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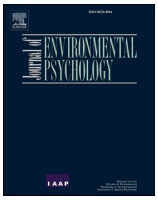

Current research practices on pro-environmental behavior: A survey of environmental psychologists

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1. Introduction

Pro-environmental behavior is central to environmental psychology. About half of the submissions to the *Journal of Environmental Psychology* are about sustainability and pro-environmental behavior (personal communication 2024, Editors-in-Chief). Neighboring disciplines such as environmental education, ecological economics, and sustainability science are also increasingly concerned with pro-environmental behaviors. Influences and interactions with these disciplines combined with rapid growth (Farrukh, Raza, Mansoor, Shahid, & Chow, 2022) make it difficult to characterize how researchers in environmental psychology study pro-environmental behavior. Learning what researchers think and do when studying pro-environmental behaviors could provide clarity about the field's research priorities, theories, and methods.

Current debates indicate that researchers differ in how they conceptualize and investigate pro-environmental behaviors. When defining *pro-environmental* or *environmentally significant behavior* (Gatersleben, 2023; Lange et al., 2023; Stern, 2000), researchers may orient towards impact (behavior that reduces harm to the natural environment) or towards intent (behavior that is motivated by an environmental preservation goal). Other researchers may conceive of pro-environmental behavior as a person characteristic or construct (Kaiser, 2021; Markle, 2013; Quoquab, Mohammad, & Nisa, 2019), which may rest on the assumption that the propensity for pro-environmental behavior is a coherent, unitary concept (Brick, Hood, Ekroll, & de-Wit, 2021). Yet other researchers study people's environmental footprints, which index consumption. Surprisingly, these footprints are sometimes unrelated to self-reported scales of pro-environmental actions (Bosshard et al., 2024; Moser & Kleinhückelkotten, 2018; Nielsen et al., 2022). This discrepancy, while perhaps a function of how these constructs are measured, demonstrates the complexity of understanding behaviors that impact the environment.

Beyond the different ways pro-environmental behavior is conceptualized, there is also wide variation in the domains of environmental behavior that are studied (e.g., water conservation, recycling, meat consumption, voting, activism, or land stewardship). However, little is known about how researchers choose which behavior to study. Recently, it was argued (Lange, Nielsen, Cologna, Brick, & Stern, 2021; Nielsen,

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Cologna, Lange, Brick, & Stern, 2021) and disputed (van Valkengoed et al., 2021) that contemporary research practices neglect behaviors with high environmental impact. Nielsen, Cologna, et al. (2021) argued that instead of studying objective measures of high-impact private behaviors (e.g., long-distance transport, food consumption, heating and cooling consumption), most papers appear to examine more accessible behaviors (e.g., recycling, reusable grocery bags) measured with self-reported scales of frequency. Such scales are sometimes criticized for being inaccurate (Koller, Pankowska, & Brick, 2023; Kormos & Gifford, 2014), though they allow for rapid deductive tests of psychological theories. To enrich these debates, empirical data are needed on what researchers currently think and do.

There is some evidence about the design of pro-environmental behavior studies. Environmental psychology heavily relies on samples from the Global North and so misses much of the globe (Henrich, Heine, & Norenzayan, 2010; Tam & Milfont, 2020). Qualitative studies are rarely published in environmental psychology journals (Esfandiar, Pearce, Dowling, & Goh, 2022; Ratcliffe et al., 2024). In addition, it is unknown how common descriptive and exploratory research are, despite these designs being critical for informed hypotheses (Scheel, Tiokhin, Isager, & Lakens, 2021). One small-scale review suggested that pro-environmental behavior research is dominated by self-report measures and correlational designs (Lange, Steinke, & Dewitte, 2018). Moreover, environmental psychology may overly rely on social psychology-based theories (Gifford, Kormos, & McIntyre, 2011) that examine the mental mechanisms believed to proximally cause behavior (Wille & Lange, 2022). In sum, these observations suggest that pro-environmental behavior research may have settled into some norms that might limit its relevance for the mitigation of climate change and other environmental crises. Evaluating this claim requires more evidence, and explicitly reflecting on the status quo could help researchers and the broader community identify opportunities for innovation.

1.1. The current study

We surveyed pro-environmental behavior researchers, recruited via mostly environmental psychology mailing lists, networks, and media channels. This design can provide information about dominant theories and research practices and reveal potential blindspots in current practices. Researchers should retain the freedom to investigate any topic and method, but barriers and pressures within the academic system could cause preferences to deviate from daily practice. Therefore, we asked participants what they do, and also surveyed their views on what the field of environmental psychology should be doing to manage environmental challenges, which allows for contrasting aspirations with current practices.

We also investigated how much these researchers collaborate between disciplines and outside academia (Lawrence, Williams, Nanz, & Renn, 2022), and the prevalence of open science practices (Munafò et al., 2017). Other surveys on open science practices among psychologists (Ferguson et al., 2023; Nosek et al., 2022) may not generalize to pro-environmental behavior research because of its multidisciplinary influences. Psychology journals increasingly expect open science practices; e.g., the author guidelines of the *Journal of Environmental Psychology* specify requirements that aim to "ensure high reproducibility standards". Discovering what researchers are currently doing could help evaluate the success of these efforts.

With this descriptive study, we do not intend a normative stance on what measures or theories researchers should choose, nor on whether pro-environmental behavior research should adopt a common paradigm. Theoretical and methodological diversity may be advantageous, particularly in times of scientific crisis. For example, if a consensus emerged that responses to hypothetical scenarios or intention items were not suitable outcome measures for the externally valid study of pro-environmental behavior (Lange et al., 2023) or that the Theory of Planned Behavior should be retired (Sniehotta, Presseau, & Araújo-Soares, 2014), it would be beneficial to have developed alternative methods and theories. Irrespective of one's preferred vision for pro-environmental behavior research, revealing the current state of goals and practices could help align shared aspirations with practice.

We surveyed authors of pro-environmental behavior research about four themes. Part 1 focused on which theories researchers used to study pro-environmental behavior. Part 2 inquired about their research methods (e.g., quantitative vs qualitative). Part 3 surveyed how researchers selected pro-environmental behaviors, and Part 4 covered inter- and transdisciplinary collaborations and open science practices.

2. Methods

2.1. Participants

We recruited researchers in environmental psychology in June 2022 on listservs, through professional societies, by the authors advertising on Facebook, X/Twitter, and Slack, and by emailing individuals using existing lists (see Supplement S1.2 for recruitment sources and text). When respondents indicated they had not worked on an empirical research study that measured a pro-environmental behavior, the survey ended ($n = 30$, 11%).

To incentivize researchers to participate, we advertised that they could determine how $1,000 USD would be donated between three organizations. Based on their choices, we donated $448 to the Center for Open Science, $174 to the Society for the Improvement of Psychological Science, and $378 to the Sustainability Preconference of the Society for Personality and Social Psychology.

Given that environmental psychology is a modestly sized subfield in which only a subset of researchers study pro-environmental behavior, the coverage of the population appeared acceptable. We received 255 responses, of which 191 completed the study, 34 provided partial data, and 30 were excluded due to lack of experience as mentioned above. Respondents who completed the study ($n = 191$) reported having published M (SD) = 4.4 (7.2) peer-reviewed empirical research articles with measures of pro-environmental behavior. A broad range of career stages were represented: 74 (39%) PhD candidates or earlier, 51 (27%) 0–5 years after PhD, and 66 (35%) more than 5 years after PhD. The sample consisted of 108 (57%) women, 79 (41%) men, and 4 (2%) participants who preferred to self-describe. Most respondents (72%) were trained in psychology.

2.2. Procedure

The online Qualtrics survey was in English and had a modal duration of 10 min. The full text of the survey in. docx and. qsf formats is available at osf. io/yns62. We adapted the wording of some questions from a contemporary survey of research practices (Schiavone & Vazire, 2023). Ethical approval was obtained from Harvard University, IRB22-0598.

2.3. Measures

Articles on pro-environmental behavior. "How many empirical research articles have you published in peer-reviewed journals that included one or more measures of pro-environmental behaviours?": *open-response numeral*.

Research objectives. "When conducting empirical studies on pro-environmental behavior, people can have different research objectives. In your view, how important does the wider environmental psychology community consider the following research objectives?": *Understanding the causes of pro-environmental behaviours*; *Understanding interventions to change pro-environmental behaviours*; *Testing or advancing theories*; *Developing, validating, or improving methods*; *Replicating previous research*; *Other (open response)*, each rated from 1 (*not at all important*) to 7 (*extremely important*).

Objectives in last study. "Recall the last empirical study you worked on

or published that included pro-environmental behavior(s). How much did these research objectives apply to your study?" rated from 1 (*not at all*) to 7 (*extremely*). Participants rated the objectives above, excluding *Other*.

Desirable objectives. "How important SHOULD these research objectives be to environmental psychologists?" rated from 1 (*not at all important*) to 7 (*extremely important*). Participants rated the objectives above, excluding *Other*.

In this *Objectives* question and also below, this phrasing of "*the last empirical study worked on or published*" was chosen to prioritize recency. More recent studies are more timely, are easier to remember accurately, and may reduce the likelihood of the participant choosing unrepresentative research studies (e.g., choosing a study because it was impressive or effortful). Last, this method reduces the file-drawer effect by not requiring that the study be published.

Theory. "Thinking about the last empirical study with pro-environmental behavior that you worked on or published, which theory/theories have you used? If you did not use a theory, leave this blank": *three open-response fields, all optional*.

Theory goals. If any theories were named in the last question, each of those entries were shown to participants: "Please choose your main goal when using this theory": *Testing one or multiple predictions of the theory*; *Inspiration for intervention design*; *Post-hoc interpretation or integration of findings*; *Modifying and/or advancing the theory to better predict behavior*; *Validating the theory in new contexts*; *Other (open response)*.

Theory impact. "Does this theory help to address the climate crisis or other environmental problems? Please explain": *open response*.

Methods. "Please consider the last empirical study with pro-environmental behavior that you worked on or published. Which method did you primarily use?": *Quantitative*; *Qualitative*; *Other (open response)*.

Design of last study. "What was the main study design?" If *Quantitative* was chosen above: *Experimental*; *Correlational/cross-sectional*; *Correlational/longitudinal*; *Meta-analysis*; *Other (open response)*. If *Qualitative* was chosen above: *Grounded theory*; *Ethnographic research*; *Narrative research*; *Case studies*; *Phenomenology*; *Other (open response)*.

Setting. "What was the main setting?": *Laboratory*; *Online*; *Field*; *Does not apply*; *Other (open response)*.

Psychological predictors. "In your last empirical study measuring pro-environmental behavior, did you also measure psychological predictors of behavior (e.g., concern; identity; norms)?": *yes*; *no*. If *yes*: "Did you personally work on the predictor selection?": *yes*; *no*. If *yes*: "How strongly did the following factors influence your choice of predictor(s)?" rated from 1 (*not at all*) to 7 (*extremely*): *Personal interest*; *Measurement ease*; *Fit with theory*; *Predictive validity according to previous empirical evidence*; *Expected preference of reviewers/journals*.

Population. "How strongly did the following factors influence your choice of study population?" rated from 1 (*not at all*) to 7 (*extremely*): *Ability to access including cost*; *Generalizability*; *Context or activity of interest* (e.g., *eco villages, sharing communities, activists, etc.)*; *Socio-demographic characteristics*; *Preference of journals*.

Country. "In the last empirical study you worked on or published measuring pro-environmental behaviours, in which country were the most participants recruited?": *drop-down menu of 207 countries*.

Multiple countries. "If participants were recruited in multiple countries, what were the next three countries with the most participants? Otherwise, leave this blank.": *three drop-down menus of 207 countries*.

Statistical power. "Considering the last empirical study you worked on or published measuring pro-environmental behavior, did you use a power analysis to determine the sample size?": *yes*; *no*; *don't know*; *I did not make statistical inferences* (e.g., *p-values)*. If *yes*: "How did you select the effect size for the power analysis?": *Meta-analysis*; *Previous studies*; *Similar sizes of related effects or relationships*; *General advice,* e.g., *Cohen's* d = *0.2, 0.4, 0.6 guidelines*; *Other (open response)*.

Behaviors. "Considering the last empirical study you published measuring pro-environmental behavior, which behavior(s) did you study? (Multiple answers possible)": *Flying*; *Driving*; *Alternative travel modes (*e.g. *public transport; bicycling)*; *Recycling*; *Meat or dairy consumption*; *Water use*; *Energy consumption (*e.g., *curtailing energy or electricity use)*; *Efficiency installations (*e.g., *weatherization or insulation; solar panels, efficient appliances)*; *Sharing practices (*e.g., *bike/car sharing, tool sharing)*; *Activist behavior (*e.g., *participation in demonstrations)*; *Civic and leadership behaviours (*e.g., *attending local government meetings; contacting politicians)*; *Initiatives in organizations (*e.g., *changing policies or practices at the company level)*; *Financial decisions (*e.g., *bank choice)*; *Land use or ecological practices*; *Wildlife conservation behaviours*; *Other (open response)*).

Desirable behaviors. "Based on your experience, how important does the wider environmental psychology community think it is to study the following behaviours?" rated from 1 (*not at all important*) to 7 (*extremely important*). The behaviors from above were each rated, including piped text if anything was entered in the open response.

Impact desirability. "To what extent do you think that environmental psychologists SHOULD address the climate crisis or other environmental problems with their research?" rated from 1 (*not at all*) to 7 (*extremely*).

Impact efficacy. "To what extent do you think environmental psychology can make important contributions to understanding and changing pro-environmental behaviours?" rated from 1 (*not at all*) to 7 (*extremely*).

Behavior measurement. For each of the behaviors the participant said they had recently studied (including *Other* as piped text): "In your last study, which assessment method best describes how you measured the following behavior(s)?": *Self-report: dichotomous (behavior present or absent)*; *Self-report: frequency words (*e.g., *"rarely" to "often")*; *Self-report: frequency numbers (*e.g., *"x times during the last x weeks")*; *Self-report: willingness or intentions*; *Directly observed by another person*.

Behavior selection. "Considering the last study you worked on with pro-environmental behavior(s), how strongly did the following factors influence the choice of behavior?" rated from 1 (*not at all*) to 7 (*extremely*): *Personal interest*; *Environmental impact(s) of behaviours*; *Available* funding; *Measurement ease*; *Continuing previous research on this behavior*; *Research* norm *of the target journal*; *Other (open response)*.

Impact and publication. "To what extent do you think that the environmental impact of the pro-environmental behaviours measured in a study affects the likelihood of publishing the results?" rated from 1 (*not at all*) to 7 (*extremely*).

Open science. "Which of these open-science practices apply to the last empirical research study you worked on with pro-environmental behavior? (choose all that apply)": *Pre-registered*; *Data posted online*; *Analysis code posted online*; *Materials posted online (*e.g., *questionnaire text)*; *Open-access paper or preprint*; *None*.

Collaborations outside academia. "Have you collaborated with any of these groups outside of academia? (choose all that apply)": *Practitioners in government*; *Practitioners in the nonprofit sector*; *Practitioners in companies or industry*; *Public utilities*; *Other (open response)*; *None*.

Research trends. "How much do you know about the current research trends in these fields?" rated from 1 (*nothing*) to 7 (*everything*): *Environmental psychology*; *Climate and environmental science*; *Behavioral economics*; *Political science*; *Sociology*; *Sustainability science*.

Favorite papers. "What are your favorite environmental psychology papers?": *Three DOI fields, and one non-DOI open response*.

Donation. Participants indicated one of the organizations to receive a donation (see *Participants* above) or chose *I'm not interested*.

2.4. Analytic plan

We planned a descriptive approach to characterize frequencies rather than estimate relationships between variables. Therefore, there are no inferential statistics such as *p*-values, and we did not preregister any hypothesis tests.

The open response questions were thematically coded in these steps: (1) answers that fit one of the provided answer options were re-coded as

such, (2) answers that did not fit the provided answer options were given a new category or coded as "*Other*", and (3) answers that were ambiguous were discussed by CB and MS and then re-coded. When no answer options were provided to participants (e.g., the question about their scientific field), we coded the answers into broad categories (e.g., natural sciences; social and behavioral sciences) based on discussions by CB and MS. See Table S2 in the Supplement for an overview of the code categories for each open response question.

3. Results

Partially complete responses were included, and some researchers who completed the survey skipped some items, so the analysis sample sizes vary between n = 191–225.

3.1. Where researchers recruited their study samples

Despite the global nature of environmental challenges, the geographic distribution of study samples was profoundly skewed compared to country populations. Countries in Latin America, Africa, and the Middle East were particularly under-represented (Fig. 1).

Researchers also reported the importance of various factors influencing their choice of sample population (Table 1; Supplement Fig. S2). Feasibility (e.g., cost) and functional characteristics (e.g., context, generalizability, demographics) emerged as relatively important, *Ms* = 3.8–5.5, *SDs* = 1.8–2.2, rated from 1 to 7). The preferences of journals were considered relatively unimportant, *M* (*SD*) = 2.2 (1.5).

3.2. Research purpose

What are the purposes of environmental psychology? All participants at least moderately agreed that environmental psychologists should address the climate crisis or other environmental problems with their research with 71% of participants reporting this to be *extremely* important (*Mdn* = 7, *M* = 6.6, *SD* = 0.8, 95% CI [6.5, 6.7]; range 1–7). Almost all participants (97%) at least moderately believed environmental psychology could make important contributions to understanding and changing pro-environmental behaviors (*Mdn* = 6, *M* = 5.9, *SD* = 1.2, 95% CI [5.7, 6.1]; range 1–7).

Participants also reported on research objectives in the field. For each category such as *Testing or advancing theories*, participants reported whether they pursued the objective in their most recent study, how important others in the field consider pursuing that objective, and how important they think that objective should be (Fig. 2). The validity of the categories appeared to be good, since all objectives were frequently pursued and considered important. Participants' own practices generally aligned with their perceptions of what others in the field thought was important. However, participants' ratings of how important the research objectives were tended to be higher than their second-order beliefs. The largest specific gaps were found for methods validation and replication, which were considered more important than their apparent frequency or the perceived importance to others. The highest rating for what should be important was understanding interventions that change pro-environmental behavior. Caution is appropriate when comparing between rating types, since these sets were not identical in response options.

Table 1
Factors influencing sample population.

	n	*M*	*SD*	95% CI	
				LL	UL
Ability to access including cost	197	5.5	1.8	5.2	5.7
Generalizability	196	4.5	1.8	4.2	4.7
Context or activity of interest	197	3.8	2.2	3.5	4.1
Socio-demographic characteristics	197	4.2	1.9	3.9	4.5
Preference of journals	197	2.2	1.5	1.9	2.4

Note. Range = 1–7; higher is more important.

3.3. Study design

Most of the recent studies reported by respondents were quantitative (88%) compared to qualitative (7%) or *Other* (5%) (Fig. 3A; see Supplement for open responses). Among quantitative designs, most studies were experimental (48%) or cross-sectional/correlational (39%), with relatively few studies that were longitudinal (9%), meta-analytic (1%), or *Other* (3%; Fig. 3B). Most longitudinal studies took place in the field (69%, *n* = 11), while cross-sectional/correlational studies and experimental studies were largely run online (70%, *n* = 48 and 58%, *n* = 49 respectively). There was more variety among recently used qualitative methodologies, including case studies (38%), grounded theory (31%), phenomenology (15%), and ethnographic research (15%; Fig. 3C). About half of the qualitative studies took place in the field (respectively of the above types: 60%, *n* = 3; 50%, *n* = 2; 50%, *n* = 1; and 50%, *n* = 1).

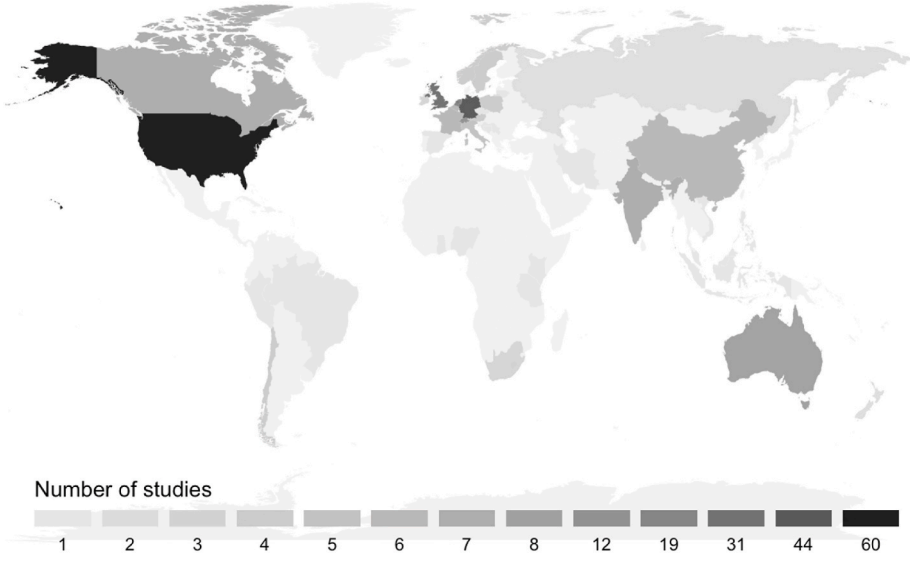

Fig. 1. Geographical Distribution of Samples in Environmental Psychology Research
Note. *N* = 194 researchers. This figure shows the sample country for their most recent study (up to four countries per researcher).

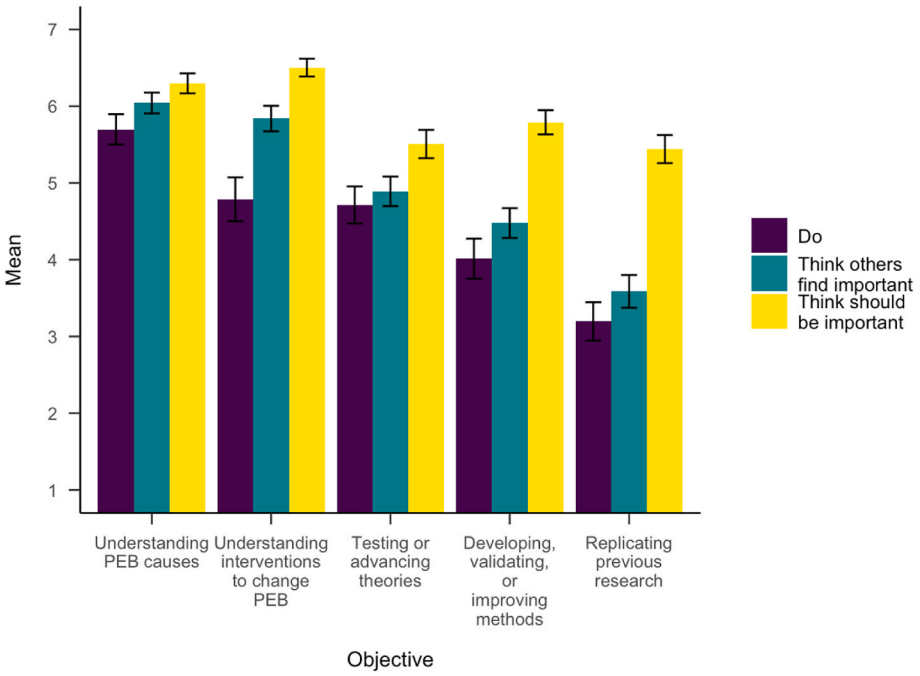

Fig. 2. *Comparing What Researchers Do; Think Others Find Important; and Think Others* Should *Find Important*
Note: ns = 211–218. PEB = pro-environmental behavior. Range 1–7. Error bars are 95% CI. Ratings of "*Other*" objectives were rare and are not shown (*ns* = 26–27).

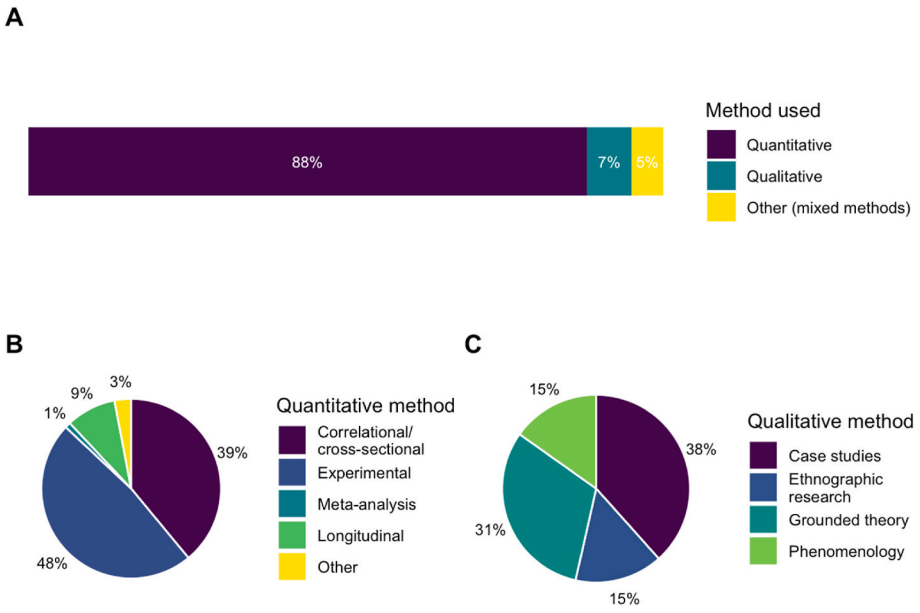

Fig. 3. Study Designs
Note: Panel A: *n* = 200. Panel B: *n* = 176. Panel C: *n* = 13.

3.4. Pro-environmental behaviors

Pro-environmental behaviors were usually measured by self-report, particularly Likert-style response scales and frequency words (e.g., *sometimes*; *often*; Fig. 4). Self-reports with precise frequencies were less common (e.g., Nielsen et al., 2022). Participants also reported using observation and behavioral traces, and similar to precise self-reports, these varied greatly in frequency between types of behavior. For example, *civic and leadership behaviors* were almost exclusively measured with self-report. Without making any strong claims about typologies of pro-environmental behavior, the most frequently studied behaviors appear to be in the role of consumer rather than citizen or advocate (Hampton & Whitmarsh, 2023; Nielsen, Nicholas, Creutzig, Dietz, & Stern, 2021). All behaviors were considered relatively important to the wider environmental psychology community, *M*s (*SD*s) = 3.5–6.0 (1.1–1.8). Relatively low importance was observed for *financial decisions*, *M* (*SD*) = 3.5 (1.8), 95% CI [3.3, 3.8], and *land use or ecological practices*, *M* (*SD*) = 4.0 (1.7), 95% CI [4.01, 4.48].

Researchers also reported why they chose those behaviors (Fig. 5; rated from 1 to 7). The highest means by visual inspection were *environmental impact*, *M* (*SD*) = 5.1 (1.7), 95% CI [4.9, 5.4], and *personal interest*, *M* (*SD*) = 4.8 (1.7), 95% CI [4.6, 5.1]. The lowest mean was *research norms of the target journal*, *M* (*SD*) = 2.1 (1.5), 95% CI [1.9, 2.3]. In a separate question, participants thought the environmental impact of

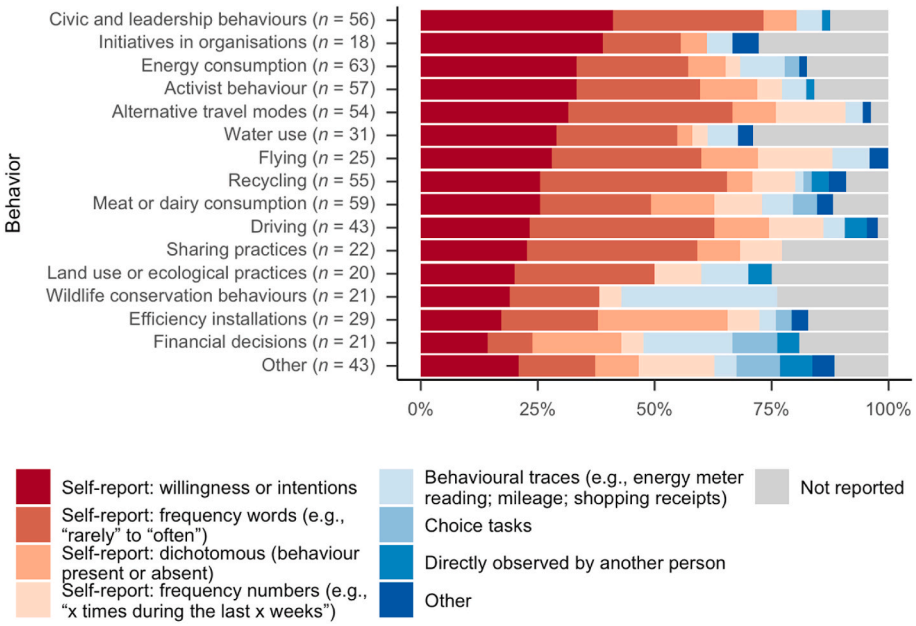

Fig. 4. Pro-Environmental Behavior Measurement
Note. $N = 195$ researchers. See Supplement Fig. S1 for a version sorted by behavior type frequency. Four responses of behavior types were coded "NA" (not behaviors) and are not shown.

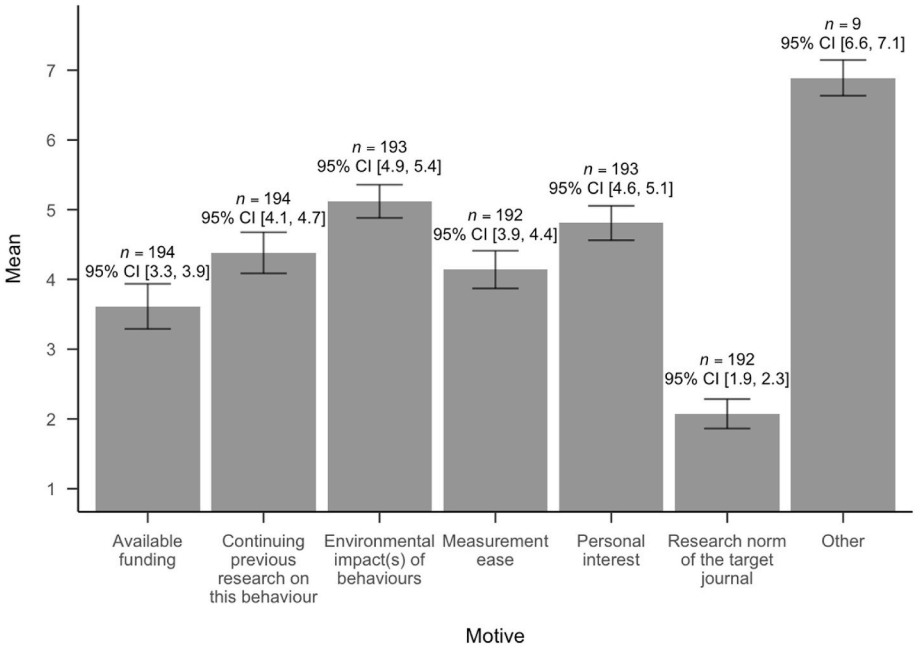

Fig. 5. Reasons for Selecting Pro-Environmental Behaviors
Note: " … *How strongly did the following factors influence the choice of behavior?*" rated from 1 (*not at all*) to 7 (*extremely*). Error bars are 95% CI.

behaviors would moderately increase the likelihood of publication (*Mdn* = 4, *M* = 3.9, *SD* = 1.5, 95% CI [3,7, 4.1]; range 1–7).

Most researchers (86%) reported measuring psychological predictors of behavior such as concern, identity, or norms, and most (87%) personally worked on selecting these predictors. Fig. 6 shows the factors they reported affecting predictor selection. All factors were rated moderately important (e.g., *fit with theory*; *predictive validity*), except for low ratings for *expected preference of reviewers/journals*, *M* (*SD*) = 2.4 (1.6), 95% CI [2.2, 2.7], range 1–7.

3.5. Theories

What theories were used most frequently and for what purpose (Fig. 7)? The theory names were all provided through open response and qualitatively coded, so the theory categories below were created by the authors. The most frequent category was that a project did not have a specified theory or that the researchers did not enter it ($n = 104$). Of the identified theories, the Theory of Planned Behavior, Reasoned Action, etc. ($n = 28$) and Value Belief Norm theory ($n = 24$) were the most common. Across theories, the stated purpose varied somewhat (e.g., *modifying the theory*; *inspiration for intervention design*). The most distinct

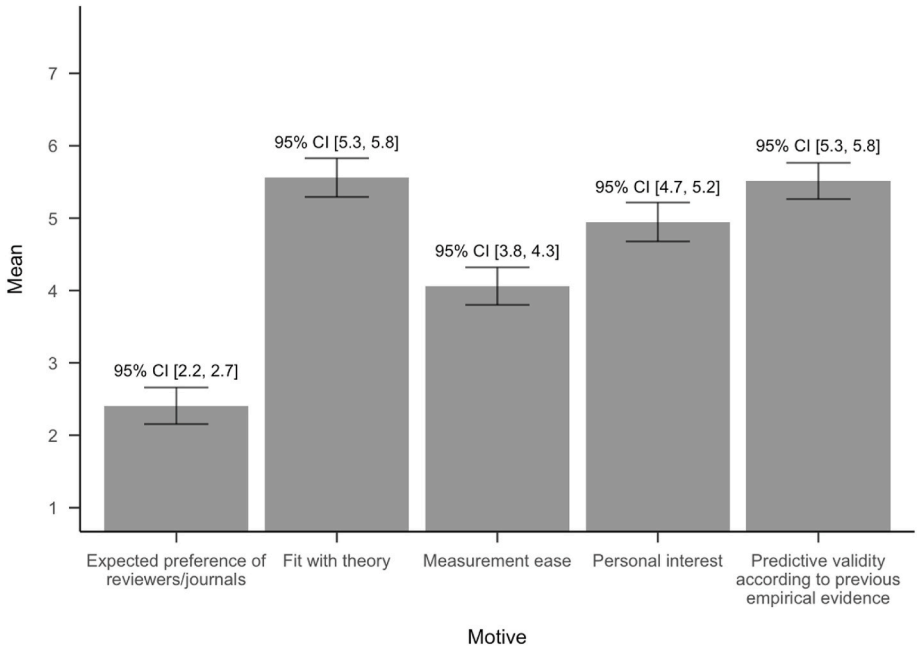

Fig. 6. *Reasons for Selecting Predictors* (n = *150)*
Note: " … *How strongly did the following factors influence your choice of predictor(s)?*" rated from 1 (*not at all*) to 7 (*extremely*). Error bars are 95% CI.

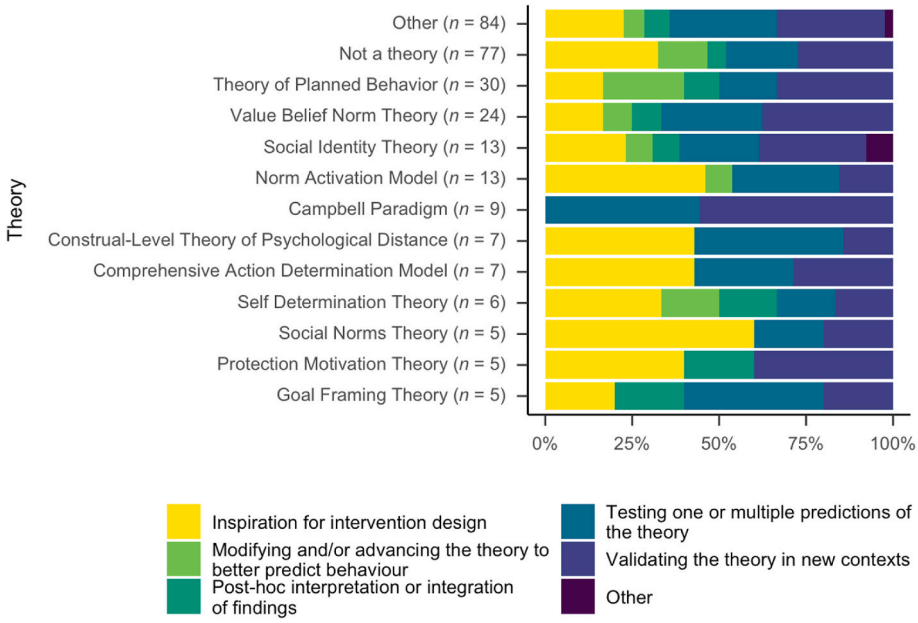

Fig. 7. Theories and goals.

theory by goal appears to be the Campbell paradigm, which was only used for *validating the theory in new contexts* and *testing predictions of the theory* (Fig. 7).

Researchers' favorite papers are shown in Supplement Table S1. The favorites distribution was quite flat, with a great diversity of papers mentioned a few times each, so the frequency ranking should not be over-interpreted.

3.6. Power analysis, open science, and collaboration

What is the frequency of open science practices in the last empirical study in which researchers included pro-environmental behavior (Table 2; $n = 190$)?

Table 2
Frequency of open science practices.

	Freq.	%
Materials posted online	110	58
Open-access paper or preprint	88	46
Data posted online	77	41
Preregistration	65	34
Analysis code posted online	64	34
None	33	17

Note. The $n = 190$ researchers could select multiple actions. Percentages represent the proportion of researchers.

Power analysis. 62% of respondents reported using an *a priori* power analysis compared to 34% *no*, 2% *don't know*, and 1% *no statistical inferences*. Those who answered *yes* were asked about how they determined the effect size. The most common answers were *General advice,* e.g., *Cohen's* d = *0.2, 0.4, 0.6 guidelines* (42%); *Previous studies* (36%); and *Size of related effects* (14%).

Open science practices. Most scientists (83%) reported using at least one open science practice, and posting materials online was the most frequent. However, fewer than 50% reported engaging in commonly advocated practices such as preregistration or posting data or analysis code online (Table 2).

Collaboration outside academia. Most of the $n = 190$ researchers had collaborated outside academia ($n = 134$, 71%). The most frequent collaboration partners were practitioners in government (42%) and nonprofits (41%; see Table 3).

Knowledge of research trends (range 1-7). Scientists reported high knowledge of research trends in environmental psychology, M (SD) = 5.0 (1.1), 95% CI [4.8, 5.1], and low-medium knowledge of research trends in behavioral economics, political science, sociology, climate and environmental science, and sustainability science, Ms (SDs) = 2.8–3.9 (1.3–1.5). For the results by field, additional analysis output, and M (SD) for values shown in Figures, see the Supplement.

4. Discussion

Researchers reported their latest practices when studying pro-environmental behaviors. Virtually all respondents agreed that environmental psychologists should address the climate crisis or other environmental problems with their research, and highlighted the importance of understanding interventions to change impactful behaviors.

Their most recent projects were dominated by quantitative designs, of which most studies were experimental or cross-sectional/correlational. The reported studies almost entirely used inferential statistics to test hypotheses, which suggests a gap of inductive, descriptive studies, e.g., to characterize a behavior in a context and population (Nielsen, Cologna, et al., 2021). Consumer and household behaviors, particularly frequent actions as opposed to installations like solar panels, appeared more common than civic or advocacy behaviors. However, activist behaviors were also widely studied (Fig. 4), which is likely an increase from previous decades. Climate-related activism rose globally during the Fridays for Future movement and related local protests (de Moor, De Vydt, Uba, & Wahlström, 2021; Sabherwal et al., 2021).

Researchers also reported their goals for choosing behaviors. Environmental impact was rated a high priority, M (SD) = 5.1 (1.7) out of 7. The reported high priority of impact (see also Fig. 5) was somewhat consistent with the behaviors that researchers reported measuring. Low-impact behaviors like recycling were still common, but they were joined by higher-impact consumer behaviors (e.g., flying, efficiency upgrades) as well as civic and advocacy behaviors (Fig. 4). These results are consistent with researchers measuring high-impact behaviors as previously recommended (Nielsen, Cologna, et al., 2021), but the reports could also differ from what was actually measured. In this survey, it was easier to endorse studying impactful behaviors than to have done so in practice.

Table 3
Frequency of collaborations outside academia.

	Freq.	%
Practitioners in government	80	42
Practitioners in nonprofits	78	41
Practitioners in companies or industry	69	36
Public utilities	40	21
None	56	29
Other	6	3

Note. The $n = 190$ participants could select multiple collaborations. Percentages represent the proportion of participants who selected the respective option.

In terms of measurement, the respondents heavily relied on self-reports using willingness, intentions, or frequency words like "rarely" and "often" (Fig. 4). These measures are easy to administer but often have low measurement accuracy, which can undermine the value of inferences about that behavior. Self-reports with precise frequencies were less common. Precise frequencies have the advantage of potential conversion into impact through physical units like kWh or kg CO_2 (Nielsen et al., 2022). The results of psychological research might be of more use to other fields and policy implementation when communicated in physical units.

Respondents said that the ease of measurement was relatively unimportant for selecting behaviors and predictors, which was surprising given the large differences in the time and funding required between methods. As a speculation, these results are also consistent with researchers assuming they would use self-report in a project, and then finding further measurement choices similar in difficulty.

Many researchers reported selecting the predictors to fit a theory. Depending on the theory, this might mean that potentially important, non-psychological factors were not considered (e.g., context, socio-demographics; Nielsen et al., 2024). The participants also reported focusing on the psychological predictors of pro-environmental behaviors (Figs. 6 and 7). To the extent that predictors and behavior are measured similarly, like with Likert-style scales and similar wording, even strong relationships may not be useful in crafting interventions (Lange et al., 2023).

Additionally, consider the example of public transit being less available in rural areas. For a predictor, a researcher could measure perceived behavioral control, or they could measure the availability of transit options, for example using spatial data on vehicles and individuals. Considering other concepts at the intersection of human perception and environmental design, such as affordances, could improve the understanding of how perceived behavioral control and behavior relate to environmental configurations in specific contexts.

When asked to list the theories that guided their most recent project, most respondents did not list a specific theory. Of the specified theories, variations of the Theory of Planned Behavior were the most mentioned. Such box-and-arrow models imply causal relationships between latent psychological variables, but may miss other contextual factors that shape behavior (Fig. 7). There were few theories that explicitly capture behavior change, such as the Stage Model of Self-Regulated Behavior Change (Bamberg, 2013), perhaps reflecting the lack of longitudinal studies. Although a quarter of participants were not trained in psychology, there were few theories from adjacent disciplines such as the influential Diffusion of Innovations Theory from sociology and marketing (Bamberg, 2013; Rogers, 2003). Broadly, theories derived from social psychology appeared dominant, with theories and paradigms from cognitive, clinical, personality, or developmental psychology rarely or not at all mentioned. There was also little consideration of psychological theories such as affordances, behavioral setting, and place attachment. For example, choosing where to place energy infrastructures or noxious facilities like incinerators also constitute behaviors that affect the natural environment. Such scholars might not have perceived a fit with the study advertisement text due to its behavioral focus. In future research, a systematic literature review could develop a more comprehensive picture of theoretical and methodological diversity using specific keywords and journals.

More than half of the cross-sectional and experimental studies were conducted online. In addition, there was a lack of longitudinal designs, perhaps due to effort, cost, and analysis complexity. However, such designs are critical for strengthening causal inference, testing popular ideas such as behavioral spillover (Carrico, 2021), and testing effects with longer time frames such as on wellbeing or lifestyle changes. Also, there is a clear need for research outside commonly studied populations (e.g., the United States, Europe, and Australia). Multi-region studies such as the recent Manylabs Climate in 63 countries (Vlasceanu et al.,

2024) can enable the testing of context and culture variables.

These results also showed that open science practices such as preregistration and sharing analysis code are developing in this field, with self-reported engagement from around a third to a half of respondents. These rates appear high compared to psychology as a whole (Ferguson et al., 2023; Munafò et al., 2017), although the methods and sample periods differed between these studies.

Most researchers reported having collaborated outside academia, likely because environmental change and demand reduction are discipline-crossing problems. To further increase the inter- and transdisciplinary integration of environmental psychology, researchers may want to look to other partners and disciplines in service of a specific connection or service each can provide, like how life cycle assessment can increase the validity of environmental impact measures (e.g., Nielsen et al., 2022), how psychologists could help constrain behavioral assumptions in climate models (Moore et al., 2022), or assist with transitions of socio-technical systems (Hanss, 2021; Wullenkord & Hamann, 2021). Psychologists can also use such partnerships to evaluate predictors beyond social psychology (e.g., cost, demographics, and non-psychological constraints such as physical context).

4.1. Limitations

The non-systematic data collection in this study means that the sample likely differs from all environmental behavior researchers. We used convenience sampling methods such as email lists that mostly covered the well-connected, English-speaking community, and to a lesser extent the Spanish-speaking community.

The phrasing of "the last empirical study worked on or published" was justified in the Methods. This phrasing may also have biased participants to recall more impactful recent work, and/or reduced the reporting of ongoing longitudinal studies. Thus, participants may not have reported a prototypical study from their research program. For example, during the COVID-19 pandemic, researchers might have been more likely to collect data online than in other periods.

4.2. Conclusion

It is an exciting time to study pro-environmental behaviors. New measures and procedures are becoming available, open science methods are gaining popularity, there are increasing calls for behavioral tools for sustainability, and environmental psychology is having useful discussions about what research to prioritize. We hope that this accounting of current priorities can support the field of environmental psychology in becoming even more effective and influential in developing theories and interventions for a thriving world. Further uses for the open dataset could include subgroup analysis (e.g., gender, career stage, country, or region) or evaluating how theory selection may affect types and measures of pro-environmental behaviors.

CRediT authorship contribution statement

Cameron Brick: Writing – review & editing, Supervision, Resources, Project administration, Methodology, Funding acquisition, Formal analysis, Data curation, Conceptualization. **Kristian S. Nielsen:** Writing – review & editing, Project administration, Methodology, Conceptualization. **Sebastian Berger:** Writing – review & editing, Methodology. **Laura Henn:** Writing – review & editing, Methodology. **Kimberly S. Wolske:** Writing – review & editing, Methodology. **Florian Lange:** Writing – review & editing, Methodology. **Daniel Hanss:** Writing – review & editing, Methodology. **Jan M. Bauer:** Visualization, Methodology, Formal analysis. **Alaa Aldoh:** Writing – review & editing, Visualization, Methodology, Formal analysis. **Maien S.M. Sachisthal:** Writing – review & editing, Methodology, Formal analysis. **Svein Åge Kjøs Johnsen:** Writing – review & editing. **Viktoria Cologna:** Writing – review & editing, Project administration, Methodology, Funding acquisition.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.jenvp.2024.102375.

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