



OPEN ACCESS

EDITED BY

Aleke Stöfen-O'Brien,
World Maritime University, Sweden

REVIEWED BY

Kiriaki M. Keramitsoglou,
Democritus University of Thrace, Greece
Olgaç Güven,
Akdeniz University, Türkiye

*CORRESPONDENCE

Isabell Richter
✉ isabell.richter@ntnu.no

RECEIVED 01 September 2023

ACCEPTED 26 March 2024

PUBLISHED 10 April 2024

CITATION

Riordan O and Richter I (2024) How does embracing an outdoor lifestyle and sense of responsibility impact plastic reduction efforts? *Front. Sustain.* 5:1287462.
doi: 10.3389/frsus.2024.1287462

COPYRIGHT

© 2024 Riordan and Richter. This is an open-access article distributed under the terms of the [Creative Commons Attribution License \(CC BY\)](https://creativecommons.org/licenses/by/4.0/). The use, distribution or reproduction in other forums is permitted, provided the original author(s) and the copyright owner(s) are credited and that the original publication in this journal is cited, in accordance with accepted academic practice. No use, distribution or reproduction is permitted which does not comply with these terms.

How does embracing an outdoor lifestyle and sense of responsibility impact plastic reduction efforts?

Oliver Riordan and Isabell Richter*

Norwegian University of Science and Technology (NTNU), Trondheim, Norway

Introduction: Plastic pollution in coastal regions poses severe environmental challenges. This research aims to examine the impact of an individual's outdoor lifestyle and their perceptions of responsibility for litter management—specifically the roles of governments, businesses, non-governmental organizations (NGOs), Cornwall council, and volunteers—on their engagement in activities aimed at reducing plastic pollution.

Methods: The study surveyed 972 individuals in Cornwall, UK, to gather data on their perceptions and behaviors related to plastic reduction initiatives. The survey employed binomial logistic regression tests to analyse the relationship between respondents' views on responsibility for litter management and their participation in ten different plastic-reducing activities.

Results: The analysis revealed that individuals' perceptions of who should be responsible for managing litter significantly influence their likelihood of participating in plastic reduction activities. Notably, respondents who viewed national governments, businesses, and volunteers as responsible were more likely to engage in outdoor plastic reduction efforts, such as beach clean-ups. In contrast, attributing responsibility to the Cornwall council and NGOs was negatively correlated with participation in some plastic-reducing activities.

Discussion: The findings suggest that perceptions of responsibility play a crucial role in motivating individuals to participate in plastic reduction efforts. The positive correlation between viewing certain entities (governments, businesses, and volunteers) as responsible and increased participation highlights the potential for targeted interventions. Recommendations for enhancing plastic reduction participation include governmental policy changes, collaboration with outdoor sports groups, and the implementation of community-focused social marketing strategies to foster a collective sense of responsibility and action.

KEYWORDS

marine plastic pollution, lifestyle, responsibility perceptions, plastic reducing behaviours, tourism

1 Introduction

1.1 Literature review

Plastic pollution in coastal areas is a significant problem in the UK and globally. This form of pollution is driven by littering, improper waste management practises or loss of fishing gear (Obebe and Adamu, 2020). Since the causes of this problem are multifaceted, solutions must be approached on individual, community, and societal levels (Aretoulaki et al., 2021; Bettencourt et al., 2023). The consequences of plastic pollution not only impact animals and the natural environment, but also people's mental and physical health, as well as the economy (Campbell et al., 2016; Beaumont et al., 2019; Aretoulaki et al., 2021; Clayton, 2021) and tourism industries (Thushari and Senevirathna, 2020). Between 5% and 15% of sites in the UK were regarded as "unacceptable" in terms of their degree of

littering according to UK government-run surveys such as “Keep Britain Tidy” and “The Association of Public Service Excellence. Consumer goods such as cigarette butts, wrappers and bottles/ cans were identified as the most littered items by the UK sample in these reports. The Office for National Statistics reported that 30% of individuals perceive littering as a problem in their local area (GOV.UK, 2022).

Previous research on perceived responsibilities points towards a relatively incoherent picture on who people see as responsible for plastic pollution. Some European samples view industries, governments, and the public as responsible (Hartley et al., 2018), while Madeira’s population sees the general public and local authorities as accountable (Bettencourt et al., 2023). In contrast, Italians blame the shipping, fishing, and tourism sectors (Forleo and Romagnoli, 2021) whereas a Chilean study emphasised community-level environmental education as the top motivator to reduce littering, surpassing methods like fines or additional bins (Eastman et al., 2013). Understanding who the public deems responsible and the interaction with socio-demographic factors, is essential for policy formulation and effective action.

The existing literature does not offer a comprehensive understanding of how people in Cornwall perceive responsibilities regarding marine litter. It is essential to understand how responsibility perceptions influence individual decisions to act or not. This study investigates the link between responsibility perceptions and individual action, acknowledging that lifestyle patterns may also play a role. To address marine litter effectively, it is crucial to recognise the significant contribution that the public can make through their consumption patterns, waste management practises, and commitment to policies aimed at reducing marine litter (SAPEA, 2019). A deep understanding of public opinions and actions is vital for promoting societal changes in behaviour (Pahl et al., 2017; DEFRA and HM Treasury, 2019).

1.2 Paper contributions

Our aim is to investigate public perceptions and attitudes towards plastic pollution in Cornwall, a county located in the southwest of England (UK), a popular tourist destination famous for its scenic coastline. Insight into people’s perceptions and behaviour could make a valuable contribution to the development of future policies aimed at reducing marine plastic litter, at the local, national, and international levels. This would be especially useful for countries where tourism is important for its economy. Although there are an array of other endeavours such as refusing and recycling plastic, our paper will primarily focus on plastic reduction at its source.

Our hypothesis states that embracing an outdoor lifestyle, coupled with the perception of which entity (governments, businesses, NGOs,¹ Cornwall council and volunteers) should be responsible for tidying up litter, influences people’s engagement in selected plastic reducing activities. The Cornwall Council is an example of a local entity, formed in 2009 after the merger of six Boroughs and District Councils of Cornwall (What We Do and

How We Work, 2023), a move likely to facilitate a greater sense of Cornish loyalism.

1.3 The role of lifestyle

Lifestyle refers to the way in which an individual or a group of people live, including their daily behaviours, habits, values, beliefs, and activities. It encompasses various aspects such as diet, physical activity, work, leisure time, social interactions, and cultural practises. In the context of plastic pollution, we will focus on people’s outdoor lifestyles, defined as regular behaviours and activities that take place outdoors. Typical behaviours associated with such a lifestyle include walking, cycling, surfing, swimming, wildlife watching or landscape photography as opposed to more “indoor” ones such as reading, board games, going to the gym or playing indoor sports.

Owning a dog often means spending more time outdoors (Zijlema et al., 2019). As a result, dog owners might be more sensitive to the presence of litter and more inclined to act against plastic pollution. Furthermore, individuals connected to nature, who typically have outdoor lifestyles, tend to be more alert to litter issues and more engaged in plastic reduction efforts (Prince, 2016). This research delves into how people’s responsibility perceptions together with their outdoor lifestyles influence their proactive measures to address the problem.

2 Methods

An online survey involved the Cornish population in September and October 2021. The survey was distributed by the environmental NGO “Clean Cornwall” via social media such as Twitter and Facebook. Before rolling out the survey, a pilot test was administered to 10 respondents to validate good comprehension of the questions. Before the questionnaire was administered, the participants were provided with a brief description of the study’s purpose and the topics that would be covered. Additionally, a confidentiality statement was given to the participants to ensure that their responses remained anonymous. A restaurant voucher was used as an incentive for the respondents to participate. This research did not require ethical approval as per the guidelines set by SIKT (2023), the Norwegian Agency for Shared Services in Education and Research, given that no personally identifiable data was collected in the process of the study. Participants were informed about their rights, the background and purpose of the study as well as the use of their responses as part of an aggregated dataset through the consent form, which they read and signed, thereby acknowledging their understanding and agreement.

2.1 Sample

A total of 979 respondents answered the questionnaire survey, however 6 respondents had to be excluded due to too many skipped questions, resulting in $N = 973$ valid cases. An overview of the demographic information is presented in Table 1.

¹ Non-governmental organisations.

TABLE 1 Frequencies and percent of total sample statistics for the demographic variables of age, education level, and dog ownership.

	<i>n</i>	%
Age		
18–24	65	6.94
25–34	87	9.29
35–44	127	13.6
45–54	165	17.6
55–64	246	26.3
65+	246	26.3
Education levels		
GCSE ^a	96	10.3
National diploma or NVQ ^b	128	13.8
A-level	165	17.7
Undergraduate degree	270	29
Postgraduate degree	232	24.9
Other	39	4.2
Dog ownership		
Dog owner (yes)	404	43.2

^aGeneral Certificate of Secondary Education. ^bNational Vocational Qualification.

2.2 Measures

The precondition to be forwarded to the survey questions was that respondents provided consent and agreed to participate. Lifestyle (“How often do you do outdoor activities such as walking, cycling, surfing, swimming or other?”) and perceived responsibility were measured on a 5-point Likert scale ranging from (“always,” “often,” “sometimes,” “rarely” and “never”) and (“not responsible at all,” “somewhat responsible,” “moderately responsible,” “mostly responsible” and “fully responsible”) respectively (for details please see Table 2).

Additional constructs that have been measured in the survey include personal norms, perceived behavioural control and ascription of responsibility. These have not been relevant to the research question of the current study and are therefore not included in the analysis. The full list of items can also be retrieved in the Supplementary material.

2.3 Statistical analyses

All statistical analyses were conducted using IBM SPSS Statistics 28. To assess how outdoor lifestyle and perceived responsibilities affect plastic reducing activities, 10 binomial logistic regression tests were run, one for each action against plastic pollution. The resulting binomial regressions included nine independent variables and one dependent variable each. The independent variables were frequency of outdoor activities, perceived responsibility of volunteers, businesses, Cornwall council, environmental NGOs and national governments, dog

ownership, age, and education level. The dependent variable for each individual test was one of the self-reported plastic-reducing activities (see Table 2 for a full list). As multiple models were run on the same dataset, Bonferroni adjustment was made for the critical Alpha level, resulting in a $p \alpha/10 = 0.005$ (Martin Bland and Douglas Altman, 1995).

3 Results

Figure 1 visualises how many respondents participated in each plastic reducing activity. The names of the activities have been shortened for convenience.

The results of this analysis are reported in Table 3 and described further below. For convenience, Table 3 only contains significant results. The complete table can be found in the Supplementary Table 1.

The binomial logistic regression for the first behaviour “beach clean-ups,” hence participation in a beach cleanup or litter pick, indicates that this behaviour is significantly related to two predictors. Specifically, the frequency of outdoor activity participation and the perceived responsibility of governments. The frequency of outdoor activity participation ($\beta = -0.32, p < 0.001$) and the perceived responsibility of governments ($\beta = 0.23, p < 0.005$) predicted beach cleaning in a negative and positive direction respectively. The total variance explained by this model was 6%.

“Avoiding single use items” is significantly and positively influenced by perceived responsibility of governments ($\beta = 0.29, p < 0.001$) and education level ($\beta = 0.30, p < 0.001$). This model, like the first one, explained 6% of the total variance.

“Finding out more about plastic pollution” was significantly predicted by two variables. Perceived responsibility of governments ($\beta = 0.29, p < 0.001$) and education level ($\beta = 0.22, p < 0.001$) had a positive relationship to the activity. In this model, the explained variance is higher at 8%.

“Encouraging friends and family” was significantly predicted by five variables, two being positive and three negative. The three negative variables were the perceived responsibility of Cornwall council ($\beta = -0.35, p < 0.001$), NGOs ($\beta = -0.28, p < 0.005$) and age ($\beta = -0.18, p < 0.001$) whereas the perceived responsibility of governments ($\beta = 0.32, p < 0.001$) and education ($\beta = 0.24, p < 0.001$) were positive. This model explained 9% of the total variance.

“Sharing information on social media” was significantly predicted by the perceived responsibility of governments ($\beta = 0.26, p < 0.005$) and age ($\beta = -0.23, p < 0.001$). This model explained 6% of the total variance.

“Picking up litter on the street” was negatively predicted by the frequency of outdoor activity participation ($\beta = -0.30, p < 0.001$), and positively by the perceived responsibility of volunteers ($\beta = 0.35, p < 0.001$). The model predicted 5% of the total variance.

“Supporting environmental organisations” was positively predicted by the perceived responsibility of governments ($\beta = 0.26, p < 0.001$) and education level ($\beta = 0.23, p < 0.001$), and negatively by the perceived responsibility of Cornwall council ($\beta = -0.31, p < 0.001$) and the frequency of outdoor activity participation ($\beta = -0.27, p < 0.005$). Total explained variance was 7%.

TABLE 2 Relevant items and descriptive statistics.

Item	Answer scale	Mean	SD
Lifestyle			
Outdoor activities	1–5 Likert (always/often/sometimes/rarely/never)	3.80	0.97
Responsible entities			
Volunteers	1–5 Likert (not responsible at all/ somewhat responsible/ moderately responsible/ mostly responsible/ fully responsible)	1.82	0.95
Cornwall council	1–5 Likert	3.87	0.94
Businesses	1–5 Likert	3.76	0.98
NGOs	1–5 Likert	2.19	1.03
National government	1–5 Likert	3.73	1.19
Self-reported behaviours		n (yes)	% (yes)
Use reusable items	Binomial (yes/no)	810	82.7
Dispose face masks correctly	Binomial (yes/no)	748	76.4
Avoid single use items	Binomial (yes/no)	647	66.1
Avoid excess plastic packaging	Binomial (yes/no)	634	64.8
Pick up litter on the street	Binomial (yes/no)	568	58
Beach clean	Binomial (yes/no)	487	49.7
Support environmental organisations	Binomial (yes/no)	391	39.9
Encourage friends and family	Binomial (yes/no)	379	38.7
Find out more about plastic pollution	Binomial (yes/no)	360	36.8
Share information on social media	Binomial (yes/no)	237	24.2

Full item wording can be retrieved in the [Supplementary material](#).

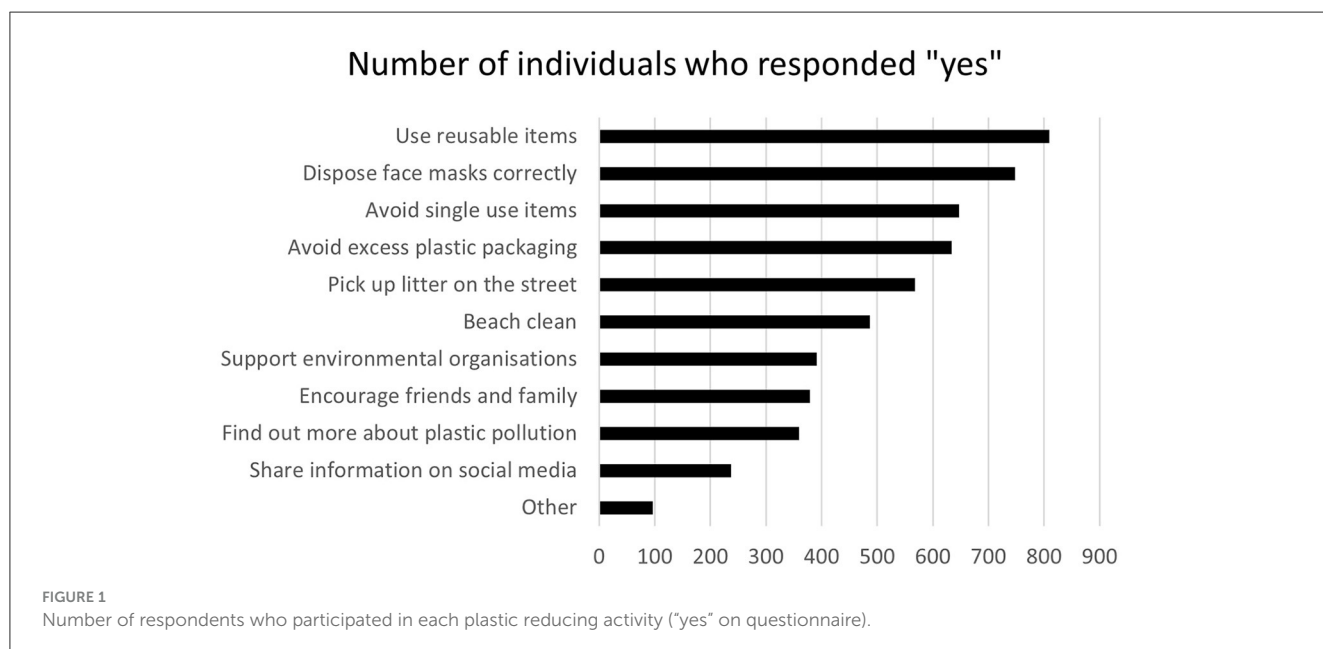


FIGURE 1 Number of respondents who participated in each plastic reducing activity ("yes" on questionnaire).

Lastly, the R^2 value (explained variance of dependent variable) that is reported here is from the Cox and Snell R^2 which was chosen over the Nagelkerke R^2 due to the latter reporting misleadingly high R^2 values in analyses with a binomial dependent variable (Allison, 2013).

4 Discussion

Embracing an outdoor lifestyle, reflected by two variables, dog ownership and the frequency of outdoor activity participation, predicted greater involvement in some of the plastic reducing

TABLE 3 Binomial logistic regressions for each significant plastic pollution reducing activity.

Dependent variable	Independent variable	R ² *	β	Sig.
Beach clean		0.06		
	Frequency of outdoor activity		-0.32	<i>p</i> < 0.001
	Resp. Governments		0.23	<i>p</i> < 0.005
Avoid single use items		0.06		
	Resp. Governments		0.29	<i>p</i> < 0.001
	Education level		0.30	<i>p</i> < 0.001
Find out more about plastic pollution		0.08		
	Resp. Governments		0.29	<i>p</i> < 0.001
	Resp. Businesses		0.28	<i>p</i> < 0.005
	Education level		0.22	<i>p</i> < 0.001
Encourage friends and family		0.09		
	Resp. Governments		0.32	<i>p</i> < 0.001
	Resp. Cornwall council		-0.35	<i>p</i> < 0.001
	Resp. NGOs		-0.28	<i>p</i> < 0.005
	Age		-0.18	<i>p</i> < 0.001
	Education level		0.24	<i>p</i> < 0.001
Share information on social media		0.06		
	Resp. Governments		0.26	<i>p</i> < 0.005
	Age		-0.23	<i>p</i> < 0.001
Pick up litter on the street		0.05		
	Frequency of outdoor activity		-0.30	<i>p</i> < 0.001
	Resp. Volunteers		0.35	<i>p</i> < 0.001
Support environmental organisations		0.07		
	Resp. Cornwall council		-0.31	<i>p</i> < 0.001
	Frequency of outdoor activity		-0.27	<i>p</i> < 0.005
	Resp. Governments		0.26	<i>p</i> < 0.001
	Education level		0.23	<i>p</i> < 0.001

Significant relationships are marked in bold. *Cox and Snell R².

activities compared to the other variables. Importantly, only the frequency of outdoor activities achieved significance in the statistical models - not dog ownership. The activities directly linked to an outdoor lifestyle are “participation in a beach clean-up,” “picking up litter on the street” and “supporting environmental organisations.” These activities (at least the first two) typically take place in outdoor locations and reflect the idea that people who spend time outdoors also appreciate a clean environment and contribute to this aim (Prince, 2016). The finding that dog ownership does not seem to be related to any of the activities could point towards dog owners being a subgroup of people with outdoor lifestyles, potentially with values and behavioural profiles which might not necessarily be connected to pro-environmentalism. It is possible that some dog owners prioritise the needs of their pets over universal environmental concerns. They may believe that plastic waste from their dog’s toys and waste bags are necessary and convenient for their pet’s wellbeing.

The results also indicate that there is a positive relationship between perceiving the national government as responsible for reducing litter and participation in most of the plastic reducing activities, namely participation in beach clean-ups, avoiding single-use items, finding out more about plastic pollution, sharing information on social media, encouraging friends and family, and supporting environmental organisations. With the government as the most superordinate and distant entity, people might feel that concrete actions on the ground need to be conducted by themselves, especially given Cornwall’s geographic distance to the UK government and their high degree of nationalism (Willett, 2013). Individuals in Cornwall are more willing to perceive the “far away” government as responsible instead of their own council, especially since about a sixth of Cornwall’s population identified themselves as “Cornish” in the latest census, which is an increase of 51.42% compared to the previous census conducted in 2011 (Cornwall Council, 2022). Even if someone

believes that the national government is primarily responsible for reducing plastic pollution, they are still aware that they need to engage in individual actions locally to reduce their own plastic footprint and thereby reduce their cognitive dissonance (Festinger, 1962).

Apart from the UK government, Cornwall council, NGOs and volunteers are perceived as responsible entities for some activities. People who perceive Cornwall council as *not* being responsible to act against plastic pollution were more likely to engage in individual actions instead such as finding out more about plastic pollution in their free time, encouraging friends and family to reduce their plastic consumption and supporting environmental organisations. Factors such as Cornish loyalism and higher levels of collectivism could explain why individuals rather take responsibility themselves or ascribe more responsibility to the UK government and less to their own council. Even though British culture is very individualistic (United Kingdom, 2022), smaller regions such as Cornwall exhibit more collectivistic attributes.

Individuals who perceive NGOs as less responsible were more likely to share information about plastic pollution on social media and to encourage friends and family, hence actions that involve communicating to other people, a core activity of NGOs. It is possible that these people are part of NGOs themselves or want to take responsibility to support their activities instead of leaving them alone with their responsibility to communicate about the issue of plastic pollution and its potential solutions.

People perceiving businesses as responsible to reduce plastic pollution are more likely to invest some time to learn more about plastic pollution, most likely to gain knowledge on environmental policies of businesses and materials used to support their purchase decisions as consumers (Mitchell, 2021).

Further, the ones who see responsibility in volunteers are more likely to pick up litter in the street themselves as well, confirming the idea of everybody contributing to the effort of reducing litter (Jorgensen et al., 2021), as well as the fact that individuals feel that they want to help volunteers since they are not financially compensated in any way (unlike taxes paid to governments). Lastly, volunteers can be useful in promoting green and “volunteer” tourism (Tomazos and Butler, 2009).

Most variance was explained in the behaviour “encouraging friends and family” which can be classified as behaviour that comes at low costs as compared to behaviours such as avoiding excess packaging and avoiding single use items that require more time and continuous effort, especially if one is making a conscious effort to refuse plastic (Kaiser and Schultz, 2009). Motivational variables and perceptions are typically stronger predictors of easy behaviours whilst more difficult behaviours depend on supporting structures and environmental conditions. This could therefore explain why there were so many significant results for this activity.

People generally exhibit two patterns of behaviour depending on their perception of responsibility. On one hand, some people are more inclined to take individual actions to shield entities they support (like volunteers, NGOs, or their local government) from bearing too much responsibility. On the other hand, there are those who perceive certain entities, like businesses, as

inherently responsible and therefore make personal choices to complement that responsibility. The specific behaviour people choose often depends on how they view the particular entity in question.

4.1 Influence of age and education

Demographic variables such as age and education level have been found to only have a limited effect on the plastic reducing behaviours. The activities “avoid single use items,” “find out more about plastic pollution,” and “supporting environmental organisations” were significant for education level. One can theorise that individuals who are more well educated might have a greater awareness of the harm of single use items as well as the positive effects of environmental organisations and would therefore take steps to reduce or even outright refuse plastic (by avoiding single use items). This may depend on the strength of one’s pro-environmental beliefs. Age was significant for the activity “share information on social media” and age, together with education for “encourage friends and family.” This result could be explained by the fact that it is more likely that older individuals might use social media purely for communicative purposes as opposed to younger ones who likely use it for an array of different things such as entertainment.

Three actions (“use reusable items,” “correctly dispose of face masks” and “avoid excess plastic packaging”) did not reveal a significant relationship to any variable in the model, pointing towards more important factors that predict said behaviour such as social norms, habits and attitudes but also circumstances and socioeconomic backgrounds (Klößner, 2013). The relatively low levels of explained variance in every action indicate that the same is true for the other activities and we encourage more research on the predictors of these behaviours.

5 Limitations

One limitation of our study was that we did not examine the relationship between nature connectedness and its role in environmental engagement due to the constraints of the questionnaire. Even though we did not statistically test this construct, we hypothesise that there is a likely relationship between nature connectedness and environmental engagement, which an outdoor lifestyle would mediate. On a deeper level, research suggests that connectedness to nature fosters an individual’s self and collective identity with strong affective components. These components can be behaviourally expressed as having an inherent commitment to nature, which may in turn, afford individuals with greater intrinsic motivation to behave in pro-environmental manner (Mayer and Frantz, 2004; Restall and Conrad, 2015). In all, the dynamics of these relationships warrant further exploration in future research.

Lastly, due to this study’s use of WEIRD samples, one must be cautious when applying the below mentioned global recommendations.

6 Practical implementations

For local practitioners, we recommend emphasising the UK government's responsibility in combating plastic pollution given its influential role. This means promoting transparency in governmental anti-pollution initiatives and fostering a societal norm in the UK that values action against plastic waste. Government-funded awareness campaigns and showcasing measures taken by various governments, like bans on single-use plastics, can be effective (Nair and Little, 2016; Cristi et al., 2020; Farage et al., 2021; Bettencourt et al., 2023). Additionally, fostering local pride can motivate support for environmental groups, reducing the burden on local authorities. However, imparting such deeply personal values can vary across regions and is inherently challenging.

Globally, community-based social marketing can foster pride in maintaining one's surroundings, evident from the positive association with volunteering (McKenzie-Mohr, 2000; Hughes et al., 2019). Activities like street or beach clean-ups, especially in tourist-driven regions, can be promoted as enriching for those with outdoor lifestyles, possibly deepening their nature connexion and inherent desire to address plastic pollution. Furthermore, encouraging individuals to embrace outdoor lifestyles appears to be a synergistic approach, as spending more time in natural settings often aligns with the adoption of pro-environmental behaviours. Particularly in places like Cornwall, with its vast natural attractions, promoting outdoor lifestyles can be especially effective in fostering sustainable actions. Raising awareness about the environmental footprints of businesses could also guide eco-friendly consumer choices (for an example see Pahl et al., 2016).

Both local and global efforts can enhance Cornwall's appeal for eco-conscious tourism, fostering a greener travel culture.

7 Conclusion

In conclusion, our study emphasises the nuanced relationship between people's outdoor lifestyles, the perceived duties of key stakeholders—such as volunteers, businesses, the Cornwall council, environmental NGOs, and the national government—and their influence on plastic reduction initiatives. We identified that different factors sway different activities. Specifically, those leading outdoor lifestyles, but not necessarily dog owners, are more likely to engage in external plastic-reducing activities. Viewing the national government as the principal problem-solver for plastic issues is tied to daily consumer choices and personal policy applications. Notably, certain behaviours are linked to specific entities, like the connexion between voluntary litter collection and the perceived responsibility of volunteers. It is particularly interesting that championing specific groups, like volunteers and NGOs, and aiming to alleviate their burden, can simultaneously boost individual initiative. The strength of local pride, labelled as Cornish loyalism, was especially evident among our study's respondents, suggesting that locals are more proactive in countering plastic pollution. Contrarily, tourists, with a diminished sense of local attachment, might be less engaged, possibly deferring cleanup responsibilities to local bodies. Future research should delve

deeper into this local vs. national preference in environmental efforts (Deslatte, 2023). In essence, to craft effective strategies promoting plastic reduction, it is vital to appreciate these distinct perceptual patterns.

Data availability statement

The original contributions presented in the study are included in the article/Supplementary material, further inquiries can be directed to the corresponding author.

Author contributions

OR: Conceptualization, Data curation, Formal analysis, Investigation, Methodology, Visualization, Writing – original draft. IR: Conceptualization, Data curation, Investigation, Methodology, Project administration, Resources, Supervision, Validation, Writing – review & editing.

Funding

The author(s) declare that no financial support was received for the research, authorship, and/or publication of this article.

Acknowledgments

We would like to thank Clean Cornwall, an NGO dedicated to promoting environmental sustainability and community engagement in Cornwall, UK, and especially Natalie Gibbs for a fruitful collaboration during the data collection process.

Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Publisher's note

All claims expressed in this article are solely those of the authors and do not necessarily represent those of their affiliated organizations, or those of the publisher, the editors and the reviewers. Any product that may be evaluated in this article, or claim that may be made by its manufacturer, is not guaranteed or endorsed by the publisher.

Supplementary material

The Supplementary Material for this article can be found online at: <https://www.frontiersin.org/articles/10.3389/frsus.2024.1287462/full#supplementary-material>

References

- Allison, P. (2013). *What's the Best R-Squared for Logistic Regression?* *Methodspace*. Available online at: <https://www.methodspace.com/blog/whats-the-best-r-squared-for-logistic-regression> (accessed February 13, 2013).
- Aretoulaki, E., Ponis, S., Plakas, G., and Agalianos, K. (2021). Marine plastic littering: a review of socio economic impacts. *J. Sustain. Sci. Manag.* 16, 277–301. doi: 10.46754/jssm.2021.04.019
- Beaumont, N. J., Aanesen, M., Austen, M. C., Börger, T., Clark, J. R., Cole, M., et al. (2019). Global ecological, social and economic impacts of marine plastic. *Marine Pollut. Bull.* 142, 189–195. doi: 10.1016/j.marpolbul.2019.03.022
- Bettencourt, S., Freitas, D. N., Costa, S., and Caeiro, S. (2023). Public perceptions, knowledge, responsibilities, and behavior intentions on marine litter: identifying profiles of small oceanic islands inhabitants. *Ocean Coastal Manage.* 231:106406. doi: 10.1016/j.ocecoaman.2022.106406
- Campbell, M. L., Slavin, C., Grage, A., and Kinslow, A. (2016). Human health impacts from litter on beaches and associated perceptions: a case study of 'clean' Tasmanian beaches. *Ocean Coastal Manage.* 126, 22–30. doi: 10.1016/j.ocecoaman.2016.04.002
- Clayton, S. D. (2021). Environment, identity, and response to polluted landscapes. *Sustainability* 13:9422. doi: 10.3390/su13169422
- Cornwall Council. (2022) *Census 2021: Welcomed Increase in the Number of People Identifying as Cornish*. Cornwall Council. Available online at: <https://www.cornwall.gov.uk/council-news/councilbudgets-and-economy/census-2021-welcomed-increase-in-the-number-of-people-identifying-as-cornish/#:~:text=Despite%20the%20absence%20of%20a,compared%20with%2052%2C793%20in%202011> (accessed December 1, 2022).
- Cristi, M. A., Holzapfel, C., Nehls, M., De Veer, D., Gonzalez, D., Holtmann, C., et al. (2020). The rise and demise of plastic shopping bags in Chile—broad and informal coalition supporting ban as a first step to reduce single-use plastics. *Ocean Coastal Manage.* 187:105079. doi: 10.1016/j.ocecoaman.2019.105079
- DEFRA and HM Treasury (2019) *Open Consultation – Plastic Packaging Tax*. Available online at: <https://www.gov.uk/government/consultations/plastic-packaging-tax> (accessed January 25, 2019).
- Deslatte, A. (2023). Motivated localism: polarization and public support for intergovernmental carbon reduction efforts. *Urban Affairs Rev.* 59, 1665–1699. doi: 10.1177/10780874221109462
- Eastman, L. B., Núñez, P., Crettier, B., and Thiel, M. (2013). Identification of self-reported user behavior, education level, and preferences to reduce littering on beaches—A survey from the SE Pacific. *Ocean Coastal Manage.* 78, 18–24. doi: 10.1016/j.ocecoaman.2013.02.014
- Farage, L., Uhl-Haedicke, I., and Hansen, N. (2021). Problem awareness does not predict littering: a field study on littering in the Gambia. *J. Environ. Psychol.* 77:101686. doi: 10.1016/j.jenvp.2021.101686
- Festinger, L. (1962). Cognitive dissonance. *Sci. Am.* 207, 93–106. doi: 10.1038/scientificamerican1062-93
- Forleo, M. B., and Romagnoli, L. (2021). Marine plastic litter: public perceptions and opinions in Italy. *Marine Pollut. Bull.* 165:112160. doi: 10.1016/j.marpolbul.2021.112160
- GOV.UK (2022). *Litter and Littering in England 2017 to 2018*. GOV.UK. Available online at: <https://www.gov.uk/government/publications/litter-and-littering-in-england-data-dashboard/litter-and-littering-in-england-2017-to-2018> (accessed January 13, 2022).
- Hartley, B. L., Pahl, S., Veiga, J., Vlachogianni, T., Vasconcelos, L., Maes, T., et al. (2018). Exploring public views on marine litter in Europe: perceived causes, consequences and pathways to change. *Marine Pollut. Bull.* 133, 945–955. doi: 10.1016/j.marpolbul.2018.05.061
- Hughes, M., McConnell, W., and Groner, S. (2019). A community-based social marketing anti-littering campaign: be the street you want to see. *Soc. Market. Action Cases Around World* 22, 339–358. doi: 10.1007/978-3-030-13020-6_23
- Jorgensen, B., Krasny, M., and Baztan, J. (2021). Volunteer beach cleanups: civic environmental stewardship combating global plastic pollution. *Sust. Sci.* 16, 153–167. doi: 10.1007/s11625-020-00841-7
- Kaiser, F. G., and Schultz, P. W. (2009). The attitude–behavior relationship: a test of three models of the moderating role of behavioral difficulty 1. *J. Appl. Soc. Psychol.* 39, 186–207. doi: 10.1111/j.1559-1816.2008.00435.x
- Klößner, C. A. (2013). A comprehensive model of the psychology of environmental behaviour—A meta-analysis. *Glob. Environ. Change* 23, 1028–1038. doi: 10.1016/j.gloenvcha.2013.05.014
- Martin Bland, J., and Douglas Altman, G. (1995). Statistics notes: multiple significance tests: the Bonferroni method. *Br Med J.* 310, 170–170. doi: 10.1136/bmj.310.6973.170
- Mayer, F. S., and Frantz, C. M. (2004). The connectedness to nature scale: a measure of individuals' feeling in community with nature. *J. Environ. Psychol.* 24, 503–515. doi: 10.1016/j.jenvp.2004.10.001
- McKenzie-Mohr, D. (2000). New ways to promote proenvironmental behavior: promoting sustainable behavior: an introduction to community-based social marketing. *J. Soc. Issues* 56, 543–554. doi: 10.1111/0022-4537.00183
- Mitchell, B. (2021). Consumer perceptions of packaging sustainability: the size of the problem for businesses. *The Sust. Debate* 2021, 101–19. doi: 10.1108/S2043-905920210000015006
- Nair, S. R., and Little, V. J. (2016). Context, culture and green consumption: a new framework. *J. Int. Consumer Market.* 28, 169–184. doi: 10.1080/08961530.2016.1165025
- Obebe, S. B., and Adamu, A. A. (2020). Plastic pollution: causes, effects and preventions. *Int. J. Eng. Appl. Sci. Technol.* 4, 85–95. doi: 10.33564/IJEAST.2020.v04i12.011
- Pahl, S., Goodhew, J., Boomsma, C., and Sheppard, S. R. (2016). The role of energy visualization in addressing energy use: Insights from the eViz project. *Front. Psychol.* 7:150416. doi: 10.3389/fpsyg.2016.00092
- Pahl, S., Wyles, K. J., and Thompson, R. C. (2017). Channelling passion for the ocean towards plastic pollution. *Nat. Hum. Behav.* 1, 697–699. doi: 10.1038/s41562-017-0204-4
- Prince, H. E. (2016). Outdoor experiences and sustainability. *J. Adv. Educ. Outdoor Learn.* 17, 161–171. doi: 10.1080/14729679.2016.1244645
- Restall, B., and Conrad, E. (2015). A literature review of connectedness to nature and its potential for environmental management. *J. Environ. Manage.* 159, 264–278. doi: 10.1016/j.jenvman.2015.05.022
- SAPEA (2019). *A Scientific Perspective on Microplastics in Nature and Society*. Berlin: SAPEA.
- SIKT (2023). *Sikt – Kunnskapssektorens Tjenesteleverandør: Sikt. – Kunnskapssektorens tjenesteleverandør*. Available online at: <http://sikt.no/> (accessed August 14, 2023).
- Thushari, G. G. N., and Senevirathna, J. D. M. (2020). Plastic pollution in the marine environment. *Heliyon* 6, 1–16. doi: 10.18356/5c672de7-en
- Tomazos, K., and Butler, R. (2009). Volunteer tourism: The new ecotourism?. *Anatolia* 20, 196–211. doi: 10.1080/13032917.2009.10518904
- United Kingdom (2022). *Hofstede Insights*. Available online at: <https://www.hofstede-insights.com/country/the-uk/> (accessed November 27, 2022).
- What We Do and How We Work (2023). *What we do and How We Work - Cornwall Council*. Available online at: <https://www.cornwall.gov.uk/jobs-and-careers/working-here/what-we-do-and-how-we-work/> (accessed March 7, 2023).
- Willett, J. (2013). Liberal ethnic nationalism, universality, and Cornish identity. *Stu. Ethn. Nationalism* 13, 201–217. doi: 10.1111/sena.12024
- Zijlema, W. L., Christian, H., Triguero-Mas, M., Cirach, M., Van Den Berg, M., Maas, J., et al. (2019). Dog ownership, the natural outdoor environment and health: a cross-sectional study. *BMJ Open* 9:e023000. doi: 10.1136/bmjopen-2018-023000