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Perceptions of local environment change and ecological habitus

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ABSTRACT

Research shows that people's perceptions of environmental change are strong predictors of ecologically supportive behaviours and attitudes, but less is known about what causes some people to perceive environmental change more than others. This study considers whether participation in outdoor leisure activities accounts for different perceptions of the local environment. We consider how leisure activities form a broader 'ecological habitus' while also considering the role that education has in structuring perceptions and practice. We use survey data on perceptions of environmental change and use Principal Component Analysis and logistic regression to explore ecological habitus and the effect of leisure activities on environmental perceptions. Results show that outdoor leisure practices shape perceptions of local environment change and offer a continuum of ecological habitus ranging from *appreciative to low resource outdoor leisure* associated with varied perceptions of environment degradation. Education is a limited factor in predicting perceptions or explaining associations between leisure and environmental perceptions.

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In the face of mounting ecological crises, such as biodiversity loss, ocean acidification, or air and water pollution, environmental activists and policymakers are increasingly encouraging people to adopt more ecologically supportive behaviours. One crucial social factor that shapes openness to such behaviours are the perceptions people have of environmental change and the meanings they associate with it (Marshall et al. 2019; Stoddart, Cruddas, and Ramos 2021). This suggests that it is important to determine what activities and, by extension, possible interventions, promote increased environmental awareness. In this paper, we consider whether or not participation in outdoor leisure activities accounts for different perceptions of local environments and the changes occurring in them.


Although prior research examines outdoors activities and perceptions of environmental degradation (e.g. Barnett, Jackson-Smith, and Haeffner 2018; Dunlap and Heffernan 1975; Jackson 1986; Knight and Hao 2022) much of it focuses on activities that are explicitly considered 'outdoor' like hiking, skiing, mountaineering, over more tertiary leisure activities such as outdoor sport and exercise. Moulin (2023) expands this by considering a wider range of cultural activities and shows that they are associated with different forms of outdoor engagement. Our paper uses a wide range of outdoor activity measures to explore if people who participate in environmentally appreciative activities have a more granular

appreciation of changes occurring in their environment. We then examine how different kinds of leisure activities are associated with degrees of perceptions of environmental change. In doing so, we consider how such activities help form continuums of an *ecological habitus*, which we conceptualize as a consciousness and practice that is produced through activities that are more environmentally aware and critical of environmental changes occurring in the local terrain. We also consider the role of education as a factor that may presage a more critical environmental consciousness.

To analyze these issues and relationships, we use survey data on perceptions of environmental change collected in Atlantic Canada. The paper first offers an overview of literature on perceptions of environmental change and introduces Pierre Bourdieu's theory of practice and habitus which we later use to operationalize the concept of ecological habitus. The paper then discusses why Atlantic Canada is a valuable case to examine and introduces the survey and methods we use. We then examine the relationship between perceptions of environmental change and leisure activities, components of ecological habitus, to understand their role in fostering an environmental consciousness that may in turn influence more ecologically supportive practices. Exploring these relationships can contribute to the understanding of how to motivate people and communities to act on climate change by

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connecting it to the outdoor activities they do in their everyday lives.

Perceptions of local environment change and ecological habitus

A wide array of literature examines social concerns about global environmental and climate change. There is comparatively less work on perceptions and direct experiences of environmental change at the local level (Stoddart and Ramos 2013). In fact, Ensor et al. (2018) call for more methods that capture the drivers of community-level perceptions as recent studies mainly rely on data that is qualitative and geographically dispersed (Nash et al. 2019; Pyhälä et al. 2016; Takakura et al. 2021). People's perceptions are critical for several reasons. They not only provide greater insight into how people *generally* perceive environment change (Pyhälä et al. 2016), but are also a predictor of their willingness to adopt more ecologically supportive behaviours and practices (Stoddart, Cruddas and Ramos 2021). Some work suggests that climate change 'deniers' do not perceive environmental degradation at the community level, nor do they perceive how environment change impacts them as individuals, and this makes them less likely to adopt ecologically supportive practices (Engels et al. 2013; Marshall et al. 2019; Milnes and Haney 2017). In contrast, those who report higher levels of climate change awareness also report higher levels of environment-friendly adaptive capacities (Marshall et al. 2013) or willingness to respond to climate change proactively and positively (Whitney et al. 2017).

These insights are important for anyone whose goal is to promote ecologically supportive practices because they imply that people who notice environmental changes are more inclined toward such behaviours. Thus, understanding social perceptions is fundamental to designing, planning, and implementing sustainability strategies at the local level (Patt and Weber 2014; Weber 2006). A burgeoning body of literature takes up this challenge by exploring the relationship between outdoor activities and perceptions of environmental change (Barnett, Jackson-Smith, and Haeffner 2018; Dunlap and Heffernan 1975; Jackson, 1986; Knight and Hao 2022).

The relationship, however, remains under-theorized; the inter-relationships among activities, perceptions, and other variables, such as socio-economic status or demographics, are not adequately understood. Thus, in testing the hypothesis that the nature of people's embodied experiences in local environments affects their likelihood of perceiving environmental degradation and ecological consciousness, we theoretically ground our investigation of the relationship between practices and perceptions in concepts from Pierre Bourdieu's (1986,

1998) work on capital and habitus, and Debbie Kasper's (2009) ecological habitus.

Bourdieu theorizes that social practice is produced by the interaction of capital, habitus and field (Bourdieu 1991) in an endogenous and embodied set of relationships. Breaking this down into his identification of key components, capital can be economic, cultural, or social assets that have symbolic value, yield status and opportunity, and can also be exchanged and transferred. Moving beyond the more simplistic understanding of capital in only monetary terms, any type of the aforementioned capital can exist in three states: the embodied, objectified, and institutionalized (Bourdieu 1984). For instance, ecological embodied capital might be expressed through affinity and feelings towards more ecologically supportive activities and practices such as appreciating carbon-neutral transportation choices or being more sensitive to perceptions of climate change. In its objectified state, ecological capital is comprised of material and symbolic possessions that signal cultural and class-based competencies. For instance, in some circles, it might be valuable to have sustainable possessions, to use recycling and compost bins, a bicycle, or a green vehicle. Institutionalized capital refers to institutional recognition of competencies – for example, a university degree. Given that climate change is a scientifically-studied and articulated phenomenon, those who are university educated and have some familiarity with scientific disciplines should be more inclined to care about, and notice changes in the natural environment.

The second of Bourdieu's concepts mentioned above, habitus, is generally understood as a 'disposition' comprised of an individual's past experiences and practices, which is expressed through the attitudes, tastes and values that structure how they choose to act in different situations. Each person possesses their own distinct habitus because each individual is uniquely socialized through their own experiences and the accumulation of capital that comes with them. The final concept, 'Field,' is the space where different individuals' habituses come together – the space where the capital produced by, and which produces a particular habitus comes to have value. As such, habitus is the nexus between the capital that one accrues, the practices one engages in, and the field that demarks their social and cultural space (Bourdieu 1984).

Recent scholarship has drawn on Bourdieu's work to develop the concept of an 'ecological habitus' to explain how dispositions, practices, and material conditions come together in a socio-ecological context to produce an embodied ecological disposition that influences environmental behaviour and practice (Kasper 2009; Kirby 2018; Moulin 2023; Nilan 2017). This approach is more nuanced than those that focus on individuals or specific behaviours without considering the broader social and cultural context that might

shape activities and practices (Shove 2010). In this article, we conceptualize outdoor leisure and sport activities as practices that shape habitus; and we propose sets of similar outdoor practices cohere to form different 'fields' of outdoor activity where social actors engage with each other and partake in similar practices in similar socially structured spaces (Kirby 2018). We delineate those fields further below, but for now we note that the concept of an ecological habitus assumes that different fields of outdoor activity overlap with ecological and other practices, and the capital associated with each (field and practice) combine to shape an ecological habitus, or consciousness, that is more or less sensitive to ecological change.

Although other research has considered ecological habitus, for example, conceptualizing it as a person's disposition toward pro- or anti-environmental practices (Smith 2001) or toward living in an ecologically conscious manner (Haluza-DeLay 2008), we follow Kasper's (2009) application of the ecological habitus framework. She conceptualizes it as a *continuum* that nudges a person or groups of people towards certain values and attitudes, ranging from 'ecologically antagonistic' to 'ecologically supportive', and situates them in relation to others. This can comparatively be thought of as fields where activities hold and produce varying degrees of ecological capital and in turn ecological practices. That is, different activities have the potential to shape unique perceptions of environment and environmental change through activities and practices. Importantly, recent work has used this ecological habitus framework to show the connection between perceptions of environmental change and ecologically supportive behaviours where a field of young people described as ecologically supportive were shown to share similar perceptions of environmental risks and local threats to the environment (Nilan 2017).

Other work contends that ecologically supportive behaviours are based on environmental subjectivities (Ford and Norgaard 2020). That is, they come from the standpoint of individuals who are embedded in communities and through everyday actions. This is similar to the Bourdieusian notions of habitus, field and capital. In such subjectivities, peoples' environmental practices are a product of lived experiences embedded in day-to-day socioecological contexts and different relationships to power structures and culture, producing diverse forms of environmental knowledge leading to different ecological practices. As Stoddart (2012) shows, outdoor sport helps shape environmental subjectivities. He examines how skiers' environmental subjectivities are shaped through their routine interactions with skiing landscapes – including perceptions of backcountry landscapes as sites of more ecologically authentic experiences. Along the same lines, Shove (2010) encourages moving beyond individual and

psychologically focused explanations of practices towards ones that account for contextual, social, and cultural temporalities that shape practices. Taken together, considering habitus, environmental subjectivities, or environmentally supportive practices are all ways of considering how people have structural locations and cultural worldviews that intersect with perceptions of climate change and ecological practices. This means that everyday activities, social situations, institutional contexts, and cultural norms shape ecologically supportive or antagonistic behaviours (Shove 2010).

For these reasons we argue that leisure activities have varying degrees of ecological capital and in turn help form different degrees of ecological habitus which in turn is related to ecologically sustainable practices. Leisure activities expose people to a diversity of environmental spaces (fields) and some spaces where social actors partake in select outdoor activities may be more influential on an individual's perception of environmental degradation than others. This brings us to our first hypothesis:

Hypothesis 1: *Outdoor leisure practices predict distinct perceptions of environment degradation*

This hypothesis builds on Dunlap and Heffernan's (1975), which evaluated the association between outdoor recreation activity and environmental concerns by examining three aspects of outdoor activity. First, they looked at the role of greater *frequency* of outdoor leisure activity and ecological concern, then they assessed if that relationship would be stronger for those who participate in 'appreciative' outdoor activities such as camping, hiking, or visiting parks than it would be for 'consumptive' activities such as fishing or hunting. Dunlap and Heffernan differentiate between 'appreciative' and 'consumptive' activities which are distinguished by the activity's consumption of wildlife. Appreciative activities embed the individual within the environment without directly disrupting wildlife, whereas consumptive activities also embed people in an environment but disrupt and potentially harm the environment. Dunlap and Heffernan also examined whether the relationship between outdoor activities and concern for the environment would be stronger if a concern is directly related to an activity – in other words, if the environmental harm or degradation prevents a person from doing the activity they enjoy. Dunlap and Heffernan conclude that appreciative outdoor activities are important predictors of greater environmental concern because such activities directly expose individuals to the natural terrain which then leads them to become more attached and committed to specific environment spaces. That in turn increases awareness about the threats to these natural areas and

cultivating a subjective preference for clean natural spaces. Consumptive leisure activities, by contrast, may bring people closer to their environment through activities such as hunting and fishing yet, consumptive activities increase ecological disruption compared to activities like hiking, swimming in natural settings, or mountaineering. We acknowledge that Dunlap and Heffernan's distinction between the two groups assumes that people who engage with consumptive activities are ecologically antagonistic. As such, we posit that individuals who engage with consumptive leisure may perceive environment degradation, but their active participation is ecologically intrusive, leading to a sense of 'ecological irony' with a 'value – action gap.' When this occurs, people's professed ecological beliefs are incongruent with their eco-social practices (Blake 1999; Szerszynski 2007).

Since the publication of Dunlap and Heffernan's initial work, more research has emerged linking outdoor recreation activities and perceptions of environment change (Barnett, Jackson-Smith, and Haeffner 2018, Jackson, 1986; Pinhey and Grimes 1979; Wolf-Waltz 2011). For example, recent work shows that people who do more outdoor activities are also more likely to enjoy being outside in nature. That enjoyment in nature helps explain the heightened levels of environment concerns among the highly active (DeVillie et al. 2021; Knight and Hao 2022). A well-known Canadian-based study by Jackson (1986) found that engagement in appreciative activities was strongly associated with environment concern compared to more consumptive environmental activities such as snowmobiling. Teisl and O'Brien's (2003) supports the overall argument that engaging in outdoor leisure activity is positively related to greater concern for the environment and ecologically supportive behaviours. The strength and direction of this association, however, is reliant on the type of outdoor activity that an individual engages with. These enduring findings underscore our second hypothesis:

Hypothesis 2: *Those who participate in appreciative outdoor leisure activities will be more likely to report perceptions of environment degradation.*

Other research emphasizes the relationship between outdoor recreation and ecologically supportive values, behaviour, and activism. The growing popularity of mountaineering in the nineteenth and early twentieth century inspired many participants to join groups like the Sierra Club to advocate for wilderness protection (Schrepfer 2005) and to mobilize in support of national park development (Reichwein 2014). Contemporary groups like Surfers Against Sewage and others draw on surfers' embodied interactions with nature to mobilize for ocean health (Heywood and Montgomery 2008;

Laviolette 2006; Wheaton 2007). Similarly, Stoddart (2012) finds that skiers draw on their recreational interactions with mountain environments to inform their understandings of environmental issues, including questioning the new ski development where this infringes on critical wildlife habitat. They also tend to view their leisure activity as consistent with ecological supportive values. At the same time, skiers often note the 'ecological irony' of defining their recreational activity in pro-environmental terms while simultaneously relying on carbon intensive car or airplane travel to access valued mountain environments, which are themselves disproportionately harmed by climate change (Stoddart 2011).

There is good reason to consider the effects of other variables that might shape activities and in turn ecological fields. For instance, Pinhey and Grimes (1979) observed that participation in outdoor recreational activity was a less powerful predictor of environmental perception compared to socioeconomic status and age. Similarly, Barnett, Jackson-Smith, and Haeffner (2018) found that perceptions of water quality were largely shaped by social characteristics like education, gender, age, and race rather than select water-related outdoor activities like fishing or boating. In fact, evidence from their work suggests that higher levels of outdoor recreational activity are linked to more positive perceptions of water quality rather than perceptions of degradation. Other research shows that attitudinal shifts that are provoked by leisure activities may be short-term and limited to the environments where these activities take place. As a result, they do not necessarily translate into long-term shifts in ecologically supportive values (Haluza-Delay 2001; Waitt and Cook 2007).

Generally, if we use a Bourdieusian lens to understand the previous research on outdoor activities and environmental perceptions we can infer that activities offer opportunities to experience environments. We also infer that the ability to access the requisite spaces and equipment to participate in any given activity will be constrained or enabled by the possession of certain kinds of capital (e.g. money to buy golf clubs and memberships, social connections to access unmarked ATV trails). If we fully adhere to Bourdieu's notion of habitus, it compels us to also examine the effects of other variables, or forms of capital, and to consider institutional opportunities to experience the environment. For Bourdieu, education was a key generator of capital formation that counterbalances lack of opportunity to gain other forms of capital. Education, which is linked to higher social statuses, has already been linked to environmental concern (Liu, Vedlitz, and Shi 2014). For example, literature looking at health outcomes shows that greater education affords people a greater capacity to acquire, evaluate, understand, and make use of information, which in turn, enables learn effectiveness and

greater self-direction that promotes a health advantage (Mirowsky and Ross 2005). This explanation for the intangible benefits accrued through education attainment may operate similarly in the context of environmental concern and perceptions of local-level change. People with more education may have more knowledge about climate change and environmental threats. They may be more critical of how authorities manage local terrain and perhaps more observant and sensitive to changes to their communities' environment.

Research also shows that higher levels of education tend to be correlated with more concern about environmental issues than those with lower levels of education (Dietz, Stern and Guagnano 1998; Kanagy, Humphrey, and Firebaugh 1994). Other work also shows that education has a positive effect on ecologically supportive attitudes, awareness, knowledge, and behaviour (Sun et al. 2020; Wang et al. 2022). In line with our Bourdieusian theoretical framework, Wang et al. (2022) argue that the relationship between educational attainment and ecologically supportive positions is explained by the increased acquisition of ecological capital and general knowledge of environmental issues. Others, however, find that higher education is not predictive of an increase in support for environmental protection policies (Harring, Jagers, and Matti 2019). The present study reconciles this tension and posits education as a pathway through which individuals acquire greater ecological capital comprised of knowledge, appreciation, and competencies to observe environment degradation, but also a heightened ability to acquire outdoor leisure resources and access to spaces that require these resources. With this consideration, we posit that:

Hypothesis 3: *Higher education increases perceptions of environment degradation*

Taken together, we believe that a component of ecological habitus, captured through exposure to outdoor environments, may contribute to perceptions of climate change. Leisure activities (embodied and objectified capital) and education (institutionalized) could shape a social actor's ecological consciousness, and ultimately lead to a more ecologically supportive position on the continuum of ecological habitus.

Why Atlantic Canada?

To explore perceptions of environmental change and understand how outdoor activities shapes them we examine perceptions of Atlantic Canadians. There are several reasons why Atlantic Canadians are primed to perceive local environmental degradation: first, the country's Atlantic region (New Brunswick, Newfoundland and Labrador, Nova Scotia and Prince

Edward Island) has experienced profound environmental change, has a long history of environmental awareness, and was an early adopter of pro-environmental practices, such as recycling. Second, the region tends to express more ecologically supportive attitudes than the rest of the country (Environics Institute 2018) and has consistently done so each year. This is likely because the region has large rural populations that have relied on resource extractive industries such as forestry, agriculture, or fishing for employment. Third, Atlantic Canada has also been the site of intensive deforestation and has little old growth forest left and was directly harmed by industrial pollution leading to acid rain. It also was subject to the closure of its ground fishery because of overfishing and experienced environmental harms because of Acid Rain. Atlantic Canada also has a history with mining and the industrial waste that results from it, and its pulp and paper industry's annual air emissions were recently shown to be much higher than federal emission thresholds by 100,000% (Giacosa et al. 2022). These are but a few examples of ecological wrongs the region has faced. Fourth, Atlantic Canada also is home to dozens of coastal communities with deep connections to the Atlantic Ocean who are witnessing climate and ocean change firsthand (Finnis, Sarkar, and Stoddart 2015; Foley, Okyere, and Mather 2018). For example, the threat of flooding, coastal erosion, and saltwater intrusion have already stressed the region's infrastructure and agriculture. Thus, the impacts of climate change are immediately detrimental to the region and people living in its communities. As a result, Atlantic Canadians are highly engaged with their environments. The region offers a unique case to explore how people perceive local environmental degradation and the pathways, such as outdoor leisure activities, that shape their perceptions and the role that ecological habitus plays in intersecting both.

Data and methods

To explore Atlantic Canadians' perceptions of environmental change and the role of leisure activity as a component of ecological habitus we use the Perceptions of Environmental Change in Atlantic Canada survey (McLay and Ramos 2021) funded by Future Ocean and Coastal Infrastructures (FOCI). The survey was reviewed by the Dalhousie University Research Ethics Board, #2020-5134 and conducted online from February to April 2021 and has a total sample of 1119 participants who lived in Atlantic Canada at the time. Despite the survey being fielded during the height of the pandemic, we do not believe that the time frame impacted environmental perceptions in the region. As noted in the previous section, the region has a long history of environmental awareness and ecologically supportive attitudes. It is largely rural with people depending on the environment for

their leisure and livelihoods, and the region has faced several environmental harms. Additionally, the survey questions used ask about perceptions of environment change over the past 5–10 years which is largely before the pandemic.

Perceptions of environmental degradation were measured by six variables that capture a participant's perception of local environmental change in their community over the last 5–10 years. The variables are scale questions about changes to *amount of environmental space, quality of natural environment, number of people using and visiting the environment space, and water, green space, and air quality.*

Outdoor leisure activities, which are a manifestation of interaction with environment and practice, are the variables we use to understand ecological habitus. We employ data that contains a diverse cache of leisure items that exceed limited indicators used in previous studies to illustrate a continuum of practices for the potential development of ecological habitus. In line with recommendations from Ford and Norgaard (2020) we believe it is important to capture how everyday activities shape the habitus and in turn ecological practices. We also follow Stoddart (2011, 2012) in considering the role of sport in the development of such a nexus. Outdoor leisure is measured based on the question 'what leisure activities do you do outdoors?' where survey participants can report participation in any of 25 *leisure activities*, including: walking; jogging, running, rollerblading, cross-country running; hiking; field sports; golfing, croquet, lawn darts, lawn bowling, bocci; boating, sailing, canoeing, kayaking, rafting, rowing, dragonboating, seadoing; swimming, beach, surfing, scuba diving, snorkeling; bicycling; all-terrain vehicle (ATV); skiing, telemarking, snowboarding; snowmobiling; cross-country skiing, snowshoeing; hunting; fishing; camping; picnicking, barbecue; ice skating; ice hockey, broomball, curling; bird watching, photography; exercise, tai chi, aerobics, yoga; visiting a park, playground; mountain climbing; tobogganing, sliding; geocaching; badminton, tennis. All activities uniquely expose people to their environment through leisure and sport and each item involves some form of contact with a person's local environment. For example, mountain climbing, golfing, and camping are each outdoor leisure activities that expose individuals to different natural terrains and green space. Each item is a binary indicator, where 0 represents 'does not do outdoor activity' and 1 'does outdoor activity.'

Following Bourdieu's work on habitus, Kasper's concept of 'ecological habitus', and work by Ford and Norgaard (2020) and Shove (2010) which encourages looking at standpoints, intersections, and broader context, our interest is in the overall configuration of outdoor leisure activities. As such, we used Principal Component Analyses (PCA) and varimax rotation to collapse the activities and generate groupings which

are reduced to six groups of activities. This approach offers a more manageable set of outdoor leisure practices and to develop a set that can explore ecological habitus. PCA is an exploratory and parsimonious data reduction technique that reduces the dimensionality of multiple data thereby increasing interpretability (Jolliffe 2002; Jolliffe and Cadima 2016). In line with PCA methodology, the method groups variables according to latent factors that represent a continuum starting with the *greatest variation* of participants data. Some factor loadings appear qualitatively complex and may not fully capture the complexities of lived experiences. However, the utility of PCA aligns with methods used by Bourdieu and others and we posit that this approach best illustrates the proposed ecological habitus continuum as well as overlapping and intersecting dimensions. It is an approach that helps understand how people are situated through their everyday activities in a broader context. We rely on the component's eigenvalue and interpretability to determine the number of retained factors. Each component in the six-component model had an eigenvalue larger than 1. Scree test results are shown in our appendices. The six-component model has a cumulative percentage of variance of 47% - the variance is based on the array of outdoor leisure activities included which increase the model's variability. Explained variance can be as low as 50–60% in the social sciences and humanities, and sometimes lower (Williams, Onsmann, and Brown, 2010), and in this instance, researchers are required to use their subjective judgement when selecting the appropriate number of components to extract (Tabachnick and Fidell 2007).

Table 1 shows a summary of the 25 outdoor leisure activity items using PCA with varimax rotation across the first six components and factor loadings with a score greater than 0.2. The six components generated by PCA are the statistical expression of participants' outdoor leisure activities - that is, their ecological habitus. These components can be interpreted as a continuum that ranges from low to high degree of a given outdoor leisure activity, where negative values concurrently indicate a low degree of select activity and an opposition to positive values. We use the collapsed activities, reflected through principal components, to test our first and second hypotheses.

Table 1 shows how the 25 *leisure activities* collapse to six descriptive components that we use in our analysis, including:

Appreciative leisure

This component's response pattern is characterized by a combination of several activities deemed 'appreciative' including walking, hiking, bicycling, swimming and beach-related activities, boating, snowshoeing, skating, and camping.

Table 1. Factor loadings of items on outdoor leisure activity. Principal component analysis with varimax rotation. Values smaller than 0.2 are not shown ($n = 1,063$).

Item	Appreciative Leisure	Consumptive Leisure	High-intensity Physical Activity	Low-resource leisure	Leisure Sport	Exploration & Moderate Physical Activity
Walking	.27			0.27		
Jogging/Running			.41			
Hiking	.44					
Field Sports			.37			
Bicycling	.28		.20			
Golf/Croquet					.66	
Swimming	.25			0.21		
Boating	.42				.20	
Fishing		.40				
Hunting		.49				
All-terrainvehicle (ATV)		.52				
Snowmobiling		.49				
Skiing/Snowboarding			.36			
Snowshoeing	.42			-0.22		
Sliding			.24	0.34		
Skating	.21		.26			
Exercise						.41
Tennis/Badminton			.28		.36	
Ice hockey/curling					.47	
Park/Playground				0.60		
Picnicking/Barbequing				0.47		
Bird Watching/Photography			-0.36			.34
Camping	.28					
Mountain climbing						.56
Geocaching						.52

Consumptive leisure

Participants in this category engage with their local environment through outdoor ‘consumptive’ activities like fishing, hunting, ATVing, and snowmobiling. This category does not assume individuals engaging in such activities fail to perceive environmental degradation or are inherently ecologically antagonistic, but rather describes activities that contribute to trail erosion, produce noise pollution or carbon emissions, or that remove fish or wildlife from their habitats. As such, people who engage in these activities use local environment in a manner that benefits individual play at the detriment of disrupting wild-life and natural terrain compared to other outdoor activities like hiking, bicycling, and mountain climbing.

High-intensity physical activity

This component is characterized by its response pattern involving physical activity – jogging, field sports, bicycling, skiing or snowboarding, sliding, skating, and tennis or badminton. Negative scores for the bird watching and photography indicate that this group of respondents do not engage with their environment in a sedentary manner.

Low-resource leisure

The fourth principal component captures respondents who engage with their environment with less resources and are less physically active. This component is defined by outdoor activities like walking,

swimming and beach-related activities, sliding, going to the park or playground, and picnicking or barbequing.

Leisure sport

This outdoor leisure component is comprised of golfing activities, boating, tennis and badminton, and ice hockey and curling. It accounts for 66% of the golf item’s variation in our data and therefore, is a dominant characteristic of this leisure principal component.

Exploration and moderate physical activity

This component is described as an ‘exploration’ group because of its high positive scores for mountain climbing and geocaching (both $> .50$), and is characterized by bird watching and photography. The score for exercise represents moderate physical activity.

To understand the role of *education*, and to test our third hypothesis, we look at the level of education attainment measured using an ordinal scale that asked participants to identify the highest level of education they obtained. Response options reflect Statistics Canada (2021) and the International Standard Classification of Education (UNESCO 2011) standards for measuring educational attainment. Participants were grouped into four categories: ‘high school diploma or less’, ‘post-secondary certificate or diploma below bachelor’s degree’, ‘bachelor’s degree’, ‘certificate, diploma, or degree above bachelors.’

We also assess a host of sociodemographic and socioeconomic characteristics in our analyses. We include characteristics that have been shown to be important in previous analyses (Barnett, Jackson-Smith, and Haeffner 2018; Liu, Vedlitz, and Shi 2014; Pinhey and Grimes 1979) including: gender, age, marital status, immigrant, visible minority, Indigenous, Atlantic province of residence, rural residency, if the respondent works outside (farming, fishing, forestry, construction), type of dwelling, home ownership, and amount of income spent on housing.

It was necessary to maintain the analytic sample in our study due to the survey's sensitive sample size. Outdoor leisure activity items had a consistent 23 missing participants who were excluded from the sample (2% from total sample). We then used multiple imputation by chained equations (MICE) with 10 replicates (Royston and White 2011) to maintain our sample size on education and all perceptions of environment change variables. This gave us a total analytic sample size of 1,063 participants. Missing data was not set to missing for any of the covariates included in our model but were instead treated as categorical and suppressed in reporting to maintain the largest sample possible. The survey's weighting factor adjusts the sample to reflect the actual composition of Atlantic Canada more closely in terms of age, education, gender, province of residence, and the proportion of residents who are immigrants, visible minorities, or Indigenous (McLay and Ramos 2021). Survey weights are based on

Canada's 2016 Census and as such, this study's sample is representative of 2,333,322 Atlantic Canadians¹ (Statistics Canada 2017).

Table 2 displays descriptive characteristics of our sample including education and select demographic and socioeconomic covariates. Almost half of our sample has high school or less (48%) education and 34.6% has post-secondary education below a university bachelor's degree, while 17.4% have a university degree or higher. 43.3% of our sample is female, 55.4% are married or live with a partner, and the highest percentage of participants in our sample are between the ages of 60 to 69 (23.4%), or under the age of 30 (17.2%). Only about 5% or less of our sample identifies as an immigrant or refugee, visible minority, or Indigenous status. Most participants reside in Nova Scotia (42.4%), New Brunswick (30.5%), and Newfoundland and Labrador (20.1%), with over 67% reporting that they live in a rural area or small population centre. 16.8% of survey participants work outside and a majority of our sample own their home (70.4%), own a single-detached dwelling (66.6%), and about 20% spend half or more of their income on housing.

We test our hypothesis by first describing the main variables that compose an ecological habitus in our analysis – leisure activities and perceptions of change – and then explore our hypotheses using logistic regression. The logistic models occur in three stages: first, we test the unadjusted association between our categories of outdoor leisure activities and self-reported

Table 2. Descriptive statistics for education, demographic and socioeconomic characteristics.

Variable	Proportion
Education	
High school diploma or less	48.0
Post-secondary certificate/diploma below bachelors	34.6
Bachelor's degree	11.3
Certificate, diploma, or degree above bachelors	6.1
Sociodemographic Characteristics	
Female	43.3
Married/common-Law	55.4
Respondents age	
Under 30	17.2
30–39	1.6
40–49	1.0
50–59	13.7
60–69	23.4
70 and older	11.3
Immigrant or refugee	4.4
Visible minority	4.0
Indigenous status	5.1
Province	
Nova Scotia	42.4
New Brunswick	3.5
Newfoundland and Labrador	2.1
Prince Edward Island	7.0
Rural area/small population centre	67.1
Socioeconomic Characteristics	
Works outside	16.8
Single-detached dwelling	66.6
Owns home	7.4
Half of income or more spent on housing	19.7

All descriptive statistics include sampling weights to account for unequal probability of selection into sample.

perception of local environment degradation for all six perceptions. This allows us to explore our first and second hypothesis. We then control for only level of education to test our third hypothesis. The final model incorporates a host of sociodemographic and economic indicators that are shown to relate to both outdoor activities and perceptions.

Analysis and results

We begin by examining the distribution of our individual-level outdoor leisure activities in [Figure 1](#). The highest percentage of leisure activity was walking (87.4%), followed by hiking (57.2%), picnicking and barbecuing (53.5%), and the bird watching and photography (52.8%). All other outdoor leisure activities are engaged with by less than half of our sample, which is beneficial as it provides a high-level of nuance to our sample's response patterns.

Next, in [Figure 2](#), we present perceptions of environmental change across the six outcome measures. [Figure 2](#) shows a higher proportion of participants perceive environmental degradation in the quality of their natural environment overall (41.5%), water quality (47.5%), and green spaces (39%). In contrast, approximately 40% of participants report 'no change' to quality of their natural environment, water quality, and green quality. Participants are less likely to observe local environment degradation on other perceptions of change indicators. For instance, 60.4% of Atlantic Canadians in our sample do not report fewer amounts of environmental space, while about 73% of participants report that air quality has 'not changed' and 8.8% report 'better' air quality. Interestingly, 60.4% of survey participants report *more* environmental space use and visits, and 26.4% observe no change. Given our interest in how outdoor leisure activities – as a component of ecological habitus – associate with perceptions of environment degradation, we dichotomize the variable for the logistic regression analysis to focus on the darkest block of the 'fewer/worse' category, versus other perceptions of change, indicated by the lighter grey blocks.

In [Table 3](#) we examined individual outdoor leisure activities and perceptions of environment degradation. We begin with perceptions of the quality of natural environment, at least 40% of participants who engage in select outdoor activities report degradation to the quality of natural environment. Some outdoor leisure activities have a proportion between 50% to over 60% of participants practicing them – for instance, 61.5% of mountain climbers and 66.2% of persons who geocache report a decrease in quality of natural environment.

A smaller proportion of participants report a lessening number of environmental spaces, ranging from 23.8% for persons who play golf/croquet to 50.9%

for hunters. Even fewer report that fewer persons are using or visiting local environmental spaces from as low as 7.1% for those who moderately exercise outdoors (yoga, tai chi) to as high as 26.3% for persons who play field sports. Water quality change is the category with the most reported environment degradation. For example, while only 36.1% of snowmobilers report water quality degradation, over 70% of mountain climbers perceive deteriorating water quality. Results for green space and air quality change are mixed. Like perceptions of amount of environmental space and environmental space use/visits, persons who play golf/croquet are the least likely to report green space (21.1%) or air quality (7.6%) degradation. And like perceptions of quality of natural environment and environmental space use/visits, mountain climbers are the most likely to report green space (57.7%) and air quality (40.7%) degradation. In our appendices we also look at the correlation among outdoor leisure items and the general principal components using varimax rotations.

In [Table 4](#) we test our three hypotheses through three sets of logistic regression testing the association between outdoor leisure activity components and perceptions of environment degradation. Model 1 is an unadjusted logistic regression, which tests our first and second hypothesis that (1) particular outdoor leisure practices predict distinct perceptions of environment degradation and (2) an ecological habitus consisting of appreciative outdoor leisure activities being more likely to report perceptions of environment degradation. We adjust for education in model 2 to test our third hypothesis that higher education increases perceptions of environment degradation, while simultaneously observing if the inclusion of an education measure helps explain some or all the statistically significant associations between outdoor activities and perceptions of environment degradation. Model 3 fully-adjusts for all sociodemographic and economic covariates to explore if other sample characteristics further explain any remaining statistically significant associations. Results for the fully adjusted model are depicted in [Figure 3\(a, b\)](#).

Several outdoor leisure activities are dynamically associated with participant's perceptions. Our first two hypothesis predict that outdoor leisure practices will uniquely shape perceptions of environment degradation, and appreciative outdoor leisure will be the most likely associated with degradation perceptions. We find partial evidence suggesting that participants who align with *appreciative leisure*, compared to other activity groups, are more likely to report degradation on four measures of perceptions: less environmental spaces, and worsening quality of natural environment, water quality and green space. *Appreciative leisure* was not shown to predict a perception of decreased use/visits to environmental space, or worsening air quality.

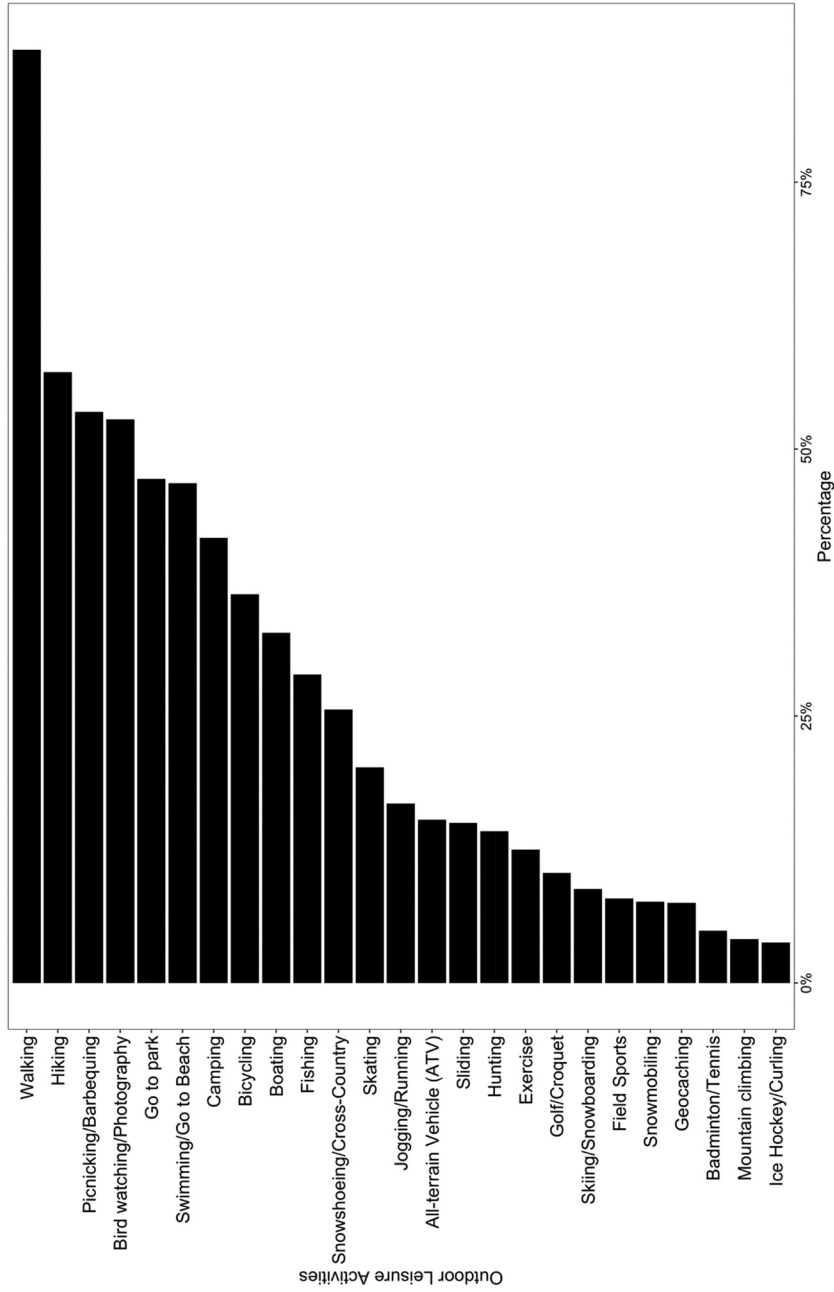


Figure 1. Percentage distribution of outdoor Leisure activity items.

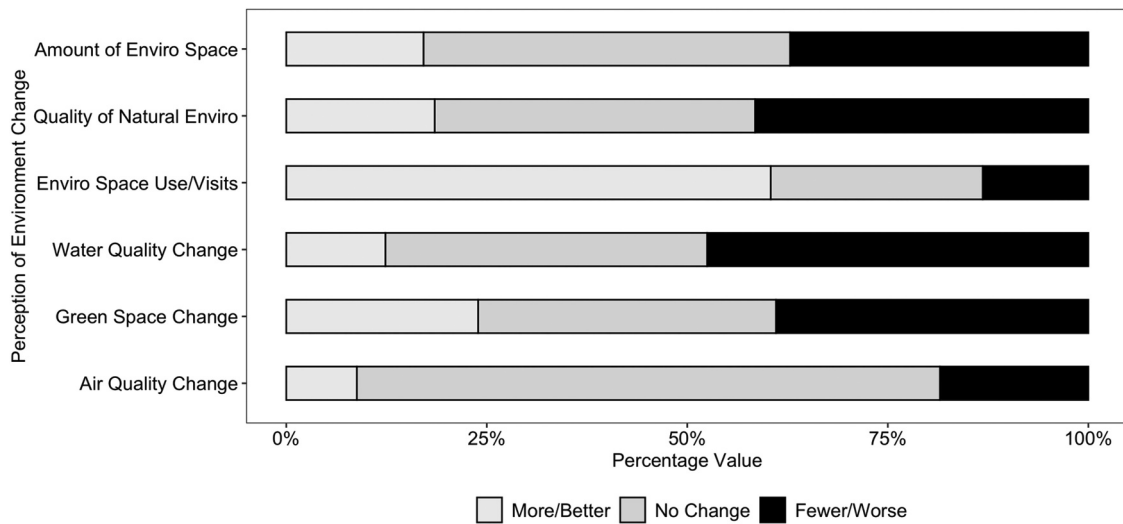


Figure 2. Stacked Bar plot for perception of environment change.

Table 3. Sample proportions for outdoor Leisure activities and perceptions of environmental change (%).

	Quality of Natural Environment	Amount of Environmental Spaces	Environmental Space Use/Visits	Water Quality Change	Green Space Change	Air Quality Change
Walking	42.8	37.7	12.5	47.7	39.7	18.9
Jogging/Running	48.6	39.2	21.4	61.9	31.6	25.8
Hiking	45.3	35.4	12.3	55.8	39.8	19.0
Field Sports	50.4	38.8	26.3	56.9	44.4	33.4
Bicycling	44.0	4.9	1.1	49.0	36.5	22.7
Golf/Croquet	37.3	23.8	15.8	46.7	21.1	7.6
Swimming	45.6	38.0	1.7	52.2	4.3	18.3
Boating	51.0	39.3	9.0	58.8	39.5	15.1
Fishing	52.3	4.1	18.1	54.7	43.6	14.3
Hunting	56.0	5.9	26.2	62.4	44.2	16.2
All-terrain vehicle (ATV)	43.6	4.1	2.0	43.1	31.8	8.0
Snowmobiling	39.7	24.6	25.0	36.1	33.1	7.9
Skiing/Snowboarding	52.7	48.2	21.3	61.3	39.9	25.6
Snowshoeing	49.1	41.2	13.3	59.3	44.5	17.5
Sliding	53.7	44.4	15.9	50.0	43.3	27.3
Skating	38.9	36.6	9.4	53.1	45.1	16.4
Exercise	56.7	37.6	7.1	55.9	51.4	24.4
Tennis/Badminton	42.5	46.7	9.0	54.2	3.8	26.6
Ice hockey/curling	43.8	37.5	13.2	56.9	42.4	20.2
Park/Playground	40.6	31.1	1.5	47.8	33.1	18.0
Picnicking/Barbequing	42.0	34.5	12.3	49.1	36.9	17.9
Bird Watching/Photography	45.5	39.1	7.7	52.5	42.7	19.1
Camping	47.2	4.9	11.8	54.3	43.0	18.2
Mountain climbing	61.5	45.6	7.6	71.6	57.7	40.7
Geocaching	66.2	47.9	2.6	53.3	39.7	32.0

Table 3 estimates the proportion of perceptions of deteriorating environment conditions by outdoor leisure activity.

Turning our attention to other ecological habitus groups, *consumptive leisure* is shown to be associated with select perceptions of environmental degradation. *Consumptive leisure* positively predicts observing a decrease in the amount of environmental spaces, worsening natural environmental quality, decreased environmental space use and visits, water and green space quality change. However, like the *appreciative leisure* group, the *consumptive leisure* tended not to notice any deterioration in air quality.

Testing our hypothesis on outdoor leisure practices best characterized by *high-intensity physical activity* yields less consistent findings. This ecological habitus is more likely to observe decreasing amounts of environmental spaces and decreased numbers of people

using or visiting an environment space. But in contrast to the *appreciative leisure* habitus, participants who align with the *high-intensity physical activity* are not likely to report degradation to the quality of natural environment, water quality or green space; conversely, they are more likely to report deteriorating air quality.

One of the more fascinating findings is with respect to the *low-resource leisure* habitus. Respondents show intriguing results as each association suggests that this category does not perceive environmental degradation. Survey participants characterized by this ecological habitus are less likely to observe decreases in the amount of environmental spaces or the people using or visiting environmental spaces, worsening quality of the natural environment, or depreddating water quality

Table 4. Logistic regressions estimating perceptions of deteriorating local environment change.

	Amount of Environmental Spaces			Quality of Natural Environment			Environmental Space Use/Visits			Water Quality Change			Green Space Change			Air Quality Change		
	I	II	III	I	II	III	I	II	III	I	II	III	I	II	III	I	II	III
Outdoor Leisure Activity Class																		
Appreciative leisure	1.12	1.08	1.09	1.21**	1.19*	1.17	0.82	0.85	0.82	1.36***	1.36***	1.40***	1.17*	1.15	1.16	0.91	0.89	0.89
Consumptive leisure	1.05	1.06	1.02	1.09	1.12	1.15*	1.27**	1.27**	1.17	1.01	1.00	1.04	1.02	1.03	0.85*	0.84*	0.89	
High-intensity physical activity	1.04	1.07	1.07	0.92	0.94	0.94	1.42**	1.44**	1.78**	0.97	0.96	0.90	0.94	0.97	0.94	1.29*	1.36*	1.30*
Low-resource leisure	0.82*	0.82*	0.84	0.89	0.89	0.87	0.86	0.87	0.91	0.81*	0.81*	0.74**	0.85	0.86	0.82*	1.00	0.98	0.98
Leisure sport	0.94	0.95	0.93	0.93	0.93	0.92	0.85	0.83	0.80	0.99	1.00	1.02	0.88	0.89	0.88	0.86	0.89	0.86
Exploration and moderate physical activity	1.11	1.12	1.11	1.30**	1.29**	1.33**	0.98	0.96	0.91	1.15	1.14	1.14	1.13	1.12	1.10	1.28*	1.27*	1.31*
Education																		
High school diploma or less		0.81	0.88		0.92	0.85	0.64	0.64	0.58		1.00	0.98	0.98	0.92	0.92	1.03	1.03	1.29
Post-secondary certificate/diploma		1.22	1.30		1.25	1.12	0.28*	0.28*	0.26**		0.83	0.73	0.88	0.88	0.79	0.81	0.81	0.78
Bachelor's degree		0.90	0.96		1.21	1.09	0.33**	0.33**	0.36*		0.94	0.85	0.97	0.97	0.90	1.17	1.17	1.32
Certificate, diploma, or degree above bachelors (ref)																		
Sociodemographic Characteristics																		
Female		0.64				1.31			0.92			1.90*			1.12			0.88
Married/common-law		1.05				1.06			2.85*			0.86			0.89			0.62
Respondent's age																		
Under 30 (ref)																		
30–39		0.51				1.06			1.85			1.01			0.97			0.34
40–49		0.66				1.11			0.85			0.85			1.07			0.46
50–59		0.62				0.90			0.80			0.69			0.77			0.68
60–69		0.46				0.68			1.93			0.48			0.46			0.61
70 and older		0.72				0.93			2.77			0.64			0.66			0.67
Immigrant or refugee		0.85				1.08			0.69			1.12			2.21			0.73
Visible minority		1.09				0.73			0.57			1.95			1.10			2.90*
Indigenous status		1.38				0.51			0.61			0.68			1.09			0.81
Province																		
Nova Scotia (ref)																		
New Brunswick		0.92				0.89			1.18			1.22			1.09			0.78
Newfoundland and Labrador		1.11				0.58			1.38			0.76			0.64			1.03
Prince Edward Island		1.23				1.32			0.60			1.39			1.73			2.84**
Rural area/small population centre		1.33				0.98			3.74*			0.84			0.93			0.52
Socioeconomic Characteristics																		
Works outside		0.88				1.49			1.13			1.20			1.17			1.21
Single-detached dwelling		0.63				0.77			2.31			1.30			1.62			0.60
Owens home		1.78				2.09			0.83			1.46			1.21			2.15
Half of income or more spent on housing		1.01				1.71			2.64*			1.43			1.60			1.47

* $p < .05$; ** $p < .01$; *** $p < .001$.

All regression models include sampling weights to account for unequal probability of selection into sample. All descriptive statistics include sampling weights to account for unequal probability of selection into sample.

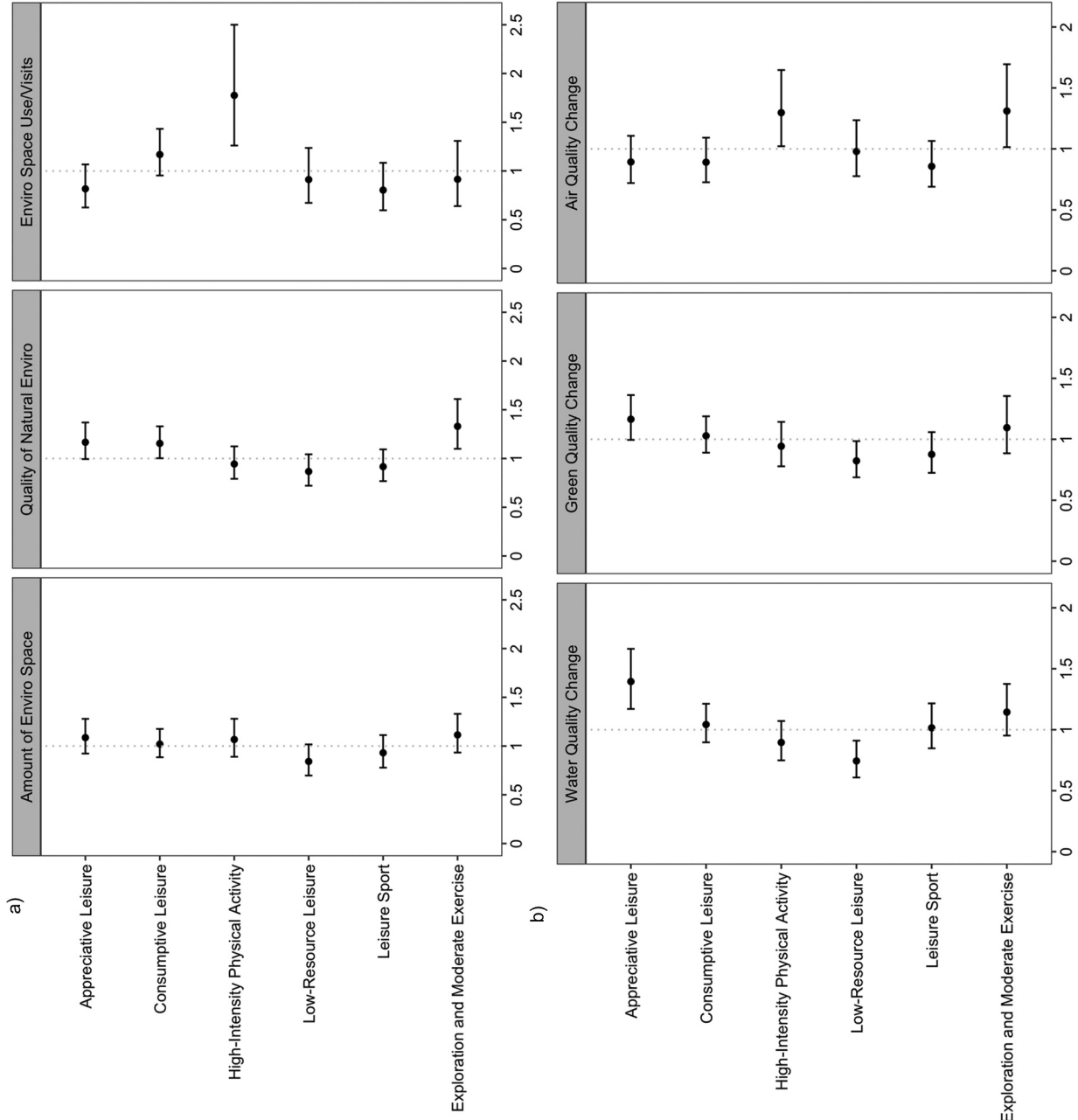


Figure 3. Fully-adjusted odds ratios for outdoor Leisure classes and perceptions of environment degradation..

or quality of green spaces. Comparing the *low-resource leisure* group to the others, there is little-to-no difference in perceptions of air quality change.

Participants who belong to the last two ecological habitus report heterogeneous perceptions. An ecological habitus characterized by *leisure sport* operates similarly to the *low-resource leisure* habitus in that they do not predict degradation on any measure, except changes to water quality change. Although the *exploration and moderate physical activity* category is the least dominant habitus (based on PCA metrics), it resembles the most dominant habitus in our model, *appreciative leisure*, in that it is associated with degradation across all perceptions except for changes to the number of people using or visiting environmental spaces. In contrast to *appreciative leisure*, the *exploration and moderate physical activity* habitus appears to be the most critical of air quality changes in that it consistently predicts air quality degradation.

We next introduce our education variable in model 2 to test our hypothesis that higher education will be predictive of perceptions of environment degradation and will explain some or all the statistically significant associations. We find evidence that, when compared with the highest education attainment group, participants with high school or less were less likely to report environmental degradation across measures, except air quality change. While participants who hold a post-secondary certificate or diploma below a bachelors are more likely to report decreased amounts of environmental space and worsening quality of natural environment, they were less likely to report degradation on any of the other measures when compared to participants with education above a bachelors. Similarly, those who hold a bachelor's degree report worsening quality of natural environment and air quality but were less likely to observe environmental deterioration on the four other perceptions of environment degradation. When we examine whether education explains some or all the association between outdoor leisure practices and perceptions of environment degradation, we make note of any changes to the statistical significance. Looking at model 2, education only explains a statistically significant association between *appreciative leisure* and green space change but in no other case. Further, the magnitude of the odds ratio seldom increases or decrease.

Few covariates were shown to be significantly associated with the six perceptions of environment change – namely, changes to environmental space use and visits, and water and air quality change. Respondents who are married or common-law, rural residents, or participants who spend half of their income or more on housing were all significantly associated with perceiving less people visiting or using local environmental spaces. Females were significantly

more likely to report water quality degradation than other gender respondents, and the odds of reporting air quality degradation are greater for visible minorities when compared to non-visible minorities and participants from Prince Edward Island when compared to Nova Scotia residents.

Although education does not appear to explain any of the statistically significant findings from model 1, our fully-adjusted model in model 3 does suggest that sociodemographic and economic characteristics are important. For example, *consumptive leisure*, which is significantly associated with less environmental space use and visits and improved or no change air quality in models 1 and 2, are no longer significantly associated when introducing our covariates. Similarly, the fully-adjusted model nullifies the significant associations between *appreciative leisure* and changes to quality of environment, and *low-resource leisure* habitus and changes to the amount of environmental spaces. Interestingly, associations that were statistically significant for *appreciative leisure* and water quality change and for *exploration and moderate physical activity* habitus remain throughout models 1 through 3. These key findings provide partial evidence to support our hypothesis positing that an ecological habitus of appreciative leisure will be most likely to report environmental degradation as shown in their significant associations with deteriorating quality of natural environment, and degradation to water and air quality.

Discussion and conclusion

Our primary objective was to examine whether or not outdoor leisure practices are a form of ecological habitus that help facilitate heightened awareness or perceptions of environmental degradation. We set out to examine three hypotheses: (1) whether outdoor leisure practices shape increased perceptions of environment degradation, (2) if an ecological habitus comprised of appreciative leisure practices increase perceptions of worsening environment conditions to a greater extent than other outdoor leisure practices, and (3) whether education, as a state of institutionalized ecological capital, influences perceptions. Our analysis moves beyond previous literature that focuses on individual and psychological mechanisms as factors that contribute to producing ecologically supportive behaviours and attitudes. Instead, we focus on leisure and perceptions that form an ecological habitus as well as education which can help offer access to such habitus. Our approach contributes to the development of the ecological habitus framework for environmental sociology (Haluzá-DeLay 2008; Kasper 2009; Nilan 2017; O'Shaughnessy and Huddart Kennedy 2010) by operationalizing it and looking at the role of everyday activities in shaping perceptions. Rather than looking at individual outdoor recreation activities, we identify

'bundles' (Shove, Pantzar, and Watson 2012) of activities that tend to go together with different forms of ecological habitus.

Our findings show that fields of outdoor leisure activities dynamically shape perceptions of local environment change. Drawing on a continuum of ecological habitus, our analysis aligns with previous research documenting this phenomenon (Teisl and O'Brien 2003), showing that perceptions of degradation are dependent on and at the same time shaped by the type of outdoor leisure activities. Indeed, each set of activities offer different assemblages of habitus and in turn form unique communities of environmental practice, or fields of practice. Understanding the nuances of those field or communities is fruitful for embedding environmentally supportive practices.

For example, participants who perceived fewer people using or visiting an environment space were more likely to belong to *consumptive leisure* variables and participants who report water and green space deterioration were more likely to belong to *appreciative leisure*. Given that *appreciative leisure* is partially composed of water activities (e.g. canoeing, swimming) and green space (e.g. hiking, camping) and *consumptive leisure* comprise activities like fishing and ATVing, activities that involve occasional contact with others in an environment space, these findings indicate an ecological habitus continuum that situates how people relate to others in that space (e.g. appreciative versus consumptive) as well as how they relate to the space, social and cultural context, and the environment. This is a direction that Shove (2010) encourages researchers and policy makers to pursue. Such findings also reflect variance in the environmental subjectivities identified by Ford and Norgaard (2020). People who participate in some activities are more likely to perceive certain changes over others and those who do not get the chance to participate in activities may have a harder time to perceive changes as well. As a result, it is important to consider how activities are local, how they bring people to places, and how both are related to other social and cultural positions.

The role of economic capital is also important to consider when examining the observed associations between leisure activities that produce ecological habitus, perceptions of environment change, and potentially ecologically supportive practices. Our findings show *low resource leisure* as the least critical of their local environment on a continuum of ecological habitus. Outdoor activities that comprise *low resource leisure* require few economic resources to participate. This means that when contemplating communities of environmental practice researchers need to consider economic capital, how it is gained, and how it limits participation. This also includes thinking about work arrangements, available time, and local infrastructure which may impede on their ability to engage in more

dynamic leisure practices. Many activities that fall under *appreciative leisure*, *consumptive leisure*, and *exploration and moderate physical activity*, such as bicycling, ATVing, canoeing or boating, or mountain climbing, are more expensive to participate in. They require equipment, training, or resources that many people cannot afford which allow for an embodied experience in the natural environment and are associated with a more critical placement on a continuum of ecological habitus, and in turn may translate to more ecologically supportive attitudes, values, and behaviours. As a result, it is important to consider the overlapping dimensions or forms of capital that shape fields and habitus. It is for this reason that community analogy is useful because it considers people, how they relate to others, social, cultural and economic contexts, and is helpful in thinking about everyday activities and sports.

These findings align with Bourdieu's (1991) insight that sport is a social practice that bridges cultural capital and economic capital. Our findings also align with Stoddart (2012), who finds that embodied experiences of outdoor sport shapes perceptions of the environment and are linked to environmental subjectivities that intersect with issues of gender, race, class. This is likewise consistent with Ford and Norgaard's work on environmental subjectivities, but also factors in the contexts that go beyond individual or psychological accounts of environmental action (Shove 2010). From the perspective of cultivating ecologically supportive awareness and change, we should be concerned about the potentially exclusionary nature of many of these appreciative leisure activities due to economic as well as social barriers to participation.

Like Bourdieu, our findings also show a role for education in generating ecological awareness of degradation. Unlike other research documenting education as a determinant of environmental awareness (Liu, Vedlitz, and Shi 2014), however, we find mixed results which are in line with Harring, Jagers, and Matti (2019) who show that higher levels of education does not always increase participants' environmental norms and in fact, in some cases, our results suggest that higher education may decrease the odds of perceiving degradation. The impact of education tended to be weaker than the impact of participation in appreciative and consumptive leisure activities. This means that education plays a role, but as noted above, it is also tied to an assemblage of factors linked to set of activities and ecological habitus and should be interpreted with nuance. For instance, recent work suggests younger, lower educated, and rural Canadians tend to cohere with consumptive activities (Moulin 2023). Again, it is worth considering how people who gain education can use it to gain insights they may not have as a result of economic, social or cultural capital. This heightened educational capital may lead people to

participate in new sets of activities, as Bourdieu's work showed, and is necessary but not sufficient. It is tied to broader fields and habitus and future work could explore how it mediates or moderates other activities. It does, however, show that it is important to consider positionality over individual properties alone.

Overall, the findings point to the need to consider ecological habitus when observing outdoor leisure activities and to consider how the fields and capital they produce overlap with ecological, economic, and potentially other forms of capital. This can help us understand not only perceptions of environmental change but also ecologically supportive practices. Our findings call attention to the importance of making appreciative leisure activities, in particular, more accessible and inclusive for a broader range of people to increase perceptions of changing environment which in turn may contribute to more ecologically supportive values, perceptions, attitudes, beliefs, and behaviours.

Note

1. The sampling error at 95% confidence level is 17,544.6.

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Data

Data can be obtained by request to the second author.

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