



The role of gender, race, and ethnicity in environmental identity development in undergraduate student narratives

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ABSTRACT

Recent work in environmental psychology and education emphasizes environmental identity as important in predicting a broad array of environmental behaviors. However, there are gaps in understanding how other social identities interact with environmental identity. We conducted semi-structured interviews with 30 undergraduate students from diverse backgrounds supplemented by environmental identity and demographic surveys. Our interviews showed that gender and race/ethnicity affect the development of undergraduate environmental identity by influencing (1) significant life experiences (SLEs) with nature and (2) important social influences in environmental identity development. In particular, gender and race impacted relationships with mentors, gender stereotypes limited potential SLEs, and gendered physical concerns constrained environmental activities. Other themes included the role of socio-economic status and nature as a source of empowerment. Our work suggests that research is needed on the interplay among different identities and environmental identity, and that further work is necessary to make the environmental field inclusive for all.

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Introduction

In recent years, environmental educators have turned their attention to psychology and sociology to better understand pro-environmental behaviors. The traditional behavioral change approach, in which knowledge leads to awareness or attitudes, which leads to action, has been challenged (Hungerford and Volk 1990). Only a modest relationship has been reported between environmental attitudes and environmentally responsive behavior (Stets and Biga 2003). Increasingly, research has emphasized the concept of environmental identity, which develops through a longer and more complicated process, and potentially predicts a broader array of behaviors across situations (Bixler, James, and Vadala 2011; Clayton and Opatow 2003; Stets and Biga 2003).

An identity is 'a set of meanings attached to the self that serves as a standard or reference that guides behavior in situations' (Stets and Biga 2003). An individual has two types of identities: (1) the role identity (e.g. gender, race), which are the meanings that they attach to themselves 'as an occupant of a role in the social structure', and (2) person identity, which is the self-meaning at the individual-level separate from social roles (Stets and Biga 2003).

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Environmental identity refers to 'one's self-meanings in relation to the environment' (Weigert 1997). It is conceptualized as a personal identity:

the way in which we define the environment, the degree of similarity we perceive between ourselves and other components of the natural world, and whether we consider nature and nonhuman natural entities to have standing as valued components of our social and moral community (Clayton and Opatow 2003).

The concept of environmental identity also addresses how a person's decision-making is guided by the social structure in which one is embedded (Stets and Biga 2003). Applying the perspective of identity gives environmental sociologists an approach to explain and predict pro-environmental behavior.

Researchers have examined multiple factors involved in the development of environmental identity among environmentally committed individuals, such as time spent outdoors, study of natural systems, witnessing habitat alteration, influence from parents, teachers, books, and environmental organizations, and more (Chawla 1999; Palmer and Suggate 1996; Tanner 1980). Two types of factors have particularly prominent influence on the environmental identity of the environmentally committed. One type of factor includes significant life experiences (SLEs), particularly the 'youthful experience of the outdoors and relatively pristine environments' (Chawla 1998; Palmer 1993; Tanner 1980). The second type of factor includes social influences on one's environmental identity – the 'social environmental identity' locates oneself as 'an environmentalist, or a particular type of environmentalist, in a context of persons, groups, and struggles' (Kempton and Holland 2003). In this, family is a strong influence among environmental educators (Corcoran 1999). Other social influences include nature authors, teachers, environmental professionals, environmental groups, friends, and co-workers (Bixler, James, and Vadala 2011; Corcoran 1999; Stapleton 2015).

A gap that exists in the current environmental identity research is understanding how other identities such as gender and race/ethnicity play a role in the development of environmental identity. Holmes (2003) acknowledges that there is a great need to explore environmental identity development across race, ethnic, and/or class diversity. There is an encouraging increase in the discussions around gender and environmental education in recent years, highlighted by the special issue of *Journal of Environmental Education* on gender (Russell, Gough, and Whitehouse 2018). Meanwhile, the development of environmental justice literature also draw attention to how one's connection to nature is influenced by their racial, gender, and class background. However, we feel that there is inadequate attention to the question of how gender and race/ethnicity identity impact the foundational factors of one's environmental identity development, namely SLEs and significant social relationships.

While some studies have shown that women are generally more concerned about the environment (Van Liere and Dunlap 1980) and exhibit more environmentally friendly behavior (Tindall, Davies, and Mauboules 2003), the mechanisms that lead to such differences have not yet been explored extensively. For example, one theory, that of ecofeminism, explains the gender difference in environmentalism as a result of different conceptualization of the world – that women tend to see the inherent connections in the world, whereas men tend to abstract events from the context, and are less attentive to the link between the environment and the things they value (Stern, Dietz, and Kalof 1993). Some studies suggest that ethnic identity might also influence or interact with environmental identity. That is to say that meaning could be structured by the culture and social structure within which the person operates (Williams and Patterson 1996), therefore people with different ethnicities might differ in the meaning that they assign to the natural environment (Virden and Walker 1999). Different cultures fit in divergent dimensions of values such as conservatism versus autonomy, hierarchy versus egalitarianism, and mastery versus harmony (Schwartz and Sagiv 1995), which in turn play a role in the cultural differences in human–environmental interactions (Milfont 2012). There could also be racial differences in one's relationship with the environment – particularly in an American context, such difference

could be caused by the systematic exclusion of African Americans from wilderness (Finney 2014; Taylor 2016), associations of wild places with violence and fear (Finney 2014; Virden and Walker 1999), and socially constructed 'white wilderness' (DeLuca and Demo 2001).

One body of research that has contributed to our understanding of the influence of gender and race/ethnicity on individual environmental identity is the discipline of leisure studies. Scholars have studied the constraints that limit participation in leisure activities, in particular in outdoors settings such as national parks. Compared to men, women are more constrained by factors such as fear of crime or victimization and fear of embarrassment by not fitting in (Shores, Scott, and Floyd 2007). Similarly, scholars have also found differences in the constraints that are perceived by people of different races. Byrne (2012) documented the barriers that Latino focus group participants faced in accessing and using some Los Angeles parks, such as feeling unwelcomed or excluded from the parks by the lack of signage in Spanish, as well as by other factors. Physical distance and transportation problems could also affect participation: the lower participation among African Americans in Detroit's regional parks is attributed to the transportation constraints (West 1989). These results from leisure studies point to potential influence from race and gender on the SLEs that one could have in nature.

To date, very few studies have investigated how gender and race/ethnicity could impact the social influence on one's environmental identity. One indirect way that the social factors involved in the development of one's environmental identity emerge is through stereotypes associated with gender and race. People who are stereotyped as 'flaky environmentalists' may develop attitudes and behaviors that are consistent with that identity (Clayton 2012). Minorities and low-income Americans have been perceived as having low environmental concerns, despite research to the contrary (Pearson et al. 2018). When one is not perceived by society as a stereotypical environmentalist (role identity), that might in turn impact one's own internal environmental identity (personal identity).

Here, we address the gap in understanding environmental identity by asking how race/ethnicity and gender might have influenced the SLE and significant social relationship that are formative in environmental identity. With semi-structured interviews enhanced by quantitative surveys, we delve into Duke University undergraduate students' narratives of the formative influences on their environmental identity, and the influence that they perceive from their race/ethnicity and gender in this process. Moreover, this group of participants differs from previous studies on SLEs, which focus on those in the environmental fields, as it includes a broader range of students from all types of backgrounds and going into different careers. This research has significance in environmental education by foregrounding gender, racial, and ethnic factors related to the construction of environmental identities.

Methods

Approach

This study is primarily a phenomenological work, with statistics used to clarify trends observed qualitatively. With each participant, we conducted two surveys about their demographic information and environmental identity, followed by a semi-structured interview.

We primarily worked from the phenomenological tradition of inquiry, particularly drawing from transcendental phenomenology (*sensu* Moustakas 1994). In this study, the phenomenon is environmental identity situated in the context of personal history and values. We also borrowed from the narrative tradition, particularly by exploring the causal links among those elements (Carter 1993), and doing so within a chronological framework (Cortazzi 1993). Moreover, while quantitative approaches are generally not used with phenomenological approaches, we used them here as an extension, for enhanced richness and to get a better sense of possible causal links.

Interviews

The first author conducted semi-structured interviews with 30 undergraduate students at Duke University during Fall 2018–Spring 2019. To balance gender, race/ethnicity, and major/career choice of our sample population, our study included both: (1) volunteers who expressed interest and (2) participants recruited *via* a social network approach and snowball sampling.

The semi-structured interview was designed to elicit open, reflective responses from the participants on their environmental identity formation and the role of other social identities in the formative process. In the 30-minute interviews, participants were asked to describe their daily interactions with nature, define their environmental identity, narrate the SLEs and social relationships that had shaped their environmental identity, and comment on the role of race/ethnicity and gender in such process. Nine questions were always asked (Supplementary Information I), such as ‘How would you describe your identity in relation to the environment?’, ‘What experiences most shaped your environmental identity throughout your life?’, and ‘Do you think your gender plays a role in determining who influenced you most? Why or why not?’. Follow-up questions were also asked to prompt narratives and for clarity. The development of these questions was guided by a review of the literature in SLEs (Chawla 1999; Palmer 1993; Tanner 1980). The term ‘nature’ and ‘environment’ were not defined for the participants.

Recorded interviews were transcribed by the first author. All transcripts were read through once, then coded with a constantly evolving coding system that involves categories of experiences in nature, significant social relationship, role of race/ethnicity and gender, and miscellaneous. Analysis was conducted using the qualitative research software NVivo 12.

Supplemental quantitative surveys

This is a predominately qualitative study enhanced by some quantitative data. The survey included a demographic survey and an Environmental Identity (EID) scale (Clayton 2003) (Appendix A). The EID scale was developed by Clayton (2003) to evaluate the importance of natural environment in one’s self-definition. The EID scale consists of 24 items where respondents rate if they strongly disagree (rated as one) to strongly agree (rated as five) to the statements. Using the EID scale allowed us to build on past research to understand environmental identity in terms of other variables (i.e. gender, race, and ethnicity).

The coding of the interviews was later quantified using the demographic and EID survey results. In visualization of the data, subgroups were created based on gender (female, male, other gender), race/ethnicity (racial minority, racial majority), and SES (high – SES higher than 5, low – SES lower than or equal to 5). We have used only basic statistics to clarify trends observed qualitatively. For example, the average and standard deviation of EID scale score of each subgroup was calculated, and statistical tests for differences were applied to determine if there is significant difference in the EID scale score among subgroups. The number of participants for each theme is tallied up for each subgroup.

Study population

Respondents are undergraduate students with an average age of 20.6, with various gender identities (30% male, 60% female, and 10% other) and racial/ethnic backgrounds (43.3% Asian or Pacific Islander, 10% Hispanic or Latino/a, 20% White or European American, and 26.7% mixed race/other) (Tables 1 and 2). Participants come from range of developed environments, that is, from urban, suburban, or rural areas (Table 1). The subjective socioeconomic status (SES) of participants ranges from 3 to 9 (out of a scale of 1–10, 10 being highest SES; $\bar{x} = 6.63$, $s.d. = 1.56$) (Table 1). Our participants are also drawn from different majors ranging from ‘Environment’ category (e.g. Environmental Science and Policy), to ‘non-Environment STEM’ category (e.g.

Table 1. Demographics of the study population.

Demographic features	Sample distribution
Age	Median = 21, average = 20.6, standard deviation = 0.836
Gender	Male (30%), female (60%), other (10%)
Race/ethnicity	Asian or Pacific Islander (43.3%), Hispanic or Latino/a (10%), White or European American (20%), mixed race/other (26.7%)
Major	Environment (23.3%), non-Environment STEM (60%), other (16.7%)
Career plan	Environment (40%), other (60%)
Major residence	Urban (26.7%), suburban (66.7%), rural (6.7%)
Subjective socio-economic status (SES) (MarcArthur Scale, scale of 1–10, with 10 being the highest SES)	Median = 7, average = 6.63, standard deviation = 1.56

Neuroscience), to ‘others’ (e.g. Public Policy) ([Supplementary Information V](#)). Twelve (12, 40%) of the participants have environment-oriented career plans (e.g. environmental law, working at an environmental justice non-profit, environmental science research), while the rest (18, 80%) has career plans for other field ranging from software engineering to clinical psychology research and medicine. No significant differences were found among the EID scale scores of the participants in different gender, race, and SES subgroups, except between female and male participants (Kruskal–Wallis rank sum test, $p = .0241$, chi-squared = 7.45, $df = 2$).

Results

Significant life experiences

All 30 participants mentioned outdoor experiences as formative to their environmental identity ([Table 3](#)). Within the subcategories of outdoor experiences, vacation or traveling influenced the largest proportion (53%) of the participants. The second largest subcategory is habitat, a subcategory created by Tanner (1980) meaning natural environment of frequent contact with the participants. Other categories include formal education, youth group or camp, student groups, and others. The category ‘hunting and fishing’ is mentioned by only one participant (3%).

Significant social influences

Family emerged as the most important social relationship that shaped participants’ environmental identity; in particular, 70% of the participants specifically mentioned their parents as important in shaping their environmental identity ([Table 4](#)).

The following quotation is one example of a participant expressing that her mother has been critical in the formation of their environmental identity:

Participant #17 (female, White or European American): ‘My mom has always been really into nature and science ... She really encouraged me to look at things and wonder how things happen ... we would go and walk along the bay lands and my mom would tell me about the birds ... And she would sign me up for a lot of programs that were involved in nature ... I got my scuba-diving license and she helped me get that. She would go scuba-diving with me’.

It is clear that parents have a major role in facilitating the SLEs their children have in nature. Some participants mentioned other types of social relationships, such as friends, that are formative to their environmental identity.

Participant #23 (female, Asian or Pacific Islander): ‘I met this girl my sophomore year who is totally an environmentalist. She is a vegetarian. She has a very strong moral code, very involved in environmental causes. I was totally eye-opened by her. So I started to realize that there’s a lot of causes behind the ideas that humans are part of nature and what we should do to preserve that environment’.

Table 2. Sample demographics by subgroups.

Demographics	Subgroups	Gender	Race	SES
Gender	Male	–	8 (100%) racial minority	1 (12.5%) low SES, 7 (87.5%) high SES
	Female	–	5 (27.8%) racial majority, 13 (72.2%) racial minority	5 (27.8%) low SES, 13 (72.2%) high SES
	Other gender	–	1 (25%) racial majority, 3 (75%) racial minority	4 (100%) high SES
Race	Racial majority	5 (83.3%) female, 1 (16.7%) other gender	–	1 (16.7%) low SES, 5 (83.3%) high SES
	Racial majority	8 (33.3%) male, 13 (54.2%) female 3 (12.5%) other gender	–	6 (25%) low SES, 18 (75%) high SES
	Other gender	–	–	–
SES	Low SES	6 (85.7%) female, 1 (14.3%) male	1 (14.3%) racial majority, 6 (85.7%) racial minority	–
	High SES	7 (30.4%) male, 12 (52.2%) female, 4 (17.4%) other gender	5 (21.7%) racial majority, 18 (78.3%) racial minority	–

In this case, the friend has served as a role model for the participant, showing her the possibilities of one's connection to nature.

Moreover, three participants (10%) from the West Coast, including California (USA) and Vancouver (Canada), mentioned city-wide societal influence that was formative to their environmental identity:

Participant #13 (male, Asian or Pacific Islander): 'I am from CA Bay area and it's just more progressive there ... We would always talk about how we need to be mindful of the environment and stuff, so maybe I just picked up from that'.

The selected quotations showcase the influence of social relationship on one's environmental identity in the forms of relationship with a specific person and wider social norms.

Gender

Childhood play was mentioned by 6 (33%) of female participants and 1 (25%) other-gender participant as formative to their environmental identity; however, this category was not mentioned by any male participants (Table 5).

Both female (5, 28%) and male (2, 22%) participants reported that gender has in some ways posed limitations on the SLE they could have with nature (Table 6). Both female and male participants mentioned that the stereotypes of gender roles influenced their experience in nature early-on:

Participant #20 (male, Hispanic or Latino/a & White or European American): 'When I was younger, one random aspect of nature that I was into was flowers. And I think boys don't ... boys being under the age of 16 – didn't like flower[s] at that time as I did. I had pressed some flowers when I was in 9th grade. My female friends at that time thought that was cool but I did get some [f]lack from my male friends ... I do remember some of my guy friends thinking that was kind of, you know, feminine'.

Participant #22 (queer, White or European American): 'When I was little I was hanging out with just my brother and just the neighborhood boys. It was a lot outdoorsy stuff and I just followed them around and climb[ed] trees. And when I got my first ring of girlfriends to hang out with I noticed that I just didn't go

Table 3. Significant life experiences that shape the participants' environmental identity.

Significant life experience	% of participants
Vacation/traveling	53
<i>Travel facilitated by ethnicity</i>	30
Habitat (including gardening)	43
<i>Gardening or backyard</i>	30
Formal education	37
Negative experience or lack of experience	23
Childhood play	23
Youth group or camp	20
Student group	17
Taking care of pets or animals	17
Books, TV, or other media	17
Sports or running	13
Informal environmental education	10
Hunting and fishing	3

out as much I think it is girls are just conditioned differently – they are raised to stay inside more whereas boys, they can go out and play'.

Here, the gender stereotypes perceived by the participants act as a constricting force to limit them from participating in and engaging in experiences in nature as they wished.

For female participants, their gender continues to influence their career later in their life. For example, one female participant recounts the physical limitations she felt during field courses:

Participant #10 (female, White or European American): 'Sometimes my female body is not welcomed by nature. Sometimes it is an inconvenience to have a female body when you are out in nature or doing an outdoorsy activity like if you are menstruating or if you are just not physically strong enough to have the muscle mass to do certain activity or to do certain activity in the best way. For example I was super conscious of my gender when I was in a class where we were snorkeling a lot... sometimes we would come back from like a 5–6h session of snorkeling... this is not really conducive to people who have a female parts [or] who might be menstruating or might be hurting in some way – there's not really an awareness... of having a female body and being outdoors. And that's true for backpacking like there's not a ton that you can do to make it super easy on someone who has a female body versus someone who has a male body who might not have that concern. There's a gender consciousness that comes with being outdoors that I think might be unconscious for a lot of people but especially for female persons when they are conscious of it[, it] is something to overcome instead of a lens to enjoy nature through. It's like something that's a blockade'.

What we are seeing here is that gender could impact one's SLE directly through making certain interactions with nature challenging; the design of a particular class further augmented such challenge.

Another female participant talked about the safety concerns for the position she wishes to take up in the environmental field:

Participant #21 (female, Asian or Pacific Islander): 'Sometimes I was told by my parents that women shouldn't seek a career that spends too much time in the field because they think women are not strong enough...and they think men are more independent. You don't have to worry about rape, just those concerns'.

Here, we can see that the limitations that these female participants felt are not only due to the limits or perceived limits of their physical abilities, but also social factors that make some environmental workplaces feel unwelcoming to them.

Among the participants who identified their parents having important influence on their environmental identity, there is not a clear gender trend (Table 7). However, a gender trend emerges with relationship with teachers or professional mentors: six (20%) participants, including five female participants and one participant of other gender, mentioned that gender influences

Table 4. Significant social relationships that shape the participants' environmental identity.

Social relationship	% of participants
Family	73
Parents	70
Siblings	17
Grandparents	10
Teachers/mentors	37
Older persons other than parents or teachers	30
Peer	27
City-wide	10

Table 5. Number and proportion of participants who mentioned the significant life experiences as formative to their environmental identity.

	Total #	Racial minority	Racial majority	Female	Male	Other gender	High SES	Low SES
Vacation/traveling	16 (53%)	15 (63%)	1 (17%)	8 (44%)	5 (63%)	3 (75%)	13 (57%)	3 (43%)
Travel facilitated by ethnicity	9 (30%)	9 (38%)	0 (0%)	3 (17%)	3 (38%)	3 (75%)	7 (30%)	2 (29%)
Habitat	13 (43%)	9 (38%)	4 (66%)	8 (44%)	2 (25%)	3 (75%)	9 (39%)	4 (57%)
Gardening	9 (30%)	6 (25%)	3 (50%)	6 (33%)	1 (13%)	2 (50%)	7 (30%)	2 (29%)
Formal education	11 (37%)	10 (42%)	1 (17%)	5 (28%)	4 (50%)	2 (50%)	9 (39%)	2 (29%)
Negative experience or lack of experience	7 (23%)	6 (25%)	1 (17%)	5 (28%)	1 (13%)	1 (25%)	3 (13%)	4 (57%)
Childhood play	7 (23%)	4 (17%)	3 (50%)	6 (33%)	0 (0%)	1 (25%)	4 (17%)	3 (43%)
Youth group or camp	6 (20%)	5 (21%)	1 (17%)	3 (17%)	3 (38%)	0 (0%)	4 (17%)	2 (29%)
Student group	5 (17%)	5 (21%)	0 (0%)	5 (28%)	0 (0%)	0 (0%)	1 (4%)	1 (14%)
Taking care of pets or animals	5 (17%)	4 (17%)	1 (17%)	3 (17%)	2 (25%)	0 (0%)	4 (17%)	1 (14%)
Books, TV, or other media	5 (17%)	3 (13%)	2 (33%)	4 (22%)	0 (0%)	1 (25%)	3 (13%)	2 (29%)
Total Number of participants in subgroup	30	24	6	18	8	4	23	7

their relationship with the teachers or professional mentors who influenced their environmental identity (Table 6).

Participant #6 (female, Asian or Pacific Islander): 'Being a female I definitely feel more comfortable with female professors [and] female teachers... One instance where this came up as a problem for me was my summer internship last summer. My direct supervisor was a male. He was white. So that in itself was a power dynamic – he was in the position of authority, and on top of that he was white and male s that's already... it feels much more powerful. I did not develop as close a relationship as I wanted to and I remember I had some other fellow interns who were working with me, and her supervisor. They were two females and I felt more comfortable talking to these two other female colleagues... just felt myself being more comfortable with them 'cause they were female'.

Participant #12 (queer, Asian or Pacific Islander): 'As a queer man I feel more comfortable when I have a role model that is a woman than like a straight man at least. I have this internal sense that there's a lot of toxic masculinity in a lot of spaces including environmental stuff so it feels easier to be authentic me when I am around women'.

What we are seeing here is that only underrepresented gender groups (female, other gender) expressed preference for mentors of similarly underrepresented gender.

Race

Compared to participants identifying as a racial minority, a higher proportion of racial majority (i.e. white) participants have SLEs in the category of habitat and childhood play. However, participants from racial minorities tended to have SLEs through vacation or traveling, and formal education (Table 5). All racial majority participants identified their parents as having significant

Table 6. Number and proportion of participants mentioning gender-related themes.

	Limit opportunities	Influence relationship with mentor	Influence relationship with parents
Total	8 (27%)	6 (20%)	6 (20%)
Female	5 (28%)	5 (28%)	3 (17%)
Male	2 (22%)	0 (0%)	2 (25%)
Other	0 (0%)	1 (25%)	1 (25%)

influence on their environmental identity, compared to a lower proportion (63%) among participants of from racial minority backgrounds. All 11 participants who reported teachers as having important impact on their environmental identity were from racial minority groups (Table 7). Thus, we observe some racial differences among both the SLEs and social relationships that influence one's environmental identity.

Only participants from racial minorities mentioned race as a limiting factor in their SLE (five participants, 21%) and the influence of their relationship with teachers or mentors (four, 17%) (Table 8). Some of the participants also mentioned an intentional effort to establish a relationship with mentors of the same racial and ethnic background.

Participant #26 (Non-binary, Asian or Pacific Islander): 'I definitely reached out to my [environmental discipline professor] because she was friendly and also Taiwanese, and I saw her as a role model because she looked more like me than my other professors'.

Participant #12 (queer, Asian or Pacific Islander): 'This summer I was doing research at an environmental non-profit in DC on environmental and environmental justice work but even then it was a very white space, even though there are people of color doing this work, but because of the history in which the environmental movement is operated and structural barriers in the US their voices aren't as amplified or given much weight ... more recently I've been thinking about trying to seek out more people of color for mentorship or like inspiration on environmental issues ... engaging with others who are Indian American or raised Hindu about how they relate to the environment I think is something that I value more than I thought before'.

It is clear that marginalized racial groups prefer mentors of the same race/ethnicity group. This trend echoes the findings from the previous section. However, it is unclear whether racial majority students also prefer to have mentors of the same race. It is possible that racial majority students take the availability of a same-race mentor for granted or that racial majority students would feel uncomfortable expressing a preference for a same-race mentor.

Ethnicity

Over half of the traveling experiences mentioned by the participants are traveling facilitated by ethnicity (i.e. travels where they visit the country of their ethnic origin). Nine participants (38%) of the racial minority group has mentioned this as SLE for them (Table 5). Some participants expressed that traveling back to his country of origin allowed him a memorable experience of living closer to nature:

Participant #18 (male, Hispanic or Latino/a): 'I have family who live near farms back in our home country, Nicaragua. They raise chickens ... my relationship with it ... is kind of like a foundation ... it was with my family, playing around, raise things from plants to raise small animals until they get bigger'.

Here, the participant recalled a positive experience with nature that he could not have experienced in the US. However, such experiences also can have a negative connotation, such as allowing the participants to see the impact of pollution:

Participant #20 (male, Hispanic or Latino/a & White or European American): 'When I was much younger I went on a family trip to Ecuador ... and I remember ... we were going through a tour and we stopped at some very, very poor part of Quito and it was absolutely environmentally filthy. I really haven't seen something with so much pollution and I was thinking to myself in the seat of the car ... "this is unreal".'

Table 7. Number and proportion of participants who mentioned the social relationships as formative to their environmental identity.

	Total #	Racial minority	Racial majority	Female	Male	Other gender	High SES	Low SES
Family	22 (73%)	18 (75%)	4 (67%)	14 (78%)	5 (63%)	3 (75%)	17 (74%)	5 (71%)
Parents	21 (70%)	15 (63%)	6 (100%)	13 (72%)	5 (63%)	3 (75%)	17 (74%)	4 (57%)
Siblings	5 (17%)	2 (8%)	3 (50%)	2 (11%)	0 (0%)	3 (75%)	4 (17%)	1 (14%)
Grandparents	3 (10%)	3 (13%)	0 (0%)	3 (17%)	0 (0%)	0 (0%)	1 (4%)	2 (29%)
Older persons other than parents or teachers	9 (30%)	6 (25%)	3 (50%)	7 (39%)	1 (13%)	1 (25%)	8 (35%)	1 (14%)
Teachers	11 (37%)	11 (46%)	0 (0%)	6 (33%)	3 (38%)	2 (50%)	7 (30%)	4 (57%)
Peer	8 (27%)	8 (33%)	0 (0%)	6 (33%)	2 (25%)	0 (0%)	5 (22%)	3 (43%)
Total Number of participants in subgroup	30	24	6	18	8	4	23	7

And my mom said to me this looks just like the town that I grew up in, which blew my mind... I was really young then but it kind of hit home – this environmental problem is hitting people I love and that is to me a very big moment’.

Hence, the traveling experiences here do not only serve as a way for our participants to connect with their culture origin, but also as an opportunity to experience connection with nature or exposure to environmental problems outside of the context of their daily life.

Other trends

Socio-economic status (SES)

Nine (30%) of the participants mentioned SES as an important factor that influence the SLEs one has with nature.

Participant #10 (female, White or European American, SES = 5): ‘I didn’t have that much money growing up so we didn’t travel. Versus like people who had a lot of money growing up could travel and have all those outdoor experiences like skiing, like going to the mountains, or going to the beach, going to a different country. That sort of feeds back into how the lack of experience has shaped me and pushed me to capitalize on the ability that college has given me to do environmental things, do outdoor activities’. (also pointed out the opportunity that college could give in terms of outdoor experience)

Participant #9 (female, White or European American, SES = 8), ‘Statistically this has to do with race but also more like SES, because my mom was able to stay home with us – because my dad’s job paid enough. I wouldn’t have all the experiences with her if she hadn’t been home. Also summer camp it was a YMCA... a non-profit a lot of times they have gyms, community center, they also runs summer camps... they give out scholarships for the camp so there was a diversity of people – there were some inner city African American kids there. But the people who could pay for it not on scholarship were white kids – generally. It is way cheaper – there are some for-profit adventure camps that are super expensive. I think there at that time was 350 dollars a week which included all of the meals and supervision for 24h a day – so if you think about it that wasn’t super expensive but that wasn’t something that everyone can afford’.

What we are seeing here is that subjective SES is linked to one’s family’s ability to facilitate SLEs.

Of the seven participants who mentioned negative experience with nature (e.g. seeing pollution) or lack of experience as having an impact on their environmental identity, four of them have lower than or equal to 5 on the scale of subjective SES (57% of this sub-group) (Table 5). Participants with lower than or equal to 5 on the scale of subjective SES also tend to report childhood play as SLE for them (Table 5).

Participants also identified SES as an important factor in creating a distance between them and environmental issues.

Participant #9 (female, White or European American): ‘I think I have the privilege as a white upper-middle class person... environmental justice is important to me but that came after I was interested in the

Table 8. Number and proportion of participants mentioning race-related themes.

	Limit opportunities	Influence relationship with mentor
Total	5 (17%)	4 (13%)
Participants of racial minority	5 (21%)	4 (17%)
Participants of racial majority	0 (0%)	0 (0%)

ecosystem and the animals. It was never shoved into my face because it was never like a problem personally to me’.

Participant #15 (female, Asian or Pacific Islander): ‘That’s why a lot of how I relate to the environmental problems is really distant to me, because I haven’t really lived in an area that is uniquely, locally affected by environmental problems. So like you know, a lot of polluted sites, where there are low-income folks. I’ve never had to deal with that... So I think my socio-economic class has allowed me to escape the worst environmental issues and to approach it from a more problem/solution mindset... [as opposed to] I have that experiences mindset’.

Here, the quotations show that SES could also impact one’s environmental identity indirectly by influencing their perspectives of environmental issues.

Nature is for everyone and serves to empower

Four participants stated how they felt welcomed in nature, which is free of judgement of their identity.

Participant #22 (queer, White or European American) commenting on feeling free of judgement: ‘I have never really identified strongly with being a man and I think definitely being in nature... the natural world is a place that I don’t have to fit in with the boys or the girls – that I have to deal with everywhere else’.

Participant #7 (female, Hispanic or Latino/a & White or European American): ‘Like nature doesn’t reinforce – yes I am a woman, or yes I am a Latina, I feel like it’s more unifying, like nature helps wash away these strict ... labels we have. Like it doesn’t really matter who you are, where you come from, we all think that mountain ridges are beautiful, we all think that the gorgeous bald eagle soaring over the sky is awesome. So that’s what I love about nature, it really just equalizes I think’.

Here, the narratives of our participants uncovered the inclusivity of nature. The positive experiences they have in nature helps to overcome burdens that come with participant’s identity as an underrepresented group.

Four participants, all of which are female, stated the sense of empowerment they feel that comes with experiences in nature:

Participant #3 (female, White or European American): ‘Playing in my backyards and going to the camp and leading those trips definitely gave me a sense of self-sufficiency and independence and courage, which were probably traits that are more associated with males. I definitely do not care about dirt or thing that were stereotypically more girly [to care about]. I was totally down to get totally muddy, dirty, bloody, I just want to get outside. I just feel like I can handle anything ... Leading the canoe trip I am like “oh I can like pack 198 meals for 7 girls and another person my age and go canoeing in the remote Canadian wilderness for 8 days”’.

Participant #7 (female, Hispanic or Latino/a & White or European American): ‘I think there is a sense of power in being comfortable with nature. I think there’s something really powerful just being one with the place that’s your home, like that’s everyone’s home regardless of identity or gender ... it’s nice that you see so many women thriving in a work [in the environmental field] that is so noble and so free of corruption. It’s just like nature is something that you can’t control or touch and to see women doing well in it and learning about it and applying themselves to it is inspiring’.

While our results have previously shown physical limitations that women feel in experiences in nature, it seems that the challenges that nature poses on one’s physical ability could be

perceived in either way, as other participants identified a sense of empowerment that comes with feeling comfortable in nature.

Discussion

Significant life experiences

Our findings on SLEs in nature show the importance of outdoor experience in shaping one's environmental identity. This confirms the results from previous studies (e.g. Tanner 1980; Chawla 1999). However, 'hunting and fishing' stands out as one category that shows change from the previous studies. In our study, hunting and fishing is mentioned by only one participant, forming an interesting contrast to Peterson's (1982) study on an earlier generation of environmental educators, 45% of whom mentioned hunting and fishing as influential to their attitude towards the environment (as cited in Chawla 1998). This contrast is supported by results from the National Survey of Fishing, Hunting, and Wildlife-Associated Recreation (FHWAR) 2016 reports, which shows a trend of declining number of hunters in the recent decade and low participation from young people in fishing and hunting. These trends lead us to a number of questions. For example, what does it mean if less people in a population are engaged in hunting and fishing? Are they simply spending less time outside, or are they engaging with the outdoors in other ways? Are they as connected to the flora and fauna in the same manner as the older generation? What, then, does this mean for environmental education in the near and far future? These are important questions to address in research in the future. For environmental educators, it is important to consider this and other generational shifts in environmental activities in order to be prepared to engage the future generations.

In addition, traveling stands out as a major category of SLEs. Compared to the habitat category, traveling allows one to experience a change in the surrounding environment. Studies from late twentieth century started a discourse on the value of ecotourism as an environmental education tool (Kimmel 1999), although there have been few studies that demonstrates changes in environmental attitudes, behaviors, and identity after ecotourism programs, and the question of whether ecotourism is 'preaching to the converted' still remains (Russell 1994). In recent years, we have also seen an increasing number of global education program offered by universities and colleges to promote a global citizenry, which strongly ties to environmental citizenry (Tarrant and Lyons 2012). Stapleton's (2018) study on global education program on climate change shows that high school participants found the importance of being in a place impacted by climate change gives them 'a reason to be emotionally and personally connected'. Our findings support that traveling establishes personal connection with the environment, and contributes to one's environmental identity development. Compared to the participants in the structured global education in Stapleton's (2018) study, or eco-tourists with an aim in mind, our participants mentioned traveling experiences that are informal and without environmental education goals. However, these experiences are instrumental in shaping one's environmental identity. Traveling as a tool for formal or informal environmental education merits more research on its effectiveness. In addition, participants from racial minority groups identify their ethnic background as important in facilitating their traveling to their country of ethnic origin. In the context of USA, a country strongly shaped by immigration, the role of ethnic background and connection to place in environmental attitude and identity would be a particularly interesting research topic.

Influences from social norms

City-wide environmental attitudes in areas such as California and Vancouver were formative to several participants' environmental identity. This confirms the theory of social norm's influence on the environmental attitude and behavior of individuals, has been applied by practitioners in social marketing campaigns (McKenzie-Mohr 2000). This corresponds with the power of social

norms in Ajzen's (Ajzen 1985) Theory of Planned Behavior, which forms the theoretical model for many ensuing environmental behavior research. TPB states that one of the three elements that make up an intention to act is the perception of social pressure regarding the behavior (Ajzen 1985). Our findings provide specific examples of how such social norms play out in individuals' environmental identity. More research could be done on the longer and deeper impact of environmental social marketing on the environmental identity of recipients. In addition, the emerging importance of traveling and city-wide environmental social norms shows that these two approaches merit more consideration by environmental educators.

Gender

The results suggest that gender stereotypes impact not only females, but individuals of all genders, by limiting opportunities to engage in life experiences that are formative to environmental identity development. Influence from gender emerges early-on in the participants' childhoods in the outdoor experiences they have with nature. Moreover, strictly assigned gender roles may influence the potential for one to embody 'androgyny', the exhibition of non-traditional sex-role characteristics, a variable involved in environmentally responsible behavior (Hungerford and Volk 1990). The restriction of gender expressed by our male participants is reminiscent of the issue raised by Blenkinsop et al. (2018): their case studies of experiences from cisgendered boys who have a caring relationship with nature showed that their care is suppressed by the normalized 'masculine' indifference in the patriarchal society.

The influence from gender persisted into the later stages of life in terms of classroom experiences and professional development. This suggests that educators might consider making the environmental classroom more accommodating for all genders by being mindful of the gender stereotypes that might be influencing student behavior. In addition, educators should consider the physiological differences between female and male students when designing courses and activities. For example, in the case of a physically strenuous field course, instructors could have individual check-ins with the students' physical ability and condition throughout the course and provide less physically-intensive options. Such an effort towards gender inclusiveness would also support students with all levels of physical ability.

Racial minority and underrepresented gender groups prefer mentors of similar identity

Race plays a similar role in influencing the formative life experiences and social relationships for one's environmental identity by influencing the participants' relationship with their mentors. Participants of underrepresented gender and from racial minority groups tend to establish stronger association with mentors of the same gender and racial identity; however, the under-representation of females and racial minorities in university environmental faculty (Taylor 2010) means that the process of finding a mentor will be more challenging to them. The results of this study therefore support the urgent need for a more diverse faculty body at academic institutions.

The statements from participants on the dynamics in the workforce agree with previous studies on the importance of a diverse workforce on decisions to work for an organization (Taylor 2007). However, a recent study on 2057 environmental nonprofits found that on average over 80% of the board members and staff of the environmental nonprofits studied were white; moreover, although females comprised the majority of the staff, about 62% of the board positions were occupied by male (Taylor 2018a, 2018b). Despite these statistics, over the last quarter century, we have seen increase in both gender diversity and racial diversity in the environmental institutions, with racial diversity increasing more slowly (Taylor 2007). Our results strongly support the need to increase gender and racial diversity among faculties at academic institutions and higher staff in environmental workforce.

Paradigm for environmental identity development

When investigating the paradigm for environmental identity development proposed by James et al. (2010), we see that the undergraduate narratives corresponded in the following way. First, the narratives agree with the models in that all sorts of peripheral and ancillary events outside of formal education (e.g. childhood play, taking care of animals, outdoor recreation) contribute to the environmental socialization process. Second, family emerges as the pivotal social relationship for environmental identity formation, which aligns with the social mediation and facilitation function provided by family in the first three of four stages of the model.

Our research adds more details for understanding the potential limitations in the social support and mentoring in environmental education, an important component in James et al.'s (2010) model of environmental identity development. In this, social support and mentoring is provided by different people at different points in the young person's development (James, Bixler, and Vadala 2010). The knowledgeable adults (e.g. professors, skilled hobbyists) are important in crystallization events and the fourth stage that cements the NHEE identity formation (James, Bixler, and Vadala 2010). However, our research suggests that the connection that one forms with environmental professionals is subject to influence from one's race and gender, and that compared to White European Americans who are strongly influenced by their parents, racial minorities may find it hard to obtain long-term mentorship from knowledgeable adults.

Nature as a source of empowerment

Many discussions around connectedness to nature has pointed out the factor of fear, such as fear of wildlands experienced by African Americans or situational fear for alligators (Taylor 2018a, 2018b). However, our findings reveal the empowerment aspect of experiences in nature. Environmental education programs could at the same time serve as an opportunity for children to cultivate their confidence. In particular, in this study, female participants and participants from racial minority groups have mentioned the empowerment aspects of nature, demonstrating that the empowerment aspect of nature could be especially important for marginalized groups. Ecopsychology approaches have been applied to increase female graduate students' relationship competencies and empower them to be themselves (Holloway et al. 2014). Environmental educators should intentionally promote opportunities for marginalized groups to experience nature.

Summary

In summary, the results support our hypothesis that additional factors differentially influence environmental identity, and that these factors differentially influence (1) SLEs with nature and (2) social relationships that are important to one's environmental identity. First, our findings suggest that SES influences one's SLEs in nature and this should be a topic of further research. Second, experience in nature proved to be a source of empowerment for gender and racial minorities in many contexts, but not all (e.g. physical limitation or discomfort in some settings). The most important implications of this study are that gender and race/ethnicity exert multifaceted impacts on Duke University undergrads' environmental identity development; two major categories of influence are gender stereotypes and mentor-mentee relationships. The influences that gender and race have on one's environmental identity development are crucial to consider in order to improve the diversity in the environmental field.

Our research built on the foundation of environmental identity studies and raised important theoretical questions for future researchers. While a diverse sample population in our study gave us the ability to assess the impact of gender, racial, and ethnic identities on environmental identity, future research should involve an even more diverse sample population, such as by involving participants self-identified as male and other gender, as well as those of other racial minority

that are not well-represented in this study (e.g. American Indian or Native American, Black or African American, and Middle Eastern or North African). The sample population of this study on average identifies at a higher subjective SES than the average SES in USA (SES = 5); future studies should involve more sample populations of lower SES. We also recommend more in-depth research, particularly in different social contexts (e.g. community colleges, various workplaces) and among various age groups, to be conducted to further investigate the impact of social identities, particularly gender, and racial identities, on environmental identity. In addition, future work could include in-depth interviews with unique individuals (of racial minority, from a marginalized gender groups, or of lower income level) to gain a richer perspective. Our research used self-reporting assessments including subjective social status and EID scale, which relies on the participants subjective judgement. Future studies could explore the potential of more objective ways to evaluate one's SES and environmental identity. In addition, this area of research could benefit from research designed with more robust multivariate statistical analysis, such as a multivariate analysis of covariance (MANCOVA), as identity development is an inherently multivariate process. Finally, the narratives from our participants uncover important information for environmental practitioners to consider in the process of making environmental education more inclusive and diverse.

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Disclosure statement

No potential conflict of interest was reported by the authors.

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Appendix A. Environmental identity scale survey (adapted from Clayton 2003)

Environmental identity scale (Clayton 2003)

Please indicate the extent to which each of the following statements describes you by using the appropriate number from the scale below:

1 2 3 4 5 6 7

Not at all true of me neither true nor untrue completely true of me

- ___ 1. I spend a lot of time in natural settings (woods, mountains, desert, lakes, ocean).
- ___ 2. Engaging in environmental behaviors is important to me.
- ___ 3. I think of myself as a part of nature, not separate from it.
- ___ 4. If I had enough time or money, I would certainly devote some of it to working for environmental causes.
- ___ 5. When I am upset or stressed, I can feel better by spending some time outdoors 'communing with nature'.
- ___ 6. Living near wildlife is important to me; I would not want to live in a city all the time.
- ___ 7. I have a lot in common with environmentalists as a group.
- ___ 8. I believe that some of today's social problems could be cured by returning to a more rural lifestyle in which people live in harmony with the land.
- ___ 9. I feel that I have a lot in common with other species.
- ___ 10. I like to garden.
- ___ 11. Being a part of the ecosystem is an important part of who I am.

- ___ 12. I feel that I have roots to a particular geographical location that had a significant impact on my development.
- ___ 13. Behaving responsibly toward the earth – living a sustainable lifestyle – is part of my moral code.
- ___ 14. Learning about the natural world should be an important part of every child's upbringing.
- ___ 15. In general, being part of the natural world is an important part of my self-image.
- ___ 16. I would rather live in a small room or house with a nice view than a bigger room or house with a view of other buildings.
- ___ 17. I really enjoy camping and hiking outdoors.
- ___ 18. Sometimes I feel like parts of nature – certain trees, or storms, or mountains – have a personality of their own.
- ___ 19. I would feel that an important part of my life was missing if I was not able to get out and enjoy nature from time to time.
- ___ 20. I take pride in the fact that I could survive outdoors on my own for a few days.
- ___ 21. I have never seen a work of art that is as beautiful as a work of nature, like a sunset or a mountain range.
- ___ 22. My own interests usually seem to coincide with the position advocated by environmentalists.
- ___ 23. I feel that I receive spiritual sustenance from experiences with nature.
- ___ 24. I keep mementos from the outdoors in my room, like shells or rocks or feathers.

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