

Pathways to Participation: Supporting Diversity in Nature-Based Recreation and Civic
Engagement Related to the Environment

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Abstract (Academic)

This thesis studies the role of community cultural wealth (CCW), an asset-based framework, and environmental education (EE) to better understand how to support Black, Asian, and Latine individuals in their interactions with nature (chapter 1) and civic engagement related to the environment (chapter 2) - two activities that have been impacted by structural racism in the US. In the introduction, we give a brief overview of how historical segregation and structural racism impacts equity in outdoor spaces, how EE may be an avenue for increased equity in these spaces, a brief overview of CCW, and existing research on drivers of participation in nature-based activities and civic engagement related to the environment. In chapter 1, we use interviews and surveys to understand how CCW, EE, and the intersection of gender and race are associated with Black, Asian, and Latine individuals' participation in nature-based activities. We found that social connections, connections with organizations, family, community, and EE can provide the necessary skills, information, and emotional support to persist in nature-based activities. Using the same interviews and surveys, chapter 2 investigates how EE and CCW are associated with Black, Asian, and Latine participation in civic engagement related to the environment. The results of this study show that a knowledge of systems of oppression and the motivation to challenge those oppressive systems are important predictors for the civic engagement related to the environment of Black, Asian, and Latine individuals. Additionally, EE, social connections, community organizations, and family provide opportunities to participate in civic engagement related to the environment and the skills and information necessary to participate. The findings from this thesis contribute valuable insights to initiatives aimed at enhancing equity in nature-based activities and civic engagement related to the environment. Such efforts can provide individuals with the benefits of interactions with nature, equip them with tools to address adverse environmental impacts in their communities, and ultimately foster broader support for the environmental movement. Additionally, this study could help public land managers reach a broader portion of their constituents and stay relevant in a rapidly diversifying US.

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General Audience Abstract

In the face of global environmental crises such as climate change and biodiversity loss, scholars are pointing to nature-based recreation and civic engagement related to the environment as potential avenues for addressing these pressing issues. Positive interaction with nature not only provides cognitive, emotional, and physiological benefits to people, but also improves pro-environmental attitudes and behaviors. Civic engagement related to the environment benefits people and the planet as well – by creating more equitable and representative societies and by providing an avenue to address environmental issues. However, both nature-based recreation and civic engagement related to the environment have historically been impacted by structural racism and by the framing of the outdoor narrative in the US as a “White space”, which still disproportionately impacts people’s participation today. To help address these inequities, this thesis investigates the role of community cultural wealth (CCW), an asset-based framework, and environmental education (EE) in supporting Black, Asian, and Latine individual’s participation in nature-based activities and civic engagement related to the environment. Results from semi-structured interviews and a nationwide survey showed that social connections, family ties, community organizations, and previous experiences with EE significantly influenced the involvement of Black, Asian, and Latine individuals in nature-based activities. These factors, along with an understanding of structures of oppression, were also important precursors to civic engagement related to the environment in our study. Our findings suggest that creating institutional opportunities (e.g., community organizations or affinity groups) for both nature interaction and civic engagement related to the environment may be a key method of diversifying outdoor spaces. Additionally, our results suggest that increasing equity within EE is necessary to expand its benefits.

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Chapter 1

Bridging the nature gap: Supporting ethno-racial diversity in outdoor spaces

ABSTRACT

Interaction with natural environments grants a myriad of health and wellbeing benefits to people and can result in an increase in conservation behaviors. Given these benefits, it is concerning that in the United States, Black, Asian, and Latine people have lower rates of participation in nature-based activities and lower access to nature when compared to White people. While previous research on this topic focused on the barriers preventing participation, it is less clear what supports Black, Asian, and Latine engagement with nature. We examined the role of community cultural wealth (CCW), environmental education (EE), and the intersection of racial and gender identities in Black, Asian, and Latine people's participation in nature-based activities. CCW is an asset-based model used to understand the persistence of marginalized individuals in institutions created without them in mind. We proposed that this novel use of the framework can help to better understand sources of support for Black, Asian, and Latine people's interactions with nature because these activities have been historically impacted by structural racism. We assessed the linkages between EE, CCW, intersectionality, and participation in nature-based activities using qualitative and quantitative social-science methods. Results from semi-structured interviews (n=36) and a nationwide survey (n=1387) showed that social connections, family, community, EE experiences, and relevant skills and information were important drivers of participation in nature-based activities for Black, Asian, and Latine individuals. Our findings suggest that fostering social connections, increasing equity in EE, and providing outdoor engagement opportunities are integral to supporting nature engagement for these individuals.

INTRODUCTION

Benefits of Spending Time in Nature

Spending time outdoors in nature has the potential to benefit people and the planet. When people have positive, direct interactions with natural environments (here also referred to as participating in nature-based activities) by doing things like hiking or birdwatching, they gain a myriad of health and wellbeing benefits such as decreased risk of heart disease, increased cognitive function, and an improved mood (Keniger et al., 2013; Capaldi et al. 2014). These interactions with nature are doubly important because they can foster a sense of connection to nature, resulting in more concern for the environment, more positive attitudes toward nature, and an increase in pro-environmental behaviors like recycling (Cooper et al. 2015; Soga and Gaston, 2016; Kals et al. 1999). Therefore, it is no surprise that an increasing number of researchers are arguing for people to reconnect with nature as a solution to today's environmental problems (Ives et al., 2018). This is especially critical given the widespread generational disconnection from nature and the 'extinction of experience' (Soga and Gaston, 2016). In this harmful cycle, individuals who spend less time in nature lose the health and wellbeing benefits associated with nature, are then less likely to value nature, and less motivated to visit and protect it - and the cycle continues (Soga and Gaston, 2016). Additionally, from an agency perspective, diversity in outdoor spaces is a key issue for public land managers as they work to stay relevant and provide benefits to all their constituents in a rapidly diversifying US (Mowen et al., 2018).

Inequities in Nature-Based Activities

Given the potential for nature interactions to combat global environmental crises and promote health and wellbeing, it is concerning that in the United States, Black, Asian, and Latine individuals experience disproportionately lower rates of participation in nature-based activities, reduced access to nature, and are disproportionately impacted by nature degradation (Outdoor Foundation, 2022; Rowland-Shea et al. 2020). These inequities stem from factors such as historical segregation and structural racism (Rothstein, 2017). For example, redlining, a historical discriminatory housing practice, contributed to today's racial wealth gap and is still negatively associated with presence of greenspaces (Rothstein, 2017; Nardone et al., 2021). These systemic factors cause and work in combination with other barriers such as a lack of resources, the threat of discrimination, a history of oppression for Black Americans in outdoor spaces, a lack of publicized role models, cultural expectations, and a lack of a social connection (Floyd, 1999; Floyd & Stodolska, 2019; Byrne and Wolch, 2009; Rutter et al., 2021; Robinson, 2005). Some researchers highlight the 'Don't Loop' phenomenon as a potential barrier to participation in birding, specifically for Black Americans, but it may have implications for other marginalized groups and various nature-based activities as well (Rutter et al., 2021; Robinson, 2005). This cycle suggests that when individuals lack personal connections to others engaged in a specific activity, they are less inclined to participate in that activity themselves and are also less likely to encourage participation among their social network (Rutter et al., 2021; Robinson, 2005).

While past research in this field focused on these barriers and constraints to participation (e.g., Garibay & Vincent, 2018; Rowland-Shea et al., 2020; Scott & Lee, 2018; Stapleton, 2020), it is less clear what drives and supports Black, Asian, and Latine engagement with nature. We know that many Black, Asian, and Latine individuals do participate in nature-based activities, despite the many barriers to their participation (Outdoor Foundation, 2022). Therefore, this study aimed to examine factors that influence the participation of Black, Asian, and Latine individuals in nature-based activities. These factors included an asset-based approach (i.e., community cultural wealth), environmental education, and the intersection of race and gender.

Community Cultural Wealth

Community cultural wealth (CCW) is an asset-based model used to understand the persistence of marginalized groups in historically exclusionary spaces and provided a framework to better examine the factors which support Black, Asian, and Latine people's participation in nature-based activities. CCW was developed by Yosso (2005), using a critical race theory lens, to empower students of color in higher education and challenge previous deficit models. Deficit models were derived from interpretations of Bourdieuean cultural capital theory (2000), which asserted that cultural capital, such as one's accent, economic goods, social network, and credentials are just as important for social mobility as wealth and can only be acquired through one's family or education (Yosso, 2005). Deficit thinkers used this model to argue that students of color lacked the cultural capital of their White counterparts and therefore exhibited lower levels of social mobility and academic achievement (Yosso, 2005). Yosso argues that this interpretation merely reveals that cultural capital is defined by the dominant groups in a society - it is the skills, knowledge, and abilities that White middle- and upper-class culture values (2005). However, this definition is not all encompassing and ignores the abundance of cultural capital that marginalized groups have acquired through their histories and lived experiences, which help

them to persist and succeed in historically oppressive structures. CCW expands the definition of cultural capital to include the many alternative forms of capital that are not valued by the dominant culture but are nonetheless powerful sources of non-monetary wealth. Yosso (2005) identifies six categories of capital. However, for this study we focused on four (Table 1-1) because we believed they were more relevant to participation in nature-based activities.

Table 1-1. Definitions of CCW capitals that were used to make the interview script and survey questions. Linguistic capital and aspirational capital are not included because we believe they are less relevant to participation in nature-based activities.

Capital Type	Definition (Adapted from Yosso, 2005)
Social Capital	Connections with people and community resources and the support that arises from those connections
Navigational Capital	Skills or knowledge needed to maneuver through institutions made without Black, Indigenous, and people of color in mind
Familial Capital	Cultural knowledge and support gained from family and community
Resistant Capital	An understanding of the structures of inequality and the motivation, skills, and knowledge used to challenge that inequality.

CCW has primarily been used by education researchers as a framework to understand the persistence of students of color or other marginalized groups in higher education (O'Shea 2016; Espino 2014; Martinez et al., 2017). For example, many studies discussed how students of color relied on peers and affinity groups for emotional and academic support which helped them navigate the transition to college (Coronella, 2018; Dika et al., 2015; Revelo, 2015). This finding highlights a key facet of CCW, showing that types of capital can overlap or lead to one another (Yosso, 2005; Denton et al. 2020; Perez & Taylor 2016).

For this study, we adapted the CCW framework to examine factors that initially drive and continually support the participation of Black, Asian, and Latine individuals in nature-based activities. This novel use of the framework allowed participants to identify factors that they believed influenced their entry to and persistence in these historically exclusionary environments. In addition to the more commonly used qualitative methods, we developed a scale to study the influence of CCW. This is a contribution to the field as there are limited existing quantitative CCW studies (Denton et al. 2020; Sablan 2019).

Environmental Education

Environmental education (EE) is a process that aims to connect people to nature and to supply people and communities with the knowledge and skills necessary to address complex environmental problems. EE is positively associated with participation in nature-based activities and indirectly associated through its role in facilitating nature connectedness (Ardoin et al., 2018, 2020; Nisbet et al., 2009). Despite these connections to participation in nature-based activities, the link between EE and how those programs have contributed to increasing equity in nature-

based activities remain less clear (Ardoin et al., 2018, 2020; Stern et al. 2014). This study set out to investigate how past EE experiences initially drive and continually support the participation of Black, Asian, and Latine individuals in nature-based activities.

Intersectionality

Intersectionality theory considers the complex interconnections of multiple identities within various systems of oppression (Esposito and Evans-Winters, 2022). In the context of this study, it is relevant because the intersection of ethno-racial and gender identities may compound to create unique barriers and constraints to participation in nature-based activities and may require different support systems (Roberts and Henderson, 1997). We used an intersectional lens in this study to better understand how these identities interact to influence individuals' participation in nature-based activities.

Gender identity influences people's participation in nature-based activities and may interact with their ethno-racial identities as well to affect participation in these activities. Historically, men have participated in nature-based activities at higher rates than women and tend to have different activity preferences than women (Outdoor Foundation, 2022). Women face unique constraints in outdoor recreation such as real and perceived violence and a lack of a recreation partner (Shores et al., 2007). Gender diverse individuals face additional threats in outdoor recreation when faced with gendered spaces such as public bathrooms (Oakleaf and Richmond, 2017). This study exclusively explored binary genders due to limitations in obtaining a sizable enough sample for other gender categories.

METHODS

We used a sequential multi-method approach to investigate the factors influencing Black, Asian/Pacific Islander (referred to as "Asian" hereafter), and Latine individuals' participation in nature-based activities (Tashakkori & Teddlie, 2003). We did not include Indigenous groups in this study because their history and connection to nature is more unique and because they tend to be better represented in nature-based activities (Rutter et. al., 2021; Taff et al., 2021). We began the study with semi-structured interviews which shaped the subsequent development of a nationwide survey. These distinct methods offered varied perspectives on the system. The qualitative interviews delved into the support factors for participants only, providing a nuanced exploration of how the support factors functioned, and provided insight on initial, as well as continued, participation (Seidman, 2006). Conversely, the quantitative surveys spanned a spectrum of participation, from non-participants to avid participants, unveiling the relative significance of support factors across all individuals and presenting a more generalizable view of the study system (Vaske, 2019).

Interviews

Sampling

The population of interest for the qualitative portion of the study was Black, Asian, and Latine individuals between the ages of 18 and 25 who participated in nature-based activities. We focused on this age range because this age group is well-suited to facilitate engagement with nature, as environmental behaviors and attitudes are high in childhood, decline in mid adolescence (e.g., ages 15-16), and revamp in early adulthood (Hughes et al., 2019; Keith et al., 2021). This early adulthood phase presents an opportune time to reestablish a connection to

nature, potentially setting the stage for sustained participation in nature-based activities throughout their lives. We recruited interview participants using convenience sampling methods. These methods work for our purposes because the interviews are not meant to be generalizable but are instrumental in highlighting some of the mechanisms underlying this study system (i.e., factors supporting ethno-racial diversity in participation in nature-based activities). The Virginia Tech Institutional Review Board approved the project proposal and all subsequent recruitment materials, surveys, and interview scripts (Protocol #22-113; Appendix A). We identified potential participants through social media and email listservs by using a combination of recruitment strategies, including contacting outdoor affinity groups, Facebook groups, university groups, and by using snowball sampling methods. Our recruitment efforts focused on outdoor affinity groups such as “Latino Outdoors” which support Black, Indigenous, and People of Color (BIPOC) in outdoor spaces by creating supportive networks, leading outdoor trips, and advocating for conservation and equity. Recruiting within these groups ensured that potential participants were engaged in outdoor recreation and were likely to be in our population of interest. We also posted our recruitment materials through relevant Facebook and university groups. Our full list of organizations and groups are listed in Appendix B. While these recruitment methods may have disproportionately highlighted the influence that organizations had on participation, our results still offered valuable insights into which specific facets of these organizations were most impactful. Participating groups distributed our recruitment materials via social media or email, which included a link to a pre-interview screening survey (see Appendix C for survey; Appendix D for recruitment materials). Potential participants were screened for age (i.e., 18-25), ethno-racial demographics (i.e., Black, Asian/Pacific Islander, or Latine heritage), and their participation in nature-based activities (eight or more outings a year). Snowball sampling methods consisted of asking interviewees to forward our recruitment materials to their relevant contacts.

Once a pool of eligible potential participants (i.e., participants who met consent and screening requirements) was collected, we emailed individuals with more information about the project and asked them to sign up for an interview slot. For those who did not sign up for a slot, we sent up to two reminder emails to increase response rates and reduce non-response bias (Dillman et al., 2014). Of the 131 eligible participants who we attempted to contact, thirty-six were willing to sign up for an interview. After conducting interviews with the initial thirty-six participants, we halted recruitment because the interview data became somewhat repetitive, signaling that we had reached saturation (Seidman, 2006). Anonymized demographic data for interview participants can be found in Appendix E. All participants were entered into a drawing for one of ten \$50 gift cards.

Data Collection

We conducted thirty-six semi-structured virtual interviews on Zoom, which lasted an average of approximately 45 minutes. These interviews aimed to understand (1) what supports initial and continued participation in nature-based activities for Black, Asian, and Latine individuals and (2) the underlying mechanisms of CCW to design a scale to measure the construct. We designed an interview script with open-ended interview questions to both investigate the salience of factors previously identified in literature (i.e., EE, CCW) and explore emergent themes by allowing participants to describe sources of support outside of the proposed factors. Preliminary interview questions were reviewed by Virginia Tech social scientists and

tested with six people that fit the target population but that were not part of the thirty-six selected participants. Based on the feedback, we adjusted the interview questions before applying them to our target audience (see Appendix F for interview questions).

During the interviews, we asked participants about the formative events and people that contributed to their initial and continued participation in nature-based activities by adapting questions from the significant life experiences (SLE) approach (Arnold, 2009; Peters Grant, 1986). The SLE approach is a retrospective qualitative method that explores the lifespan of a person to better understand the experiences that influence their current environmental attitudes and behaviors (Chawla, 1998). We defined nature-based activities using Ives and colleagues' (2018) inclusive definition of experiential connections to nature (i.e., direct interactions with natural environments) which avoided prescriptive definitions and allowed participants to define this concept in their own terms. Similarly, we used a broad definition for EE to ask interviewees about their experiences. We later retroactively coded for EE participation based on our interpretation of the concept based on the literature (See Appendix G for code book; Disinger and Monroe, 1994; Monroe and Krasny, 2016).

CCW interview questions were adapted from a dissertation by Gonzalez (2019) and based on Yosso's (2005) definitions of the capitals (Table 1-1). CCW questions asked interviewees who they participated with, who supported their participation, how they continued their participation, where they received information about nature-based activities, strategies they used to participate, what barriers to participation they faced, and how they persisted despite those barriers.

Data Analysis

The lead author conducted all interviews. Zoom audio recordings were transcribed using Zoom transcription software and then edited for accuracy on inqScribe. The lead author qualitatively coded all interview material in Dedoose. Data was deductively coded for concepts identified from literature (i.e., CCW framework, EE, participation in nature-based activities) and inductively coded to explore emerging themes. To produce inductive codes, the lead author conducted two rounds of coding - an initial round to identify and refine codes, and a second round to reanalyze data. Throughout this process, the lead author checked their interpretation of the data during weekly peer debriefs with a project collaborator.

Survey

Sampling

Following the interviews, we conducted a national survey of Black, Asian, and Latine people living in the US who were over 18 to gain a more generalizable understanding of the study system, to assess variables along a spectrum of participation, and to better understand the intersection of gender and race and its effects on participation in nature-based recreation. We recruited survey participants from QuestionPro's Audience panel, a database of individuals who have registered to partake in panel survey research in exchange for a modest financial incentive. QuestionPro distributed our survey to their panel directly via email and invited them to participate. Survey respondents were recruited using quota sampling methods (Bernard, 2018). Participants were first screened for ethno-racial demographics and residency in the US to ensure that they fell within our population of interest. We set quotas for participation in nature-based

activities at four different levels, from no participation to high participation, to gather a diversity of responses. Lastly, we used quotas to ensure that our sample had similar characteristics to that of our target population because effective use of relevant quotas can reduce sampling bias (Wardropper et al., 2021; Newing et al. 2011; Yang and Banamah 2014; Tehranian et al., 2016). To this end, we included quotas for race, gender, age, income, U.S. region residency using distributions based on U.S. census data, and a quota for population size to guarantee a variety of responses (towns with up to 49,999 people (16%); cities with 50,000 people or more (84%)) (Jones et al., 2021; US Census Bureau, 2022; 2019; 2023; 2020). We included several quality and attention checks, removing all responses that failed four or more checks and individually reviewing all remaining responses with failed checks (Appendix H; Wardropper et al., 2021). Those considered unreliable were omitted from the final dataset.

Data Collection

We designed an anonymous web-based survey (see Appendix I) to assess our independent variables of interest (i.e., CCW, EE, ethno-racial identity, gender), dependent variables (i.e., participation in nature-based activities), and relevant covariates (i.e., perceived access to green space, income, and age).

Community Cultural Wealth

To assess CCW, we designed four scales to measure navigational, resistant, social, and familial capital using the results from our qualitative study and by adapting existing scales (Table 1-2; Yosso, 2005; Sablan 2019; Hiramori et al., 2024; Cohen and Wills, 1985). Notably, we designed items without any direct reference to nature-based activities as the scale was intended for non-participants as well as participants. We tested initial scale items by first distributing questions to Virginia Tech conservation social scientists for review, then testing the survey amongst ninety-nine undergraduate students. We used that data to perform an exploratory factor analysis (EFA) using the psych package in R to test the unidimensionality of each of the scales, using a principal axis factoring extraction method with a Varimax rotation (Ravelle, 2023). All questions with a coefficient lower than the threshold of $<.04$ were removed from scales and other questions were altered or removed based on reviewer feedback, resulting in the final versions of the scales used in the survey.

Participation in Nature-Based Activities

We adapted a previous survey question to define nature-based activities as “spending time in natural areas such as the woods, local parks, a lake or beach, or other features of the natural environment” (Salazar et al., 2020). With that, we developed a two question count-data measure for participation in nature-based activities, where first we asked respondents how often they participated (1= Never, 2=A few times per year, 3=every month, 4=every week) and then asked how many days they spent participating in nature-based activities in a typical week, month or year, respectively. We also measured initial participation (Table 1-2) and perceived access to natural areas (Table 1-2; Flowers et al, 2016).

Environmental Education

EE participation was assessed with a binary variable based on the North American Association for Environmental Education definition of EE (Table 1-2; Disinger and Monroe, 1994; Monroe and Krasny, 2016).

Race and Ethnicity

We assessed race and ethnicity using a single multi-select question, where respondents could indicate their ethnic origin and racial background (Krogstad and Cohn, 2014). Using this information, we categorized all respondents into one of five groups: Latine of any race, Black or African American alone, Asian alone, or Multiracial non-Latine.

Table 1-2. Survey questions and examples of items for social capital, familial capital, navigational capital, resistant capital, perceived access to nature, initial participation in nature-related activities, and participation in environmental education.

Question Stem and Response Options	Survey Item Examples	Construct
Please indicate the degree to which you agree with each statement below. <i>Do not agree (1), Slightly agree (2), Moderately agree (3), Mostly agree (4), Completely agree (5)</i>	• If I got stranded 10 miles out of town, there is someone I could call to come get me.	Social capital, navigational capital (Yosso, 2005; Cohen and Wills, 1985)
	• I know about my family's cultural heritage/history.	Familial capital (Yosso, 2005; Sablan 2019; Hiramori et al., 2024)
	• I have developed strategies to navigate difficult people and situations.	Navigational capital (Yosso, 2005; Hiramori, et al., 2024; Sablan 2019)
	• I want to create a more just or equitable society.	Resistant capital (Yosso, 2005; Hiramori et al., 2024; Sablan 2019; Cohen and Wills, 1985)
I first began participating in nature-based activities because of...	• ...a friend • ...an organization, group, or club • ...a role model • ...a family member	Initial participation in nature-based activities
Please consider "natural areas" to include the woods, local parks, a lake or beach, or other features of the natural environment. <i>Very difficult (1), Difficult (2), Somewhat difficult (3), Neither easy nor difficult (4), Somewhat easy (5), Easy (6), Very Easy (7)</i>	• How easy is it for you to get to "natural areas" in your local area?	Perceived access to nature (Flowers et al., 2016; Salazar et al., 2020)

Have you ever taken part in any of the following types of environmental education before?	• Environmental education during elementary school, including field trips • Environmental education through informational plaques at museums or parks	Environmental Education (Disinger and Monroe, 1994; Monroe and Krasny, 2016)
<i>Yes or No</i>		

Analysis

Exploratory Factor Analysis of Community Cultural Wealth

Using the panel survey data, we performed a second EFA of social, familial, navigational, and resistant capital scales to determine the underlying structure of CCW. We used a principal axis factoring extraction method with an oblique rotation (promax) to conduct this analysis. To determine the number of factors to extract, we conducted a scree test and a parallel analysis. Items with factor loading $\leq .04$ were dropped from the scale and the EFA was run again. Lastly, we calculated Cronbach's alpha scores for the scales to measure internal consistency.

Factors Associated with Participation in Nature-Based Activities

The panel survey was unable to completely meet the quota for ethno-racial identity distribution. Thus, we weighted our data for ethno-racial identities using a bootstrap method based on the US census distribution of ethno-racial demographics (Jones et al., 2021; US Census Bureau, 2022). Continuous predictor variables were standardized, resulting in a mean of zero and a standard deviation of one. We found no collinearity between our predictor variables. All statistical analyses were performed using the statistical software R (v4.1.3; R Core Team 2023).

We analyzed the strength of relationships between our predictor (i.e., social capital, navigational capital, familial capital, resistant capital, environmental education, age, race, gender, income, and access to natural areas) and response (i.e., interactions with nature) variables by using negative binomial regression models (Lattin et al., 2003). In these models, we examined the marginal effects of CCW and EE on participation by accounting for other variables that could also influence participation. We examined comparisons between each of our predictor variables using incidence rate ratios with a statistical significance level of $\alpha = 0.1$. We ran four additional interactive negative binomial models with each ethno-racial identity in addition to gender as predictor variables to assess whether the interaction of race and gender affects participation in nature-based activities (Lattin et al., 2003). Additionally, initial participation was analyzed with descriptive statistics by finding the mean score for each of the options (i.e., via a friend, a family member, a role model, an organization).

RESULTS

Qualitative Results

Social Capital

All interviewees emphasized the significance of social capital in shaping their engagement in nature-based activities, citing its provision of both emotional and instrumental support. They relied on various individuals and groups within their social networks to partake in these activities, including friends, schools, school organizations, community organizations, and

educators. Notably, friends emerged as the most common source of social capital among the respondents. Interviewees often relied on their social networks to introduce them to the outdoors, especially if they did not have a family with knowledge of nature-based activities. One participant initially recreated because of the friends she met in her new, environmental-based major at university:

It was almost like I had a reason to do it. Because growing up, camping, hiking all that stuff was never a thing that my family did. And when I switched majors and interacted with my peers and learned all these new things, it was like a whole new world that I didn't even realize existed.

Even when introduced to outdoor activities by family, some participants acknowledged that they were not interested in nature-based activities until they realized they could participate with friends.

Most participants drew on their social connections one way or another to continue participating, including by learning new skills or information (i.e., providing navigational capital), being motivated by them, or by having someone to go with. While some preferred to recreate alone, several participants perceived nature-based activities as a social activity and had more enjoyment participating in nature-based activities with others. One participant described hiking as “a good way to meet other people with similar interests.” This demonstrates how participants were able to cultivate more social capital by engaging in nature-based activities – most often through outdoor organizations, outdoor volunteering opportunities, social media, or environmental education opportunities (especially during a college program). Several of the respondents named social media as a platform to connect with people or organizations for information, opportunities, or outdoor companions.

Support from friends who are also part of marginalized communities was especially helpful in some cases. Respondents described how those relationships helped them feel safer outdoors and allowed them to speak of their shared experiences. One interviewee described how connecting with other racial minorities allowed them to see that “yes I’m not the only one who has experienced this.” Similarly, when participating with outdoor organizations, a number of respondents preferred BIPOC groups because they felt more comfortable, less judged, and safer.

Familial Capital

Familial capital took many forms (i.e., family, ethno-racial communities, communities of fellow recreators, and cultural knowledge) and contributed to the initial or continued participation of all interview participants. In most cases, the interviewees’ first experiences with nature were with family members or facilitated by their families. One young woman described how her parents were not “too outdoorsy” but that they still signed her up for opportunities to be outside, which is how she started participating in nature-based activities. Some participants see the outdoors as a way to connect with family and extended family. One participant said about nature that “it’s always been a family thing. A time for me to go out and be with friends and family, it’s kind of like a gathering space for me.” According to the interviews, familial capital provided instrumental support (e.g., paying for things, transportation, teaching skills, signing permission slips, paying for college) and emotional support (e.g., encouragement, showing interest, expressing pride). Emotional support additionally manifested as parental concern for safety.

A few participants expressed dedication to supporting younger generations and to community wellbeing by their desire to share their outdoor expertise with their families and communities. Some focused on supporting their families' engagement, like one woman who commented that "it's really nice to be able to introduce new trails to my family...that's something that really keeps me interested in going." One young woman spoke about her desire to "incorporate doing more outdoor activities as one big Black community" within her majority Black university residence hall. Although this example referred to friends rather than family, it is more in line with familial capital because of the cultural and kinships connections she spoke of.

A few interviewees expressed a cultural connection to nature which contributed to their participation. One young woman spoke about her family's background with traditional Chinese medicine and foraging and how it "gave [her] the confidence and interest to be like 'yeah, I can learn how to do this' and 'this is normal'."

Another woman spoke about an influential experience in South Africa, where seeing Black people in nature every day and learning more about the history of slavery and Black farming brought her to believe that "being outdoors is Black culture." She said:

It was really this recognition that Black people have always been connected to nature, and through enslavement we've been disconnected from nature... and so I feel like the more I learn about Black history, the more I want to engage with the outdoors as a way to connect to something that has been lost.

Navigational Capital

Participants described two main forms of navigational capital: (1) the skills and information needed to participate in nature-based activities and (2) the personal attributes that were helpful for maneuvering in these spaces. Interviewees expressed an ability to acquire navigational capital through support networks as well as through their own qualities. Navigational capital was discussed primarily in relation to continued participation in nature-based activities.

The skills and information described most commonly by the interview participants included outdoor skills (e.g., how to build a fire, use equipment, follow a trailblazer, swim, fish), information about where to recreate, information about relevant rules and regulations, information about safety, and information about necessary equipment. These skills were most often described as being taught by family, friends, outdoors groups, school organizations, social media, and the internet. For example, one interviewee said:

...If I have any friends that I know had been in the area that I'm going, I definitely will contact them and be like 'hi what did you think of this place, what do you recommend, what equipment do you think I need'?...

A few interviewees used social media to connect with BIPOC communities and organizations, where they felt more comfortable receiving guidance. One woman expressed that being in such a group helped her "feel more at ease asking questions" because she was "more comfortable being in a BIPOC group than just on Facebook anywhere else." Similarly, another interviewee said: "I think anytime you can learn with people who've faced similar issues as you,

it puts your mind at ease and typically the learning can go a bit further if you don't have to navigate things like microaggressions."

In addition to seeking support from people, interviewees drew from their personal attributes to persist. The qualities most often described included having research skills, being comfortable with asking questions, feeling comfortable outside, and being comfortable with trial and error. One person described how his research skills and ability to weigh risks helped him navigate potentially dangerous outdoor situations:

[I conduct] honest, quick research in terms of actually finding out what's going on... just trying to do some of that calculation of how much negative information about a place will deter me from being in that area.

Lastly, a number of interviewees discussed how navigational capital provided them with self-efficacy. These interviewees felt confident in their own capacity to participate in nature-based activities once they had the necessary opportunities, skills, and knowledge to do so.

Resistant Capital

Roughly half of the interviewees described resistant capital. Those who did exhibited resistant capital through their knowledge of systems of inequality and acts of opposition. For example, several participants highlighted an awareness of inequities in outdoor spaces yet continued to persist in those spaces. While not being an overtly oppositional behavior, existing in these unwelcoming spaces is in itself an act of resistance, as explained by this participant:

I think that white supremacy wants us to be downtrodden and wants us to not feel joy, and so I feel like in many ways, pushing through is a form of resistance. Being like 'no, I deserve to be in this space' is a form of resistance.

Some interviewees persisted instead by avoiding outdoor situations that they deemed more dangerous or by following the existing culture of the outdoors. Others, like this interviewee, persisted by making community and making space for themselves and their communities: "I feel like now I'm realizing more that I just want to be a part of Black groups that are making that space, versus trying to be a Black person in a completely White space."

Some participants mentioned struggling with identity and overcoming Eurocentric views of nature-based activities in order to participate. One participant exemplified this concept while describing her relationship with hiking:

I had built up in my head that "oh, I don't like hiking", because it's this big thing, right? You have to have the proper shoes, you have to figure out what trail you want to go on, you have to follow a map... But then I realized that I do like hiking, I just don't like it in the way that it's presented in dominant culture. It's very - I don't know if 'white-washed' is the right word to use, but it can be intimidating... It can be this really deep, restorative, like 'connect with nature in a hippy-dippy way', but it doesn't have to be. It can just be you going outside and enjoying yourself and then walking back.

Some interviewees were motivated by their awareness of inequities in nature-based activities and consciously participated in opposition to that. One participant said they persevered because they were "pushing for a more inclusive outdoor space." Lastly, a few participants continued to persist in order to encourage others, like this person who said, "I feel like right now

I actually see myself more as someone that gets Black people into the outdoor environment in new ways.”

Environmental Education

When asked about their experiences with environmental education, roughly half of the interviewees considered these experiences influential to their continued participation in nature-based activities. The most common forms of EE discussed by participants included: college courses, K-12 programming, zoos or museums, documentaries, and volunteer opportunities. The influential element of EE seemed to differ amongst participants, with some participants highlighting the impact of the actual information being disseminated, some enjoying the aspects of time spent outdoors, some appreciating the sense of community, and others the passion of their environmental educators.

According to the interviews, knowledge of climate change and other environmental issues made outdoor experiences more meaningful and motivated some participants to recreate more because they better appreciated nature and its scarcity. For example, one participant said about EE that:

I do think that it has furthered and deepened my appreciation, because there's a difference between going on hikes and camping and just liking it versus going out and really thinking about, 'how can I protect this?'

In addition, some participants stated that they engaged differently after becoming more conscious about their impact on the outdoors (e.g., following leave no trace guidelines). EE occasionally contributed to participants' navigational capital by teaching them skills and to their social capital by providing space to connect to others with outdoor interests.

When asked about EE experiences, several participants instead discussed outdoor education experiences or other programs that focused on time spent outside. These programs did seem to impact initial participation according to the interviews. Some said the experiences helped them feel more comfortable and confident outside and cultivated a sense of self-efficacy. One respondent who went to a nature-based summer camp said it made her “more adventurous and made [her] seek out those kinds of adventures....” Similarly, a few participants, unprompted, discussed ecological knowledge (e.g., plant and animal identification, knowledge of ecological systems) as a factor contributing to their continued interest in nature-based activities and how that knowledge made their outdoor experiences more meaningful.

Other Emerging Factors

A few themes emerged from the interviews that we were not explicitly looking for. Many of the participants expressed a recognition and appreciation of the health and wellbeing benefits from nature interaction, especially in relation to family. Interviewees expressed that their parents wanted them to “get outside” and “get fresh air.” In addition, a few participants stated that the primary motivation for participating in nature-based activities was the benefits they received from nature-based recreation or their innate connection to nature. Several interviewees also indicated that traditional forms of capital such as income, access to nature, access to transportation, and leisure time were essential for their ability to participate. Some participants described feeling motivated by representation of BIPOC in outdoor spaces. Some spoke of

BIPOC representation in media and advertising, but most talked about seeing BIPOC in outdoor spaces or on social media.

Quantitative Results

EFA results

The initial principal axis factoring for all twenty items on our CCW scale resulted in five factors based on interpretation of a scree plot and parallel analysis. After initial analysis, one item with a factor loading $\leq .04$ was removed from the scale. Subsequent analysis revealed four factors with one item that scored $\leq .04$, which we removed from the scale. The remaining 18 items fell into four factors, all with a factor loading of $\geq .05$ (Table 1-3). Each factor directly corresponded with one of the four capitals. Items for each scale were then averaged to create single measures for social, familial, navigational, and resistant capitals.

Table 1-3: The factor loadings from an EFA using the principal axis factoring extraction method with an oblique rotation (promax) for items used to evaluate CCW. The four factor model accounted for 54% of the variance.

Item Code	Item Text	<i>F1</i>	<i>F2</i>	<i>F3</i>	<i>F4</i>
Social Capital (Cronbach's $\alpha = 0.77$ Mean = 3.78 SD = 0.94)					
Social 1	There is at least one person I know whose advice I really trust.	0.01	0.06	0.07	0.58
Social 2	When I need suggestions for how to deal with a personal problem, I know there is someone I can turn to.	0.01	0	-0.01	0.75
Social 3	If I had to go out of town for a few weeks, someone I know would look after my home (the plants, pets, yard etc.)	0.11	-0.02	0.03	0.59
Social 4	If I got stranded 10 miles out of town, there is someone I could call to come get me.	0.1	0.05	0.02	0.53
Navigational Capital (Cronbach's $\alpha = 0.81$ Mean = 3.70 SD = .95)					
Navigational 1	I have developed strategies to navigate difficult people and situations.	-0.02	0.08	0.63	0.06
Navigational 2	I have succeeded despite barriers to my success.	0.01	-0.1	0.89	-0.05

Navigational 3	I am confident in my ability to get through struggles.	-0.06	-0.07	0.8	0.11
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Familial Capital
(Cronbach's $\alpha = 0.89$
Mean = 3.65
SD = .95)

Familial 1	Family values are an important part of my cultural background.	0.6	0.1	0.01	0.07
Familial 2	I know about my family's cultural heritage/history.	0.69	0.01	0.08	-0.09
Familial 3	I have role models in my family.	0.77	-0.07	-0.06	0.07
Familial 4	I maintain a connection to my extended family.	0.72	-0.01	-0.04	0.03
Familial 5	My family provides me with emotional support.	0.73	-0.13	-0.06	0.2
Familial 6	I maintain a connection to my home community and culture.	0.71	0.05	0.1	-0.09
Familial 7	I learn a lot of valuable knowledge from my family members.	0.8	-0.03	-0.08	0.06

Resistant Capital
(Cronbach's $\alpha = 0.82$
Mean = 3.74
SD = .98)

Resistant 1	I believe there are injustices in my ethnic/racial/cultural community.	-0.08	0.86	-0.11	0.05
Resistant 2	I want to create a more just or equitable society.	0.08	0.63	0.14	-0.02
Resistant 3	I believe racism is a major factor for issues in society.	-0.14	0.82	-0.11	0.08
Resistant 4	I want to make a difference in my racial/ethnic/cultural community.	0.25	0.57	0.13	-0.13

Factors Associated with Participation in Nature-Based Activities

We received 1709 completed responses, with 1387 usable surveys (the remaining 322 failed attention and quality checks). After weighting the data based on US census ethno-racial distribution data, we had a total of 1808 responses. Approximately 85% of respondents participated in nature-based activities for at least one day out of a typical year, with a median of 36 days spent outside in nature among those who participated. Respondents began participating in nature-based activities most often because of family (median=3 out of a 5-level Likert scale) and friends (median=3). Respondent characteristics are reported in Appendix J.

Navigational and social capital were positively associated with participation in nature-based activities. For each standard deviation (SD) increase in navigational capital (SD = 0.95) or social capital (SD = 0.94) (both of which varied on 5-point scales), there was approximately a 13% increase in the number of days spent in natural areas, after accounting for other capitals and variables. Resistant and familial capital, however, were not associated with participation in nature-based activities (see Table 1-4 and Figure 1-1).

When asked about their participation in EE, 82.8% of respondents indicated that they had participated previously. Environmental education was positively associated with participation in nature-based activities. After accounting for other factors, respondents who took part in an environmental education experience participated in nature-based activities 2.88 times more than those who had not, after accounting for other factors.

Some other variables were also associated with participation in nature-based activities. For race, those who were Black alone, Asian alone, or Latine of any race, participated less often than those who were multiracial non-Latine (see Table 1-4 and Figure 1-1). Middle-income and high-income individuals participated more often than those who were low income (see Table 1-4 and Figure 1-1). For each increase in one SD of perceived access to nature (equivalent to 1.49), there was a 50.80% increase in participation. Those who were twenty-five and older participated 31% less often than those who were 18-25. Gender was not associated with participation (Table 1-4 and Figure 1-1).

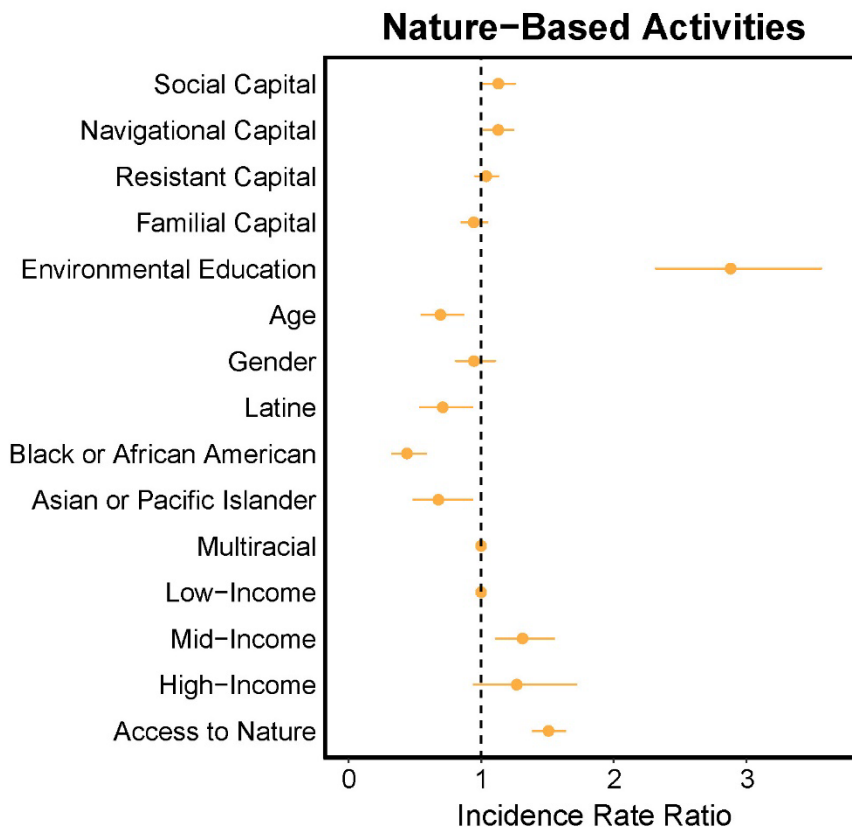


Figure 1-1. The incidence rate ratio (IRR) for participation in nature-based activities. Higher or lower IRR indicates a stronger association between a variable and participation for categorical variables. For ordinal variables, IRR indicates a change for each increase in one SD of the variable. Errors are the 95% confidence intervals (CI). CIs that overlap the IRR of one indicate no significant differences.

Table 1-4. Parameter estimates, standard errors, and incidence rate ratios (IRR) for the effects of community cultural wealth and other variables on participation in outdoor activities.

Variable	Estimate	SE	IRR	P-value
Social Capital	0.12 [0.02, 0.23]	0.05	1.13 [1.02, 1.25]	0.011
Navigational Capital	0.12 [0.02, 0.22]	0.05	1.13 [1.02, 1.24]	0.007
Resistant Capital	0.04 [-0.05, 0.12]	0.04	1.04 [0.95, 1.13]	0.370
Familial Capital	-0.06 [-0.16, 0.05]	0.05	0.94 [0.85, 1.05]	0.243
Environmental Education	1.06 [0.84, 1.27]	0.10	2.88 [2.32, 3.56]	< 0.0001
Age	-0.37 [-0.59, -0.15]	0.11	0.69 [0.55, 0.86]	< 0.001
Gender	-0.06 [-0.21, 0.10]	0.07	0.95 [0.81, 1.1]	0.451
Latine	-0.34 [-0.62, -0.07]	0.13	0.71 [0.54, 0.93]	0.007
Black or African American	-0.82 [-1.10, -0.54]	0.13	0.44 [0.33, 0.58]	< 0.0001
Asian or Pacific Islander	-0.39 [-0.71, -0.07]	0.15	0.68 [0.49, 0.93]	0.008
Mid-Income	0.27 [0.11, 0.44]	0.08	1.31 [1.11, 1.55]	< 0.001
High-Income	0.24 [-0.05, 0.54]	0.14	1.27 [0.95, 1.72]	0.098
Perceived Access to Nature	0.41 [0.33, 0.49]	0.04	1.51 [1.39, 1.63]	< 0.0001

The interaction between gender and race was significantly associated with participation in nature-based activities in one case only. Survey respondents who identified as Black or African American alone and as men participated less often than those who identified as Black or African American alone and as women (Figure 1-2). There were no interactions of other races and gender on the participation in nature-based activities.

Intersection of Race and Gender

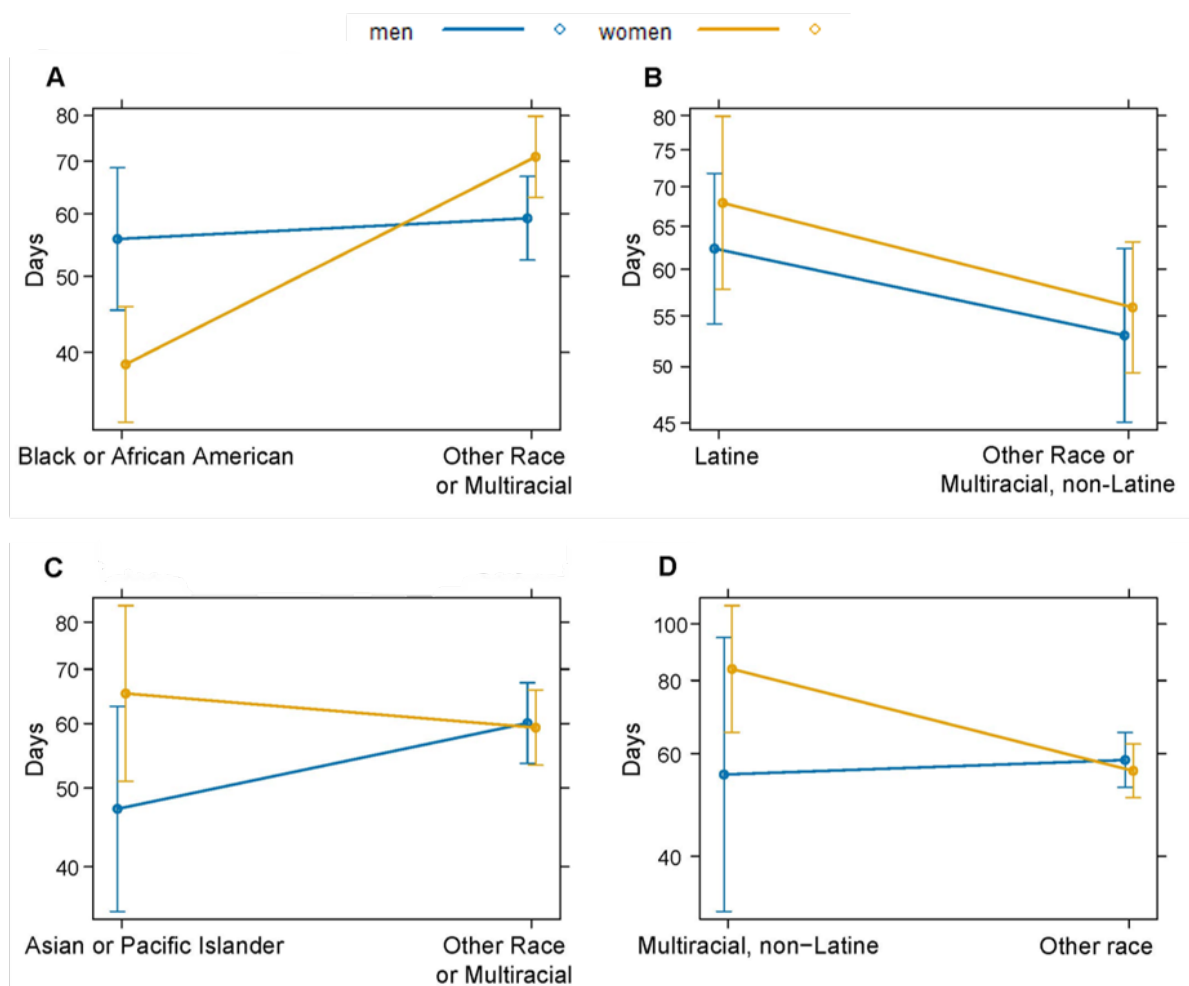


Figure 1-2. The interactions between gender and race and their effects on participation in nature-based activities.

DISCUSSION

We examined the role of community cultural wealth (CCW) and environmental education in supporting increased participation in nature-based activities for Black, Asian, and Latine people. To our knowledge, this was a novel use of the CCW framework in conservation social science and one of few CCW studies that used quantitative methods in addition to qualitative ones. Our findings showed that higher levels of social and navigational capital were associated with more time spent participating in nature-based activities. Familial and resistant capital were not linked to participation in nature-based activities in our quantitative analysis, but our qualitative work shed light on how these factors may support some people with their participation. Similarly, we also found that people who participated in EE spent more time participating in nature-based activities than those who had not. Although EE has been associated with participation in nature-based activities (Ardoin et al., 2018, 2020), our findings show the potential of EE to contribute to equity in outdoor spaces. An additional insight of this study was

that the identities of gender and race interact to affect participation in nature-based activities, a finding that aligns with intersectionality theory (Esposito and Evans-Winters, 2022).

Community Cultural Wealth and Participation in Nature-Based Activities

Perhaps the most striking finding in this study was that survey respondents with higher navigational or social capital participated in nature-based activities more often, a finding further substantiated by our interviews. These findings are consistent with the substantial body of literature that connects social support as a driver of outdoor recreation (Scott and Shafer, 2001). It seems possible that these results are due to the ability of the capitals to mitigate some of the barriers believed to inhibit Black, Asian, and Latine participation in nature-based activities (e.g., don't loop, lack of knowledge, transportation) (Solop et al., 2003; Robinson, 2005). The interviews provided further insight into how people used these capitals to support their participation. For example, people mentioned the skills, information, and personal attributes they needed to continue participating. They spoke about being motivated by their social circles to participate more often, relying on them for transportation, connecting with them over shared experiences, and how the outdoors can be a "gathering space" for friends and family.

While resistant capital was not significant in our survey, some interviewees did allude to it. They did so by describing the ways they persisted in nature-based activities despite their understanding of the inequities in those spaces. Certain interviewees found motivation in their awareness of these inequities and deliberately participated in defiance of those inequities, similar to other CCW studies where interviewees were motivated in part by their desire to create a social impact (Samuelson & Litzler, 2016; Denton et al., 2020).

Familial capital was salient for the interviewees as well, but not significant in our survey findings. This difference may be because our interviews focused on participants of nature-based activities only, whereas the surveys included both participants and non-participants (i.e., participants may have high familial capital, but non-participants do too). Furthermore, because our survey was designed for both participants and non-participants, concepts were measured without reference to nature-based activities. If we had specifically measured familial capital tied to nature-based activities, we would expect results to be different. Nonetheless, qualitative results showed that some individuals relied on instrumental or emotional support from family, felt a cultural connection to the outdoors, or participated in nature-based activities as a way to connect with family and friends. Qualitative results provided evidence that social and familial capital can specifically support initial participation of nature-based activities. This finding is especially relevant given previous research which suggests that supporting initial participation may be the most effective way to diversify nature-based activities (Rutter et al., 2021).

Continued efforts are needed to create opportunities that develop social, familial, and navigational capital in relation to nature-based activities. To this end, we recommend developing outreach programs focused on creating community, social connections, and building lasting skills which could be integral to initial and continued participation in nature-based activities. Previous research highlights the ability of such targeted outreach efforts in drawing new individuals into the fold of nature-based activities, a notion affirmed by our qualitative findings (Solop et al., 2003; Hunt & Ditton, 2002; Flores & Kuhn, 2018). These programs can promote

social capital by expanding an individual's social network and connecting them with valuable support that they would not otherwise have access to. Additionally, programs can attempt to nurture self-efficacy by teaching relevant skills or by fostering a sense of familiarity with the outdoors, as shown by our interview findings. Family-centric programs may bolster familial capital and establish nature-based activities as a collective family endeavor. This could be particularly meaningful for Latine families, as their leisure activities often revolve around familial and social circles (Shaull and Gramann, 1998). Programs can further strengthen familial capital by nurturing a sense of community amongst their participants.

Numerous organizations such as Outdoor Afro and Latino Outdoor boast years of experience organizing precisely these types of targeted outreach endeavors. While other more general outreach efforts may be beneficial as well, affinity-based spaces such as these might be especially impactful, particularly as our qualitative findings indicated the important support provided by BIPOC-specific organizations. There is therefore a need to ensure that these organizations have the funding and resources necessary to continue supporting ethno-racial diversity in nature-based recreation.

Environmental Education and Participation Nature-Based Activities

This study found that environmental education was strongly positively associated with spending time in nature for Black, Asian, and Latine people. It is important to note that the directionality of this association was not clear. We saw in our qualitative interviews that EE impacted participation in nature-based activities, however, participation in nature-based activities could have also impacted EE participation. Overall, our findings align with expectations, as EE aims to connect people with nature, a factor closely tied to participation in nature-based activities (Nisbet et al., 2009). However, to our knowledge, this is the first study that focused specifically on these ethno-racial identities. Our qualitative results suggest that some of the mechanisms that may drive the importance of EE include facilitating a greater appreciation for nature, fostering a sense of community, the presence of passionate environmental educators, skill building, and time spent outdoors, which is similar to literature about elements of effective EE programs (Stern et al., 2014). EE with a nature contact component (i.e., a nature-based environmental education experience or outdoor education experiences) may be especially important in fostering lifelong participation in nature-based activities, according to the qualitative results. Consequently, we encourage educators to integrate outdoor experiences into their programs, with a particular focus on fostering individuals' confidence in outdoor settings and imparting essential outdoor skills.

Given our findings, it is concerning that access to and participation in EE remains inequitable for these groups despite calls for inclusivity and engagement (Anderson, 2021). Addressing these disparities is crucial for expanding the reach and impact of EE. One way to address these inequities is by incorporating CCW to create culturally informed EE programs. While we have used the CCW framework to identify factors that support participation in nature-based activities, there is also a potential for CCW to inform the creation of programs that actively engage Black, Asian, and Latine individuals in nature-based activities.

The Role of Intersectionality

We found that race and ethnicity affected participation in nature-based activities, with some ethno-racial identities participating less often than others. Notably, we found that there was

an effect of the intersection of race and gender on participation. Black men participated less often than Black women, aligning with intersectionality theory, which underscores the impact of multiple identities within various systems of oppression (Esposito and Evans-Winters, 2022). It is not surprising that Black men in the United States would feel this effect given media representation of Black male violence, the heightened policing they face as a group, and recent highly publicized instances of blatant discrimination (e.g., the persecution of Black birder, Christian Cooper) (Dixon et al., 2003; Stoudt et al., 2011). Given this context, Black men may have a greater awareness of their potential perception as a threat and awareness of the dangers of racial discrimination, which could explain the compounding negative effect on participation in nature-based recreation. We encourage future researchers to consider intersectionality in their studies and investigate support mechanisms that may benefit various identity combinations or examine how barriers affect individuals differently.

Other Variables Associated with Participation in Nature-Based Activities

In addition to CCW and EE, several covariates assessed in this study were significantly associated with participation. Our findings support the ample body of literature that demonstrates the importance of access to nature for participation in nature-based activities (Robinson et al., 2022, Kellert et al., 2017). Our question about perceived access was broad, so several access mechanisms could be significant factors here, such as distance to a natural area, transportation, and cost, among others. Income was also associated with participation in nature-based activities, with people who had middle or high incomes participating more often than those with low income. In the context of nature-based recreation, low income is associated with several perceived constraints, including but not limited to safety, health issues, and transportation (Scott and Munson, 1994). With these barriers in mind, several studies point to providing transportation assistance as a means of bolstering perceived access and alleviating some of the barriers associated with low income (RSG and WYSAC, 2019; Scott and Munson, 1994). Our findings about access and income highlight the importance of endorsing such supportive measures.

Another demographic variable associated with nature-based activities was age. We found that individuals who were twenty-five and above participated 31% less often than those between the ages of 18 and 25. This was initially surprising because the average age of an outdoor recreationist in the US tends to be higher (Taff et al., 2021; Outdoor Foundation, 2022). However, the 2022 Outdoor Participation report sheds some light on this finding by showing that the participation rate among Black, Asian, and Latine youths is higher than older age groups (Outdoor Foundation, 2022). Thus, when looking solely at Black, Asian, and Latine populations, a larger proportion of the recreationists may be younger.

A final variable of interest is BIPOC representation in media. Although we did not assess this concept in our survey, our qualitative data showed that representation of BIPOC in social media, traditional media, and in outdoor spaces may have supported participation in nature-based activities for Black, Asian, and Latine people. This observation is important to note given research that shows a lack of representation of non-White outdoor recreators in media (Frazer and Anderson, 2018). As social media was especially salient for interview participants, our findings underscore the importance of ongoing online initiatives, such as 'Black Birders Week,' in highlighting the existing diversity in outdoor spaces.

CONCLUSION

This study set out to identify ways in which to support and promote engagement in nature-based activities within historically underserved populations for the purpose of ensuring that these individuals receive the numerous health and wellbeing benefits associated with time spent in nature and to promote conservation attitudes and behaviors. We identified key factors that supported initial and continued participation in nature-based activities of Black, Asian and Latine individuals including environmental education, social networks, community, knowledge of relevant skills, familial support, and self-efficacy. We did so using the CCW framework, which examines the assets that marginalized groups use to persist in institutions that were made without them in mind. This is a novel use of the CCW framework in conservation social science and provided insight into how the framework could be integrated into creating more equitable EE programs. To enhance participation in nature-based activities among Black, Asian, and Latine communities, managers and practitioners could consider implementing outreach programs with a focus on fostering community, social connections, and developing lasting skills.

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Chapter 2

Investigating pathways to civic engagement related to the environment for diverse communities

ABSTRACT

Civic engagement related to the environment provides an essential avenue to combat global environmental crises. However, opportunity and ability to participate in such civic action are not equal for everyone. Concerningly, the conservation movement in the US has historically marginalized Black, Asian, and Latine voices from policy and decision-making processes. While previous research on this issue has focused on predictors of civic engagement in general or on all segments of the US public, what supports Black, Asian, and Latine individuals' civic engagement related to the environment is less clear. To explore this question, we used qualitative and quantitative methods to investigate the role of community cultural wealth (CCW) and environmental education (EE) in Black, Asian, and Latine individuals' participation in civic engagement related to the environment. CCW is an asset-based model with a foundation in critical race theory which has been used to understand the persistence of marginalized groups in historically exclusionary spaces. In this study, we used CCW to identify factors that support Black, Asian, and Latine individuals' civic engagement related to the environment as these behaviors have been affected by structural racism. Results from semi-structured interviews and a nationwide survey showed that understanding systems of oppression and being motivated to change such systems were important predictors of civic engagement related to the environment for Black, Asian, and Latine individuals. Furthermore, our results suggest that organizations, social connections, family connections, and EE may be important sources of civic knowledge and opportunity. These findings suggest that supporting organizations engaged in civic engagement related to the environment, enhancing equity in environmental education, and nurturing social connections are crucial for supporting civic engagement related to the environment among Black, Asian, and Latine individuals.

INTRODUCTION

Civic Engagement Related to the Environment

Researchers increasingly emphasize the significant role civic engagement plays in combatting global environmental challenges like climate change, deforestation, waste disposal, and biodiversity loss (Brulle, 2010; Ardoin et al., 2023; Turaga et al., 2010; Levy and Zint, 2011). Civic engagement not only has the potential to combat global environmental crises, but also provides numerous benefits at the individual and collective level (e.g., improved positive development in youth, increased community resiliency, strengthened social networks, etc.) (Ardoin et al., 2023; Brady et al., 2020). A noteworthy benefit of civic engagement is that it allows for a wider portion of society to have a say in how they think the world should look. In the context of conservation, this not only contributes to a more equitable society, but also opens avenues for diverse ideas and perspectives crucial for addressing wicked problems like global climate change (Naiman et al., 2019).

Concerningly, in the US, Black, Asian, and Latine Americans have historically been disenfranchised from environmental policy and decision-making processes, in part because of the

environmental narrative in the US which has been rooted in domination-based Eurocentric views (Finney, 2014; Taylor, 2016). These practices have left lasting effects on these communities and on their participation in civic engagement related to the environment (Finney, 2014; Taylor, 2016). For example, the narrative of the conservation movement as a “White Space” continues to impact perceptions of who an “environmentalist” is, as Americans of all backgrounds view nonwhite Americans as less environmentally concerned than their white counterparts, despite repeated evidence that nonwhite Americans exhibit higher levels of environmental concern (Pearson et al., 2019; Ballew et al., 2020). These perceptions can discourage Black, Asian, and Latine engagement with advocacy organizations, impact collective action, and can affect policy decisions (Pearson et al., 2019). Historically, US environmental policy decisions have largely favored affluent, White communities and failed to respond to the environmental concerns of ethno-racial minorities, resulting in the disproportionate distribution of environmental burdens (Mohai et al., 2009). Race is a key predictor of environmental burdens, such as proximity to hazardous waste facilities and reduced air quality (Mohai et al., 2009; Pearson et al., 2019). Supporting the civic engagement of Black, Asian, and Latine people could be a pivotal strategy to combat this harmful cycle of neglect and disengagement (Ardoin et al., 2023). By increasing civic engagement among these historically marginalized groups, we can effectively address environmental injustices within their communities and foster broader support for conservation efforts overall (Adler and Goggin, 2005). To address these issues, this study aimed to examine factors that influence the participation of Black, Asian, and Latine individuals in civic engagement related to the environment. These factors included the community cultural wealth framework (defined below) and environmental education (EE).

Although there is not a consensus on a single definition of civic engagement (Serrat et al., 2021; Gibson 2000), it has been broadly defined as community service (Diller, 2001), collective action (Adler and Goggin, 2005), and political involvement (Diller, 2001). We adapted Adler’s definition of civic engagement for this study and defined civic engagement related to the environment as: the ways people are involved in the environmental decision-making processes in their communities to improve environmental conditions for themselves and others (Adler and Goggin, 2005). This includes, but is not limited to, regular voting, advocating, contacting officials, or protesting in relation to environmental issues (Keeter et al., 2002). Viewing civic engagement broadly as a means of social and environmental change allows the consideration of nontraditional forms of action that may be favored by younger generations (Andolina et al., 2002).

Civic engagement related to the environment, sometimes referred to as environmental citizenship in the literature, falls under the umbrella of pro-environmental behaviors, which are behaviors that benefit or reduce harm to the environment (Larson et al. 2015; Steg & Vlek, 2009). We were interested in civic engagement related to the environment rather than other pro-environmental behaviors, such as conservation lifestyle (e.g., recycling), because of the potential for civic engagement to provide agency for Black, Asian, and Latine people in environmental decision-making in their communities to improve environmental conditions (Adler and Goggin, 2005).

Previous research examined predictors of civic engagement across various contexts, including the general public and marginalized communities, and within the realm of

environmental issues. However, we are not aware of a specific study on the factors supporting civic engagement related to the environment for Black, Asian, and Latine individuals. The partially related literature that does exist can inform us of potential important variables. For example, Wray-Lake and Abrams' (2020) study on urban Youth of Color revealed that safe community spaces, connecting with people with similar identities and interests, positive neighborhood and social connections, opportunities for local engagement, and positive adult interactions are related to civic engagement (2020). Other studies on youth participation in civic engagement have linked political efficacy (i.e., perceived capacity to influence social and political change), parents, schools, community organizations, race and ethnicity, gender, and workplaces to civic engagement (Flanagan et al., 2011; Brady et al., 2020; Wray-Lake and Abrams, 2020; Levy and Zint, 2011). In their study of Latine people in Chicago environmental organizations, Naiman and colleagues (2019) found that exposure to environmental inequality and educational role models were the most common motivators for initiating interest in civic engagement related to the environment. Much of the current literature on pro-environmental behaviors (including civic engagement related to the environment) points to interactions with nature, both as an adult and as a child, as a significant predictor (Larson et al., 2011; Cooper et al. 2015; Wells and Lekies, 2006). The present study expands existing research to better understand how to support civic engagement related to the environment among Black, Asian, and Latine individuals.

Community Cultural Wealth

Community cultural wealth (CCW) is an asset-based model that seeks to understand the strengths, skills, and knowledge that marginalized groups use to persist in exclusionary spaces (Yosso, 2005). In the present study, we adapted the CCW framework to better understand factors that support civic engagement related to the environment for Black, Asian, and Latine individuals. This novel application of the framework is relevant given the historical disenfranchisement of these groups from the environmental movement.

CCW was developed, using critical race theory as a foundation, to challenge deficit models which asserted that Students of Color did not possess the cultural capital (e.g., an individual's credentials, accent, or social etiquette) necessary to succeed in higher education (Yosso, 2005). Instead, CCW posits that Students of Color possess a wealth of capital which is undervalued by the dominant culture, enabling them to succeed in historically exclusionary spaces despite numerous challenges (Yosso, 2005). Rather than focusing on what marginalized individuals lack, the model attempts to accentuate asset-based thinking in research and practice to work towards equity in education (Yosso, 2005; Denton et al., 2020). CCW conceptualizes this wealth in six forms of capital. However, for this study we considered the following four because we believe they may be most relevant to civic engagement related to the environment: social capital, familial capital, navigational capital, resistant capital (Table 2-1)

Capital	Definition (Adapted from Yosso, 2005)
Social Capital	The support from networks of people and community resources
Navigational Capital	The skills, knowledge, and competencies needed to maneuver through inequitable systems

Resistant Capital	An understanding of the structures of inequality and the motivation, skills and knowledge used to challenge that inequality
Familial Capital	Knowledge of oppressive structures and the motivation and skills necessary to oppose such structures

Table 2-1. The four types of capital from the community cultural wealth (CCW) framework used in this study.

Existing research which uses the CCW framework primarily does so to understand how marginalized groups (e.g., Students of Color, first generation students, etc.) persist in higher education (Denton et al., 2020; O’Shea 2016). For example, CCW was used to explore experiences of first-generation college students in Australia (O’Shea 2016), how Mexican American doctoral students accessed and persisted in graduate school (Espino 2014), and the mechanisms that Faculty of Color used to persevere when faced with difficulties in their institutions (Martinez et al., 2017). In their review of CCW education research, Denton and colleagues describe the emotional and instrumental support provided by families, peers, student organizations, and faculty (i.e., social and familial capital) (Denton et al., 2020). Often this support allowed the students to better maneuver through social institutions (i.e., navigational capital) (Denton et al., 2020). This illustrates a key point of CCW – that the capitals overlap and are not “mutually exclusive or static” (Yosso, 2005, p. 77; Denton et al., 2020). Another key finding of the review paper was that there is a lack of quantitative research on CCW, a gap that this study attempted to address (Denton et al., 2020).

Environmental Education

Environmental education (EE) is linked to civic engagement related to the environment by its very definition. Although conceptualizations vary, many researchers and practitioners posit that EE is designed to equip individuals and communities with the knowledge and skills necessary to engage in actions benefiting the environment (Ardoin et al., 2020). There are some examples in the literature of EE achieving its goal of creating an environmentally active citizenry. For example, in their review of fostering civic engagement through EE, Levy and Zint (2011) found that participating in environmental policy decision-making simulations may increase civic engagement related to the environment by increasing the students’ political efficacy (2011). A study on informal EE experiences (i.e., environmental stewardship volunteering) found that the most frequent participants were most likely to be engaged civically in their communities (Dresner et al., 2015). In their review of civic engagement outcomes from EE experiences, Ardoin et al. (2023) found that EE experiences that focused on the local community, used participatory or experiential practices, included action-taking, developed cognitive skills, and provided opportunities for social interaction were the most effective in fostering civic engagement (although their study examined civic engagement generally and not civic engagement related to the environment). However, the link between EE and how it could increase equity in civic engagement related to the environment for these groups remains less clear.

METHODS

The present study employed a sequential multi-method approach to examine the factors that affected the participation of Black, Asian/Pacific Islander (referred to as “Asian” hereafter),

and Latine individuals in civic engagement related to the environment (Tashakkori & Teddlie, 2003). First, we conducted semi-structured interviews which later informed the development of a nationwide survey. We used each method to study the system in slightly different ways. The qualitative interviews investigated only support factors for those who were participants and provided us a more in depth look at the context behind people's behaviors (Seidman, 2006). In contrast, the quantitative surveys focused on a range of participation which showed the relative importance of support factors across all individuals and yielded more generalizable findings (Vaske, 2019). This study was conducted as part of a larger study on supporting nature-based recreation for Black, Asian, and Latine people. The Virginia Tech Institutional Review Board approved the project proposal, recruitment materials, and data collection materials (Protocol #22-113; Appendix A).

Interviews

Sampling

The qualitative portion of the study focused on Black, Asian, and Latine individuals between the ages of 18 and 25 who resided in the US and participated in civic engagement related to the environment. We selected this age group because research shows that civic attitudes and skills formed at young adulthood continue to affect civic behavior throughout adulthood, which makes this a good age group with which to facilitate civic engagement (Brady et al., 2020).

To gather interview participants for our study, we employed convenience sampling methods. Our interview recruitment strategy involved posting the study's information to relevant social media accounts and email listservs. We conducted the recruitment as part of another study focused on participation in nature-based outdoor activities (see chapter 1) because outdoor recreation and civic engagement related to the environment are often linked (See Appendix D for recruitment materials; Wells and Lekies, 2006; Cooper et al. 2015). Therefore, we targeted groups relevant to that topic (e.g., Latino Outdoors, BIPOC Mountain Collective, university adventure clubs, etc.). See Appendix B for a full list of groups. Because of these methods, the importance of groups and organizations may have been overrepresented in our qualitative results. However, our findings can still provide important insight into the aspects of organizations that may be impactful. Participating groups circulated our recruitment materials including a Qualtrics screening survey (Appendix C). The survey filtered potential participants based on their age (i.e., 18-25) and ethno-racial background (i.e., Black, Asian, or Latine heritage) and participation in nature-based activities (8+ outings a year). Although participants were not initially screened out for participation in civic engagement related to the environment, only interviewees who indicated they did participate were included in this study. We supplemented these recruitment efforts with snowball sampling, where we relied on our interviewees to share our recruitment materials with relevant members of their networks.

For individuals who completed the screening survey and met necessary requirements, we emailed further details and a link to schedule an interview slot. We followed up with two reminder emails for those who did not respond to enhance response rates (Dillman et al., 2014). We contacted 131 eligible candidates for the interviews. Of those, 36 signed up. However, only 31 indicated a history of civic engagement related to the environment and were therefore included in the sample for this study. At that point, we estimated that we had reached saturation

within our data collection process because we began to hear much of the same information (Seidman, 2006). We entered each participant into a drawing for one of ten \$50 gift cards. Anonymized demographic data for all participants is included in Appendix E.

Data Collection

To better understand the factors that support the initial and continued participation of Black, Asian, and Latine people's civic engagement related to the environment, we conducted 31 virtual interviews using Zoom. Interviews spanned about 45 minutes to an hour and consisted of open-ended questions. By using open-ended interview questions, our research team was able to investigate both the significance of previously identified factors, such as EE and CCW, as well as explore themes that emerged from the participants' descriptions. To fine-tune the interview questions to better suit the target population, we tested preliminary questions on six individuals outside of our sample who fit the desired criteria. We adjusted the interview script based on the outcomes of these tests before administering them to our sample (See Appendix F for interview questions).

In the interviews, we defined civic engagement related to the environment broadly as “ways that you participate in your community or government in order to improve environmental conditions” based on Adler and colleagues’ (2005) definition, and provided examples adapted based on several indicators of civic engagement (Keeter et al., 2002). We asked participants if they participated in civic engagement related to the environment and in what ways. Then we retroactively coded for participation based on our definition of the concept. We adapted questions from the significant life experiences (SLE) approach to ask participants how they initially began participating and how they were able to continue participating (Arnold, 2009; Peters Grant, 1986). The SLE approach is a qualitative technique designed to uncover the events and experiences which shaped an individual’s present environmental attitudes and behaviors (Chawla, 1998).

We explicitly asked participants about their participation in environmental education experiences using broad definitions (Disinger and Monroe, 1994; Monroe and Krasny, 2016). Subsequently, we retroactively coded for past EE experiences using the same definition. (Disinger and Monroe, 1994; Monroe and Krasny, 2016). We asked participants about CCW by adapting Yosso’s (2005) definitions of the capitals and by adapting interview questions from a dissertation (Gonzalez, 2019) (Table 2-1). Our CCW questions asked interviewees who or what encouraged their initial participation, what supported their continued participation, where they received information about civic engagement related to the environment, barriers to participation they faced, and how they overcame those barriers.

Data Analysis

The lead author conducted all interviews virtually on Zoom. The audio was recorded and transcribed using the Zoom transcription software and later revised for accuracy on inqScribe. To analyze the interview data, the lead author used both inductive and deductive qualitative coding techniques in Dedoose. The lead author undertook two rounds of coding, involving an initial round to identify and refine codes and a subsequent round to reanalyze data for consistency (see Appendix G for code book). Regular peer debriefs with a project collaborator provided an external check for the coding process.

Survey

Sampling

Once the interviews were completed and analyzed, we began recruiting for a nationwide survey. Unlike the interviews, our sample for the survey included all individuals over 18, including those who were not civically engaged in environmental issues. We used the QuestionPro Panel, Audience, to recruit survey respondents. The audience panel is a pool of individuals who enrolled to participate in panel surveys such as this one and were compensated for their efforts.

To recruit an appropriate sample, our survey screened for race (i.e., Black, Asian, or Latine), residency in the US, and age (i.e., 18 years or older). Additionally, we used quota sampling methods to ensure that the respondents had similar characteristics to that of our population of interest (Jones et al., 2021; US Census Bureau, 2022) and participated in civic engagement related to the environment at a variety of frequencies (i.e., at most 35% of respondents could be non-participants; Bernard, 2018). Using quotas to match the target population can be an effective way to reduce sampling bias (Wardropper et al., 2021; Newing et al. 2011; Yang and Banamah 2014; Tehranian et al., 2016). With this aim, we used several quotas, including those for race, gender, age, income, and U.S region residency by aligning with the distributions found in US census data (US Census Bureau, 2019; 2023; 2020). Additionally, we included a quota for population size of towns and cities by categorizing them into two groups: up to 49,999 people (16%) and 50,000 people or more (84%). To bolster data quality, we integrated multiple quality and attention checks. Our final sample only included responses that either failed fewer than four of our quality and attention checks or underwent individual review and were deemed reliable (Wardropper et al., 2021; see Appendix H for more details on quality checks).

Data Collection

To investigate the hypothesized relationship between our independent variables (i.e., CCW, EE), dependent variables (i.e., participation in civic engagement related to the environment), and relevant covariates (i.e., age, race and income), we constructed an anonymous web-based survey (see Appendix I) which QuestionPro distributed to their panel directly via email. The email included a link to the survey and invited panelists to participate.

Community Cultural Wealth

We used our findings from the qualitative interviews, our understanding of Yosso's capitals, and existing surveys items to construct four separate scales to measure social, familial, navigational, and resistant capital (Table 2-1; Sablan 2019; Hiramori et al., 2024). Social capital questions were adapted from existing scales as social capital is an established construct used in numerous fields (Cohen and Wills, 1985). Respondents were prompted to indicate how much they agreed with statements related to the capitals (1= Do not agree, 2= Slightly agree, 3= Moderately agree, 4= Mostly agree, 5= Completely agree).

Scales were reviewed by Virginia Tech social scientists and piloted by a class of undergraduate students. The results from the undergraduate pilot survey were used to conduct an exploratory factor analysis (EFA) to test the unidimensionality of each scale. We performed the

analysis using the *psych* package in R, with a principal axis factoring extraction method and Varimax rotation (Ravelle, 2023). We removed all scale items with a coefficient of .04 or lower and several other items according to reviewer feedback. These modifications led to the final versions of the scales.

Participation in Civic Engagement Related to the Environment

Civic engagement related to the environment questions were adapted from the *Questionnaire for the National Youth Survey of Civic Engagement* (Zukin et al., 2002) and using the indicators of civic engagement identified in Keeter et al. (2002). We measured participation in civic engagement related to the environment in two ways: first by generally asking individuals how often they participated (i.e., general civic engagement related to the environment), then by asking if they participated in specific aspects of civic engagement related to the environment (i.e., protesting for environmental causes, fundraising for environmental organizations, etc.) within the last twelve months or five years.

Initial Participation

To gauge initial participation, participants were prompted to select the reason they initially engaged in civic engagement related to the environment from a provided list, including the options of a friend, a family member, a role model, or an organization. Subsequently, respondents indicated their level of agreement for each option using a 5-point Likert scale ranging from 'strongly disagree' to 'strongly agree'.

Environmental Education

Survey participants were presented with a number of EE experiences, such as those described by the North American Association for Environmental Education as formal, informal, and nonformal (Disinger and Monroe, 1994; Monroe and Krasny, 2016). They were then asked to indicate whether they had engaged in any of those experiences, allowing us to establish a binary variable distinguishing individuals with EE exposure from those without.

Race and Ethnicity

A single multi-select question evaluated both race and ethnicity (Krogstad and Cohn, 2014). Based on the provided information, we classified all participants into five distinct groups: individuals identifying as Latine of any race, those identifying as Black or African American alone, those identifying as Asian alone, and those identifying as Multiracial non-Latine.

Other Factors Associated with Participation in Civic Engagement Related to the Environment

During the interviews, nature interaction and connection to nature emerged as a factor motivating civic engagement related to the environment. In lieu of this evidence, we decided to include days spent in nature as a covariate in our survey. To assess days spent in nature in a typical year, we used a measure developed as part of our study on nature-based activities from chapter 1.

Analysis

Exploratory Factor Analysis of Community Cultural Wealth

To determine the underlying structure of our CCW scale and to finalize the questions used in our analysis, we conducted separate EFA's for the social, familial, navigational, and

resistant capital scales. The EFA employed a principal axis factoring extraction method and an oblique rotation (promax). As for the number of factors to extract, we looked to parallel analyses and scree plots. We removed any items with factor loadings of $\leq .04$ and ran the EFA again until all factor items were acceptable. Once we had the final factors, we determined Cronbach's alpha scores to ensure internal consistency.

Factors Associated with Participation in Nature-Based Activities

Before beginning analysis, we weighted our data to match the US census distribution of ethno-racial demographics using a bootstrapping method (Jones et al., 2021; US Census Bureau, 2022). We standardized all continuous predictors variables to have a mean of zero and a standard deviation of one. No collinearity was observed among our predictor variables. We conducted all analyses using the statistical software R (v4.1.3; R Core Team 2023).

We used an ordered logistic regression to analyze the predictors of general civic engagement related to the environment (Lattin et al., 2003). Additional ordered logistic regressions were conducted to analyze the factors predicting the five most frequently identified forms of civic engagement related to the environment (Lattin et al., 2003). As part of these models, we isolated the marginal effects of our predictor variables (i.e., social capital, navigational capital, familial capital, resistant capital, and EE) by accounting for relevant covariates (i.e., race, days spent outside, age, and income). For each variable, we calculated the relative likelihood of participating in civic engagement related to the environment using odds ratios at a significance level of $\alpha = 0.05$. Moreover, we examined the drivers of initial participation in civic engagement related to the environment by computing the mean score for each hypothesized factor (i.e., a friend, a family member, a role model, an organization).

RESULTS

Qualitative Results

Social Capital

When asked about their participation in civic engagement related to the environment, the majority of interviewees discussed how their social capital impacted both their initial and continued involvement. Social capital derived from several sources including community organizations, school organizations and clubs, educators, social media, and friends. These sources of social capital helped facilitate participation by providing both emotional support (e.g., accompanying them to a protest or speaking about shared experiences) and instrumental support (e.g., providing information about environmental issues or opportunities to engage).

Social capital supported initial participation in several ways. Some individuals described meeting passionate friends or educators who introduced them to civic engagement related to the environment. For example, one person, who had some knowledge of environmental issues, said that “it wasn’t fully until [they] met people who it was their life’s goal, passion, to really take care of their community, their outdoors” that they began to participate. This example, among other similar statements, suggests that while people may develop interest in civic engagement related to the environment by learning about environmental issues, their motivation to participate stems from social capital. Similarly, another interviewee said they would “probably still care” about environmental issues but that “it definitely makes it easier to be active when your friends are.” Other people began participating because of organizations or institutions. For example, a

participant described how their first experience with civic engagement related to the environment was through a tree planting initiative hosted by their local city. In many cases, interviewees reported that social capital facilitated initial and continued participation by providing information about environmental issues and opportunities to participate in civic engagement related to the environment. In other words, social capital led to navigational capital for many interviewees.

In some cases, participants leveraged their social capital to increase their influence by sharing information with their social networks. For example, one person said they feel as if they have “a bigger impact” if they convince their friends to sign a petition with them. Another participant described how his local community was able to more efficiently enact environmental change and protect their local natural resources by using their network of community members for collective action.

Familial Capital

In the interviews, familial capital manifested as support from family, extended family, and community and contributed to the participation of most interviewees. While familial capital was mostly spoken of in terms of continued engagement, it did support the initial participation of a few people (e.g., the participants’ parents conveyed the importance of civic duty or the importance of protecting the environment).

Familial capital provided emotional support to interviewees. Some participants said their families and communities would listen to them talk about their civic engagement related to the environment, would offer encouragement, or would follow their environmental advice. One interviewee said their family “understands their passion” for civic engagement related to the environment and that being close to family keeps them from being isolated. Similarly, interviewees emphasized the importance of community. One interviewee described how working in revolutionary spaces lends itself to community and how that community of like-minded people can be encouraging. When asked what supports her continued participation, she said, “I think knowing that there's always a community of people that are working in this sector, that you're never really alone.” Another interviewee described how connecting with their community by doing things like group dinners helped regenerate their drive for environmental change: “building a really strong resilient community is one of the ways that I felt refreshed from having to constantly be exposed to all of the issues that are happening.” In this case, the participant and their friends built resiliency by strengthening their community.

Some people were motivated to continue participating in civic engagement related to the environment to conserve resources for their families. For example, an interviewee whose extended family lived in Southeast Asia expressed that they were motivated to act partially out of concern for them, given they are “more vulnerable to climate change impacts like sea rise.” Another person said they continue persisting because they want themselves and their younger nephews to “have a healthy environment.” Another woman spoke about how she wants to be a mother someday and how she is “concerned about what conditions they'll grow up in and how they'll view the world” and so she contributes “to programs where [she] can help future generations including the children in [her] family and [her] friends' children.

Navigational Capital

In almost all cases, interview participants reported that they used navigational capital to participate in civic engagement related to the environment. Navigational capital was most often spoken of in relation to continued participation. Participants primarily described these forms of navigational capital: 1) skills and information related to civic engagement processes and 2) information about opportunities to be civically engaged. Participants leveraged their social and familial capital to learn this essential information. Most often, participants indicated that they relied on community, organizations, colleges, social media, environmental education, and family for the necessary information and skills.

Several interviewees attributed their knowledge of civic engagement processes to their social circles. One interviewee described how their friends would share information about public comment periods and opportunities to contact representatives, which “definitely increased” their level of engagement. As one interviewee put it, “having people in your life who are knowledgeable about how to fight against certain groups would be the key.” In another case, an interviewee recollected how their connections to a friend who works in policy helped them participate more effectively by using impactful techniques: “the emailing helps, the calling helps, the petitions don't really help.”

Many participants stated their social connections also provided information about opportunities to participate in civic engagement related to the environment. Several participants specifically used social media for this purpose. As one interviewee put it, social media is “definitely helpful” because “[you’re] just one click away from signing a petition or one click away from getting a link where you can type two paragraphs about why they shouldn’t be drilling this pipeline....” Others spoke about using connections to local organizations to learn more about local opportunities. One participant commented that they were “a lot more aware” of opportunities to participate because of their local community organizations.

Colleges also emerged as an important source of opportunities for civic engagement in the interviews. For example, this interviewee described how her school supported her engagement: “I would say that UCLA’s effort to make these sustainability campaigns gives me an opportunity to actually get involved. Because if they didn’t have those things, I wouldn’t really have a structure in place to actually try to help make change.” Another participant spoke about how going to college and connecting with different organizations like Latino Outdoors impacted her participation in civic engagement related to the environment:

If I hadn’t gone to college and if I hadn’t been a part of all these groups, I don’t know if I would have been really civically engaged. Because I wouldn’t have access to these different networks, I have access to now, and I wouldn’t have gone to these talks that tell you about how impactful it is - all these facts about public comments. I would probably feel really similar to how a lot of people in my community feel. I would probably feel really disempowered just seeing how things go for them all the time.

It seems that for this participant, connecting with different organizations and learning about the impacts of civic engagement through school, provided her with political efficacy that she would not otherwise have, which was essential to her participation. This view that political efficacy is necessary for continued engagement was echoed by others.

Resistant Capital

Approximately half of the interviewees reported using resistant capital to participate in civic engagement related to the environment. For these participants, resistant capital manifested in their understanding of systems of inequality and the ways in which they challenged that inequality to continue participating. Many participants expressed an understanding of structural racism within civic engagement processes as a whole. They spoke about feeling like their voices went unheard, about having higher barriers to participation because of their ethno-racial identities, and the belief that “the system helps some communities more than others.” Some individuals expressed understanding of institutional racism by speaking about tokenization and the lack of diversity within environmental organizations. For example, one interviewee said:

If you have only White managers on a team, you will never create a space of diversity because your diverse staff will probably feel uncomfortable saying things to you. Most big greens are mainly White...And diversity is not one person of color.

Other participants expressed an understanding of environmental justice and spoke on how their communities shoulder a higher burden of negative environmental impacts.

Despite exhibiting awareness about these inequities, the interviewees continued to persevere in the civic engagement space. They did so in several ways. A number of participants indicated that they are motivated to create change in these spaces for future generations. As one interviewee put it, “that desire to pave a path for the future generation is what inspires me, what motivates me to get involved in that kind of stuff. Because if an Asian kid can see me and feel inspired, that’s all I want.” Another person who had access to nature experiences as a kid was inspired to participate in civic engagement so other kids from the city could have the same opportunities.

Others persevered by creating BIPOC spaces within the civic engagement sphere. One interviewee alluded to this by saying, “if I can’t be authentic in a space, then I don’t want to be in that space. And sometimes it’s better to just create your own space.” Another participant indicated that being in diverse spaces and “having Black and Indigenous people in [their] life” provided them with knowledge about environmental justice that they would otherwise lack. While several interviewees expressed desire and motivation to enact “system-oriented” change, many of those same people indicated that they “wouldn’t even know where to start.”

Environmental Education

Most participants attributed their initial and continued participation in civic engagement to the environment at least in part to experiences with environmental education (EE). EE played a key role in driving initial civic engagement by teaching participants about environmental issues. Notably, a few people highlighted that it was the passion and interpersonal skills of their environmental educators that made the most significant impact on them.

Most participants described learning about environmental issues as highly impactful on their decision to participate in civic engagement. One person who had a more formal, classroom EE experience described it as the catalyst for their interest: “I can trace it back to learning about global warming and things like that in school. And understanding the importance of the damage that we cause to the planet.” While learning about environmental issues did not always drive interviewees to actually engage, several interviewees pointed to EE as the first step in their civic engagement journey. As one participant put it, “I feel like you have to know what’s going on in

order to want to do something about it.” EE also contributed to initial interest in another way - by connecting people to nature. A few participants spoke about how EE experiences from when they were younger provided them with an appreciation for nature, which would later play a role in their participation in civic engagement related to the environment.

While many people spoke on the impact of learning about global climate change and other highly publicized natural disasters through EE, a few people mentioned that learning about environmental issues in their local context was impactful for their participation. For example, one person mentioned learning about projected sea level rise issues in Baltimore and another mentioned learning about climate change and the shrinking of the Great Salt Lake and its related public health concerns. A small number of participants indicated that EE experiences provided them with tools to fight environmental issues. For example, a participant described how an environmental justice course taught them the importance of collective action and drove them to be more active in their local community.

Lastly, several participants implied that they had EE experiences by describing an understanding of environmental issues without providing a clear source for their knowledge. When questioned further, some of these participants attributed their knowledge to news sources or social media posts, suggesting that nonformal EE may be an important source of environmental knowledge.

Other Emerging Factors

In addition to the themes for which we deductively coded, a few inductive themes emerged in our analysis. Several of the participants not only talked about EE and knowledge of environmental issues, but also spoke about personally experiencing negative environmental effects. In one case, a participant described how sea level rise spurred their participation:

I come from a coastal community, and it was really big seeing the rising sea levels. They took out a good section of a neighborhood nearby. And these people no longer had a place to live...I think, seeing parts of different neighborhoods being swept away, there were newly formed groups in our local high schools that realized that this is something that we didn't want to progress even more, and we wanted to do our part to help stop that change.

Another participant responded that it was learning that PFAS (a group of harmful chemicals) was potentially present in their community's drinking water that contributed to their participation in civic engagement related to the environment.

Nearly half of the interviewees said they participated in civic engagement related to the environment because of their connection to nature. Some participated as a way to get outside and interact with nature as was the case with one person who volunteered for a reforestation project. Others expressed that it was their “love for nature” that led them to participate in civic engagement related to the environment.

Quantitative Results

EFA results

We conducted an EFA with principal axis factoring for all twenty items within our CCW scale as part our study on nature-based activities (see chapter 1, table 1-3). After removing low

scoring items, the final results revealed eighteen items that were distributed across four factors. Notably, each factor corresponded directly to one of the four capitals: social (Cronbach's $\alpha=0.77$), familial (Cronbach's $\alpha=0.89$), navigational (Cronbach's $\alpha=0.81$), and resistant (Cronbach's $\alpha=0.82$). We averaged the items within each factor to create single measures for social, familial, navigational, and resistant capital.

Factors Associated with Participation in Nature-Based Activities

Of the 1709 complete survey responses, 1387 were usable and 322 were removed due to failed attention and quality checks (Wardropper et al., 2021). The cleaned data was weighted using US census data on ethno-racial distributions for a total of 1808 responses. When asked about their participation in general civic engagement related to the environment within the past five years, approximately 67% of respondents indicated that they did participate. Those who participated did so most often by boycotting companies and products because they cause environmental harm ($n = 664$), signing petitions to support environmental initiatives ($n = 503$), “buycotting” (i.e., buying a product because it’s environmentally friendly) ($n = 481$), donating to environmental causes or organizations ($n = 467$), and volunteering for environmental organizations ($n = 344$). When asked to rank (5-point Likert scale from do not agree to completely agree) how much a friend, family member, role model, or organization, group, or club impacted their initial participation in civic engagement, respondents most often indicated that they first started participating because of an organization, group, or club. Further survey respondent characteristics are reported in Appendix J.

Notably, we found that resistant capital affected all our civic engagement measures (Appendix K and Figure 2-1). For each increase in one standard deviation (SD) in resistant capital (equivalent to .98), the odds of boycotting ($OR=1.63$; $CI=1.45-1.83$), signing petitions ($OR=1.55$; $CI=1.38-1.75$), donating ($OR=1.33$; $CI=1.19-1.49$), volunteering ($OR=1.27$; $CI=1.14-1.43$), “buycotting” ($OR=1.56$; $CI=1.39-1.77$), and participating in general civic engagement ($OR=1.26$; $CI=1.14-1.4$) also increased (Appendix K and Figure 2-1). We found that as familial capital increased by one SD (equivalent to .95), individuals were more likely to participate in general civic engagement ($OR=1.19$; $CI=1.05-1.35$), to donate ($OR=1.18$; $CI=1.04-1.35$), and to volunteer ($OR=1.37$; $CI=1.19-1.58$) (Appendix K and Figure 2-1). Familial capital was not, however, associated with the other forms of civic engagement (i.e., boycotting, signing petitions, and “buycotting”) (Appendix K and Figure 2-1). Each SD increase in social capital ($SD=.94$) increased the likelihood of boycotting ($OR=1.16$; $CI=1.02-1.33$) and “buycotting” ($OR=1.17$; $CI=1.02-1.35$). However, it did not have an effect on general civic engagement, signing petitions, volunteering, or donating (Appendix K and Figure 2-1). As navigational capital increased by one SD (equivalent to .95), the odds of general participation in civic engagement increased ($OR=1.17$; $CI=1.05-1.31$). Navigational capital had no effect on the odds of participating in boycotting, signing petitions, “buycotting”, donating, or volunteering (Appendix K and Figure 2-1).

Approximately 82.8% of respondents indicated that they had participated previously in a form of EE. The odds of participating in general civic engagement significantly increased for those with previous EE experiences as compared to those without ($OR=4.42$; $CI=3.39-5.8$) (Appendix K and Fig 2-2). EE experiences were also linked to an increase in boycotting ($OR=5.75$; $CI=4.15-8.09$), signing petitions ($OR=6.87$; $CI=4.82-10.05$), donating ($OR=4.95$;

CI=3.56-7.03), and volunteering (OR=6.13; CI=4.26-9.05) and “buycotting” (OR=4.78; CI=3.35-6.98)(Appendix K and Figure 2-2).

Some covariates were linked to our measures of civic engagement as well. It is worth noting that for approximately every additional 81 days respondents spent in nature in a typical year (SD=80.55), they had increased odds of participating in all measures of civic engagement, including general civic engagement related to the environment (OR=1.34; CI=1.22-1.47), boycotting (OR=1.45; CI=1.31-1.61), signing petitions (OR=1.42; CI=1.29-1.57), donating (OR=1.45; CI=1.32-1.6), volunteering (OR=1.45; CI=1.32-1.59), and “buycotting” (OR=1.41; CI=1.28-1.55)(Appendix K and Figure 2-1). Age had no effect on any of our measures of civic engagement (Appendix K and Figure 2-2). Results showed that survey respondents who identified as Black or African American had lower odds of boycotting (OR=0.57; CI=0.4-0.82), “buycotting” (OR=0.56; CI=0.39-0.81), and signing petitions (OR=0.63; CI=0.45-0.9) than the baseline (i.e. those who identified as multiracial non-Latine) (Appendix K and Figure 2-2). Those who identified as Latine or Asian on the survey had higher odds of donating to environmental organizations when compared multiracial non-Latine individuals (OR=2.24; CI=1.59-3.18) (Appendix K and Figure 2-2). The odds of volunteering also increased for participants who identified as Latine (OR=1.5; CI=1.08-2.1) when compared to those who were multiracial non-Latine (Appendix K and Figure 2-2). Interestingly, we did not find an effect of race when we asked about participation in civic engagement in general (Appendix K). Participants with a high (OR=1.76; CI=1.25-2.47) or middle (OR=1.23; CI=1.01-1.5) level of income had a higher likelihood of participating in general civic engagement than those of low income (Appendix K and Figure 2-2). Unsurprisingly, the odds of boycotting or “buycotting” were also higher for those with middle (boycotting: OR=1.24; CI=1.00-1.54, buycotting: OR=1.45; CI=1.16-1.82) or high (boycotting: OR=1.76; CI=1.25-2.47; buycotting: OR=2.53; CI=1.73-3.73) income levels when compared with low income individuals (Appendix K and Figure 2-2). We did not find that income had a significant effect on signing petitions, volunteering, or donating (Appendix K).

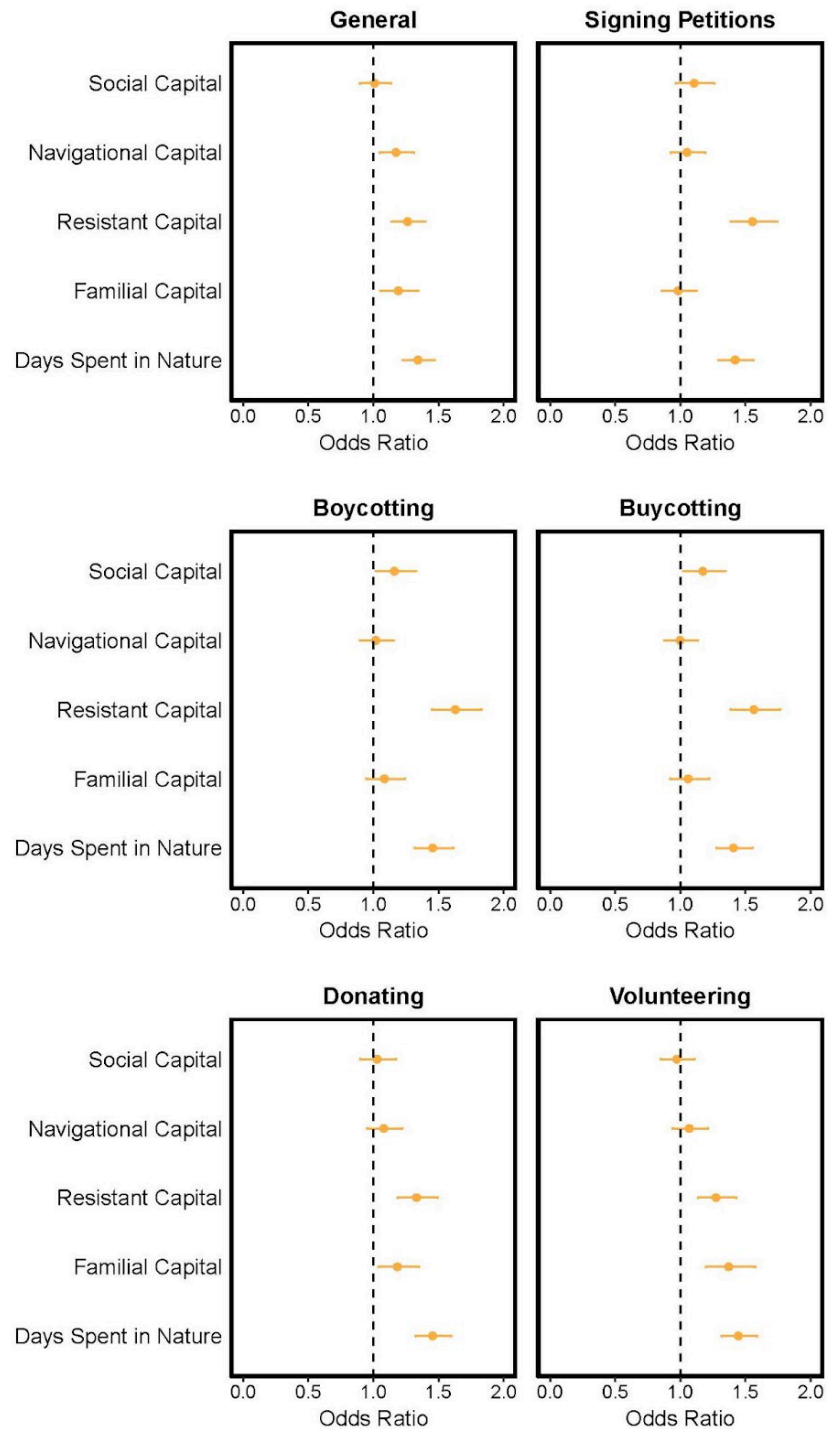


Figure 2-1. The relative effect of our ordinal and count predictors (CCW capitals and days spent in nature) on participation in civic engagement activities. Error bars are the 95% confidence intervals (CI). CIs that cross the OR of one (i.e., the dashed line) indicate no significant effect. OR reflects a change per each increase in one SD of the variable.

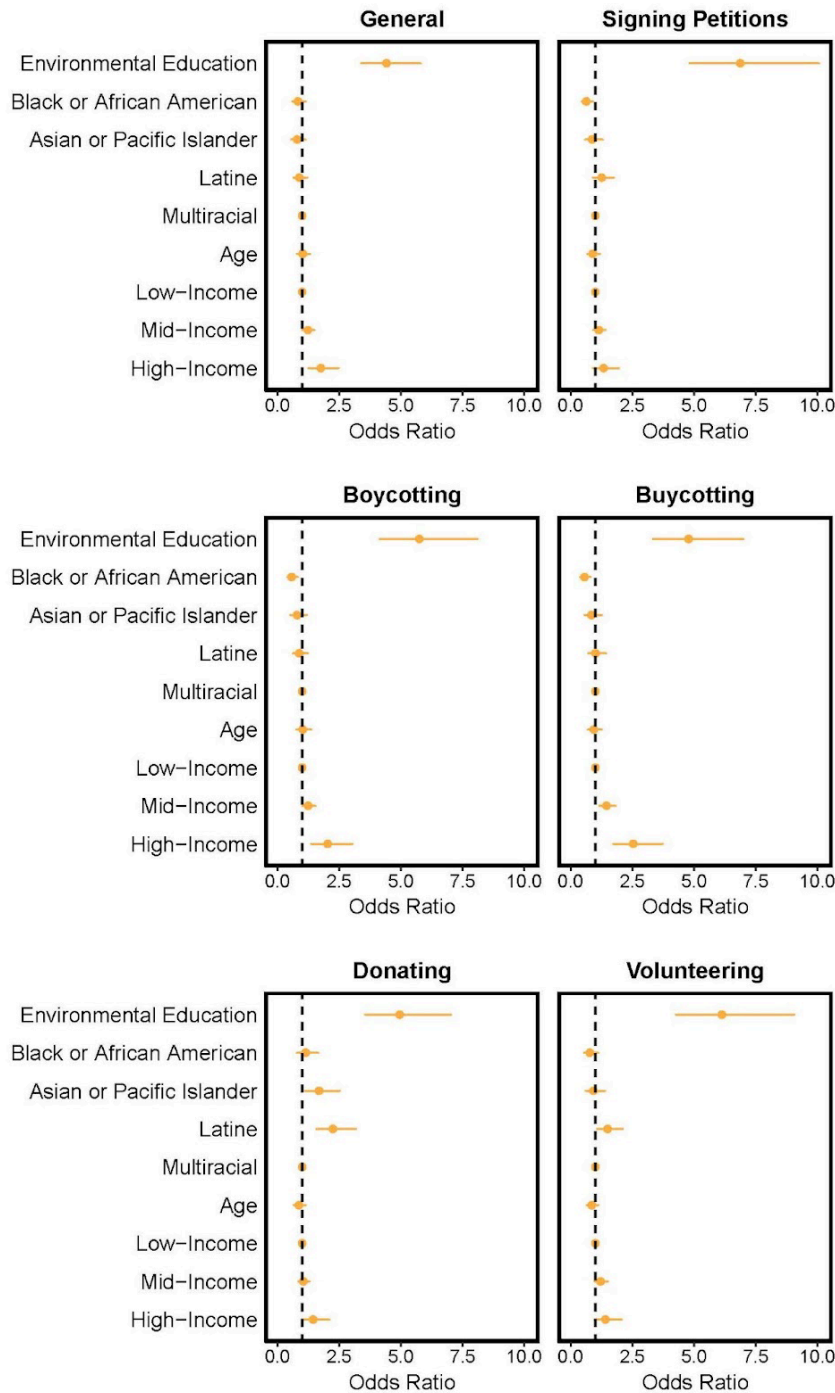


Figure 2-2. The odds ratio (OR) for our binary predictors. Error bars are the 95% confidence intervals (CI). CIs that cross the OR of one (i.e., the dashed line) indicate no significant effect.

DISCUSSION

We investigated the influence of community cultural wealth (CCW) and environmental education (EE) in fostering participation in civic engagement related to the environment among Black, Asian, and Latine individuals. This novel use of the CCW framework showed that

resistant, familial, social, and navigational capital were all positively associated with one or more measures of civic engagement related to the environment (i.e., general participation, boycotting, “boycotting”, volunteering, donating, and signing petitions). Most notably, we demonstrated a significant relationship between resistant capital and all six measures of civic engagement. Qualitative findings further revealed some ways people may leverage their capitals to be civically engaged. Additionally, we expanded prior research on Environmental Education (EE) and its link to civic engagement related to the environment by showing its positive association with participation for Black, Asian, and Latine individuals.

Community Cultural Wealth and Participation in Civic Engagement Related to the Environment

Quantitative results showed that resistant capital was linked with higher odds of participating in all measures of civic engagement used in this study. This suggests that knowledge of structures of oppression and the motivation to challenge those structures may be important for fostering civic engagement related to the environment among Black, Asian, and Latine individuals. These findings reflect those of earlier studies that link the knowledge of systemic injustices with civic action, albeit without clear directionality (Diemer et al., 2021). Notably, we asked about knowledge of structures of oppression in general, and not specifically about knowledge of environmental injustice (i.e., the inequitable distribution of environmental benefits and burdens), although many posit that environmental and social justice issues are inexorably linked (Ergas et al., 2021). These results are not surprising given prior research indicating that Black environmentalists may prioritize environmental justice issues such as neighborhood pollution (Johnson et al., 2004) and that youth are more inclined to be interested in civic issues relevant to their culture and ethno-racial background (Patterson et al., 2019). Taken together, these findings suggest that considering civic engagement related to the environment through an intersectional lens, highlighting the interconnectedness of environmental and social issues, and addressing concerns specific to these communities could be essential for boosting participation.

Curiously, resistant capital was not salient for all interview participants, only about half of our interviews were coded for it. This difference between qualitative and quantitative results may be due to the nature of our questions for each method - the quantitative questions explicitly asked about resistant capital whereas the qualitative questions were more indirect. Of the interviewees who did rely on resistant capital, several emphasized their perception of inequities within civic engagement processes, noting that certain groups wielded more influence than others. Others expressed concern about the predominantly White makeup of major environmental organizations. Interviewees persisted with their civic engagement, despite being aware of these disparities, in part because they were fueled by a determination to support future generations, similar to findings from another CCW study on Latine graduate healthcare students (Zell, 2014). Others were driven by the mission to create inclusive spaces that amplify the voices of BIPOC communities. A notable subset of participants actively sought to instigate change. In fact, multiple interviewees underscored the critical role of systemic change in promoting diverse participation in civic engagement related to the environment and in advancing environmental justice initiatives.

The other capitals were each linked with one or more of the quantitative measures of civic engagement related to the environment, but not to all of them. For example, social capital

was positively associated with boycotting and “buycotting”. In the qualitative interviews, interviewees described deriving instrumental and social support from their social networks, including organizations and institutions. Some participants said that despite having a previous interest in civic engagement, it was their social capital that ultimately moved them to act - a finding which supports the work of other studies which link peer relationships with increased civic engagement (Barrett and Pachi, 2019; Wray-Lake and Abrams, 2020). Similarly, familial capital (which was linked to general civic engagement, volunteering, and donating in the quantitative analysis) provided essential emotional and instrumental support to the interviewees. Other studies have linked family political interest, political knowledge, values, and political behavior to young people’s civic engagement (Barrett and Pachi, 2019). Although it is important to note that our measure of familial capital was general and did not include ties to civic engagement, which emphasizes its effect. In addition to relatives, having a supportive community was regenerative for some interview participants and helped them persist with their civic actions. Lastly, navigational capital was only associated with general civic engagement related to the environment. In the interviews, participants spoke about how their social and familial capital led to navigational capital, by providing essential skills, information, and opportunities. This finding underscores the importance of establishing pathways to cultivate social or familial capital. One potential avenue could be connecting with organizations like affinity groups and colleges, which many interview participants identified as influential. Similarly, several previous studies have demonstrated that institutions such as faith-based organizations, community organizations, and especially colleges are linked to civic engagement (Barrett and Pachi, 2019; Flanagan and Levine, 2010; Flanagan et al., 2011). Additionally, some interviews associated their increased knowledge and skills (i.e., navigational capital) with a strengthened sense of political self-efficacy. These participants highlighted the importance of political self-efficacy in civic engagement related to the environment, which is consistent with existing literature on political self-efficacy (Wray-Lake and Abrams, 2020). Therefore, providing opportunities to learn more about civic engagement processes and skills could strengthen political self-efficacy and increase civic engagement related to the environment.

Environmental Education

Environmental education (EE) was positively associated with all measures of civic engagement related to the environment. While we cannot assume directionality or causation through our quantitative results, our qualitative results showed that EE influenced participation in civic engagement related to the environment. Nevertheless, this association may operate bidirectionally. For example, individuals engaged in civic engagement related to the environment might also exhibit heightened inclination towards EE involvement.

These findings reflect those of numerous studies which connect EE to civic engagement and provide further evidence that EE may be impactful for Black, Asian, and Latine individuals specifically (Ardoin et al., 2023; Levy and Zint, 2011). Qualitative results suggest that EE could be a key method of recruiting new and diverse participants into civic action by fostering environmental attitudes, knowledge, and civic skills. They provided further context into what aspects of EE were particularly efficacious in fostering civic engagement. Some respondents highlighted the passion and interpersonal skills of their educators, while others said that learning about environmental issues from EE was the first step in their civic engagement journey. Similar to a review of civic engagement outcomes of EE, we found that experiential learning, a focus on

local issues, and learning relevant skills were themes that supported civic engagement amongst participants (Ardoin et al., 2023). Consequently, we suggest that educators consider these themes when designing EE programs.

While EE is a potential avenue to civic engagement for Black, Asian, and Latine people, it is crucial to acknowledge that there are persistent inequities in access to and participation in EE within these communities (Anderson, 2021). The civic engagement outcomes of EE cannot reach a broader audience until we address this gap in access. To mitigate these disparities, we suggest that future researchers consider using the CCW framework to design a culturally responsive EE curriculum. CCW has potential not only as a tool to better understand the persistence of students of color in EE programs, but also to design programs that leverage the capital of students and support their persistence.

In the qualitative interviews, nearly half of the interview participants participated in civic engagement related to the environment due to their “love for nature” or desire to be outside. The link between nature interaction and civic engagement related to the environment is a notion well established in the literature (Wells and Lekies, 2006; Cooper et al. 2015; Kals et al. 1999; Larson et al., 2011). We saw an example of this in the present study when several interviewees participated in volunteer opportunities because it was a way for them to get outside. In the quantitative study, we found that participants who spent more time in nature in a typical year had higher odds of participating in all our measures of civic engagement. These findings suggest that nature interaction has potential to support participation in civic engagement related to the environment for Black, Asian, and Latine individuals. These results underscore the significance of diversifying nature-based recreation - an activity that has historically excluded these communities and continues to exhibit disproportionate participation (Outdoor Foundation, 2022; Rowland-Shea et al. 2020).

Age, Income, Race

This study documented differences in civic engagement rates based on race and income, but not on age. Although some studies find that young people are less likely to exhibit civic behavior (Flanagan et al., 2011), our results may differ because we specifically examined civic engagement related to the environment, an issue that is seeing increasing youth leadership and support (Tyson and Funk, 2021). As for income, individuals with middle or high income were more likely to engage in several measures of civic engagement (i.e., “buycotting”, boycotting, and general) compared to people of low income, which is a well-established pattern in previous literature (Barrett and Pachi, 2019). Income is often correlated with education, which is another key predictor of civic engagement (Flanagan et al., 2011). It is interesting to note that while we observed variations in participation rates across ethno-racial groups and specific types of civic engagement (e.g., Latine and Asian respondents had higher odds of donating to environmental organizations), we did not find a difference between ethno-racial groups for general civic engagement related to the environment. This suggests that while these groups may have different preferences for civic engagement types (or face diverse barriers), they may participate at similar rates. Offering a variety of opportunities can ensure that individuals from diverse economic and ethno-racial backgrounds have civic engagement activities aligning with their preferences and abilities.

Recommendations

In accordance with our resistant capital results, fostering an understanding of inequities within civic engagement related to the environment may be a key approach to garner environmental interest and action among Black, Asian, and Latine individuals. This could entail education on environmental justice, emphasizing the intersectionality of environmental and racial issues, or framing issues in a manner that prioritizes the needs of Black, Asian, and Latine communities.

Additionally, ensuring that Black, Asian, and Latine individuals have institutional opportunities to participate in civic engagement related to the environment should be prioritized. We recommend investing in community organizations, faith-based organizations, affinity groups, and other institutions which provide free and public civic opportunities. This is especially important considering that some regard 4-year colleges, which can be expensive and exclusive, as the “central institution” by which youth civic engagement is promoted (Flanagan and Levine, 2010). Providing alternative avenues for civic engagement opportunities to college-aged individuals is particularly crucial because the civic skills, attitudes, and beliefs cultivated during that time play a significant role in shaping continuous civic engagement throughout one’s life (Flanagan and Levine, 2010). Therefore, we recommend supporting existing institutions that provide opportunities for civic engagement related to the environment. Furthermore, it is crucial to endorse affinity-based organizations and those amplifying BIPOC voices, as emphasized by our qualitative findings which revealed the barriers presented by predominantly White environmental organizations. BIPOC spaces, as indicated by our results, have the potential to attract a more diverse cohort of environmentalists.

As indicated by our findings, individuals from different ethno-racial and income backgrounds participated in civic engagement related to the environment in diverse ways and should therefore be provided with varied participation opportunities. To enhance engagement, we must increase the diversity of engagement opportunities. Additionally, future research should consider the barriers faced by diverse segments of the US population when participating in civic engagement related to the environment and identify resources to mitigate these challenges.

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APPENDIX A

IRB Approval Letter



Division of Scholarly Integrity and
Research Compliance
Institutional Review Board
North End Center, Suite 4120 (MC 0497)
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irb@vt.edu
<http://www.research.vt.edu/sirc/hrpp>

MEMORANDUM

DATE: May 2, 2022

TO: Willandia Chaves Didier, Ashley Anne Dayer, Tiffany A Drape, Alison Bowers, Aida Bagheri Hamaneh, Lena Mahyoub

FROM: Virginia Tech Institutional Review Board (FWA00000572)

PROTOCOL TITLE: Exploring factors that influence Black, Asian, and Latinx people's interactions with nature and participation in environmental civic engagement

IRB NUMBER: 22-113

Effective May 2, 2022, the Virginia Tech Human Research Protection Program (HRPP) determined that this protocol meets the criteria for exemption from IRB review under 45 CFR 46.104(d) category (ies) 2(ii).

Ongoing IRB review and approval by this organization is not required. This determination applies only to the activities described in the IRB submission and does not apply should any changes be made. If changes are made and there are questions about whether these activities impact the exempt determination, please submit an amendment to the HRPP for a determination.

This exempt determination does not apply to any collaborating institution(s). The Virginia Tech HRPP and IRB cannot provide an exemption that overrides the jurisdiction of a local IRB or other institutional mechanism for determining exemptions.

All investigators (listed above) are required to comply with the researcher requirements outlined at:

<https://secure.research.vt.edu/external/irb/responsibilities.htm>

(Please review responsibilities before beginning your research.)

PROTOCOL INFORMATION:

Determined As: **Exempt, under 45 CFR 46.104(d) category(ies) 2(ii)**
Protocol Determination Date: **March 14, 2022**

ASSOCIATED FUNDING:

The table on the following page indicates whether grant proposals are related to this protocol, and which of the listed proposals, if any, have been compared to this protocol, if required.

Invent the Future

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An equal opportunity, affirmative action institution

SPECIAL INSTRUCTIONS:

This is a personnel amendment, submitted on March 21, 2022, to add Alison Bowers and Lena Mahyoub. The Individual investigator agreement has been executed.

Date*	OSP Number	Sponsor	Grant Comparison Conducted?

* Date this proposal number was compared, assessed as not requiring comparison, or comparison information was revised.

If this protocol is to cover any other grant proposals, please contact the HRPP office (irb@vt.edu) immediately.

APPENDIX B
Organizations Contacted for Recruitment

Alabama Black Belt Adventures
Amherst College -Outing Club
Basecamp: outdoor jobs and more
BIPOC Mountain Collective
BIPOC Outdoors Twin Cities
Black Adventure Crew
Black folks camp too
Black Girls Hike RVA
Black Girls Surf
Black Girls Trekkin
Black Hunters and Fishing
Black Outside Inc.
Brown Folks Fishing
Brown People Camping
Center for diversity in the environment
Climbers of color
Colorado Mountain Club
Community Nature Connection
Diversify whitewater
Georgia State University - Dunwoody Outdoor Adventure Club
Georgia State University - Student Environmental Team
Get Out Stay Out
Great Outdoors LA
HECHO (Hispanics enjoying camping, hunting, and the outdoors)
Hunters of Color
In Solidarity Project
Interim CDA
Justice Outside
Latino Outdoor DMV
Latino Outdoors
National Brotherhood of Skiers
Nature for All
Nuestra Tierra
Outdoor Alliance
Outdoor Asian
Outdoor Industry Association
Outdoors Empowered Network
PDX People of Color Outdoors
PGM One
Pomona College -Black Student Union
Pomona College's Latinx Alliance
Queer Nature
Rutgers Outdoors Club

Rutgers Wildlife Society
Sierra Club - North Star Chapter
Soul Trak
The Brown Ascenders
Trail Mixed
UC Riverside - CalPIRG
UCLA - Backpacking club
UCLA - Bruin Birding Club
UCLA - Environmentalists of Color Collective
University of Houston Horticultural Society
University of Houston Wall Crawlers
University of Nevada, Las Vegas - Audubon Student Conservation Chapter
University of Nevada, Las Vegas - Ecology, Conservation, and Evolution Club
University of Nevada, Las Vegas - Mountain Club
University of Nevada, Las Vegas - Student Sustainability Council
Venture Out Project
Venture Outdoors
Vibe Tribe Adventures
Virginia Tech - Bird Club
Virginia Tech - Black Students in STEM
Virginia Tech - Climbing Club
Virginia Tech - Horticulture Club
Virginia Tech - LAIGSA
Virginia Tech - MANRRS
Virginia Tech - Venture Out
Virginia Tech - Wildlife Society
Virginia Tech - Art for Environmental Justice
Virginia Tech - Outdoor Club
We Got Next
Wild Diversity
Women Who Hike

APPENDIX C

Interview Screening Survey

Consent

Virginia Tech is conducting a national study to learn more about factors that initially drive and continually support Black, Asian, and Latinx Americans with their interactions with nature and participation in environmental civic engagement (IRB Protocol #22-113). As a component of this study, we will be conducting 30-45 minute virtual interviews with participants from all over the US who interact with nature, are 18-25, and are Black, Asian, or Latinx. By sharing your thoughts and experiences in these interviews, you can help us gain a better understanding of how to support all Black, Asian, and Latinx people in outdoor spaces.

Your participation in this study is completely voluntary and you can stop participating in the research study at any time, for any reason, and it will not be held against you. There are no right or wrong answers to the screening survey or the subsequent interview questions. Your responses will never be presented in a way that could be connected to your identity. The results of this study will be published as a graduate thesis, presentations, reports, and journal articles. There are no known risks or benefits to participating in this research study.

If you have questions regarding this study or would like more information, please contact Aida Bagheri Hamaneh at aidabagheri@vt.edu. If you have questions or concerns about this study's conduct or about your rights as a research subject, you may contact the Virginia Tech IRB at 540-231-3732 or irb@vt.edu.

Do you consent to participate in this research study?

- ☐ Yes, I agree to participate in this research study
- ☐ No, I do not agree to participate in this research study

Demographics

What is your zipcode for most of the year?

How old are you?

- ☐ Under 18
- ☐ 18-25
- ☐ 26-30
- ☐ 31-35
- ☐ 36-45
- ☐ 46-65
- ☐ 66+

What is your gender?

- ☐ Male
- ☐ Female
- ☐ Non-binary / third gender
- ☐ Prefer not to say
- ☐ Prefer to self-describe

Are you of Hispanic, Latino, or Spanish Origin?

- ☐ Yes
- ☐ No

How would you describe yourself?
(Please select all that apply.)

- ☐ American Indian or Alaska Native
- ☐ Asian
- ☐ Black or African American
- ☐ Native Hawaiian or other Pacific Islander
- ☐ White

College/Org

What is the highest degree or level of school you have completed?
(If currently enrolled, highest degree received.)

- ☐ No schooling completed
- ☐ Some high school, no diploma
- ☐ High school graduate (diploma or equivalent)
- ☐ Some college, no degree
- ☐ Associate's degree
- ☐ Bachelor's degree
- ☐ Graduate degree

How did you hear about this study?

- ☐ Outdoors Empowered

- ☐ HECHO
- ☐ Latino Outdoors
- ☐ HBCUs Outside
- ☐ Next100 Coalition
- ☐ Black AF in STEM
- ☐ The Black Ecologists Section of the ESA
- ☐ 500 Women Scientists
- ☐ Scientist Sentinels
- ☐ Other

Interactions With Nature

Next we are interested in your interactions with nature

In which of the following ways have you participated in outdoor recreation in the past 12 months?

- ☐ Trail-based activities (hiking, jogging, backpacking, off-roading etc.)
- ☐ Water-based activities (kayaking, swimming, stand-up paddle boarding, etc)
- ☐ Winter outdoor activities (skiing, sledding, ice skating, etc.)
- ☐ Wildlife-related activities (hunting, fishing, birdwatching, etc.)
- ☐ Outdoor sports (soccer, football, tennis, golf, etc.)
- ☐ Camping (tent camping, RVs)
- ☐ Picnicking
- ☐ Other
- ☐ I do not participate in any of the activities.

In the past 12 months, about how many days did you spend engaging in the activities mentioned above?

- ☐ 1-7
- ☐ 8-14
- ☐ 15-30
- ☐ 31-45
- ☐ 46+
- ☐ Never

Civic Engagement

We are also interested in your civic engagement related to the environment

Civic engagement is the way that people are involved in the decision-making processes in their communities to improve conditions for themselves and others.

In the past 5 years, have you participated in any of the following forms of environmental civic engagement?

(Please select all that apply.)

- ☐ Signing petitions (written or email)
- ☐ Volunteering for environmental advocacy groups
- ☐ Protesting for environmental issues
- ☐ Donating money to support environmental causes
- ☐ Boycotting for environmental causes
- ☐ Voting to support environmental causes

- ☐ Writing letters in support of environmental causes
- ☐ Other
- ☐ I do not participate in any of these activities.

Name and Email

Thank you for telling us about yourself and your experiences. Finally, we need to know how to get in touch with you if you are selected to participate

Please provide your name and email address

Name

Email address

Powered by Qualtrics

APPENDIX D
Interview Recruitment Materials

Email to organizations

Hello,

I am a master's student at Virginia Tech conducting a research study to better understand how to support Black, Asian, and Latine folks' participation in outdoor recreation and environmental civic engagement (IRB 22-113). I am looking for potential participants to interview as part of this study. I would greatly appreciate it if you could forward this email to your [insert organization] email list to help with this effort.

Understanding what initiates and supports Black, Asian, and Latine people's participation in outdoor recreation can help park managers, environmental educators, and other practitioners create more inclusive, supportive, and culturally relevant programs. Additionally, encouraging and supporting Black, Asian, and Latine people in civic engagement will help empower these groups to make environmental decisions for themselves and their communities.

I am looking for interview participants who:

- Spend time in nature,
- Are 18-25,
- And are Black, Asian, or Latinx.

All participants will be eligible for a drawing for a \$50 digital gift card, with a 1 in 6 odds of being selected. If you're interested in joining me for a 30-45 minute virtual interview as part of this research, please [click here](#) to learn more and answer some initial screening questions, or email me at aidabagheri@vt.edu.

Thanks so much for your help,
Aida Bagheri Hamaneh
Graduate Research Assistant
Department of Fish and Wildlife Conservation
Virginia Tech | Latham 340

Sample Social Media Post

Hey There! Want to contribute to a study on supporting diversity in outdoor spaces? I am a master's student at Virginia Tech conducting interviews develop a greater understanding of how to support BIPOC in outdoor spaces (IRB 22-113). I am looking for interview participants from all over the US who:

- Participate in outdoor recreation
- Are 18-25
- And are Black, Asian, or Latinx.

All participants will be eligible for a drawing for a \$50 digital gift card, with a 1 in 6 odds of being selected.

If you're interested in joining me for a 30-45 minute virtual interview as part of this research, please click here (https://virginiatech.qualtrics.com/.../SV_8hKwBmBOEGdhrQa) to learn more and answer some initial screening questions, or email me at aidabagheri@vt.edu

VIRGINIA TECH IRB 22-113

STUDY ON DIVERSITY IN THE OUTDOORS

A master's student at Virginia Tech is conducting interviews for a **study which explores how to support BIPOC in outdoor spaces.**

You're eligible to participate if you are:
18-25, spend time in nature, and are Black, Asian, or Latine

All participants will be eligible for a drawing for a \$50 digital gift card, with a 1 in 6 odds of being selected

If you're interested in joining us for a 45 min virtual interview as part of this research, please follow the link below to see if you're eligible or email aidabagheri@vt.edu for more info

www.tinyurl.com/outdoors-study

Selection Email

Email subject: Virginia Tech Diversity in the Outdoors Virtual Interview: You have been selected

Dear [participant name]

You have been selected to participate in a virtual interview with Virginia Tech about your experiences in the outdoors and with environmental civic engagement (IRB # 22-113).

By sharing your thoughts and experiences, you can help us better understand what factors support Black, Asian, and Latinx folks in the outdoors and in environmental civic engagement. During the meeting, we'll ask you a series of questions about your experiences. The interview should take approximately 30-45 minutes, and it will be audio-recorded to allow us to accurately capture your thoughts. Your responses will not be associated with your name. There are no known risks associated with participating in the study, and your participation is completely voluntary. Results from this research study will be used for peer-reviewed publications, a master's thesis, presentations, and reports for participants.

To sign up to participate in this study, please use the following link to schedule a time to participate: <https://calendly.com/dei-study/interview>.

For more information on the study, please review the attached information sheet. If you have any questions regarding this study or would like more information before signing up for the interview, please reply to this email or email Aida Bagheri Hamaneh at aidabagheri@vt.edu.

I look forward to talking with you!

Sincerely,
Aida Bagheri Hamaneh
Graduate Research Assistant
Department of Fish and Wildlife Conservation
Virginia Tech | Latham 340

Reminder Email

Email subject: We'd Like to Interview you About your Experiences in the Outdoors

Dear [participant name],

We're interested in interviewing you as part of a Virginia Tech Study on your experiences in the outdoors and with environmental civic engagement. By sharing your thoughts and experiences, you can help us better understand what factors support Black, Asian, and Latinx folks in the outdoors and in environmental civic engagement. During the meeting, we'll ask you a series of questions about your experiences.

The interview should take approximately 30-45 minutes, and it will be audio-recorded to allow us to accurately capture your thoughts. Your responses will not be associated with your name. There are no known risks associated with participating in the study, and your participation is completely voluntary. Results from this research study will be used for peer-reviewed publications, a master's thesis, presentations, and reports for participants.

To sign up to participate in this study, please use the following link to schedule a time to participate: <https://calendly.com/dei-study/interview>.

For more information on the study, please review the attached information sheet. If you have any questions regarding this study or would like more information before signing up for the interview, please reply to this email or email Aida Bagheri Hamaneh at aidabagheri@vt.edu.

I look forward to talking with you!

Sincerely,
Aida Bagheri Hamaneh
Graduate Research Assistant
Department of Fish and Wildlife Conservation
Virginia Tech | Latham 340

Confirmation Email:

Email subject: Confirming Interview for Study on Diversity in the Outdoors

Dear [Participant Name],

Thank you for your interest in this research study. This email is to confirm our scheduled interview for (time) on (date). Below is the zoom link that you may use for the interview. If you do not have internet access that allows for web-conferencing, you can call this number instead (zoom number and code).

I'm happy to answer any questions that you may have. I'm looking forward to speaking with you and if you have any questions please contact me at aidabagheri@vt.edu

Sincerely,
Aida Bagheri Hamaneh
Graduate Research Assistant
Department of Fish and Wildlife Conservation
Virginia Tech | Latham 340

Thank you email

Email subject: Thank You for Your Participation in Our Study on Diversity in the Outdoors

Dear [Participant Name],

Thank you for taking the time to speak with me today. I appreciated hearing about your experiences with outdoor recreation and in environmental civic engagement. Once we have finalized the findings from this study, we will email you with a link to a summarized report of our results. You can expect a link to the report within the next 6-9 months.

Thank you again for your time.

Best,
Aida Bagheri Hamaneh
Graduate Research Assistant
Department of Fish and Wildlife Conservation
Virginia Tech | Latham 340

APPENDIX E
Anonymized Demographic Data for Interview Participants

ID	Gender Identity	Ethnicity	Race	Education	# of Days Participating in Nature-Based Activities in the Last Year	Participated in Civic Engagement?
1	Non-binary / third gender	Yes	White	Bachelor's degree	46+	Yes
2	Non-binary / third gender	Yes	White	Bachelor's degree	46+	Yes
3	Female	Yes	White	Bachelor's degree	15-30	Yes
4	Female	No	Black or African American	Bachelor's degree	8-14	No
5	Female	No	Black or African American	Bachelor's degree	8-14	Yes
6	Male	No	Black or African American	Bachelor's degree	8-14	Yes
7	Female	No	Asian	Some college, no degree	46+	Yes
8	Female	No	Asian	Some college, no degree	46+	Yes
9	Female	No	Asian	Bachelor's degree	31-45	Yes
10	Female	Yes	Asian	Associate's degree	31-45	Yes
11	Female	No	Black or African American	Bachelor's degree	8-14	Yes
12	Male	Yes	White	Some college, no degree	31-45	Yes
13	Female	No	Black or African American	High school graduate (diploma or equivalent)	8-14	No
14	Female	No	Asian	Associate's degree	46+	Yes
15	Male	Yes	White	Bachelor's degree	8-14	Yes
16	Female	Yes	Black or African American	Graduate degree	15-30	Yes
17	Female	No	Black or African American	Some college, no degree	46+	Yes
18	Male	No	Asian, White	Some college, no degree	31-45	No
19	Male	Yes	White	Bachelor's degree	46+	Yes

20	Female	No	Asian	Graduate degree	15-30	No
21	Non-binary / third gender	No	Asian	Some college, no degree	46+	Yes
22	Female	Yes	Asian	High school graduate (diploma or equivalent)	46+	Yes
23	Male	No	Asian	High school graduate (diploma or equivalent)	31-45	No
24	Female	No	Black or African American, White	Bachelor's degree	46+	Yes
25	Non-binary / third gender	No	Asian	Bachelor's degree	8-14	Yes
26	Female	No	Black or African American, White	Bachelor's degree	31-45	Yes
27	Male	Yes	American Indian or Alaska Native, Black or African American	Some college, no degree	15-30	Yes
28	Female	Yes	Black or African American	Graduate degree	46+	Yes
29	Male	Yes	White	Bachelor's degree	15-30	Yes
30	Female	No	Asian	Bachelor's degree	31-45	Yes
31	Female	Yes	White	High school graduate (diploma or equivalent)	46+	Yes
32	Female	Yes	White	Bachelor's degree	15-30	Yes
33	Female	No	Asian	Bachelor's degree	15-30	Yes
34	Female	Yes	American Indian or Alaska Native, Asian, White	Bachelor's degree	46+	Yes
35	Female	No	Asian, White	Graduate degree	15-30	Yes
36	Female	No	Asian	Graduate degree	15-30	Yes

APPENDIX F

Interview Script

Hello and thank you for taking the time to talk with me today. My name is Aida Bagheri Hamaneh and I am a graduate student at Virginia Tech.

As a part of my thesis, I am conducting a national study to learn more about what supports Black, Asian, and Latinx people in outdoor recreation and civic engagement. In this interview, I will ask you some questions about your experiences with activities in natural settings, civic engagement, and environmental education. The interview should be about 30-45 minutes long. By participating in these interviews, you will help us gain a better understanding of how to support all Black, Asian, and Latinx people in outdoor spaces.

Please keep in mind that there are no right or wrong answers and that your responses will be completely confidential and never associated with your name, so please feel free to speak your mind openly. Your participation in this interview is also completely voluntary, and you can choose to skip questions or leave the conversation at any time. We will be audio recording this meeting to ensure that we accurately capture your responses.

Thank you again for your participation, do you have any questions before we begin?

Let's start by talking about nature and the ways that you interact with nature

- What comes to mind when you think of nature? (Taylor)

I. Interactions with Nature

- A. What activities do you enjoy doing in natural settings or in the outdoors?
 - 1. Can you describe these activities? (Do you view wildlife, go boating, or fishing?)
- B. How did you first start [reference activities they mentioned]?
 - 1. Were there any significant events which you believe contributed to your initial interest in these activities? (Peters Grant)
 - a. How about any significant people?
 - b. How was this event/person significant?
- C. Since then, what has supported your continued engagement with these activities?

II. Environmental Education/Interaction with Nature

Thank you for telling me about your experiences with nature. Now I hope to learn more about any environmental education experiences you might have had in your life. That would be any program or place where you learned more about the environment, and developed skills and understanding about how to solve the world's environmental problems (NAAEE).

- A. Have you ever participated in an environmental education program?

1. For example, have you ever experienced environmental education during a school field trip, at a nature center, zoo, or botanical garden?
2. If so, can you describe these experiences?
3. How did these experiences impact you?
- B. Have these experiences encouraged your *initial* interest in [reference activities they mentioned]?
 1. If so, in what ways?
- C. Have these experiences supported your continued engagement in [reference activities they mentioned]? (Such as giving skills or information on what to do or where to go, or introducing you to organizations or people?)
 1. If so, in what ways?

III. Cultural Capital/Interaction with Nature

Thank you, now I'm going to ask you more questions about your engagement in [reference activities they mentioned].

- A. How has your family responded to your interest in [reference activities they mentioned]? (Gonzalez)
 1. Have they encouraged your participation in these activities? How?
 2. For example, have they offered to drive you places, or pay for things, or given you skills or information on what to or where to go?
- B. Have members of your community outside of your family supported your engagement in these activities? (This can include organizations, friends, educators) (Gonzalez)
 1. In what ways?
 2. Are there any community resources that directly support your engagement in these activities (community groups, church groups, etc.)? (Gonzalez)
 3. Do you generally engage in these activities alone or with others?
- a. Are these activities organized and planned by someone else (someone you know or an organization/person unfamiliar to you)
- C. What strategies, if any, do you use to maneuver through these activities? Such as getting information like finding where to go, or information about skills or equipment you might need. (Gonzalez)
 1. What strategies did you learn from your family and community that helped guide you through these activities? (Gonzalez)
- D. Were there any certain people, organizations, or groups that you felt you had to struggle against to participate in these activities? (Gonzalez)
 1. How did you persevere through that? (Gonzalez)

IV. Civic Engagement/Transformative Resistance

Thank you for sharing your thoughts and experiences. Now I would like to talk more about your participation in civic engagement related to the environment. By civic engagement I mean ways that you participate in your community or government in order to improve environmental conditions. Before I start asking questions about civic engagement, I'll post a few examples in the chat so you can get an idea of what I mean. Please keep these examples in mind when answering questions, but remember that it's not a complete list so feel free to speak on other types of civic engagement as well. (In Zoom Chat: Community problem solving, Regular volunteering for an organization involved with environmental causes, Fundraising for an

environmental cause, Donating to an environmental Cause, Regular voting to support environmental causes, Advocating for environmental issues, Campaign contributions with environmental causes in mind, Volunteering for candidate or political organizations because they support environmental causes, Contacting officials, Contacting media, Protesting, Signing petitions, Boycotting, Canvassing)

- A. In what ways, if any, do you participate in civic engagement related to the environment?
 - 1. Such as (but not limited to) voting, activism, advocating, participating in public hearings, making public comments (Alder et al.)
 - 2. Could you describe?
- B. What first encouraged you to participate in civic engagement related to the environment?
 - 1. Were there any significant events which you believe contributed to your involvement in civic engagement related to the environment? (Peters Grant)
- a. How about any significant people?
- b. How was this event/person significant?
 - 2. Can you describe your community's (or neighborhood's or friends) involvement in environmental issues?
- . Are environmental issues a big concern in your community?
- a. Does this affect your participation in civic engagement? How?
 - 3. Earlier we talked about your experiences with environmental education, do you feel like those experiences influence your civic engagement? If so, how?
- C. What supports your continued participation in civic engagement related to the environment?
 - 1. Does your family or community support your participation in civic engagement related to the environment?
- D. What strategies, if any, do you use to maneuver through civic engagement processes?
 - 1. Where did you learn these strategies?
 - 2. What strategies did you learn from your family and community that helped you navigate civic engagement processes?
- E. Were there any certain people, organizations, or groups that you felt you had to struggle against to participate in these activities? (Gonzalez)
 - 1. How did you persevere through that? (Gonzalez)

Before we end, is there anything you would like to share with me that I didn't cover in the interview?

Thank you for your participation! The results of these interviews will be published as a report, graduate thesis, and journal articles. If you're interested, I can send you a short report of the results via email. Please reach out to me via phone or email if you have other questions or comments.

APPENDIX G
Code Book

Code	Description	Example
Connection to nature	Describing an emotional, cognitive, or spiritual connection to nature	“I think being in really amazing landscapes is just really inspiring, and it’s very spiritual for me in a way. I didn’t grow up super religious, but I think I feel most connected with things outside of me when I am just out in nature.”
Continued participation	People, actions, or events that supported the participants continued participation or interest	“I think it's that the environmental jobs that I've worked in have had affinity spaces related to gender and race that have helped me feel more comfortable being in environmental spaces.”
Ecological knowledge	Knowledge of plants, wildlife, ecosystems, water quality, etc.	“Just walking down the street in DC being able to be like “Oh, this is an oak tree, and this is a ginkgo "... it’s just satisfying to know that and kind of exciting.”
Environmental education As a child As an adult	A program or place where individuals learn more about the environment, and develop skills and understanding about how to address global challenges (North American Association for Environmental Education)	“I can trace it back to learning about global warming and things like that in school, and just understanding the importance of the damage that we cause to the planet.”
Environmental justice knowledge	Knowledge of the unequal distribution of the benefits and burdens of the environment	“We didn’t have access to any parks that we could really go to...and we had some of the worst water quality in the state of Texas, some of the worst air pollution... I started realizing how my own community was really impacted and disadvantaged by all these factors”

Experiences of environmental degradation	Personal experiences of negative environmental impacts	“I come from a coastal community, and it was really big also seeing the rising sea levels. They took out a good section of a neighborhood nearby. And these people no longer had a place to live...”
Experiential outdoor education	A learning approach that involves active engagement with the natural environment	“I think the hands on experience was definitely one of the more important things too - just kind of messing around in the marsh was like "this is really fun, we should save the environment".”
Familial capital Instrumental support Emotional support Community Cultural knowledge	The cultural knowledge and support gained from family and community (Yosso, 2005)	“Most of it has just been knowledge that my family has or that I’ve learned from my Community...”
Initial interest/Initial participation	People, actions, or events that supported the participants initial participation or initial interest	“My AP environmental science teacher. She was definitely a hippie. And kind of drilled it into our heads like, if you don’t engage, they’re not gonna change anything. So, that was like a ‘oh, okay, gotta start doing stuff to help’.”
Knowledge of environmental issues	Exhibits knowledge of environmental issues (e.g., biodiversity loss, climate change, waste-disposal, ocean acidification, etc.) without stating a clear source of that knowledge	“Water pollution is actually really, really bad. Like it's crazy that there's a whole island of plastic somewhere floating in the ocean.”
Navigational capital	Skills or knowledge needed to maneuver through institutions made without Black, Indigenous, and people of color in mind (Yosso, 2005)	“When I was in college, there was the outdoor club, and they had all the gear for you and there was basically a guide that could help you do all the things.”

Resistant capital	An understanding of the structures of inequality and the motivation, skills and knowledge used to challenge that inequality (Yosso, 2005)	“I think just seeing and advocating for change and that - that more people can be involved, especially minorities. It’s important me to try to do my part to advocate for the change, and that more people can be involved, but the hope that everyone has equal access to their civic duties, and being able to partake in them.”
Self-efficacy Political efficacy	A person’s belief in their capacity to execute a specific behavior	“... So I think that gave me confidence and interest to be like ‘yeah, I can learn how to do this’”
Social capital Organization/club Affinity group Educator Mentor Friends Fellow marginalized individual School or school organization Social media	Connections with and support from people and community resources (Yosso, 2005)	“I like to reach out to someone who I trust and has personal experience. Because I think that they may be able to give me some more advice of what they wish they knew before they started, that they think would be pertinent to me because they know me”
Supporting future generations Shared experiences	Expressing a desire to contribute to the well-being and support of upcoming generations, whether referring to the younger generation or one's own children.	“I don’t have kids yet, but like I want to have kids, and wanting to leave a better environment for them, and wanting for them to have a relationship with the environment around them”

APPENDIX H

Data Quality

We included several quality, attention, and time checks in the survey. Three of these questions were straight lining questions where respondents were flagged if their responses to a block of questions which included an inverse worded question had a standard deviation of zero. We included two logic checks. For example, if a respondent indicated that they did participate in nature-based activities earlier in the survey and then claimed that they did not later on in the survey, their entry was flagged. For the time check, we set the minimum completion time at $\frac{1}{5}$ the median of all responses, and flagged all responses completed faster than the minimum time. An attention check question prompted respondents to choose a picture of a “natural area” after defining the concept. Incorrect responses were flagged. Lastly, when asking about environmental education experiences, we included a phony environmental education program as a trap question. All respondents with four or more flags were removed from the sample. Remaining respondents who had one, two, or three flags were all individually checked for reliability. Those considered unreliable were removed from the final sample.

APPENDIX I
Survey Instrument



*** Thank you for participating in our survey!**

We are conducting a national study **to learn more about what supports People of Color who live in the US with their participation in nature-based activities and environmental civic engagement** (IRB Protocol #22-113). By sharing your thoughts and experiences in this survey, you can help us gain a better understanding of how to support people's diverse experiences in outdoor spaces.

This survey should take about 15-20 minutes to complete. Your participation in this study is **completely voluntary and anonymous**. You can stop participating in the research study at any time, for any reason, and it will not be held against you. There are no right or wrong answers to the survey questions. Your responses will never be presented in a way that could be connected to your identity. The anonymous results of this study will be published as a graduate thesis, presentations, reports, and journal articles. There are no known risks or benefits to participating in this research study.

If you have questions regarding this study or would like more information, please contact Aida Bagheri Hamaneh at aidabagheri@vt.edu. If you have questions or concerns about this study's conduct or about your rights as a research subject, you may contact the Virginia Tech IRB at 540-231-3732 or irb@vt.edu.

Do you consent to participate in this research study?

- ☐ Yes, I agree to participate in this research study
- ☐ No, I do not agree to participate in this research study

To begin, we have a few questions about you

* How many days per year do you participate in **nature-based activities**?

Note: Please consider “nature-based activities” to include **spending time in natural areas** such as the woods, local parks, a lake or beach, or other features of the natural environment.

- ☐ Never
 - ☐ 1 to 11 days per year
 - ☐ 12 to 51 days per year
 - ☐ Over 52 days per year
-

* **Civic engagement related to the environment** is the way that you **participate in your community or government to create positive environmental change** (this can include voting, petitioning, volunteering, donating, and advocating for the environment).

Thinking about the past **5 years**, have you participated in civic engagement related to the environment?

- ☐ No, I have not participated
- ☐ Yes, I participated rarely
- ☐ Yes, I participated sometimes
- ☐ Yes, I participated often

* In what year were you born?

(Please select your birth year from the drop-down list.)

- ☐ After 2004
- ☐ 2004
- ☐ 2003

- ☐ 2002
- ☐ 2001
- ☐ 2000
- ☐ 1999
- ☐ 1998
- ☐ 1997
- ☐ 1996
- ☐ 1995
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- ☐ 1937
- ☐ 1936
- ☐ 1935

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☐ 1926

☐ 1925

☐ 1924

☐ 1923

☐ 1922

☐ 1921

*** Are you over 18?**

☐ Yes, I am 18 years or older.

☐ No, I am under 18 years old.

*** What is your racial or ethnic identity?**

(Please select all that apply.)

☐ African American/Black

☐ East Asian

- ☐ Hispanic/Latinx
- ☐ Middle Eastern
- ☐ American Indian/Alaskan Native
- ☐ Pacific Islander
- ☐ South Asian
- ☐ Southeast Asian
- ☐ White
- ☐ Other (please specify)

* What region of the country do you live in?

- ☐ **Northeast:** Connecticut, Maine, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, or Vermont
- ☐ **South:** Alabama, Arkansas, Delaware, D.C., Florida, Georgia, Kentucky, Louisiana, Maryland, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia, or West Virginia
- ☐ **Midwest:** Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, South Dakota, or Wisconsin
- ☐ **West:** Alaska, Arizona, California, Colorado, Hawaii, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, or Wyoming
- ☐ None of the above

* What is your **9-digit ZIP code** for most of the year?

Note: [Click here](#) to look up your 9-digit ZIP code.

* What is the **population** size of the town/city where you now live?

Note: [Click here](#) to look up the population size of your home town.

- ☐ Up to 4,999 people
 - ☐ 5,000 to 9,999 people
 - ☐ 10,000 to 49,999 people
 - ☐ 50,000 to 99,999 people
 - ☐ 100,000 to 249,999 people
 - ☐ 250,000 to 499,999 people
 - ☐ 500,000 people or more
-

*** What is your gender?**

- ☐ Woman
- ☐ Man
- ☐ Non-Binary
- ☐ Prefer not to disclose
- ☐ Prefer to self-describe

What is your gender?

*** What was your total household income in the last 12 months?**

- ☐ Less than \$5,000
- ☐ \$5,000 to \$9,999
- ☐ \$10,000 to \$14,999

- ☐ \$15,000 to \$19,999
- ☐ \$20,000 to \$24,999
- ☐ \$25,000 to \$29,999
- ☐ \$30,000 to \$34,999
- ☐ \$35,000 to \$39,999
- ☐ \$40,000 to \$44,999
- ☐ \$45,000 to \$49,999
- ☐ \$50,000 to \$54,999
- ☐ \$55,000 to \$59,999
- ☐ \$60,000 to \$64,999
- ☐ \$65,000 to \$69,999
- ☐ \$70,000 to \$74,999
- ☐ \$75,000 to \$79,999
- ☐ \$80,000 to \$84,999
- ☐ \$85,000 to \$89,999
- ☐ \$90,000 to \$94,999
- ☐ \$95,000 to \$99,999
- ☐ \$100,000 to \$124,999
- ☐ \$125,000 to \$149,999
- ☐ \$150,000 to \$174,999
- ☐ \$175,000 to \$199,999
- ☐ \$200,000 to \$249,999
- ☐ \$250,000 and above

* What is the highest level of school that you have completed?

- ☐ 3rd grade or less
- ☐ Grades 4 to 8
- ☐ Completed some high school
- ☐ High school graduate or equivalent
- ☐ Other post-high school vocational training
- ☐ Completed some college, but no degree
- ☐ Associate degree
- ☐ College degree (such as B.A., B.S.)
- ☐ Completed some graduate, but no degree
- ☐ Master's degree
- ☐ Doctorate degree

* Now we would like to ask you some questions about civic engagement related to the environment.

Please note: Civic engagement related to the environment is the way that you participate in your community or government to create positive environmental change.

Thinking about the **last 5 years**, have you spent time participating in any of the following?

	No, not in the past 5 years	Yes, but not in the last 12 months	Yes, in the last 12 months
Volunteering for an organization involved with environmental causes	☐	☐	☐
Volunteering for a candidate or political organization that supports environmental causes	☐	☐	☐

Participating as an active member of a national or local environmental organization (such as the Sierra Club, the Audubon Society, etc.)	☐	☐	☐
Fundraising money for environmental issues or organizations	☐	☐	☐
Signing an online or written petition to support an environmental initiative	☐	☐	☐
Protesting for an environmental cause	☐	☐	☐
	No, not in the past 5 years	Yes, but not in the last 12 months	Yes, in the last 12 months
Donating money to an environmental organization or cause	☐	☐	☐
Donating money to a candidate or political party that supports environmental causes	☐	☐	☐
Contacting local or national representatives to ask for assistance or to express your opinion about environmental causes	☐	☐	☐
Contacting the media (newspapers, TV, radio) to express your opinions regarding protecting the environment	☐	☐	☐
Working informally with others in your community to solve a local environmental problem	☐	☐	☐
Canvassing (or going door to door) to persuade people to support environmental initiatives	☐	☐	☐
	No, not in the past 5 years	Yes, but not in the last 12 months	Yes, in the last 12 months
Trying to persuade others to support candidates or policies that support environmental causes	☐	☐	☐

Buying a product because it's environmentally friendly or because the profits go towards environmental causes



NOT buying a product because of the environmental conditions under which the product is made, or because you dislike the environmental conduct of the company that produces it



Other forms of civic engagement related to the environment not mentioned above



* In the last question, you selected "other". What other types of civic engagement related to the environment do you participate in?

* How often do you vote for local or national candidates who support environmental causes?

☐ Never

☐ Rarely

☐ Sometimes

☐ Often

☐ Always

* The statements below are about **how you first started participating in civic engagement related to the environment**.

I first began participating in civic engagement related to the environment because of...

Do not agree

Slightly agree

Moderately agree

Mostly agree

Completely agree

... a friend	☐	☐	☐	☐	☐
... an organization, group, or club	☐	☐	☐	☐	☐
... a role model	☐	☐	☐	☐	☐
... a family member	☐	☐	☐	☐	☐

*** This next series of questions will be about civic engagement related to the environment.**

Please note: Civic engagement related to the environment is the way that you participate in your community or government to create positive environmental change.

Please indicate the degree to which you agree with each statement below.

	Do not agree	Slightly agree	Moderately agree	Mostly agree	Completely agree
I know where to learn about civic engagement processes (such as how to vote or how to reach out to a representative).	☐	☐	☐	☐	☐
I know where to find information about environmental issues and actions that I can take to help.	☐	☐	☐	☐	☐
I know where to find information about opportunities to participate in civic engagement related to the environment.	☐	☐	☐	☐	☐
People in my ethnic/racial/cultural community face discrimination when participating in civic engagement related to the environment.	☐	☐	☐	☐	☐
I do not feel confident searching for information about civic engagement related to the environment.	☐	☐	☐	☐	☐

*** Please indicate the degree to which you agree with each statement below.**

Do not agree Slightly agree Moderately agree Mostly agree Completely agree

I draw on connections with friends to participate in civic engagement related to the environment.	☐	☐	☐	☐	☐
I draw on connections with organizations, groups, or clubs to participate in civic engagement related to the environment.	☐	☐	☐	☐	☐
My friends and I talk to each other about our civic engagement related to the environment.	☐	☐	☐	☐	☐
My friends encourage me to participate in civic engagement related to the environment	☐	☐	☐	☐	☐

* Please indicate the degree to which you agree with each statement below.

Do not agree Slightly agree Moderately agree Mostly agree Completely agree

My family encourages me to participate in civic engagement related to the environment.	☐	☐	☐	☐	☐
I have helped my family participate in civic engagement related to the environment.	☐	☐	☐	☐	☐
My family listens to me talk about my participation in civic engagement related to the environment.	☐	☐	☐	☐	☐

* This set of statements is also about participation in **civic engagement related to the environment**.

Remember, civic engagement related to the environment is the way that you participate in your community or government to create positive environmental change.

Please indicate the degree to which you agree with each statement below.

Do not agree Slightly agree Moderately agree Mostly agree Completely agree

Participating in civic engagement related to the environment will help combat stereotypes about people in my ethnic/racial/cultural community.



Participating in civic engagement related to the environment will pave the way for future generations of people in my ethnic/racial/cultural community to participate.



I want to inspire other people in my ethnic/racial/cultural community to participate in civic engagement related to the environment.



Even when presented with obstacles, I am able to continue participating in civic engagement related to the environment.



I have developed strategies to navigate difficult people and situations while participating in civic engagement related to the environment.



*** Next, we want to know more about how you participate in nature-based activities.**

*Note: Please consider "nature-based activities" to include **spending time in natural areas** such as the woods, local parks, a lake or beach, or other features of the natural environment.*

How often do you participate in nature-based activities?



Never



A few times per year



Every month



Every week

* In a **typical week**, how many days do you spend participating in nature-based activities?

(Please select one from the drop-down list.)

- ☐ 1 day a week
- ☐ 2 days a week
- ☐ 3 days a week
- ☐ 4 days a week
- ☐ 5 days a week
- ☐ 6 days a week
- ☐ 7 days a week
- ☐ I do not participate in nature-based activities

* In a **typical month**, how many days do you spend participating in nature-based activities?

(Please select one from the drop-down list.)

- ☐ 1 day a month
- ☐ 2 days a month
- ☐ 3 days a month
- ☐ 4 days a month
- ☐ 5 days a month
- ☐ 6 days a month
- ☐ 7 days a month
- ☐ 8 days a month
- ☐ 9 days a month

- ☐ 10 days a month
- ☐ 11 days a month
- ☐ 12 days a month
- ☐ 13 days a month
- ☐ 14 days a month
- ☐ 15 days a month
- ☐ 16 days a month
- ☐ 17 days a month
- ☐ 18 days a month
- ☐ 19 days a month
- ☐ 20 days a month
- ☐ 21 days a month
- ☐ 22 days a month
- ☐ 23 days a month
- ☐ 24 days a month
- ☐ 25 days a month
- ☐ 26 days a month
- ☐ 27 days a month
- ☐ 28 days a month
- ☐ 29 days a month
- ☐ 30 days a month
- ☐ 31 days a month

☐ I do not participate in nature-based activities

* In a **typical year**, how many days do you spend participating in nature-based activities?

(Please select one from the drop-down list.)

- ☐ 1 day a year
- ☐ 2 days a year
- ☐ 3 days a year
- ☐ 4 days a year
- ☐ 5 days a year
- ☐ 6 days a year
- ☐ 7 days a year
- ☐ 8 days a year
- ☐ 9 days a year
- ☐ 10 days a year
- ☐ 11 days a year
- ☐ 12 days a year
- ☐ 13 days a year
- ☐ 14 days a year
- ☐ 15 days a year
- ☐ 16 days a year
- ☐ 17 days a year
- ☐ 18 days a year
- ☐ 19 days a year

- ☐ 20 days a year
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- ☐ 47 days a year
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- ☐ 57 days a year
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- ☐ 66 days a year
- ☐ 67 days a year
- ☐ 68 days a year
- ☐ 69 days a year
- ☐ 70 days a year
- ☐ 71 days a year
- ☐ 72 days a year
- ☐ 73 days a year
- ☐ 74 days a year
- ☐ 75 days a year
- ☐ 76 days a year
- ☐ 77 days a year
- ☐ 78 days a year
- ☐ 79 days a year
- ☐ 80 days a year
- ☐ 81 days a year
- ☐ 82 days a year
- ☐ 83 days a year
- ☐ 84 days a year
- ☐ 85 days a year
- ☐ 86 days a year

- ☐ 87 days a year
- ☐ 88 days a year
- ☐ 89 days a year
- ☐ 90 days a year
- ☐ More than 90 days a year
- ☐ I do not participate in nature-based activities

* In a **typical outing**, about **how many hours** do you spend participating in **nature-based activities**?

Note: Please consider “nature-based activities” to include spending time in natural areas such as the woods, local parks, a lake or beach, or other features and of the natural environment.

(Please select one from the drop-down list.)

- ☐ Less than 1 hour
- ☐ 1 hour
- ☐ 2 hours
- ☐ 3 hours
- ☐ 4 hours
- ☐ 5 hours
- ☐ 6 hours
- ☐ 7 hours
- ☐ 8 hours
- ☐ 9 hours
- ☐ 10 hours
- ☐ 11 hours

- ☐ 12 hours
- ☐ More than 12 hours

* Please look at the nature-based activities listed below. Did you participate in any of these activities in the past 12 months?

(Please select all that apply.)

- ☐ Beach activities (on the ocean, lakes, rivers, reservoirs, etc.)
- ☐ Botanizing or viewing wildflowers, other plants, or fungi
- ☐ Camping or backpacking
- ☐ Fishing
- ☐ Foraging or collecting (such as rocks, plants, berries, or mushrooms)
- ☐ Geocaching or orienteering
- ☐ Hiking or walking
- ☐ Horseback riding
- ☐ Hunting
- ☐ Motorized boating
- ☐ Mountain or road biking
- ☐ Non-motorized boating (such as canoeing or kayaking)
- ☐ Off-roading
- ☐ Outdoor rock climbing or bouldering
- ☐ Picnicking
- ☐ Recreational shooting sports or archery
- ☐ Running or jogging

- ☐ Swimming
- ☐ Winter sports
- ☐ Wildlife photography
- ☐ Wildlife viewing (such as birdwatching)
- ☐ Other activity not listed above
- ☐ None of the above

What other types of nature-based activities do you participate in?

*** This next question is about using natural resources.**

Below, we list activities involving collecting natural resources. How often do you participate in each of these activities?

	Never	Less than once a year	Once a year	A few times per year	Once a month	Once a week	More than once a week
Fishing for consumption	☐	☐	☐	☐	☐	☐	☐
Fishing for sport (catch and release)	☐	☐	☐	☐	☐	☐	☐
Hunting	☐	☐	☐	☐	☐	☐	☐
Foraging for mushrooms	☐	☐	☐	☐	☐	☐	☐
Foraging for edible plants	☐	☐	☐	☐	☐	☐	☐
Foraging for medicinal plants	☐	☐	☐	☐	☐	☐	☐
Foraging for seafood (such as clams and mussels)	☐	☐	☐	☐	☐	☐	☐
Foraging for firewood	☐	☐	☐	☐	☐	☐	☐

Other activities involving
collecting natural resources not
listed above



* In the last question, you selected “Other”. What other types of activities involving collecting natural resources do you participate in?

* **The next set of questions is about natural areas near your home.**

Please consider “natural areas” to include the woods, local parks, a lake or beach, or other features of the natural environment.

How would you rate the quality of natural areas near your home? Please consider number, size, and quality.



Terrible



Very Poor



Poor



Fair



Good



Very Good



Excellent

* How easy is it for you to get to “natural areas” in your local area?



Very difficult



Difficult

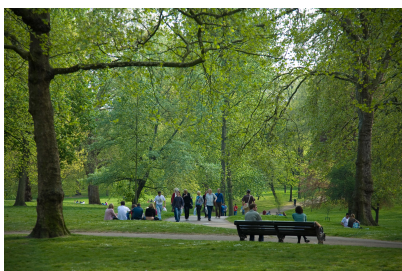
- ☐ Somewhat difficult
- ☐ Neither easy nor difficult
- ☐ Somewhat easy
- ☐ Easy
- ☐ Very Easy

* Looking at the images below, **please select the image of a "natural area"**.

Remember, natural areas include the woods, local parks, a lake or beach, or other features of the natural environment.



Option 1



Option 2



Option 3



Option 4

* The statements below are about **how you first started participating in nature-based activities**.

I first began participating in nature-based activities because of...

	Do not agree	Slightly agree	Moderately agree	Mostly agree	Completely agree
... a friend	☐	☐	☐	☐	☐
... an organization, group, or club	☐	☐	☐	☐	☐
... a role model	☐	☐	☐	☐	☐
... a family member	☐	☐	☐	☐	☐

This next series of questions will be about nature-based activities.

Note: Please consider “nature-based activities” to include spending time in natural areas such as the woods, local parks, a lake or beach, or other features of the natural environment.

* Please indicate the degree to which you agree with each statement below.

	Do not agree	Slightly agree	Moderately agree	Mostly agree	Completely agree
I know where to learn the skills I need to participate in nature-based activities.	☐	☐	☐	☐	☐
I know where to find information on nature-based activities (such as finding where to go or information about equipment I might need).	☐	☐	☐	☐	☐
I know where to find information about opportunities to participate in nature-based activities.	☐	☐	☐	☐	☐
People in my ethnic/racial/cultural community face discrimination when participating in nature-based activities.	☐	☐	☐	☐	☐

*

Please indicate the degree to which you agree with each statement below.

	Do not agree	Slightly agree	Moderately agree	Mostly agree	Completely agree
I draw on connections with friends to participate in nature-based activities.	☐	☐	☐	☐	☐
I draw on connections with organizations, groups, or clubs to participate in nature-based activities.	☐	☐	☐	☐	☐
My friends and I talk to each other about our experiences participating in nature-based activities.	☐	☐	☐	☐	☐
My friends encourage me to participate in nature-based activities.	☐	☐	☐	☐	☐

* Please indicate the degree to which you agree with each statement below.

	Do not agree	Slightly agree	Moderately agree	Mostly agree	Completely agree
My family encourages me to participate in nature-based activities.	☐	☐	☐	☐	☐
I have helped my family participate in nature-based activities.	☐	☐	☐	☐	☐
My family listens to me talk about my participation in nature-based activities.	☐	☐	☐	☐	☐

* This set of statements is also about your participation in **nature-based activities**.

Note: Please consider “nature-based activities” to include spending time in natural areas such as the woods, local parks, a lake or beach, or other features of the natural environment.

Please indicate the degree to which you agree with each statement below.

	Do not agree	Slightly agree	Moderately agree	Mostly agree	Completely agree
--	--------------	----------------	------------------	--------------	------------------

Even when presented with obstacles, I am able to continue participating in nature-based activities.	☐	☐	☐	☐	☐
Even when I have limited resources (such as money), I find ways to secure the essentials for nature-based activities (such as gear or park passes).	☐	☐	☐	☐	☐
Participating in nature-based activities will help combat stereotypes about people in my ethnic/racial/cultural community.	☐	☐	☐	☐	☐
Participating in nature-based activities will pave the way for future generations of people in my ethnic/racial/cultural community to participate.	☐	☐	☐	☐	☐
I want to inspire other people in my ethnic/racial/cultural community to participate in nature-based activities.	☐	☐	☐	☐	☐

This next series of questions is about your thoughts and feelings about nature.

* Please indicate the degree to which you agree or disagree with each statement below.

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
I feel uneasy if I am away from nature for too long.	☐	☐	☐	☐	☐
I feel right at home when I am in nature.	☐	☐	☐	☐	☐
Feeling connected to nature helps me deal with everyday stress.	☐	☐	☐	☐	☐
I feel a strong emotional connection to nature.	☐	☐	☐	☐	☐
I think of myself as an "environmentalist".	☐	☐	☐	☐	☐
	Strongly disagree	Disagree	Neutral	Agree	Strongly agree

I think of myself as someone who is very concerned about taking care of nature.	☐	☐	☐	☐	☐
Protecting nature is an important part of who I am.	☐	☐	☐	☐	☐
My relationship to nature is a big part of how I think about myself.	☐	☐	☐	☐	☐
Forests are valuable mostly because they produce wood products, jobs and income for people.	☐	☐	☐	☐	☐
Meeting the needs of people requires sacrificing some natural areas.	☐	☐	☐	☐	☐
	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
In order to provide us with the goods and services we need we can't avoid nature being degraded.	☐	☐	☐	☐	☐
Natural areas are important to people because we use them for recreation.	☐	☐	☐	☐	☐
I enjoy spending time in nature.	☐	☐	☐	☐	☐
I like to get outdoors whenever I get the chance.	☐	☐	☐	☐	☐
Being in nature allows me to do the things I like doing most.	☐	☐	☐	☐	☐
	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
Getting away on an overnight trip in nature is something I do as often as I can.	☐	☐	☐	☐	☐
My connection to nature is something I would describe as "spiritual".	☐	☐	☐	☐	☐
Everything in nature is connected (e.g. animals, plants, humans, water, air, land, fire, etc.).	☐	☐	☐	☐	☐
Human beings and nature are connected by the same "energy" or "life-force".	☐	☐	☐	☐	☐
Human wellbeing depends upon living in harmony with nature.	☐	☐	☐	☐	☐

For this next section, we would like to know more about you.

* Please indicate the degree to which you agree with each statement below.

	Do not agree	Slightly agree	Moderately agree	Mostly agree	Completely agree
There is at least one person I know whose advice I really trust.	☐	☐	☐	☐	☐
I feel that there is no one with whom I can share my most private worries and fears.	☐	☐	☐	☐	☐
When I need suggestions for how to deal with a personal problem I know there is someone I can turn to.	☐	☐	☐	☐	☐
If I had to go out of town for a few weeks, someone I know would look after my home (the plants, pets, yard, etc.)	☐	☐	☐	☐	☐
There is no one I could call on if I needed to borrow a car for a few hours.	☐	☐	☐	☐	☐
If I got stranded 10 miles out of town, there is someone I could call to come get me.	☐	☐	☐	☐	☐

* Please indicate the degree to which you agree with each statement below.

	Do not agree	Slightly agree	Moderately agree	Mostly agree	Completely agree
Family values are an important part of my cultural background.	☐	☐	☐	☐	☐
I know about my family's cultural heritage/history.	☐	☐	☐	☐	☐
I have role models in my family.	☐	☐	☐	☐	☐
Family is not important to me.	☐	☐	☐	☐	☐
I maintain a connection to my extended family.	☐	☐	☐	☐	☐
My family provides me with emotional support.	☐	☐	☐	☐	☐
I maintain a connection to my home community and culture.	☐	☐	☐	☐	☐

I learn a lot of valuable knowledge from my family members.

☐ ☐ ☐ ☐ ☐

* Please indicate the degree to which you agree with each statement below.

Do not agree Slightly agree Moderately agree Mostly agree Completely agree

I have developed strategies to navigate difficult people and situations.

☐ ☐ ☐ ☐ ☐

I have succeeded despite barriers to my success.

☐ ☐ ☐ ☐ ☐

I am confident in my ability to get through struggles.

☐ ☐ ☐ ☐ ☐

* Please indicate the degree to which you agree with each statement below.

Do not agree Slightly Agree Moderately agree Mostly agree Completely agree

I believe there are injustices in my ethnic/racial/cultural community.

☐ ☐ ☐ ☐ ☐

I believe I will be able to make a difference in society.

☐ ☐ ☐ ☐ ☐

I want to create a more just or equitable society.

☐ ☐ ☐ ☐ ☐

I believe racism is a major factor for issues in society.

☐ ☐ ☐ ☐ ☐

I want to make a difference in my racial/ethnic/cultural community.

☐ ☐ ☐ ☐ ☐

Lastly, we would like to know more about your past experiences with environmental education.

* In this survey, environmental education can be defined as a process that helps people **learn more** about the environment and **develop skills** and understanding about how to **solve environmental problems** (this can include going on a school fieldtrip to a nature center, taking an environmental science class, or watching a video about environmental issues, etc.).

Have you ever taken part in any of the following types of environmental education before?

(Please select all that apply.)

- ☐ Environmental education during elementary school, including school field trips
- ☐ Environmental education during middle school, including school field trips
- ☐ Environmental education during high school, including school field trips
- ☐ Environmental education during college
- ☐ Environmental education during professional training programs that offer licensure or certificates of completion
- ☐ Environmental education program run by parks, museums, nature centers, or somewhere similar
- ☐ Environmental education as part of a 4H or FFA (Future Farmers of America) program
- ☐ Environmental education as part of Girl Scouts or Boy Scouts or similar program
- ☐ Environmental education as part of a Johnson's Young Environmentalists program
- ☐ Environmental education through informational plaques at museums or parks
- ☐ Environmental education through web/social media content
- ☐ Environmental education through environmental movies or TV shows
- ☐ Other environmental education activity not listed above
- ☐ None of the above

Please describe the environmental education program you participated in.

* In the last question, you selected "**Other**". Thinking about that environmental education experience - how often did you participate in something like this?

- ☐ Never

- ☐ Once
 - ☐ Once in a while
 - ☐ Regularly
-

* Thinking about your experiences with environmental education in **elementary school** - how often did you participate in something like this?

- ☐ Never
- ☐ Once
- ☐ Once in a while
- ☐ Regularly

* Thinking about your experiences with environmental education in **middle school** - how often did you participate in something like this?

- ☐ Never
 - ☐ Once
 - ☐ Once in a while
 - ☐ Regularly
-

* Thinking about your experiences with environmental education in **high school** - how often did you participate in something like this?

- ☐ Never
- ☐ Once
- ☐ Once in a while
- ☐ Regularly

* Thinking about your experiences with environmental education in **college** - how often did you participate in something like this?

- ☐ Never
- ☐ Once
- ☐ Once in a while
- ☐ Regularly

* Thinking about your experiences with environmental education in **professional training programs** - how often did you participate in something like this?

- ☐ Never
- ☐ Once
- ☐ Once in a while
- ☐ Regularly

* Thinking about your experiences with environmental education run by a **park, museum, nature center**, or somewhere similar - how often did you participate in something like this?

- ☐ Never
- ☐ Once
- ☐ Once in a while
- ☐ Regularly

* Thinking about your experiences with environmental education through **4H or FFA** - how often did you participate in something like this?

- ☐ Never

- ☐ Once
- ☐ Once in a while
- ☐ Regularly

* Thinking about your experiences with environmental education as part of **Boy Scout's, Girl Scout's,** or a similar program - how often did you participate in something like this?

- ☐ Never
- ☐ Once
- ☐ Once in a while
- ☐ Regularly

* Thinking about your experiences with environmental education through **plaques at museums or parks** - how often did you interact with something like this?

- ☐ Never
- ☐ Once
- ☐ Once in a while
- ☐ Regularly

* Thinking about your experiences with environmental education through **web/social media content** - how often did you interact with something like this?

- ☐ Never
 - ☐ Once
 - ☐ Once in a while
 - ☐ Regularly
-

* Thinking about your experiences with environmental education through **environmental movies or TV shows** - how often did you watch something like this?

- ☐ Never
 - ☐ Once
 - ☐ Once in a while
 - ☐ Regularly
-

APPENDIX J
Respondent Characteristics

The characteristics of our survey respondents (n=1808) after being weighted by ethno-racial identity.

CHARACTERISTICS	PERCENTAGE
Race	
Latine	46%
Black	30%
Asian	14%
Multiracial	10%
Gender	
Woman	54%
Man	46%
Income	
Low (up to 49,999)	39%
Middle (50,000 - 149,999)	53%
High (150,000 or above)	8%
Education	
High school graduate or equivalent	23%
Some college - college degree	61%
Some graduate schooling - doctorate	16%
Environmental Education	
Previous EE experience	83%
No previous EE experience	17%
Participation in Nature-Based Activities	
Participate in a typical year	85%

Do not participate in a typical year	15%
Age	
Up to 25	13%
25 or Above	87%
Region	
Northeast	17%
South	42%
Midwest	14%
West	27%

APPENDIX K
Odds Ratio Tables

General Civic Engagement Related to the Environment. Parameter estimates, standard error, and odds ratios (OR) for the effects of community cultural wealth, environmental education, and other variables on general participation in civic engagement related to the environment.

Variable	Estimate	SE	OR	P-value
Social Capital	0.01 [-0.11, 0.13]	0.06	1.01 [0.9, 1.14]	0.883
Navigational Capital	0.16 [0.05, 0.27]	0.06	1.17 [1.05, 1.31]	0.005
Resistant Capital	0.23 [0.13, 0.34]	0.05	1.26 [1.14, 1.4]	< 0.0001
Familial Capital	0.17 [0.05, 0.3]	0.06	1.19 [1.05, 1.35]	0.005
Environmental Education	1.49 [1.22, 1.76]	0.14	4.42 [3.39, 5.8]	< 0.0001
Black or African American	-0.19 [-0.51, 0.13]	0.16	0.83 [0.6, 1.14]	0.252
Asian or Pacific Islander	-0.23 [-0.59, 0.13]	0.18	0.8 [0.56, 1.14]	0.216
Latine	-0.12 [-0.43, 0.19]	0.16	0.89 [0.65, 1.2]	0.439
Days Spent in Nature	0.29 [0.2, 0.39]	0.05	1.34 [1.22, 1.47]	< 0.0001
Age	0.03 [-0.23, 0.28]	0.13	1.03 [0.8, 1.33]	0.833
Mid-Income	0.21 [0.01, 0.41]	0.1	1.23 [1.01, 1.5]	0.036
High-Income	0.57 [0.23, 0.91]	0.17	1.76 [1.25, 2.47]	0.001

Boycotting. Parameter estimates, standard error, and odds ratios (OR) for the effects of community cultural wealth, environmental education, and other variables on participation in boycotting.

Variable	Estimate	SE	OR	P-value
Social Capital	0.15 [0.02, 0.28]	0.07	1.16 [1.02, 1.33]	0.028
Navigational Capital	0.02 [-0.11, 0.14]	0.06	1.02 [0.9, 1.15]	0.788
Resistant Capital	0.49 [0.37, 0.61]	0.06	1.63 [1.45, 1.83]	< 0.0001

Familial Capital	0.08 [-0.06, 0.22]	0.07	1.08 [0.94, 1.24]	0.251
Environmental Education	1.75 [1.42, 2.09]	0.17	5.75 [4.15, 8.09]	< 0.0001
Black or African American	-0.56 [-0.92, -0.2]	0.18	0.57 [0.4, 0.82]	0.002
Asian or Pacific Islander	-0.23 [-0.63, 0.17]	0.20	0.79 [0.53, 1.18]	0.258
Latine	-0.13 [-0.47, 0.21]	0.17	0.88 [0.63, 1.24]	0.467
Days Spent in Nature	0.37 [0.27, 0.48]	0.05	1.45 [1.31, 1.61]	< 0.0001
Age	0.03 [-0.25, 0.3]	0.14	1.03 [0.78, 1.36]	0.860
Mid-Income	0.22 [0, 0.43]	0.11	1.24 [1, 1.54]	0.045
High-Income	0.71 [0.32, 1.11]	0.20	2.04 [1.38, 3.03]	< 0.001

Signing Petitions. Parameter estimates, standard error, and odds ratios (OR) for the effects of community cultural wealth, environmental education, and other variables on signing petitions.

Variable	Estimate	SE	OR	P-value
Social Capital	0.1 [-0.03, 0.23]	0.07	1.11 [0.97, 1.26]	0.140
Navigational Capital	0.05 [-0.07, 0.18]	0.06	1.05 [0.93, 1.19]	0.428
Resistant Capital	0.44 [0.33, 0.56]	0.06	1.55 [1.38, 1.75]	< 0.0001
Familial Capital	-0.02 [-0.15, 0.12]	0.07	0.98 [0.86, 1.12]	0.797
Environmental Education	1.93 [1.57, 2.31]	0.19	6.87 [4.82, 10.05]	< 0.0001
Black or African American	-0.46 [-0.8, -0.11]	0.18	0.63 [0.45, 0.9]	0.011
Asian or Pacific Islander	-0.14 [-0.53, 0.26]	0.20	0.87 [0.59, 1.29]	0.498
Latine	0.23 [-0.1, 0.56]	0.17	1.26 [0.91, 1.75]	0.170
Days Spent in Nature	0.35 [0.25, 0.45]	0.05	1.42 [1.29, 1.57]	< 0.0001
Age	-0.11 [-0.39, 0.17]	0.14	0.9 [0.68, 1.19]	0.447

Mid-Income	0.13 [-0.08, 0.35]	0.11	1.14 [0.92, 1.41]	0.225
High-Income	0.29 [-0.1, 0.67]	0.20	1.33 [0.91, 1.96]	0.140

Donating. Parameter estimates, standard error, and odds ratios (OR) for the effects of community cultural wealth, environmental education, and other variables on donating to environmental organizations or causes.

Variable	Estimate	SE	OR	P-value
Social Capital	0.03 [-0.1, 0.16]	0.07	1.03 [0.9, 1.17]	0.678
Navigational Capital	0.08 [-0.05, 0.2]	0.06	1.08 [0.95, 1.22]	0.228
Resistant Capital	0.29 [0.17, 0.4]	0.06	1.33 [1.19, 1.49]	< 0.0001
Familial Capital	0.17 [0.04, 0.3]	0.07	1.18 [1.04, 1.35]	0.012
Environmental Education	1.6 [1.27, 1.95]	0.17	4.95 [3.56, 7.03]	< 0.0001
Black or African American	0.13 [-0.23, 0.5]	0.19	1.14 [0.79, 1.65]	0.474
Asian or Pacific Islander	0.52 [0.12, 0.93]	0.21	1.68 [1.13, 2.53]	0.011
Latine	0.81 [0.47, 1.16]	0.18	2.24 [1.59, 3.18]	< 0.0001
Days Spent in Nature	0.37 [0.28, 0.47]	0.05	1.45 [1.32, 1.6]	< 0.0001
Age	-0.14 [-0.41, 0.14]	0.14	0.87 [0.66, 1.15]	0.326
Mid-Income	0.05 [-0.16, 0.26]	0.11	1.05 [0.85, 1.3]	0.661
High-Income	0.37 [-0.01, 0.74]	0.19	1.44 [0.99, 2.1]	0.055

Volunteering. Parameter estimates, standard error, and odds ratios (OR) for the effects of community cultural wealth, environmental education, and other variables on volunteering for environmental organizations.

Variable	Estimate	SE	OR	P-value
Social Capital	-0.03 [-0.16, 0.1]	0.07	0.97 [0.85, 1.11]	0.675

Navigational Capital	0.07 [-0.06, 0.19]	0.06	1.07 [0.94, 1.21]	0.308
Resistant Capital	0.24 [0.13, 0.36]	0.06	1.27 [1.14, 1.43]	< 0.0001
Familial Capital	0.32 [0.18, 0.46]	0.07	1.37 [1.19, 1.58]	< 0.0001
Environmental Education	1.81 [1.45, 2.2]	0.19	6.13 [4.26, 9.05]	< 0.0001
Black or African American	-0.25 [-0.61, 0.11]	0.18	0.78 [0.54, 1.11]	0.166
Asian or Pacific Islander	-0.08 [-0.48, 0.32]	0.2	0.92 [0.62, 1.38]	0.696
Latine	0.4 [0.07, 0.74]	0.17	1.5 [1.08, 2.1]	0.018
Days Spent in Nature	0.37 [0.27, 0.46]	0.05	1.45 [1.32, 1.59]	< 0.0001
Age	-0.16 [-0.43, 0.12]	0.14	0.85 [0.65, 1.12]	0.258
Mid-Income	0.19 [-0.02, 0.41]	0.11	1.21 [0.98, 1.51]	0.080
High-Income	0.34 [-0.04, 0.73]	0.2	1.41 [0.96, 2.07]	0.079

Boycotting. Parameter estimates, standard error, and odds ratios (OR) for the effects of community cultural wealth, environmental education, and other variables on “boycotting”.

Variable	Estimate	SE	OR	P-value
Social Capital	0.16 [0.02, 0.3]	0.07	1.17 [1.02, 1.35]	0.024
Navigational Capital	0 [-0.13, 0.13]	0.07	1 [0.88, 1.14]	0.969
Resistant Capital	0.45 [0.33, 0.57]	0.06	1.56 [1.39, 1.77]	< 0.0001
Familial Capital	0.06 [-0.08, 0.2]	0.07	1.06 [0.92, 1.22]	0.414
Environmental Education	1.56 [1.21, 1.94]	0.19	4.78 [3.35, 6.98]	< 0.0001
Black or African American	-0.58 [-0.95, -0.21]	0.19	0.56 [0.39, 0.81]	< 0.0001
Asian or Pacific Islander	-0.17 [-0.58, 0.24]	0.21	0.84 [0.56, 1.27]	0.412

Latine	0.01 [-0.33, 0.36]	0.18	1.01 [0.72, 1.43]	0.954
Days Spent in Nature	0.34 [0.24, 0.44]	0.05	1.41 [1.28, 1.55]	< 0.0001
Age	-0.06 [-0.35, 0.23]	0.15	0.94 [0.7, 1.26]	0.670
Mid-Income	0.37 [0.15, 0.6]	0.11	1.45 [1.16, 1.82]	< 0.001
High-Income	0.93 [0.55, 1.32]	0.2	2.53 [1.73, 3.73]	< 0.0001
