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Does environmental education work differently across sociopolitical contexts in the United States? PART I. Exploration of outcomes for adolescent youth

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ABSTRACT

In the United States, the two main political parties, Democrats and Republicans, have become increasingly polarized, including with regard to environmental issues. As part of a national study of environmentally focused single-day field trips for early adolescent youth in 2018, we conducted exploratory research to examine how outcomes differed for public school students from different sociopolitical contexts (i.e. predominantly Democratic, Republican, or mixed). Students from wealthier Democratic contexts exhibited less positive outcomes, measured as self-reported changes in environmental literacy, compared to others. The findings suggest that single-day EE field trips in the United States, in their current forms, may be particularly valuable in lower income and more politically conservative contexts, possibly due to the degree of novelty they may provide to these audiences. Meanwhile, EE field trips for students from wealthier Democratic contexts may provide reinforcement rather than meaningful shifts in environmental literacy, suggesting a need for more novel approaches for these audiences.

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Introduction

Environmental education (EE) aims to develop environmental literacy, which refers to the knowledge, skills, attitudes, dispositions, and competencies necessary to address environmental problems (Hollweg et al. 2011; UNESCO 1978). However, environmental issues and concerns, such as those that may be the focus of many EE programs, have become increasingly politicized in recent decades in the U.S. (Dunlap, McCright, and Yarosh 2016). As partisan polarization between political parties in the U.S. has intensified since the 1970s, support for environmental protection has declined considerably amongst those identifying as Republican, largely due to messaging at the level of political elites (Abramowitz and Saunders 2006; Dunlap, McCright, and Yarosh 2016; Egan and Mullin 2017; Jacobson 2012; Levendusky 2009; Walsh and Tsurusaki 2018). Coinciding with this political polarization, the United States electorate has become increasingly geographically segregated, with Democrats and Republicans clustering into likeminded

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communities (Bishop 2008; Johnston, Manley, and Jones 2016, Johnston et al. 2020). Income levels add further nuance to political identity formation, with wealthier groups of Democrats and Republicans exhibiting somewhat different political views than their less wealthy counterparts (Kitschelt and Rehm 2019; Pew Research Center 2021; Associated Press-NORC Center for Public Affairs Research (AP-NORC), 2015).

This politically divided climate and these politically segregated communities serve as the settings in which today's EE programs strive to develop environmental literacy in learners. Although some studies have examined the social and political dimensions of EE program curricula (McKeown-Ice and Dendinger 2000; Van Poeck and Östman 2018; Schild 2016; Slimani, Lange, and Hakansson 2021; Walsh and Tsurusaki 2018), and others have demonstrated the influence of socioeconomic status on student outcomes (Stern, Powell, and Frensley 2022), we have been unable to find any studies that explicitly examine the relationship between students' sociopolitical context and EE learning outcomes at a national scale. This study represents a preliminary step in identifying how student learning outcomes associated with participation in EE field trips might differ in different sociopolitical contexts in the U.S. and how sociopolitical context and socioeconomic context may interact to potentially influence outcomes for learners.

We focus on middle school-aged students (grades 5-8; ages 10-14), who serve as a common audience for EE field trip programs¹ in the United States. Early adolescence is a critical developmental period for forming identity, morality, environmental literacy, and connection to place and community (Piaget 1972; Kohlberg 1971; Kahn and Kellert 2002; Kroger 2006). Research on the political socialization of youth indicates that, by middle school age, students have developed modest political awareness shaped by family, community, and major societal events (Jennings and Niemi 1974, 1981; Lewis-Beck et al. 2008). As students of this age become aware of the dominant political messages in their own communities, they likely begin to incorporate these messages into their own identities and worldviews; therefore, we might expect students to be influenced by the political beliefs and identities of the voting age adults in their community. Conversely, Lawson et al. (2019) argue that youth are less susceptible to political polarization than adults, and thus suggest educating youth can inspire intergenerational learning and potentially influence more politically entrenched parents.

As part of a larger study of single-day EE field trips for adolescent youth within the United States, we examined the following research question: *Do the outcomes of EE programs differ for middle school students (grades 5-8; ages 10-14) from different sociopolitical contexts in the United States?* We examine both voting trends and socioeconomic conditions as indicators of sociopolitical context. In a linked manuscript (Thorpe et al. 2023), we examine whether certain pedagogical approaches to the programs are associated with more or less positive learning outcomes for students from different political contexts.

Literature review

Sociopolitical contexts of youth

Literature suggests that partisan identification is rooted in early childhood, largely as a result of parental influence (Campbell et al. 1960; Jennings and Niemi 1981; Tedin 1980). Children begin developing a vague political awareness as young as age 5, form general notions of political parties around ages 7 to 10, and can generally express partisan loyalty by high school (ages 14 to 18) (Campbell et al. 1960; Connell 1971; Lewis-Beck et al. 2008; Pettifor 2012). Partisan and ideological identities, such as Democrat, Republican, conservative, or liberal, represent strong social identities characterized by a "sense of connection to like-minded others" (Kinder and Kalmoe 2017; Mason 2018, p. 867). Social science research demonstrates that these group attachments are instrumental in explaining how individuals process new information, construct their attitudes and beliefs, and respond to particular message sources (Cohen 2003;

Kahan 2013; Stern Taber and Lodge 2006; Tajfel and Turner 1979). Even individuals with only modest political awareness, such as adolescent youth, may draw on politically based social identities in response to messages from people outside their own group, or “out-group” messages (Barber and Pope 2019; Cohen 2003; Mason 2018).

The development of young people’s political attitudes and partisan identities may also be based upon the geographic communities in which they live (Levin 1961; MacKuen and Brown 1987). In the 2008 book, *The Big Sort*, Bishop suggests that residents in the United States “have clustered in communities of sameness, among people with similar ways of life, beliefs, and, in the end, politics” (p. 5). Several studies further confirm that Democrats and Republicans have become increasingly geographically segregated and demonstrate that this trend exists at multiple scales in the United States – including Census-block, state, county, precinct-level, and several other micro-level scales (Johnston, Manley, and Jones 2016; Kinsella, McTague, and Raleigh 2015; Morrill, Knopp, and Brown 2007; Myers 2013; Rohla et al. 2018; Sussell 2013). Democrats have become more concentrated in major metropolitan areas, while Republicans are largely in exurb and rural areas (Johnston, 2020).

The sociopolitical contexts of adolescent youth are also influenced by the major events, issues, and political campaigns that define the era in which they mature (Jennings 2002; Gimpel, Lay, and Schuknecht 2003; Wolak 2009). Based on evidence of increasing consistency between political ideology and party identification, as well as significant declines in split-ticket voting, political scientists generally agree that we are living in an especially polarized era, both at the level of political elites and the general public (Abramowitz and Saunders 2006; Gelman 2010; Hopkins 2018; Jacobson 2012; Jost 2017; Levendusky 2009). “Party sorting” at the level of political elites has aligned liberals with Democrats and conservatives with Republicans and provided clearer cues to the general public about what the two parties stand for with regard to particular issues – such as environmental regulation or efforts to mitigate climate change (Dunlap, McCright, and Yarosh 2016; Jacobson 2012; Levendusky 2009).

Beginning in the late 1970s and intensifying since the 1980s, Republicans have become increasingly opposed to environmental protection and regulations; meanwhile, Democrats have largely embraced a pro-environment agenda (Dunlap, Xiao, and McCright 2001; Dunlap, McCright, and Yarosh 2016; Funk and Hefferon 2019; Kahan, Donald, and Jenkins-Smith 2011; McCright, Xiao, and Dunlap 2014). Complex and politically contentious issues can embody certain cues about partisan group identity that may serve as meaningful heuristics for less politically engaged individuals, such as middle school students (Cohen 2003; Huckfeldt et al. 2005; Krishna and Sokolova 2017; McCright and Dunlap 2011; Nisbet, Cooper, and Garrett 2015). Some researchers suggest that conservatives’ skepticism of climate change is part of a larger national trend of anti-intellectualism, largely attributable to the politicization of science and characterized by distrust of scientific knowledge and suspicion of scientists (Gauchat 2012; Merkley 2020; Motta 2018; Walsh & Tsurusaki, 2018). Anti-intellectual or anti-environmental cues from prominent Republican leaders can be expected to shape public opinion and political behavior, making citizens more distrustful of science and experts.

Research demonstrates divisions and variability within the two parties as well. While some disagreements over policy objectives are generally consistent, other divides align with differences in race, class, education, and geography. Evidence suggests that socioeconomic status interacts with partisanship to frame people’s views on economic, social, and environmental issues (Associated Press-NORC Center for Public Affairs Research (AP-NORC), 2015; Kitschelt and Rehm 2019; Pew Research Center 2021;). For example, wealthier Republicans tend to be more highly educated and more fiscally conservative than those with low to moderate incomes, who tend to be more socially conservative, on average (Pew Research Center 2021). Although pro-environmental messages are prevalent in Democratic settings, lower income, less educated, and more racially diverse Democratic voters tend to hold more moderate political views regarding environmental issues (Kitschelt and Rehm 2019; Pew Research Center 2021). Meanwhile,

research shows that environmental concerns are most pervasive among wealthier and more highly educated liberal Democrats. These individuals also tend to be more well-traveled and hold more cosmopolitan views (Associated Press-NORC Center for Public Affairs Research (AP-NORC), 2015; Dunlap, Xiao, and McCright 2001; Kitschelt and Rehm 2019; Pew Research Center 2021; Pichler 2012). Cosmopolitanism generally refers to “an openness to and appreciation of other cultures, values, and experiences,” often stemming from greater exposure to a wider array of people and ideas (Keating 2016, p. 340). Prior studies suggest that political liberals consistently score higher on measures of “openness to experience” than political conservatives (Osborne and Sibley 2020).

The sociopolitical contexts of today’s adolescent youth are complex; shaped not only by ongoing political polarization and increased politicization of science and nature protection, but also by the demographic characteristics of their families and communities. The middle school-aged youth in this study are likely still forming their own political orientations and partisan preferences. When students arrive to EE programs, they may carry with them the environmental views that dominate within their own politically distinct communities. Although Stern, Powell, and Frensley (2022) found that students from different socioeconomic backgrounds experience EE programs differently, with poorer students generally exhibiting more positive outcomes, we know of no similar study exploring how EE may function differently in different sociopolitical contexts.

Methods

Study overview

This research is part of a larger study designed to explore the relationships between specific pedagogical approaches and student outcomes on EE-related field trips in the U.S. (see Powell, Stern, and Frensley 2023). This study uses data collected from program observation, student participant questionnaires, and pre-existing databases at single-day EE field trip programs for students in grades 5-8 (ages 10-14) across the U.S. Program providers included national parks, state and local parks, nature centers, botanical gardens, wildlife reserves, farms, public forests, science museums, and other environmental and educational organizations. Programs were selected to maximize the diversity of geographic locations, programmatic approaches, and the socioeconomic contexts in which they took place. We began by using Ruggiero’s (2016) ranking of statewide Environmental Literacy Plans as a proxy for the general status of EE in each state in the U.S. and then aimed to select at least 10 program providers from states in each quartile of these rankings. We then worked with the North American Association of Environmental Education (NAAEE), the National Park Service (NPS), and the Association of Nature Center Administrators (ANCA,) to identify over 300 potential organizations providing programs that met our criteria. We selected program providers based on their scheduling of programs and our ability to observe multiple programs in a single week and to maximize diversity in terms of program types and the demographics of their participants. For more details on sampling, see Dale et al. (2020).

Following extensive training and calibration on the measurement of each indicator (see Powell et al. 2019, Powell, Stern, and Frensley 2023), four pairs of researchers collected observational data at 345 EE field trip programs for 5th to 8th graders between January and June of 2018. The research team most commonly followed subgroups of students on their field trips to ensure complete observation of their experiences (visiting school groups most commonly sub-divided into smaller groups on-site). Immediately following each program, all attending students in grades 5-8 in the observed groups were invited to complete the EE21 survey (Powell et al. 2019) to assess their opinions of the program and its influence on them. Surveys were administered with a consistent script, offered in both English and Spanish, and took an average

of 8 min to complete. Sociopolitical context measures were developed from pre-existing databases. The research protocol was approved by the Virginia Tech Institutional Review Board (IRB), protocol # 15-1031, and the Clemson University IRB, protocol # IRB2016-154, PPN 2016000567.

Measurement

Program outcomes

Paper surveys were administered to all student participants immediately after each observed program before they left the site of their field trip. The **EE21 scale**, which represents the composite mean of all subscales in [Table 1](#), was developed through an extensive collaborative process between EE professionals and researchers coupled with rigorous statistical validation to broadly represent key concepts associated with environmental literacy relevant to a wide array of EE programs (see Powell et al. 2019 for details). Prior analyses of national data using this scale revealed a significant upward response bias for Latinx respondents and significantly higher outcomes scores for fifth grade students (Stern, Powell, and Frensley 2022). We thus controlled for grade level and race in this study by group-mean-centering the EE21 outcome measure for each grade level (grades 5, 6, 7, 8) and group racial majority (majority White, majority Black, majority Latinx, no racial majority). We removed programs with multigrade groups or groups of unknown racial majority from our analyses (see *Data cleaning & aggregation*). Following group-mean-centering, the resulting overall mean for the group-mean-centered EE21 outcome score is zero. In effect, this process eliminates the influence of race and grade level in subsequent analyses. Original mean scores (on the 1-to-10 scales, prior to group-mean-centering) are provided in [Table 1](#).

Determining sociopolitical context

The measure of sociopolitical context incorporates voting from the 2016 Presidential, Senate, and House elections that could be attributed to a school attendance zone (SAZ). A measure of socioeconomic context was based on free-and-reduced lunch statistics for the attending school. We first limited the sample to public schools (removing all private, charter, and choice schools from the larger study's sample), because only public schools have geographic attendance boundaries to match with voting precincts. We used a combination of the 2016 Presidential, Senate, and House elections, rather than midterm or state-level elections, because Presidential election years draw a higher level of public attention and greater participation from voters, making them more likely to play a role in the political socialization of youth (Wolak 2009; Sears and Valentino 1997). Precincts, sometimes called "voting districts," are created by state or local governments for the purpose of conducting elections and provide the most precise micro-scale measure of partisan voting behavior² (Bureau of the Census, 1994; Kinsella, McTague, and Raleigh 2015).

Because school attendance zones didn't always align with voting precincts, we used dasy-metric mapping to reapportion 2016 precinct-level election returns within SAZs by using land-cover data as a proxy for population, following procedures described by Amos, McDonald, and Watkins (2017). In short, this enabled the weighting of voting results by areas of higher and lower population to produce a more accurate depiction of actual voting patterns within a precinct than simply using an unweighted proportion. Precinct-level election returns provided the raw Republican vote and combined two-party vote in each race. Using the two-party vote eliminated votes for third party candidates, resulting in a more precise measure of partisanship than using total votes cast (Gelman 2010; Ambrosius 2016; Kinsella, McTague, and Raleigh 2015; Myers 2013, McKee and Teigen 2009). For each precinct, we used all of the available election data with one exception: races where a Democrat or a Republican ran unopposed by a member

Table 1. Environmental Education Outcomes for the twenty first century (EE21). all items measured on a 0-to-10 scale (Powell et al. 2019).

Environmental Education Outcomes for the twenty first Century (EE21)		
Outcome	Definition	Items
Place Connection ($M=7.85$; $SD = 1.19$)	The development of appreciation for and positive personal relationships with the physical location and its story.	How much do you agree with the following statements? (anchors: not at all, some, totally) - Knowing this place exists makes me feel good. - I want to visit this place again. - I care about this place.
Learning ($M=7.60$; $SD = 1.00$)	Knowledge regarding the interconnectedness and interdependence between human and environmental systems.	How much did you learn about each of the following things as a result of this field trip? (anchors: nothing at all, a fair amount, a huge amount) - How different parts of the environment interact with - each other. - How people can change the environment. - How changes in the environment can impact my life. - How my actions affect the environment.
Interest in Learning ($M=6.61$; $SD = 1.39$)	Enhanced curiosity, increased interest in learning about science and the environment.	Did this field trip make you feel any <u>more interested</u> in any of the following things? (anchors: not at all, more interested much more interested) - Science. - How to research things I am curious about. - Learning about new subjects in school.
Twenty first Century Skills ($M=6.51$; $SD = 1.38$)	Critical thinking and problem solving, communication, and collaboration	How much did this field trip help you <u>improve</u> any of these skills? (anchors: not at all, a fair amount, a huge amount) - Solving problems. - Using science to answer a question. - Listening to other people's points of view. - Knowing how to do research.
Meaning/Self-Identity ($M=6.92$; $SD = 1.31$)	A heightened sense of self-awareness, critical reflection, and purpose.	Did this field trip do any of the following things for you? (anchors: not at all, a fair amount, a huge amount) - Taught me something <u>that will be useful to me</u> in my future. - Really made me think. - Made me realize something I never imagined before. - Made me think differently about the choices I make in my life. - Made me curious about something.
Self-Efficacy ($M=1.00$; $SD = 0.57$)	Belief in one's own ability to achieve one's goals and influence their environment.	In a single post-experience survey, students were asked how much they agreed with each statement before and after the field trip. The scale is the mean difference between before and after evaluations. (anchors: not all, somewhat agree(d); strongly agree(d)) - I believe in myself. - I feel confident I can achieve my goals. - I can make a difference in my community.
Environmental Attitudes ($M=1.01$; $SD = 0.50$)	Sensitivity, concern, and positive dispositions towards the environment	Same as above for self-efficacy: - I feel it is important to take good care of the environment. - Humans are a part of nature, not separate from it. - I have the power to protect the environment.

(Continued)

Table 1. Continued.

Environmental Education Outcomes for the twenty first Century (EE21)		
Environmental Stewardship (<i>M</i> =7.49; <i>SD</i> = 1.08)	Motivations to perform stewardship-related behaviors.	Did this field trip make you any <u>more likely</u> to do any of the following things within the next year? (anchors: no more likely, somewhat more likely, way more likely) • Help to protect the environment. • Spend more time outside. • Make a positive difference in my community.
Collaboration (<i>M</i> =7.12; <i>SD</i> = 1.25)	Motivation to collaborate more with others	Did this field trip make you any <u>more likely</u> to do any of the following things within the next year? (anchors: no more likely, somewhat more likely, way more likely) • Listen more to other people's points of view. • Cooperate more with my classmates.
School motivations (<i>M</i> =7.45; <i>SD</i> = 1.42)	Motivation to work harder in school.	Did this field trip make you any <u>more likely</u> to do any of the following things within the next year? (anchors: no more likely, somewhat more likely, way more likely) • Work harder in school. • Pay more attention in class.
EE21 Scale (<i>M</i> =5.96; <i>SD</i> = 0.96)	Unweighted index: Mean of the means of all outcomes measures above.	

M: mean; *SD*: standard deviation, prior to group-mean-centering for grade level and racial majority of the group.

of the opposite party were eliminated, as these would produce an inaccurate measure of partisanship. We assigned the ratio of Republican-to-total two-party votes within each precinct to each map segment, weighted appropriately, within each SAZ. The reapportioned votes for each precinct were then aggregated to the SAZ-level and used to calculate the average Republican percentage of the available races. We refer to this measure as *average percent Republican* and use it to establish cut-points described below.

Establishing precise definitions to describe an area as being either “conservative” or “liberal” is a challenge. A review of political geography literature indicates that methodology is not limited to a single approach (Ambrosius 2016; Morrill, Knopp, and Brown 2007; Johnston, Manley, and Jones 2016; Kinsella, McTague, and Raleigh 2015; McKee and Teigen 2009). Bishop (2008) uses landslide counties, defined by a presidential candidate’s victory of 20 percentage points or more, whereas Abramowitz (2010) defined landslide states by a difference of at least 10 percentage points between Republican and Democrat presidential candidates. We use both measures – the 10-point landslide and the 20-point landslide – for our analyses. Using the 10-point landslide, we divided our sample into three subgroups: *Democrat-leaning* (< 45%), *Republican-leaning* (> 55%), *mixed* (45-55%). Using the 20-point landslide, we divided our sample into three different subgroups: *strongly Democratic* (< 40%), *strongly Republican* (> 60%), and *mixed* (40-60%). While not a perfect match, we assume Republican-leaning and strongly Republican areas are generally more conservative and Democrat-leaning and strongly Democratic areas are generally more liberal (Levendusky 2009).

To incorporate socioeconomic status, we used the percentage of students with access to free and reduced lunch prices within a school (% *FRPL*) as a single indicator of socioeconomic status. While socioeconomic status reflects a far broader array of circumstances, % *FRPL* reflects the general context of a school’s attendance zone in terms of the concentration of low-income students (National Center for Education Statistics (NCES), 2020). NCES divides public schools into categories by *FRPL* eligibility where < 25% is low-poverty; 25.1 to 50% is mid-low poverty; 50.1 to 75% is mid-high poverty; and > 75% is high-poverty. To maintain sufficient statistical power within each subsample, we consolidated categories, coding schools with > 50% *FRPL* as poorer schools and schools with ≤ 50% *FRPL* as wealthier schools. These categories were then

combined with the first sociopolitical context measure to create six total categories with poorer and wealthier subgroups of each political group (conservative/Republican; liberal/Democrat; and mixed). For a more detailed description of the methods for determining sociopolitical context, please see the [Supplementary Materials](#).

Data cleaning & aggregation

Data cleaning procedures on the original data set of 345 programs included removing invalid responses and screening for multivariate outliers, as described in Powell, Stern, and Frensley (2023). The data for this study were further limited to programs attended by public school groups of a single grade and known racial majority. We removed 83 programs with non-public school groups or for which the SAZ was not available. To allow for group-mean-centering of the EE21 outcome based on grade level and race, we removed another 16 programs for multi-grade groups or groups of unknown racial identity (Table 2). The resulting final sample for this study included 235 programs provided by 65 organizations across 114 schools in 22 states.

Following data cleaning, individual student survey responses were aggregated to the program level to match all other data – grade level, racial majority, socioeconomic status, and sociopolitical context of the attending group, which all exist at the program level. The EE21 outcome score thus represents the mean across all students who attended a specific program. To test the validity of aggregating to the program level, we calculated the ICC (1) and ICC (2), which were 0.19 and 0.76 respectively. These scores indicate that most of the variance exists at the group level rather than the individual level and that aggregation is thus valid (Woehr et al. 2015).

Analyses

We conducted two analyses to explore if outcomes differed for students from different sociopolitical contexts. We first compared mean EE21 outcomes for each sociopolitical context independent of socioeconomic context using a one-way ANOVA with post hoc analyses while controlling for grade and race. We then combined sociopolitical context and socioeconomic status to divide the sample into six categories with poorer and wealthier subgroups of each sociopolitical context and re-ran the analyses, again controlling for grade and race.

Results

Sample characteristics

Table 3 reports sample frequencies for programs, providers, schools, and states by sociopolitical context. Examining the distribution of programs across sociopolitical contexts using the 10-point landslide, 46% of programs served students from Democrat-leaning contexts, 34% from Republican-leaning contexts, and 20% from mixed contexts. Using the 20-point landslide, 40% of programs served students from strongly Democratic contexts, 25% from strongly Republican

Table 2. Data cleaning of programs.

Reason for removal	Programs removed	Programs remaining
Initial sample	0	345
Validity screening	11	334
Non-public school/SAZ unavailable	83	251
Multigrade/Unknown racial majority	16	235
Total	110	235

contexts, and 35% from mixed contexts. Across all 235 programs, the *average percent Republican* ranged from 9.3% to 78.2% with a mean of 46.1%, equal to the national Republican percentage of the two-party vote in the 2016 presidential election (The New York Times 2017). Free and reduced-price lunch statistics were available for 231 of the visiting school groups and the proportion of eligible students ranged from 7% to 96.2% with a mean of 57.5%, similar to the national average of 58% in 2018 (Bauman and Cranney 2020; U.S. Department of Agriculture (USDA) Food and Nutrition Service 2020).³

Most of the programs we observed focused on general natural history elements (e.g. species identification and information, ecosystem descriptions); making scientific observations (e.g. soil coring or water quality testing); and other curriculum-linked scientific topics (e.g. hydrology, food webs). Few programs (about 12%) directly addressed environmental issues, their consequences, and potential solutions directly. We observed some elements of pro-environmental advocacy by the on-site environmental educators in about one quarter of the programs. This ranged from minor comments about minimizing negative human impacts to specific calls to protect species, water quality, or the specific place in which the program occurred. Politically contentious issues were rarely addressed. For example, in this sample we only observed 11 programs that referenced climate change or alternative energy production. For more details on the specific content and pedagogical approaches of these programs, see our companion article in this issue (Thorpe et al. 2023).

Do outcomes of EE programs differ for middle school students (grades 5-8; ages 10-14) from different sociopolitical contexts?

Table 4 displays the results of a one-way ANOVA comparing EE21 outcome scores across sociopolitical contexts independent of socioeconomic context using the 10- and 20-point landslides, controlling for grade and race. There were no significant differences in EE21 outcomes for students from different sociopolitical contexts using the 10-point landslide; however, using the more hyper-partisan 20-point landslide, groups from strongly Republican contexts had significantly more positive EE21 outcomes. Eta-squared effect size analysis indicated a small effect size ($\eta^2 = 0.030$).

Table 5 displays the results of a one-way ANOVA comparing EE21 outcomes scores across poorer and wealthier sociopolitical subgroups using the 10- and 20-point landslides while controlling for grade and race. Using both the 10- and 20-point landslides, groups from wealthier Democratic contexts had significantly less positive EE21 outcomes. Eta-squared effect size analyses indicated large effect sizes in both the 10-point ($\eta^2 = 0.182$) and 20-point landslides ($\eta^2 = 0.194$). Thus, combining socioeconomic and sociopolitical considerations of context provides a much clearer picture of differential impacts of EE programs than considering voting patterns alone. No other statistically significant differences were observed between wealthier and poorer populations within the mixed or Republican subgroups.

Table 3. Sample frequencies by sociopolitical context.

	10-point landslide			20-point landslide		
	Democrat-leaning	Mixed	Republican-leaning	Strongly Democratic	Mixed	Strongly Republican
# Programs (235)	108	48	79	95	82	58
# Providers (65)	37	17	26	32	27	18
# Schools (114)	53	24	37	44	44	26
# States (22)	20	10	16	18	15	11

Note: (total n in sample).

Discussion

Because adolescents are exposed to the dominant political messages in their own communities, and are at a stage in life where they may be adopting politically-based social identities (Bishop 2008; Connell 1971; Lewis-Beck et al. 2008; Campbell et al. 1960), we hypothesized differential responses to EE school field trip programs for middle school students from different sociopolitical contexts. Controlling for grade and race, analyses revealed that student groups from poorer contexts (irrespective of political context) and students from Republican or mixed political contexts (irrespective of income levels) had more positive EE21 outcomes than groups from wealthier Democratic contexts. These findings have both theoretical and practical explanations and implications.

Prior research suggests that higher income tends to strengthen the partisan divide on many environmental issues, including those associated with regulating pollution, funding renewable energy research, and mitigating climate change (Ballew et al. 2020; Bohr 2014). However, we did not observe consistent negative reactions to EE programming in students from wealthier Republican contexts. Rather, only students from wealthy Democratic contexts exhibited less positive results. This seems to support hypotheses that early adolescents in mixed and Republican contexts have less strongly entrenched partisan identities that would trigger identity threats to experiences on EE field trips than adults from those same communities (Lawson et al. 2019). Alternatively, it may also signal a general lack of controversial material presented on most of the field trips we observed. Most programs largely steered clear of discussing highly politically-contested environmental issues, such as climate change, or advocating for any particular positions (see Powell et al. 2023; Thorpe et al. 2023).

A lack of novelty may have played in role as well, given the greater potential for wealthy Democrat-leaning youth to already be familiar with pro-environmental messaging and experiences typical of EE programs. These students may also have had higher baseline levels of environmental literacy (as reflected in the EE21 measure) and thus may have experienced a ‘ceiling effect’ (i.e. limited potential for change in a positive direction). The retrospective measure employed in this study was not designed to detect such effects. As noted above, pro-environmental messages may be less commonplace for students from less wealthy contexts. Thus, those from less wealthy communities may have found the programs more novel in this respect. Moreover, despite ample opportunities for unstructured experiences in the outdoors for many students in rural settings, students from poorer rural areas commonly have less access to the types of structured out-of-school experiences considered in this study (Chin and Phillips 2004; Hemby, Powell, and Stern 2023). Thus, students both from poorer and from Republican sociopolitical contexts may have had greater opportunity for change resulting from EE field experiences.

Multiple studies suggest that the novelty of field trip programs and their settings is positively associated with enhanced learning outcomes (Dale et al. 2020; Kiewra et al. 2023). Achieving these gains does not necessarily require access to remote or pristine natural spaces. Educators can make mundane natural settings novel through creative experiences or through illuminating highly novel elements of the setting. For example, even though students might live next to a

Table 4. One-way ANOVA by sociopolitical context of visiting groups with dunnett’s C posthoc tests for EE21 outcomes, controlling for grade and race.

	Sociopolitical context			Test statistic	p	η^2
	Democratic	Mixed	Republican			
10-point landslide (n)	(108)	(48)	(79)			
EE21	−0.07	0.05	0.07	F: 0.882	0.415	0.008
20-point landslide (n)	(95)	(82)	(58)			
EE21	−0.09 ^a	−0.05 ^a	0.23 ^b	F: 3.63	0.028	0.030

Eta-squared effect size: 0.01 = small effect, 0.06 = medium effect, & 0.14 = large effect. ^{a,b}Indicate statistically significant differences between groups ($p < 0.05$).

Table 5. One-way ANOVA by sociopolitical context and socioeconomic status of visiting groups with dunnett's C posthoc tests for EE21 outcomes, controlling for grade and race.

		Sociopolitical context by socioeconomic status						Test statistic	p	η2
		Democratic		Mixed		Republican				
		Wealthy	Poor	Wealthy	Poor	Wealthy	Poor			
10-point landslide (n)	(28)	(76)	(15)	(33)	(36)	(43)	Welch: 12.279	< 0.001	0.182	
EE21	−0.84 ^a	0.20 ^b	0.13 ^b	0.01 ^b	−0.03 ^b	0.15 ^b				
20-point landslide (n)	(26)	(65)	(26)	(56)	(27)	(31)	Welch: 11.717	< 0.001	0.194	
EE21	−0.83 ^a	0.18 ^b	−0.31 ^{ab}	0.07 ^b	0.25 ^b	0.20 ^b				

Eta-squared effect size: 0.01 = small effect, 0.06 = medium effect, & 0.14 = large effect.

cypress swamp, wading waist-deep through one may be a highly novel experience for most (Dale et al. 2020). Similarly, a great educator might be able to make a blade of grass or a mowed lawn novel if they lie down on their chests with their students to excitedly explore the intricacies of leaves or the diversity of plants together in a fun way.

Mundane experiences, alternatively, can make novel settings feel commonplace. In our recent national study (Powell, Stern, and Frensley 2023), we observed multiple field trips that felt more like a classroom science experience that just happened to take place away from school. For example, a program on a mountaintop with expansive views of the surrounding mountains and valleys can feel commonplace if student activities are limited to completing worksheets about basic soil types or insects in a nearby forested area. The same program could feel novel and exciting if students' attention is directed to experiencing the novel components of the place in a way that is relevant to them (Dale et al. 2020; Powell, Stern, and Frensley 2023)– for example, exploring how the land use patterns they can observe from the mountaintop influences their water quality at home. In short, educators who consider what might be novel and relevant to their audiences may be likely to produce greater environmental literacy in their students (see Dale et al. 2020; Powell, Stern, and Frensley 2023). The present study suggests that programs for students from wealthier Democratic areas, in particular, may be falling short in this respect.

Taken together, the results suggest that the present moment may represent a unique opportunity for the field of EE to play a role in lessening the political polarization of environmental issues. Today's youth generally hold more pro-environmental views than adults and are seemingly less polarized in their views of environmental issues (Pew Research Center 2020; Parker, Graf, and Igielnik 2019; Funk and Hefferson 2019). Our findings convey additional good news for the field. Audiences for which environmental concerns may be counter-attitudinal, such as students from Republican contexts, did not exhibit less positive outcomes following participation in EE programs. Rather, we found that students from wealthier Democratic contexts demonstrated less positive changes in outcomes; therefore, we recommend that providers continue to be conscious of their audiences, particularly when working with groups from this context, as these students may benefit from different, and perhaps more novel, approaches.

Limitations

Limitations of the study are primarily attributable to small subsamples that were not statistically representative of the entire U.S. Future research could aim to conduct larger and more representative samples of each sociopolitical context or focus in on specific communities for more locally-specific explorations. Moreover, these summary findings do not account for the influence of the specific content or pedagogies of programs themselves. For more on this, please see the companion article in this issue, which explores the influence of different pedagogical approaches in different political contexts (Thorpe et al. 2023).

Notes

1. We refer to the field trips as “programs” throughout the manuscript, as the experiences all involved a planned set of activities with on-site educators.
2. Using precinct-level election returns provides us with a sharper representation of students’ immediate sociopolitical context than if we were to use school district or county-level data, which produce coarser illustrations of partisan turnout and may obscure variation between schools within the same district (Kitchens, 2021; Kinsella, McTague, and Raleigh 2015; Myers, 2013).
3. We also examined relationships between groups’ sociopolitical context and socioeconomic status, race, and urbanity. In short, participants from Republican contexts tended to be Whiter, wealthier, and live in more suburban or rural areas, whereas participants from Democratic areas tended to be more racially diverse, urban, and of lower socioeconomic status (see supplemental tables). All subsequent analyses eliminate the effects of grade level and race through group-mean-centering of the dependent variable, EE21. For a more thorough examination of the relationship between race and program outcomes, see Stern, Powell, and Frenslley (2022).

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