The Environmental Protection Agency (EPA) is officially in charge of the United States' environmental education (EE). It was established in 1970 to protect human health through protecting the environment. The EPA does this by enforcing environmental regulations, performing and funding environmental research, supporting volunteer, environmental groups, and to publish materials for public use (EPA 2006). In 1990 President Bush signed into law the National Environmental Education Act (P.L. 101-619) that required the EPA to administer an Environmental Education Division (originally started in 1985), education and training programs, and various other grant and advisory programs (EPA 1996). The goal of EE is to instill awareness and knowledge of the environment and environmental challenges, concern and a motivation to improve environmental quality, and skills to identify and help resolve environmental challenges (UNESCO 1978). Furthermore, EE provides the public with the knowledge, tools, and ethics to enable them to make informed and responsible decisions to live sustainably (EPA 1996). I will therefore define an environmentally aware person as one who has the desire to improve or support environmental quality (attitude) and acts on those desires (behavior). EE benefits society by protecting human health, advancing the quality of education, creating jobs, and promoting sustainable development, which protects America's natural heritage (EPA 1996).

There has been an increase in the number of EE programs (e.g. teacher training) around the United States, but the programs are too scattered to be as effective as planned: in 1995 only eleven states required EE to be infused or blocked into core curricula (EPA 1996). In 1998, the California State Board of Education increased its requirements for science education in primary and secondary schools, with a focus on developing experimental and testing abilities and specific information earlier on (Burton and Ong 2003). Environmental science has been indirectly infused into the curriculum, but it was not a direct goal of the Board.

Education is a key element in the design of the National Park Service (NPS). When one goes to a National Park, for example, one cannot help but notice the ubiquitous informational signs and the many tours and lectures offered by park rangers. Fran Mainella, director of the NPS, noted: "People more readily retain information, grasp meanings, and adopt new behaviors and values when directly involved with cultural and natural heritage resources and sites" (NPS 2005).

She spoke directly to the efficacy of NPS units as educational centers. Arcury and Christianson also found that directly experiencing the environment affects ones ecological worldview (1990).

Since children can be very impressionable (Basile 2000), they should be the focus of EE, to instill ideas of environmental awareness through both formal (e.g. school) and nonformal (e.g. a ranger tour at a National Park) forms. Currently, the focus is more on formal education, but nonformal methods may be more effective at achieving those goals laid out by the EPA (Kruse and Card 2004). It is uncertain whether environmental awareness is dependent upon experiencing the environment first hand, or if abstract learning is sufficient.

I hypothesize that visiting natural NPS units (i.e. parks, recreation areas, and monuments) as a youth is more effective at developing environmental awareness than visiting as an adult. If this is the case, then there is good reason for public schools to implement trips to national parks for all students, and for the NPS to focus on attracting parents and their children, and possibly to subsidize transportation, especially for the marginal groups that the NPS has identified – i.e. African- and Hispanic-Americans in working class neighborhoods (Floyd 1999). I limit this study to national parks, recreation areas, and monuments because these are the units that have ranger tours and other nonformal educational programs that focus on teaching visitors about nature.

Methods

I conducted a telephone survey of a random sample of all telephone-owning Californian residents. To reduce bias from political views and residence – e.g. Placer County is 52% Republican and Alameda County is 55% Democrat (California Secretary of State 2006) – I randomly surveyed residents from the entire state. I surveyed by telephone rather than by mail or in person to increase the response rate. The subjects were chosen by modified random digit dialing: rather than dialing completely random numbers, I had a list of Californian telephone area codes and central office codes from the North American Numbering Plan Administration (2006). I used Microsoft Excel to generate the remaining 4 random digits. The list included all area and central office codes used in California, including business, cellular, and residential numbers. To ensure that the subject was over 18, the first question asked was age. When the subject was under 18, I asked to speak to the next oldest person above 18. Calls were made from 6 p.m. to

8:30 p.m. during weekdays and 11 a.m. to 8:30 p.m. during weekends, times when most people are home and awake (Frey and Oishi 1995), from February 26 to April 9th, 2006.

In this study the independent variables were visitation to NPS units and formal environmental education (EE). The dependent variables were environmental attitude and behavior. The backbone of the survey rested upon whether and when the subject had visited a NPS unit and the subject's environmental awareness. All other questions dealt with confounding variables. The first section of the questionnaire (Appendix 1) was a modification of the NPS survey (2001) that uncovered the subject's visitation to NPS units. The second section of the questionnaire dealt with formal EE, participation in environmental organizations like the Sierra Club, and parental involvement. The third section of the questionnaire was a modification of the Shultz survey (2000) on environmental awareness. In that section subjects answered Likert Scale (e.g. "Do you strongly or mildly agree or disagree that ...") questions about their environmental behavior (e.g. recycling and energy use habits) and to what degree their environmental attitude conforms to the New Environmental Paradigm (NEP) as defined by Dunlap and Van Liere (1978). Shultz (2000) confirms the continued validity of the NEP. The questionnaire was pre-tested using a convenience sample of ten people.

Responses were coded onto Microsoft Excel and sorted by visitation history. If a subject visited NPS units in multiple stages (e.g. middle and high school), then the earliest visit determined the subject's placement. Responses to the environmental attitude and behavior questions were transformed to a zero-to-four scale, averaged, then divided by four to get the percent attitude and behavior scores. Those two scores were then averaged to get environmental awareness, awareness having already been defined as the equal combination of attitude and behavior.

To find the correlation between visitation and awareness, I sorted the responses by visitation, initially only looking at those who have visited and those who have not. I then performed a two sample *t* test assuming equal variances in Microsoft Excel, comparing the mean awareness of those who had visited to the mean awareness of those who had not.

This will tell me, at the most basic level, what the difference is between populations. To see the effect of formal EE, I will compare the awareness of those who underwent formal EE and those who did not. I will then limit the "no formal EE" group to visitors of NPS units.

If there is a significant difference between the awareness of visitors before finishing high school and non-visitors, with the formally educated entirely removed, then I can reject the null hypothesis that visiting National Parks when one is young does not influence one's environmental awareness as an adult.

Results

For the survey 834 phone numbers were called. Ultimately, 106 people responded to the survey (12% response rate). Of those, 54 visited NPS units (51%) and 1 did not know. Table 1 shows when the 54 visitors first visited a NPS unit, with most visits occurring in middle school.

Table 1. Distribution of earliest visits to NPS units.

Grade	%
Pre-K	17
K-5	20
6-8	22
9-12	17
12+ no kids	13
12+ with kids	11

The environmental awareness scores (out of 100) conform to a bell curve shape (Fig. 1), with an average score of 54 with a standard error of 1.5. 58% of the sample scored 50-69. No one scored lower than 14 or higher than 90.

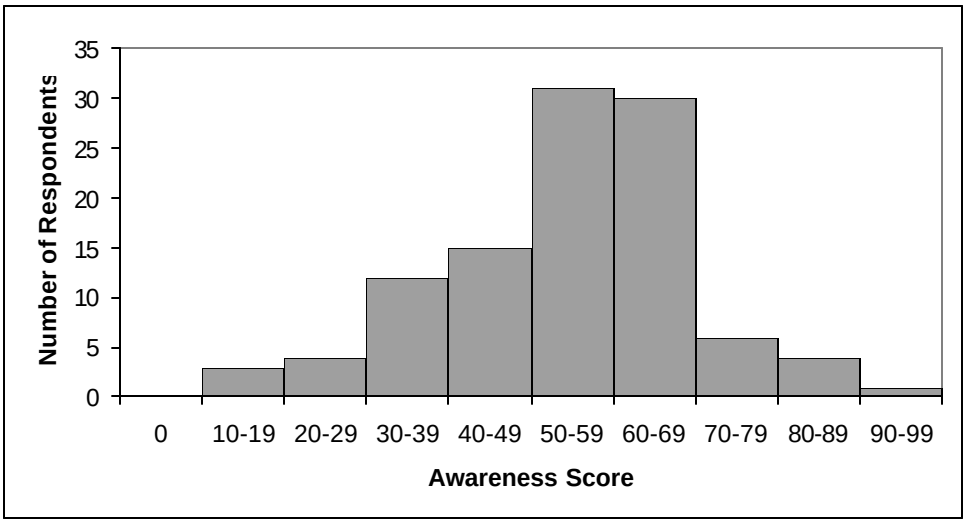

Figure 1. Frequency of awareness scores. *n*=106

When broken down into visitors and non-visitors, the average visitor score is 59±1.8 compared to the non-visitor's 50±2.3, 9% higher (Fig. 2). These averages are significantly different

(*p*=.002). Visitors scored primarily in the 50-69 range (72% of the sample), whereas non-visitors spread from 30-69 (80% of the sample). The visitors have a much clearer peak than the non-visitors, who are more evenly spread.

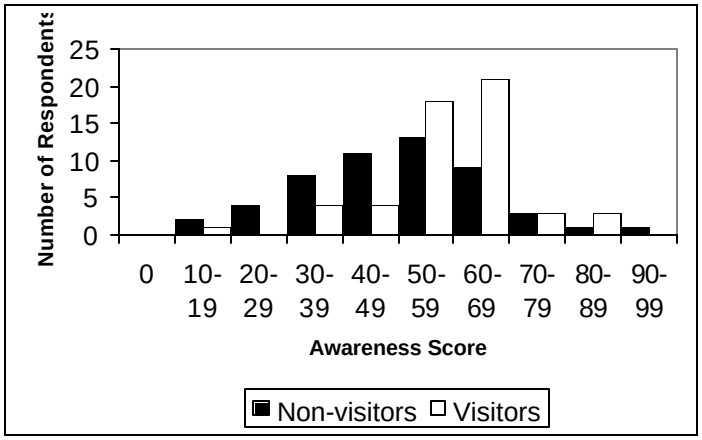

Figure 2. Frequency of awareness scores. Non-visitor *n*=51, Visitor *n*=54

The awareness scores for visitors, arranged by earliest visitation, were not different from each other, but behavior scores were consistently lower by an average of 19 points (Fig. 3). Neither attitude nor behavior scores correlate with the earliest visitation to a NPS unit. Environmental awareness remains the same, no matter when one visits a NPS unit, and attitude is always higher than behavior, regardless of the earliest visit.

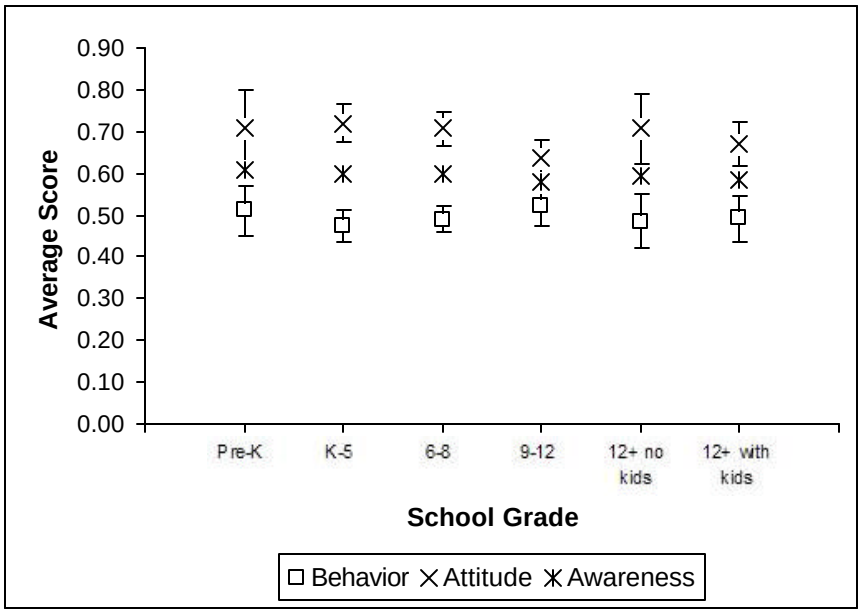

Figure 3. Average scores of the 54 visitors decomposed into attitude, behavior, and awareness, arranged by school grade

Overall, attitude and behavior did not closely follow each other. When plotted against each other, the r^2 value is only 0.18 (Fig. 4), so it is not possible to predict one score from the other, although there is a general upward trend and the sample is more populous in the higher scores. I will call a score above 50 "high" and below 50 "low" and split this distribution into quadrants, forming four groups: low attitude and low behavior, low behavior and high attitude, high attitude and low behavior, and high and high behavior. Only 7% of respondents fell into the low attitude and high behavior group, making this the odd group out. High attitude accounted for 72% of respondents, split evenly between high and low behavior, but not split evenly between visitors and non-visitors. 58% of the high attitude respondents were visitors. 32% of the low attitude respondents were visitors. Clearly, high attitude corresponds with visiting a NPS unit. Unlike attitude, high behavior only accounted for 43% of the sample. For both visitors and non-visitors, there are 30 respondents in the low behavior category, and there is no even split between attitudes as there is with the high attitude category.

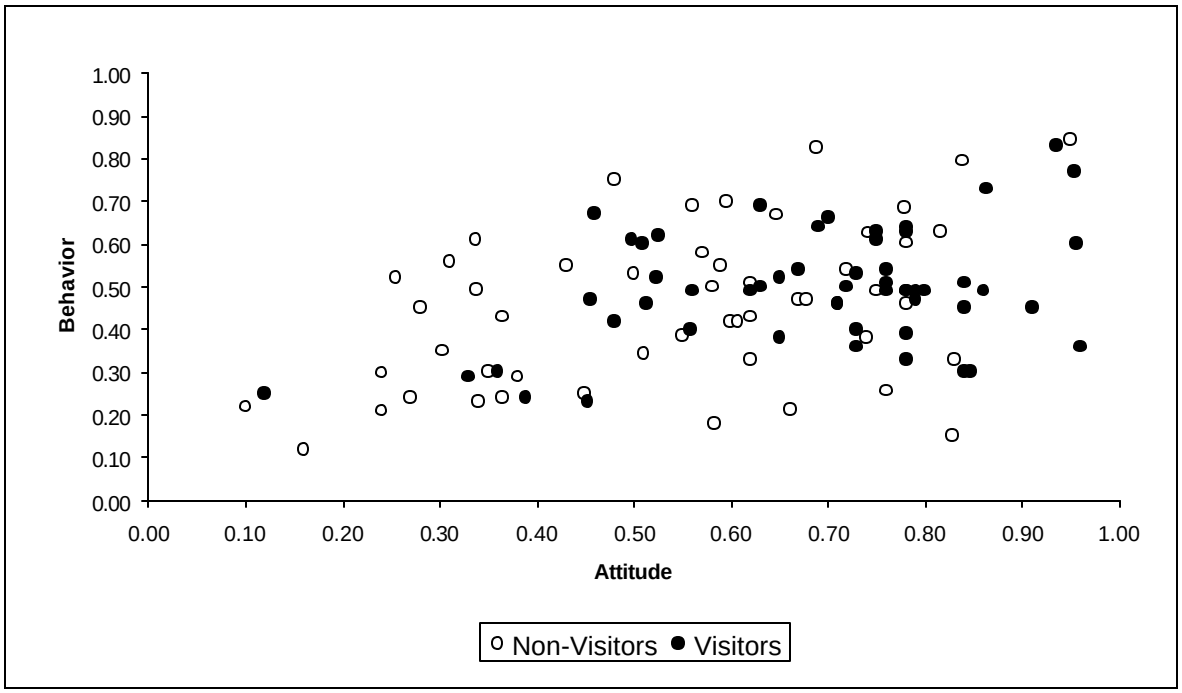

Figure 4. Attitude and Behavior Percentage Scores

Formal EE also influences attitude and behavior. Even though the sample is much smaller (*n*=26), those with formal EE scored much higher in all categories than those without (Table 2). The average attitude score is higher than the average behavior score, the same as with visitors and non-visitors to NPS units.

Table 2. Average behavior, attitude, and awareness scores for those who have been formally, environmentally educated and those who have not.

Educated?	Behavior[a]	Attitude[a]	Awareness[a]
Not educated	45	59	52
Educated	56	73	64

[a]Average scores are significantly different ($p < 0.05$) between non-visitors and visitors.

To see if the difference in scores was due to formal EE or visiting NPS units, I compared the scores with and without formal EE (Table 3). While the scores are generally lower without formal EE, the difference between the scores remains the same (e.g. the average behavior score for non-visitors is four points lower, regardless of education). Thus, visiting NPS units still significantly raises environmental attitudes.

Table 3. Average behavior, attitude, and awareness scores for visitors and non-visitors including and without formal, environmental education.

Including Education *n*=105

Visitor?	Behavior	Attitude[a]	Awareness[a]
Non-visitors	45	54	50
Visitors	49	68	59

Without Education *n*=78

Visitor?	Behavior	Attitude[a]	Awareness[a]
Non-visitors	43	52	47
Visitors	47	65	56

[a]Average scores are significantly different ($p < 0.05$) between non-visitors and visitors.

Discussion

When the National Park Service conducted their telephone survey of the American public (2001), they found that 72% of Americans surveyed had visited a NPS unit at least once in their lifetime and they achieved a 95% response rate in the Pacific Western Region (PWR). I found that 51% had visited a NPS unit, with a 12.5% response rate so my results are very different from the NPS study and may not apply to the PWR, nor to the nation. I expected to get a much higher proportion of visitors, assuming that they would be more willing to answer a survey, but this was not the case. There must be an equal disdain for telephone "solicitors" that not even the mystique of nature can quell.

Those who did visit NPS units had higher awareness scores, primarily due to the high attitude scores. Visitor behavior scores were only minimally higher than non-visitors, suggesting that visiting NPS units does not greatly affect one's behavior. The same holds true for those who have received formal EE. The discrepancy between attitude and behavior scores might be due to an inability in the human population to "practice what it preaches." It is very easy to espouse

ideas on paper or over the telephone, but it is much more difficult to change one's lifestyle to adopt those ideas. Conversely, the survey might inaccurately measure environmental behavior, which is very possible as there are currently no question sets similar to the NEP question set to capture behavior.

Visiting NPS units and formal EE correlate with increased awareness. With the current study, it is impossible to tell whether visiting NPS units actually increases awareness, or if those who are more aware are more likely to go to NPS units. To discover this, one would need to study awareness before and after visiting NPS units.

Visiting NPS units at an early age does not significantly increase awareness (Fig. 3). Therefore, I must reject my hypothesis. However, visiting a NPS unit at any age certainly correlates with an increase in awareness. This suggests that, while the EPA may not need to institute mandatory school programs to take students to NPS units, the government should still encourage NPS unit visitation, regardless of agency, because it might increase awareness.

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Appendix: Questionnaire

"Hi, my name is Andrew Wallace. I'm a student at UC Berkeley and I'm doing a survey about visiting National Parks for my senior thesis. Would you be willing to take a 15 minute survey about your experiences with National Parks, either today or sometime in the near future? All your answers will be completely anonymous."

1.1 How old are you?

- ? under 18
- ? 18-25
- ? 26-40
- ? 41-64
- ? 65 or older

1.2 Have you ever, in your lifetime, visited a national park, national recreation area, national monument, or other unit managed by the National Park Service?

- ? Yes
- ? No
- ? Don't know

1.3 Did you visit any of the above before kindergarten? (~0 to 5 years old)

1.4 Did you visit any of the above from kindergarten to 5th grade? (~6 to 11 years old)

1.5 Did you visit any of the above in middle school? (~12 to 14 years old)

1.6 Did you visit any of the above in high school? (~15 to 18 years old)

1.7 Did you visit any of the above after high school, without kids? (18+ years old)

1.8 Did you visit any of the above after high school, with kids? (18+ years old)

1.9 During your visits, in which of the following did you participate?
Interviewer: Read each response from the list. Respondent can answer more than one.

- ✍ Go sightseeing
- ✍ Go day hiking
- ✍ Go picnicking
- ✍ Camp at a National Park Service campground
- ✍ Attend a demonstration or performance
- ✍ Take a ranger-led interpretive historical tour
- ✍ Take a ranger-led nature tour
- ✍ Go overnight backpacking
- ✍ Other/none of the above
- ✍ Don't know

2.1 Have you ever been on a school field trip that focused on teaching you about the environment, like bird watching or looking at a stream or learning about trash?

- o Yes
- o No
- o Don't Know

2.2 About when was the field trip?

Interviewer: Read the options, but check only one

- o Before Kindergarten
- o K-5th Grade
- o Middle School (6th-8th Grade)
- o High School (9th-12th Grade)
- o After High School, without children of your own
- o After High School, with children of your own

2.3 In High School or College, did you have any Environmental Science, Ecology, or Resource Management classes?

- o Yes
- o No
- o Don't Know

2.5 Were you involved in an organization like the Boy Scouts of America or Campfire Girls?

- o Yes
- o No
- o Don't Know

2.6 Which ones?

2.7 Would you say that your parents have had a big influence on the way you treat the environment?

- o Yes
- o No
- o Don't Know

2.8 Do you belong to or donate money to any environmental clubs or groups like Sierra Club or Nature Conservancy, to name a few?

- o Yes
- o No
- o Don't Know

2.9 Which ones?

2.10 Are there any other experiences that you have had with the environment that haven't been covered?

3.1 "Now I am going to ask you about the relationship between humans and the environment. For each question, please say if you strongly agree, mildly agree, if you are unsure, or if you mildly disagree, or strongly disagree."

	Strongly Disagree	Mildly Disagree	Unsure	Mildly Agree	Strongly Agree
We are approaching the limit of the number of people that the earth can support.					
Humans have the right to modify the natural environment to suit their needs.					
When humans interfere with nature it often produces disastrous consequences.					
Human ingenuity will ensure that					

we do not make the earth unlivable.					
Humans are severely abusing the environment.					
The earth has plenty of natural resources if we just learn how to develop them.					
Plants and animals have as much right as humans to exist.					
The balance of nature is strong enough to cope with the impacts of modern industrial nations.					
Despite our special abilities, humans are still subject to the laws of nature.					
The so-called "environmental crisis" facing humankind has been greatly exaggerated.					
The earth is like a spaceship with very limited room and resources.					
Humans were meant to rule over the rest of nature.					
The balance of nature is very delicate and easy to upset.					
Humans will eventually learn enough about how nature works to be able to control it.					
If things continue on their present course, we will soon experience a major ecological catastrophe.					

3.2 "Now I am going to ask you about your lifestyle. For each question, please say if you do the activity very often, often, sometimes, rarely, or never.

	Very Often	Often	Sometimes	Rarely	Never
I pick up and throw away trash that I see in the street or in the environment.					
I conserve water whenever possible.					
I turn off the lights when I leave the room.					
When I need to, I buy energy efficient appliances and light bulbs.					
When I go to buy something, I make sure that it is the most environmentally friendly product on the market.					
I use something other than a car or					

motorcycle to get around.					
I buy recycled or used products.					
I recycle.					
I vote for politicians mainly based upon their pro-environmental stance.					
I buy locally grown, unprocessed, and/or organic food.					