Visitation to Natural Areas on Campus and its Relation to Place Identity and Environmentally Responsible Behaviors

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Visitation to Natural Areas on Campus and its Relation to
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VISITING NATURAL AREAS ON CAMPUS

Abstract
This study examined college students’ visits to natural areas on campus and how these visits relate to place identity and environmentally responsible behaviors. The majority (76.5%) of the 115 participants visited the natural areas, and 55.7% of these students visited for a course requirement. Students who lived on campus, were younger, and majored in environmental studies, humanities, or arts made more frequent visits. Among those who had visited the natural areas ($n = 88$), place identity and environmental responsibility were related to visitation frequency, and were stronger for those who had visited for a course requirement. Place identity mediated the relationship between visiting for a course requirement and environmental behaviors, but did not mediate the impact of visitation frequency.

*Keywords*: environmentally responsible behavior, outdoor recreation, place identity.
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Introduction

One of the foundations to outdoor recreational and educational programs is the belief that exposure to nature will impact attitudes and behaviors toward the natural world (Tarrant & Green, 1999). Past research supports this link between outdoor experiences and environmental responsibility (e.g., Chawla, 1999; Ewert, Place, & Sibthorp, 2005). In particular, outdoor experiences that encourage appreciation of nature appear to have the most beneficial effects (Dunlap & Heffernan, 1975; Geisler, Martinson, & Wilkening, 1977; Jackson, 1986; 1987; Teisl & O’Brien, 2003; Van Liere & Noe, 1981).

A possible explanation for how outdoor experiences impact environmental outcomes is that certain experiences help shift one’s perspectives of nature. Sandell and Öhman (2010) suggest that direct experiences with the outdoors encourage participants to see themselves in relation to their surroundings, and this relational perspective plays a critical role in the development of environmental values. Similarly, Vaske and Kobrin (2001) found that experiences with a particular natural area might result in a person coming to see that area as part of their identity, which in turn may lead to greater environmental responsibility. Place identity, the emotional connection with and personal investment in a specific setting, may thus serve to mediate the relationship between outdoor experiences and environmental behaviors.

This study examines how college students’ experiences with a specific natural area on campus impact their identification with that area as well as their involvement in environmentally responsible behaviors. The possible mediating role of place identity is examined in order to gain
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a better understanding of how experiences with a specific place may translate into more general environmental behaviors such as recycling and water conservation.

College students were of interest because they have relatively easy access to natural areas on campus, but certain students may be more likely to avail themselves of these experiences. Therefore, this study also sought to better understand the factors that impacted students’ decisions to visit natural areas on campus. One reason that a college student might visit the natural areas is that it was required for a course, and this is of particular interest in this study because visiting for purely recreational purposes may not be as effective as a structured class experience. Phipps (1988) noted that visitors of natural areas can be bored, overwhelmed, or unaware of the important points of the experience if feedback and reflection are not included. A key aim of this study, then, is to compare students who visited the natural areas on campus to those who visited for recreational purposes only.

Literature Review

Research Linking Outdoor Recreation and Environmental Responsibility

Studies of those who are actively involved in the environmental movement support the connection between outdoor recreation and environmental outcomes. These environmentalists consistently name extended time spent outdoors as one of their primary motivators to protect the natural world (Chawla, 1999; Palmer, 1993; Tanner, 1980). Based on their research, Chawla (1999) noted that experience of natural areas was the most frequently named source of environmental commitment and Palmer (1993) concluded that early life experience with the outdoors is the single most important factor in developing environmental concern.

Evidence for the link between outdoor experiences and environmental attitudes and behaviors is not limited to environmentalists. Ewert et al. (2005) found that college students with
pro-environmental views were more likely to have participated in outdoor recreation activities early in life. Empirical research on child-focused environmental education programs reveals that outdoor activities can enhance the effectiveness of the programs (Palmberg & Kuru, 2000; Vaske & Kobrin, 2001). Moreover, Newhouse (1990) suggested that environmental attitudes are formed throughout one’s lifetime and are based on multiple experiences. Thus adult experiences with nature can help reinforce or even establish positive environmental perspectives (Bartlett, 2005; Loeffler, 2004).

It is unlikely, however, that increased environmental concern is simply a function of exposure to nature, but rather the specific type of experience is key. Early research distinguished between recreational activities that are appreciative such as hiking and camping, consumptive such as hunting and fishing (Dunlap & Heffernan, 1975), and mechanized such as snowmobiling and ATV riding (Geisler et al., 1977). Participation in appreciative activities had a stronger connection to environmental concern (Dunlap & Heffernan, 1975; Geisler et al., 1977), and this result was supported by later studies (Jackson, 1986, 1987; Van Liere & Noe, 1981). These studies suggest that appreciative experience in nature is an important component in the development of environmental values.

On the other hand, environmental concern may be a cause rather than a consequence of involvement in outdoor activities. Those with pro-environmental views likely select activities consistent with their values (Jackson, 1986; Tarrant & Green, 1999). The impact of the experience may instead manifest as a behavioral outcome. That is, certain outdoor experiences may motivate specific preservationist behaviors associated with the chosen recreation (Jackson, 1986; Teisl & O’Brien, 2003) as well as more general environmental behaviors (Nord, Luloff, & Bridger, 1998; Tarrant & Green, 1999; Teisl & O’Brien, 2003). For example, Teisl and O’Brien
(2003) surveyed a representative sample of U.S. adults and found that appreciative activities of hiking, wild life watching, nature photography, and camping were most strongly correlated with interest in forest management, as well as participation in environmental organizations and likelihood of purchasing an environmental product.

**The Role of Place Identity in Environmental Responsibility**

Appreciative outdoor activities may impact environmental behaviors by shifting our perspective of the natural world and changing our relationship with place. For example, one outdoor program for college students included a variety of appreciative activities (camping, kayaking, and nature photography) and such activities led many participants to a more personal, and sometimes spiritual, connection with nature as well as feelings of awe and wonder (Loeffler, 2004). Similarly, faculty participating in nature walks as part of the Piedmont Project at Emory University reported that these experiences not only provided a retreat, but also helped them to engage with the natural world on a deeper level (Bartlett, 2005).

Natural areas represent more than the physical space they occupy, rather they provide the context for developing personal meaning and a social construction of place (Williams & Patterson, 1999). People may become attached to particular places, even coming to see a place as a component of their self-identity (Proshansky, Fabian, & Kaminof, 1983). Place identity is the term associated with the emotional connections and personal meanings associated with a specific setting. Whereas place dependence is the functional attachment associated with resources or activities, place identity represents a psychological investment that develops over time (Cuba & Hummon, 1993; Moore & Graefe, 1994; Proshansky et al., 1983; Vaske & Kobrin, 2001; Williams & Patterson, 1999). Both place identity and place dependence are components of place
attachment, but place identity may have a more direct impact on environmental behaviors (Vaske & Kobrin, 2001).

Because of the personal investment associated with place identity, we might assume that it is associated with place-protective behaviors. However, research on this topic is sparse and inconsistent (Scannell & Gifford, 2010). In one study, farmers’ ecological management of their properties was related to their general feelings about nature, but not to place-specific attachment (Gosling & Williams, 2010). Uzzell, Pol, and Badenas (2010) found that place identity was related to environmentally sustainable behaviors for residents of one neighborhood, but not another. On the other hand, the extent to which one identifies with a specific natural area has been associated with caretaking behavior within that area (Williams & Patterson, 1999) as well as broad environmental activities such as water conservation and recycling (Vaske & Kobrin, 2001).

**Place Identification and Environmental Responsibility among College Students**

Place identification begins with visits to a specific area, and visitation is more likely to occur with near-by and easily accessible places (Kaplan & Kaplan, 1995). College campuses typically include natural areas that offer convenient access to the campus community (e.g., Hien & Jusef, 2008; Lau & Yang, 2009), and provide a place for recreation and relaxation (Griffith, 1994). College students may benefit from experiences with natural areas on campus, but some types of students are more likely to visit natural areas than others. Both Jackson (1986) and Tarrant and Green (1999) concluded that people choose outdoor recreational activities that are consistent with their values and beliefs. Therefore, students who opt to go on walks in the woods or other appreciative activities likely already have pro-environmental beliefs.

A student’s academic major is a good indicator of their personal beliefs and worldviews.
Research has consistently found that environmental studies majors have a stronger concern for the environment than those majoring in business-related fields (Ewert & Baker, 2001; Hodgkinson & Innes, 2001; Sherburn & Devlin, 2004; Synodinos, 1990; Tikka, Kuitunen & Tynys, 2000). Not only do values play a role in students’ choice of major, values shift based on one’s major (Biddle, Bank, & Slavings, 1990). Ewert and Baker (2001) suggested that experiences within an academic major help shape how students perceive the natural world. For example, students who major in wildlife ecology might learn about ecosystems and preservation whereas students who major in forestry might learn about forest management and resource development. More broadly, certain majors such as business or economics may be more likely to encourage individualistic or competitive views that are contrary to environmental values (Sherburn & Devlin, 2004).

Given that academic major reflects personal beliefs (e.g., Ewert & Baker, 2001) and that personal beliefs impact outdoor recreation choices (Jackson, 1986; Tarrant & Green, 1999), it is reasonable to expect that academic major will affect how students utilize natural areas on campus. Indeed, Sherburn and Devlin (2004) found environmental studies majors were more likely to visit a campus arboretum than business and other majors, and would like to visit more often if they had the time. Although those who are most interested and concerned with the environment may be more likely to value and visit natural areas on campus, this doesn’t rule out the potential impact of the time spent at these natural areas. The experience of visiting natural areas on campus may reinforce already existing beliefs by fostering place identification and other pro-environmental beliefs and behaviors.

Whereas students who choose to visit for recreational purposes may have values that support environmentally friendly behaviors, students who visit for a class requirement may or
may not have such values. They may, however, have some unique benefits from their class-based experiences. Cuba and Hummon (1993) suggested that unstructured recreation can lead to place identification, but such identification is more likely if the activity is structured because such activities require time and commitment. Moreover, Phipps (1988) noted that including feedback and reflection are critical to helping students translate their outdoor experiences into improved environmental responsibility.

The Current Study

This study examines students’ utilization of a campus woods and lake in order to first explore who visits these natural areas on campus, reasons they visit, and what types of courses incorporate visitation as part of the course requirement. Secondly, this study builds on past research linking outdoor recreation and environmentally responsible behavior (e.g., Chawla, 1999; Moore & Graefe, 1994; Teisl & O’Brien, 2003) by examining the relationship between frequency of visitation to natural areas, place identity, and environmentally responsible behaviors. Third, based on theories that structured experiences are important in the development of place identity (Cuba & Hummon, 1993) and environmental responsibility (Phipps, 1988), this study compared students who visited the natural areas on campus for a course requirement to those who visited for recreational purposes only. Finally, this study contributes to the relatively little and contradictory literature examining the relationship between place identity and environmentally responsible behaviors. Unlike past studies that examined place-specific caretaking (e.g., Gosling & Williams, 2010; Williams & Patterson, 1999), this study is similar to that of Vaske and Kobrin (2001) that examined how identification with a specific place generalizes to environmentally responsible behaviors within the community.
It is expected that even after accounting for student characteristics such as academic major and time spent outdoors that likely both impact and reflect students’ environmental beliefs and behaviors, time spent in the natural areas on campus will be linked with place identity and environmentally responsible behaviors. Specifically, several hypotheses are tested in this study:

H₁: Spending more time in the natural areas on campus will be related to stronger identification with these areas as well as more environmentally responsible behaviors.

H₂: Students who visit the natural areas on campus for a course requirement will have higher levels of place identity and environmentally responsible behaviors than those who visit solely for recreational purposes.

H₃: Place identity will be linked with environmentally responsibility and will also mediate the relationship between experience and behavior. In other words, outdoor recreation and structured experiences (via a course requirement) at the natural areas on campus will impact environmentally responsible behaviors only if the experiences foster place identity.

Method

Participants

One hundred fifteen undergraduates (27 men; 88 women) at Guilford College participated in this research. Guilford College is a small liberal arts college in Greensboro, North Carolina that has 356 acres of woods fronted by a small lake. This sample consisted of 62 students living on campus and 53 students living off campus. Ages ranged from 18 to 51 ($M = 24.10$, $SD = 8.66$). Students who live off campus have a wider variation in age, but are on average older ($M = 31.53$, $SD = 9.20$) than those who live on campus ($M = 19.61$, $SD = 1.24$), $t (53.63) = -9.35$, $p < .001$, $r_{pb}^2 = .47$. 
Most participants were Caucasian (83.3%), with African Americans making up 9.6% of the sample, and the remaining 7.1% indicating that they were Latino/a, Asian, or other. There were 26 first year students (22.6%), 20 sophomores (17.4%), 29 juniors (25.2%), and 40 seniors (34.8%). Participants attended Guilford College between one-half and five years ($M = 2.01$, $SD = 1.33$). There were 38 students majoring in the social sciences (33%), 21 in business (18.3%), 18 in environmental studies (15.7%), 16 in the humanities (13.9%), eight in art (7%), seven in the natural sciences or mathematics (6.1%), and seven undecided (6.1%). At Guilford College, environmental studies is an interdisciplinary major that requires a second disciplinary major. In other words, a student who selected environmental studies as their major double majored in another area.

**Procedure**

An anonymous online survey was emailed to students and advisees of the author. Additionally, a link to the survey was posted to a daily electronic message board that is emailed to all Guilford College students. All potential participants were informed that the study was about their experiences on campus as well as their environmental attitudes and behaviors. They were told that their answers would be both confidential and anonymous and that they could withdraw at anytime by simply exiting the survey. Students had to acknowledge that they read this information and were at least 18 years old in order to participate in the study.

**Measures**

**Outdoor Experiences.** Participants estimated the percentage of their free time spent outdoors each year in order to gauge their preference for outdoor recreation. Next, participants indicated how often they visited the lake or woods on Guilford’s campus (*never, 1 time a year or less, 2-5 times a year, 6-9 times a year, about every month, a few times a month, every week or
They were told not to include times they just passed by or through these areas, and were asked to report times that they had spent at least 15 minutes in either or both of the areas.

Participants who reported that they had ever been to the natural areas on campus (lake or woods) were asked an open-ended question about the primary reason they visited. Responses were coded based on common themes: enjoying nature (including bird or animal watching, observing flora, and nature photography or art), hiking or walking, being with friends, and academics (studying or doing a course project). These participants were also asked if they ever took a course at Guilford College that required them to spend time at the woods or lake. Those who answered in the affirmative were asked how many courses required a visit to the lake or woods and how many times they visited due to a course requirement (1-3 times, 4-6 times, 7-9 times, 10 times or more). Students also indicated what type of courses required them to visit the lake or woods and what types of activities the course required.

**Place Identity.** Participants who reported ever visiting natural areas on campus were asked four questions that assessed identification with these areas using a scale ranging from 1 (strongly disagree) to 5 (strongly agree). The questions were modified from those used by Vaske and Kobrin (2001): (a) I often think about coming to the lake and/or woods on campus to enjoy the outdoors, (b) I am very attached to the lake and/or woods on Guilford’s campus, (c) I identify strongly with the lake and/or woods on Guilford’s campus, and (d) I feel like the lake and/or woods on Guilford’s campus is a part of me. The internal consistency of this scale was excellent ($\alpha = .89$).

**Environmental Behaviors.** All participants were asked seven items that assessed environmental behaviors based on the Environmentally Responsible Behaviors Inventory (ERB) (Smith-Sebasto & D’Costa, 1995). Participants indicated how often they participated in the
following behaviors: (a) learning how to solve environmental issues, (b) talking to peers about environmental issues, (c) talking to parents about environmental issues, (d) joining community clean-up efforts, (e) sorting recyclable trash, (f) trying to convince friends to act in environmentally responsible ways, and (g) conserving water by turning off the tap while washing dishes. The items were rated on a 5-point likert scale from rarely (10%) to usually (90%) and had demonstrated internal consistency (α = .88).

Results

Frequency and Types of Outdoor Experiences

Participants reported spending anywhere from none to 100% of their leisure time outdoors, with an average of 47.7% (SD = 20.95). Twenty-seven participants indicated that they had never been to the natural areas on campus (23.5%), 17 visited once a year or less (14.8%), eight visited two to five times a year (7%), 15 visited six to 10 times a year (13%), 12 about every month (10.4%), 18 several times a month (15.7%), and 18 visited every week or more (15.7%). Responses were rated from 1 (never) to 7 (every week or more), with a Mean of 3.82 (SD = 2.22).

Almost all the students reported that recreation was the primary reason they visited the natural areas on campus. Most reported their motivation was to enjoy nature (69%) and others indicated they visited to walk or hike (16%) or be with friends (8%). Only six (7%) of the students reported that they visited the natural areas primarily to study or do a course project. These six students were from various academic majors (one social science, two natural science, one business, two environmental studies), and all of them had visited at least once for a course requirement.

Forty-nine (55.7%) of the 88 who had ever visited the natural areas on campus reported that they had visited at least once for a course requirement. These 49 participants indicated that
one to four of their classes had required visitation ($M = 1.53, SD = 0.79$), with one the most common (63%). The majority (86%) of these classes required between one to three visits, 6% required four to six visits, and 8% required seven or more visits.

A variety of courses required visits to the natural areas, although no business courses were listed. Sixteen participants reported taking first-year orientation courses that required visitation to the lake or woods, nine arts, six humanities, 22 natural science, six social science, ten environmental studies, and five interdisciplinary courses. Course activities likewise varied. Twenty-one participants reported that they hiked and 18 reported participating in an outdoor class discussion. Scientific activities, which included analyzing and identifying natural materials, was another common experience ($n = 19$). Art activities occurred for nine participants, nature appreciation for six, and spiritual activities or meditation for six.

Who Visits the Natural Areas on Campus?

Students who live on campus have easier access to the natural areas on campus, and it is not surprising that they make more frequent visits ($M = 4.73, SD = 1.87$) than off campus students ($M = 2.75, SD = 2.13$), $t(113) = 5.28, p < .001, r_{pb}^2 = .20$. Age was also significantly correlated with visitation, $r = -.55, p < .001$. On the other hand, there were no significant gender differences ($M_{men} = 3.44, SD = 2.03$ vs. $M_{women} = 3.93, SD = 2.27, t(113) = -1.00, p = .32, r_{pb}^2 = .01$) nor was there a significant correlation between how long a student attended the college and visitation to the natural areas on campus, $r = -.01, p = .92$.

A one-way ANOVA revealed that academic major was significantly related to frequency of visits, $F(6, 114) = 5.65, p < .001, \eta^2 = .24$. Post hoc Least Significant Difference tests revealed that participants majoring in environmental studies, humanities, and art visited the natural areas on campus more frequently than those majoring in social sciences, natural sciences,
and business ($p$ ranged from $p = .01$ to $p < .001$). Undecided majors fell in the middle and did not significantly differ from other types of majors. Descriptive data are provided in Table 1.

A new variable for academic major was created based on the ANOVA results by dividing major into two categories (social science, natural science, and business vs. humanities, arts, and environmental studies). Students majoring in the social sciences, natural sciences, or business were less likely to have a course that required them to visit the lake or woods, $\chi^2(1) = 7.66$, $p = .01$, $\phi^2 = .07$. Forty-six of these majors never took a course requiring a visit to the lake or woods whereas 20 had. On the other hand, only slightly more students majoring in environmental studies, humanities, or arts had taken a course requiring visitation ($n = 24$) than those who had not ($n = 18$).

**Correlations Among Outdoor Experiences and Environmental Outcomes**

Zero-order correlations were calculated for all participants to determine the relationship between outdoor experiences and environmentally responsible behaviors. Not surprisingly, preferences for outdoor experiences (assessed by asking participants how much free time they spent outdoors) was significantly correlated with frequency of visits to the natural areas on campus, $r = .27$, $p = .006$. Involvement in environmentally responsible behaviors was not correlated with the amount of free time spent outdoors, $r = .16$, $p = .104$, but had a moderately strong correlation with frequency of visits to the natural areas on campus, $r = .46$, $p < .001$. A similar pattern emerged when correlations were calculated for those who had visited the natural areas at least once. These analyses also revealed significant relationships among place identity, environmental responsibility, and visiting for a course requirement (see Table 2).

**Multiple Regression Analyses**
Hierarchical regression analyses were conducted to determine if visiting more frequently or having a course that required visitation impacted place identity and environmentally responsible behaviors, while taking into account potential confounds (see Table 3). Only students who had ever visited the natural areas on campus were included in the analyses. Gender, age, living on or off campus, amount of time at the college, and amount of leisure time spent outdoors was entered in the first step. Major was significant for both environmental outcomes, indicating that those who major in environmental studies, humanities, or arts had stronger place identity ($\beta = .53$, $p = < .001$) and engaged in more environmentally responsible behaviors ($\beta = .50$, $p < .001$).

Frequency of visits to the lake or woods was entered in the second step. Results indicated that after taking into account demographics and amount of leisure time spent outdoors, frequency of visits still had a significant relationship with environmental outcomes. Specifically, the more one visited the lake or woods, the stronger one’s place identity ($\beta = .28$, $p = .024$, $\Delta R^2 = .05$) and the more frequent one’s engagement in environmental behaviors ($\beta = .45$, $p = < .001$, $\Delta R^2 = .15$).

Visiting the lake or woods for a course requirement was entered in the third step to take into account potential confounding variables including frequency of visits. Those who reported having ever visited for a course requirement had a stronger place identity than those who visited for recreational reasons only ($\beta = .22$, $p = .046$, $\Delta R^2 = .04$).

**Place Identity as a Potential Mediator**

A mediator helps explain how one variable impacts another (Baron & Kenny, 1986). Frequency of visits to natural areas on campus or having a course requiring visitation may impact environmental behaviors through place identity. In order to establish a mediational relationship, three criteria must be met. First, there must be a significant relationship between the
predictor (experiences with natural areas) and the outcome (environmental behaviors) (Baron & Kenny, 1986). Correlational analyses confirm a significant relationship between both frequency of visitation and visiting for a course requirement and the outcome of environmental behaviors (see Table 2). Regression analyses provide additional support for frequency of visitation (see Table 3).

The second criterion for mediation is that there must be significant relationships between the mediator (place identity) and both the predictor and the outcome (Baron & Kenny, 1986). Correlational and regression analyses demonstrate that place identity is related to both predictor variables (visitation frequency and visiting for a course) and the outcome of environmental behaviors (see Tables 2 and 4).

The final criterion for mediation is that the relationship between the predictor and outcome must be reduced when the mediator is included in the equation (Baron & Kenny, 1986). Regression analyses were used to test this criterion (see Tables 3 and 4). The relationship between visitation and environmental behaviors was reduced slightly when place attachment was in the equation and was still significant ($\beta = .45, p < .001$ vs. $\beta = .33, p = .005$). On the other hand, the relationship between course requirement and environmental behaviors was reduced more dramatically when place identity was included in the equation ($\beta = .19, p = .06$ vs. $\beta = .10, p = .31$). Therefore results do not support a mediating effect for frequency of visits, but there is evidence that place identity mediated the relationship between course requirement and environmentally responsible behaviors.

**Discussion**

The first aim of this research was to better understand who visits the natural areas on campus and for what reasons. Over two-thirds of participants visited the natural areas on campus
at least once. Students who lived on campus and were younger visited the natural areas more
than those who lived off campus and were older. These factors are correlated, and it is possible
that proximity to the natural areas afforded to those on campus was a key factor affecting use, as
suggested by previous literature (Kaplan & Kaplan, 1995).

Students who major in environmental studies, humanities, or art reported a higher
frequency of visitation than those who majored in business, social science, or natural science.
The finding that environmental studies majors were more likely to visit the natural areas than
business majors is consistent with past research (Sherburn & Devlin, 2004). Past research
suggests that academic major can be an indicator of environmental values (e.g., Ewert & Baker,
2001), and this study also found that students who majored in environmental studies, humanities,
and art had higher levels of both place identity and environmentally responsible behaviors. These
majors may encourage more aesthetic and relational perspectives associated with environmental
values (Sandell & Öhman, 2010). It should be noted that environmental studies majors are
defined differently here than at other schools because they must have a joint major in another
discipline. Comparisons to research on academic major and environmental responsibility
conducted at other schools are therefore limited. In particular, past research has found that
biology majors have higher environmental concern (Ewert & Baker, 2001), but in this study the
natural science major excluded those who co-majored with environmental studies.

Students who visited the natural areas on campus did so primarily to engage in
appreciative activities (enjoying nature or walking/hiking) that have been associated with
environmental concern and involvement in environmentally responsible behaviors (Dunlap &
Heffernan, 1975; Geisler et al., 1977; Teisl & O’Brien, 2003). Based on the ways that students
utilize the natural areas, we would expect a positive relationship with environmental outcomes.
Indeed, results support the first hypothesis that spending more time in natural areas on campus is related to stronger identification with these areas as well as more environmentally responsible behaviors. This relationship was significant above and beyond the impact of demographics, preferences for spending time outdoors, living on or off campus, and academic major. These results support previous literature touting the importance of outdoor experiences on place identification (e.g., Vaske & Kobrin, 2001) and environmentally responsible behaviors (e.g., Chawla, 1999; Tarrant & Green, 1999; Teisl & O’Brien, 2003). At the same time, it is important to note that these results do not provide evidence for a causal link between outdoor experiences and environmental outcomes.

Results of this study also support the second hypotheses that students who visited for a course requirement had higher levels of place identity and environmentally responsible behaviors than those who visited only for recreational reasons. For place identity, this was true even when factoring in demographics, major, preferences for spending time outdoors in general, and amount of time spent at the natural areas. A variety of courses included a requirement for visiting the lake and/or woods on campus. This helps rule out that only environmentally minded students will participate. In fact, only 10 students reported that they took an environmental studies course that required visitation. Although the types of activities required also varied quite a bit, most would be considered appreciative (Dunlap & Heffernan, 1975; Geisler et al., 1977; Teisl & O’Brien, 2003). Moreover, because the activities were integrated into an academic class it is likely that they included the instruction, feedback, and/or reflection that has been connected to both place identity (Cuba and Hummon, 1993) and environmentally responsible behaviors (Phipps, 1998).
The third hypothesis that place identity would be linked to environmentally responsible behavior and mediate the relationship between outdoor activities and environmental outcomes was partially supported. Place identity did relate to environmental responsibility, but evidence for a mediating effect was found only for the course requirement. Having a course requiring visitation impacted environmentally responsible behaviors through its relationship with place identity. It appears that a structured course activity in a natural area on campus can increase one’s identification with that area, and it is this identification that is linked with environmentally responsible behaviors. However, as with the results for frequency of visitation, a causal link cannot be tested given this data. Future studies utilizing experimental methods would be needed to help rule out alternative explanations. Additionally, the present study has a relatively small sample of self-selected students and future studies are needed to support these results.

There is good evidence that environmental education programs can be enhanced by outdoor experiences (e.g., Palmberg & Kuru, 2000; Sandell & Öhman, 2010), and this study provides further encouragement for environmental educators to provide participants with opportunities to engage with the outdoors. The results of this study suggest that even brief encounters with the outdoors through a structured course can have positive environmental outcomes, even if environmental education is not the primary goal of the course. Educators in a variety of disciplines may help promote pro-environmental attitudes and behaviors by incorporating field trips, field work, and other outdoor experiences. In particular, university and college professors are encouraged to utilize the green spaces on their campuses. These areas are easily accessible to students, and a structured experience may lead to greater identification with the natural area that in turn may motivate environmental responsibility.
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References


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Table 1

*Frequency of Visits to Natural Areas on Campus by Academic Major*

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<th>Major</th>
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Table 2

Correlations Among Outdoor Experiences and Environmental Outcomes for Visitors to Natural Areas on Campus

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<td>.19</td>
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<tr>
<td>2. Frequency of visits to natural areas on campus</td>
<td>--</td>
<td>.02</td>
<td>.46***</td>
<td>.50***</td>
<td></td>
</tr>
<tr>
<td>3. Course required visit to natural areas on campus</td>
<td>--</td>
<td>.23*</td>
<td>.28**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Place identity with natural areas on campus</td>
<td>--</td>
<td>.55***</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Environmentally responsible behaviors</td>
<td>--</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note. n ranged from 77 to 88 due to missing data except where noted.

* p < .05, ** p < .01, *** p < .001.
**Table 3**

*Hierarchical Regression Analyses for Outdoor Experiences and Environmental Outcomes Among Visitors to Natural Areas*

<table>
<thead>
<tr>
<th></th>
<th>Place Identity</th>
<th>Environmentally Responsible Behaviors</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$B$</td>
<td>$SE$</td>
</tr>
<tr>
<td><strong>Step 1</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td>1.08</td>
<td>0.88</td>
</tr>
<tr>
<td>Age</td>
<td>-0.09</td>
<td>0.08</td>
</tr>
<tr>
<td>Academic Major</td>
<td>3.72</td>
<td>0.75</td>
</tr>
<tr>
<td>Amount of Time at College</td>
<td>0.03</td>
<td>0.32</td>
</tr>
<tr>
<td>Live On or Off Campus</td>
<td>1.93</td>
<td>1.14</td>
</tr>
<tr>
<td>Amount of Leisure time outdoors</td>
<td>0.03</td>
<td>0.02</td>
</tr>
<tr>
<td><strong>Step 2</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Frequency of visits to lake or woods</td>
<td>0.55</td>
<td>0.24</td>
</tr>
<tr>
<td><strong>Step 3</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Course required visit to lake or woods</td>
<td>1.52</td>
<td>0.74</td>
</tr>
<tr>
<td><strong>Total $R^2$</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

$^*p = .06, ^*p < .05, ^**p < .01, ^***p < .001.$
### Table 4

*Hierarchical Regression Testing Place Identity as a Mediator*

<table>
<thead>
<tr>
<th>Step</th>
<th>B</th>
<th>SE B</th>
<th>β</th>
<th>ΔR²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 1&lt;sup&gt;a&lt;/sup&gt;</td>
<td></td>
<td></td>
<td></td>
<td>.35***</td>
</tr>
<tr>
<td>Step 2</td>
<td></td>
<td></td>
<td></td>
<td>.09**</td>
</tr>
<tr>
<td>Place Identity</td>
<td>0.64</td>
<td>0.20</td>
<td>0.38*</td>
<td></td>
</tr>
<tr>
<td>Step 3</td>
<td></td>
<td></td>
<td></td>
<td>.07**</td>
</tr>
<tr>
<td>Frequency of Visits</td>
<td>1.12</td>
<td>0.38</td>
<td>0.33**</td>
<td></td>
</tr>
<tr>
<td>Step 4</td>
<td></td>
<td></td>
<td></td>
<td>.01</td>
</tr>
<tr>
<td>Course Requirement</td>
<td>1.24</td>
<td>1.21</td>
<td>0.10</td>
<td></td>
</tr>
<tr>
<td><strong>Total R²</strong></td>
<td></td>
<td></td>
<td></td>
<td>.52***</td>
</tr>
</tbody>
</table>

*Note.* <sup>a</sup>Gender, age, major, time at college, on/off campus, and amount of time spent outdoors was entered in the first step.

*p < .05, **p < .01, ***p < .001.*