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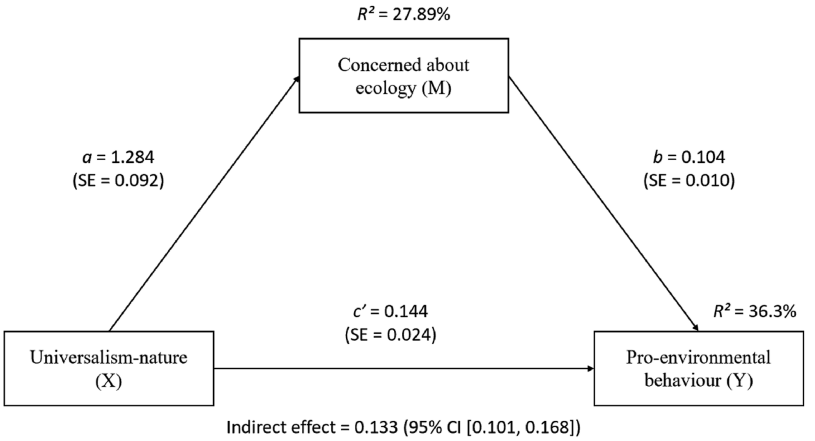

Path coefficients (*a*, *b*, and *c'*) are standardised regression weights. For all paths, $p < 0.001$.

Figure 1.
Short: A conceptual path diagram linking "Universalism nature (X)" to "Pro-environmental behaviour (Y)".
Long: The conceptual path diagram is arranged from left to right with three rectangular boxes connected by arrows. On the left, a box labeled "Universalism-nature (X)" is shown. An arrow runs from "Universalism-nature (X)" to "Concerned about ecology (M)" in the center top, labeled "a equals 1.284 (S E equals 0.092)". Above the center box, the text reads "R squared equals 27.89 percent". An arrow runs from "Concerned about ecology (M)" to "Pro-environmental behaviour (Y)" on the right, labeled "b equals 0.104 (S E equals 0.010)". To the top right of the right box, the text reads "R squared equals 36.3 percent". A horizontal arrow runs from "Universalism-nature (X)" directly to "Pro-environmental behaviour (Y)", labeled "c prime equals 0.144 (S E equals 0.024)". Below this arrow, the text reads "Indirect effect equals 0.133 (95 percent C I [0.101, 0.168])". At the bottom, a note states "Path coefficients (a, b, and c prime) are standardised regression weights. For all paths, p less than .001".

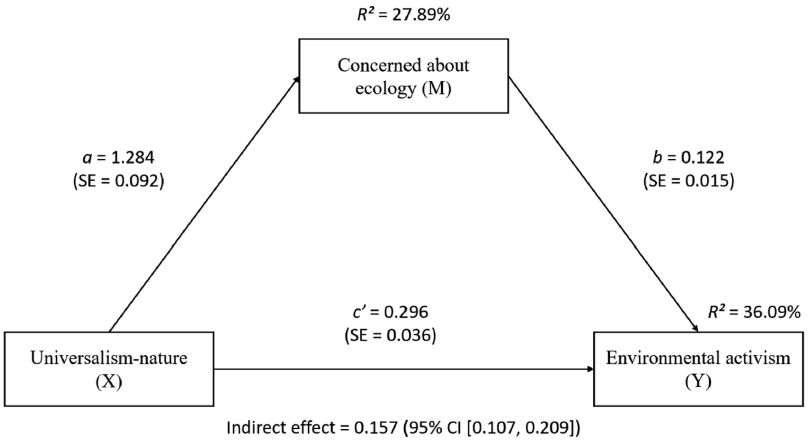

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Figure 2.
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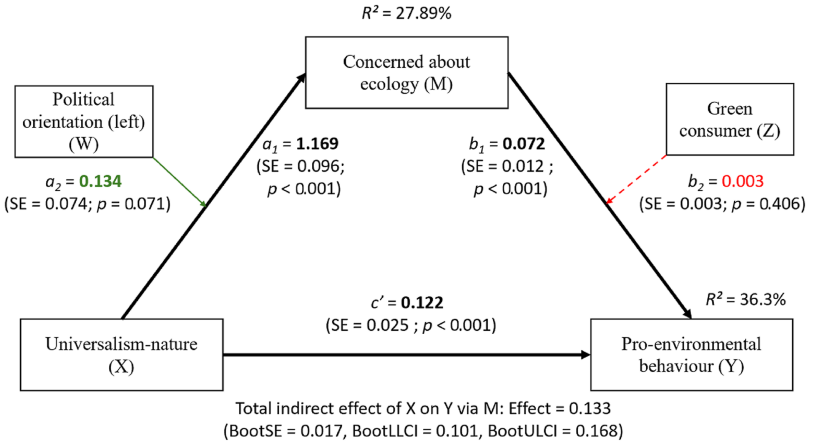

Figure 3.
Short: A conceptual path diagram showing moderated effects linking “Universalism-nature (X)” to “Pro-environmental behaviour (Y)”.
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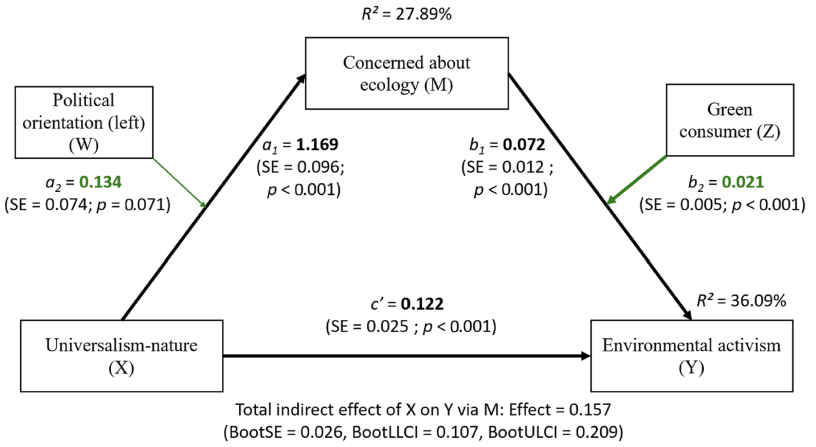

Figure 4.
Short: A conceptual path diagram showing moderated effects from “Universalism-nature (X)” to “Environmental activism (Y)”.
Long: The conceptual path diagram is arranged from left to right with five rectangular boxes and labeled arrows. On the left bottom, a box labeled “Universalism-nature (X)” is shown. An arrow runs from “Universalism-nature (X)” to the center-top box labeled “Concerned about ecology (M)”, with the path labeled “a subscript 1 equals 1.169 (S E equals 0.096; p less than .001)”. Above the center box, the text reads “R squared equals 27.89 percent”. From the center box, an arrow runs downward to the right bottom box labeled “Environmental activism (Y)”, with the path labeled “b subscript 1 equals 0.072 (S E equals 0.012; p less than .001)”. To the top right of this box, the text reads “R squared equals 36.09 percent”. A horizontal arrow runs from “Universalism-nature (X)” directly to “Environmental activism (Y)”, labeled “c prime equals 0.122 (S E equals 0.025; p less than .001)”. On the upper left side, a box labeled “Political orientation (left) (W)” is connected by an arrow to the path between “Universalism-nature (X)” and “Concerned about ecology (M)”, with the moderation effect labeled “a subscript 2 equals 0.134 (S E equals 0.074; p equals .071)”. On the upper right side, a box labeled “Green consumer (Z)” is connected by an arrow to the path between “Concerned about ecology (M)” and “Environmental activism (Y)”, with the moderation effect labeled “b subscript 2 equals 0.021 (S E equals 0.005; p less than .001)”. Below the diagram, the text reads “Total indirect effect of X on Y via M: Effect equals 0.157 (BootSE equals 0.026, BootLLCI equals 0.107, BootULCI equals 0.209)”. At the bottom, a note states “Path coefficients (a, b, and c prime) are standardised regression weights. Index of moderated mediation with two moderators: 0.0028 (BootSE equals 0.0020, BootLLCI equals negative 0.0005, BootULCI equals 0.0073). The index was not statistically significant”.

Journal of Applied Research in Higher Education

Assessment of environmental attitudes, values, and behaviours in university students: the relevance of environmental education

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Heike Clara Pintor Pirzkall
Department of International Relations,
Universidad Pontificia Comillas – Campus de Cantoblanco, Madrid, Spain, and
Gisela Delfino and Pilar Martinez-Diaz
Department of Psychology,
Universidad Pontificia Comillas – Campus de Cantoblanco, Madrid, Spain

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Abstract

Purpose – This study examines relationships between self-transcendence values, environmental attitudes, and pro-environmental behaviours among Spanish university students.

Design/methodology/approach – 624 participants completed a questionnaire based on Schwartz's benevolence and universalism values, environmental concern, pro-environmental behaviours (PEB), and environmental activism (EA) across different disciplines.

Findings – Universalism-nature values showed the strongest positive correlations with PEB and EA. Being concerned about ecology (CAE) partially mediated the relationship between universalism-nature values and PEB and EA. Personal factors, such as green family environment and eco-friendly consumption habits, as well as left-wing political orientation were positively associated with PEB, EA, and positive environmental concern dimensions. Contrary to expectations, final-year students did not demonstrate higher levels of PEB or environmental concern compared to first-year students. Psychology and Interpretation/International Relations students scored higher on PEB than Law/Business students. Moderated mediation analyses revealed that political orientation moderated the relationship between universalism-nature values and CAE, with stronger effects for left-leaning individuals. Additionally, green consumer identity moderates the relationship between CAE and EA, with stronger effects for those identifying as green consumers.

Research limitations/implications – The study reveals complex interactions between values, attitudes, and behaviours, highlighting the need for targeted environmental education strategies in higher education that address contextual barriers and facilitate behaviour change through supportive environments.

Originality/value – This study is the first of its kind to examine relationships between self-transcendence values, environmental attitudes, and pro-environmental behaviours in Spanish private universities.

Keywords Environmental attitudes, Pro-environmental behaviour, Environmental activism, SDG 4, SDG 12, Universalism values

Paper type Research article

Introduction

Environmental education is a long-term process and a core component of all education levels. During university, when key life choices are being made, it aims to foster awareness, ecological knowledge, attitudes, and values so that students commit to leading a more sustainable life (Galiano-León and García-Sampalo, 2002). This period is crucial because it often shapes individuals' long-term behaviours and attitudes towards environmental issues (Aznar Minguet *et al.*, 2014).

Although most university students have favourable attitudes towards sustainability, these often do not translate into behaviours that promote environmental care (Kollmuss and Agyeman, 2002; Whitney *et al.*, 2017; Wyss *et al.*, 2022). Despite extensive research, this

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attitude-behaviour gap remains poorly understood. Examining the psychological and contextual mechanisms, particularly the values and attitudes that shape Pro-Environmental Behaviours (PEB) among university students, can clarify this discrepancy and guide more effective environmental education interventions.

This research examines private- and public-sphere PBE among students at a private university in Spain. Private institutions constitute a relevant context because they often combine explicit commitments to sustainability with strong employability agendas. Previous studies on PEB have primarily concentrated on private-sphere behaviours, often overlooking the role of public engagement and activism in the environmental domain.

The present study investigates how values, environmental concern, and attitudes jointly predict private and public-sphere PEB among Spanish university students. Drawing on the Theory of Planned Behaviour, the Value-Belief-Norm theory, and Schwartz's Theory of Basic Values, we conceptualise pro-environmental actions as shaped by self-transcendence values, with environmental attitudes and concern mediating this relationship.

Theoretical framework

Pro-Environmental Behaviour (PEB) has been studied across various disciplines, including organisational psychology, environmental education, and environmental psychology, reflecting its multifaceted nature and wide-ranging implications. PEB is defined as "the commission of acts that benefit the natural environment (e.g. recycling) and the omission of acts that harm it (e.g. avoiding air travel)" (Lange and Dewitte, 2019, p. 93). This definition encompasses active and passive behaviours, highlighting how individuals can contribute to environmental protection.

PEB research distinguishes between private and public spheres of behaviour, whereas most existing questionnaires focus predominantly on the private sphere (Lange and Dewitte, 2019). Private-sphere PEB includes individual actions demonstrating environmental awareness and care, such as recycling at home, reducing energy consumption, or choosing eco-friendly products (Chuvieco *et al*., 2018; Kosic *et al*., 2024; Markle, 2013). In contrast, public-sphere PEB refers to environmental activism and encompasses activities such as participating in environmental protests, supporting green policies, or engaging in community environmental initiatives (Xing *et al*., 2022). The predominant emphasis on private behaviours often ignores the importance of public actions essential for broader societal change. The present study addresses this gap by evaluating both private-sphere actions (PEB) and public-sphere environmental activism (EA).

Building on this distinction, we argue that explaining both private- and public-sphere behaviours requires considering broad value orientations and domain-specific attitudes. Values provide general motivational orientations toward environmental concern, but their effects on concrete actions are typically indirect, operating through more proximal evaluations of environmental objects and issues (Milfont, 2009). Following Gifford and Sussman (2012), we understand environmental attitudes as "concern for the environment or caring about environmental issues" (p. 65) and treat them as the motivational bridge from values to specific behavioural choices.

The relationship between values, attitudes, and behaviour has been addressed by two influential frameworks: the Theory of Planned Behaviour (TPB; Ajzen, 1991) and the Value-Belief-Norm (VBN) theory (Stern *et al*., 1999). TPB explains pro-environmental actions as the result of intentions shaped by attitudes toward the behaviour, perceived social expectations, and perceived behavioural control, highlighting rational decision processes and contextual constraints. VBN complements this view by grounding PEB in personal values and moral obligation, proposing a causal chain from stable value priorities and beliefs about environmental consequences to a sense of personal responsibility and norm activation (Stern, 2000). Together, these perspectives suggest that the impact of values on environmental action is mediated by more specific cognitions and affective evaluations of environmental issues.

To examine which value orientations are most relevant for environmental engagement, we draw on Schwartz's Theory of Basic Values (Schwartz, 1992). This model, validated across diverse cultural contexts, organises values into two main bipolar dimensions: openness to change versus conservation, and self-transcendence versus self-enhancement (Schwartz and Bilsky, 1987). The latter is particularly important for PEB (Primc *et al*., 2021). Self-transcendence values (universalism and benevolence) emphasise concern for the welfare of others and the protection of nature, fostering empathy and ecological responsibility (De Dominicis *et al*., 2017), whereas self-enhancement values (power, achievement) prioritise personal success and social status and are associated with more anthropocentric orientations (Czupryna *et al*., 2024; Milfont and Duckitt, 2010). Prior research has consistently linked self-transcendence to stronger pro-environmental commitment and self-enhancement to weaker or more conditional environmental concern (Choon *et al*., 2024).

Beyond values and attitudes, empirical work also highlights the role of personal and contextual factors in shaping environmental engagement. Personal dimensions, such as family environment and consumption habits, are important predictors of environmental awareness and behaviour (Kollmuss and Agyeman, 2002), while contextual factors, such as religiosity and political ideology, influence individuals' levels of environmental concern and PEB (Gifford and Nilsson, 2014). Educational factors in higher education, including years of study and field of specialisation, have likewise been associated with differences in students' environmental knowledge, attitudes, and behaviours (Chuvieco *et al*., 2018; Heeren *et al*., 2016).

The way environmental concern is measured is also crucial for understanding value-behaviour links. Multidimensional scales capture distinct facets of concern, but evidence within value-belief-norm frameworks suggests that single-item measures can adequately represent global ecological concern (Milfont, 2009). In particular, the item "I consider myself to be very concerned about ecological issues" (CAE) has shown strong predictive power for public-sphere behaviours such as activism, although its associations with private-sphere actions are typically more modest (Ertz *et al*., 2016; Tam and Chan, 2017).

AQ: 8

Building on this integrative framework-combining TPB, VBN and Schwartz's value theory-with previous findings on environmental concern dimensions (Amérigo *et al*., 2007) and on personal, contextual and educational influences (Gifford and Nilsson, 2014; Kollmuss and Agyeman, 2002), the present study formulates the following hypotheses to examine how values, attitudes and contextual factors jointly shape Spanish university students' PEB, environmental activism (EA), environmental concern (EC) and critical awareness of environmental issues (CAE).

H1. Universalism values will positively relate to Pro-environmental Behaviours (PEB) and Environmental Activism (EA).

H2. The dimensions of Environmental Concern (EC) will show distinct associations with PEB and EA:

- Connectedness with nature and emotional affinity will positively correlate with PEB and EA.
- Anthropocentrism and environmental apathy will negatively correlate with PEB and EA.

H3. The single-item concern about ecology measure (CAE) will exhibit superior predictive power compared to specific EC subscales for public-sphere and private-sphere pro-environmental behaviours.

H4. Personal and contextual factors will be associated with differences in PEB, EA, EC, and CAE.

H4a. Personal factors, such as a green family environment and green consumption habits, will relate positively to higher PEB, EA, EC, and CAE scores.

H4b. Contextual factors, including religious beliefs and political orientation, will be associated with differences in PEB, EA, EC, and CAE.

H5. Students with more years of university education will score higher on PEB, EA, EC, and CAE due to cumulative educational effects.

H6. Students in more socially oriented degree programmes will score higher on PEB, EA, EC, and CAE.

Materials and methods

Participants

This study used convenience sampling to maximise participation. The final sample of 624 students provides sufficient statistical power for the correlational, mediation, and moderated mediation analyses reported in this study. Simulation studies on mediation models indicate that samples of approximately 250–400 participants are generally required to achieve adequate power to detect medium-sized indirect effects in simple and complex mediation models (e.g. Fritz and MacKinnon, 2007; Sim *et al*., 2022). In addition, conventional power guidelines for multiple regression suggest that, for medium effects ($f^2 \approx 0.15$) and a similar number of predictors, required sample sizes are typically well below 300 cases (Cohen, 1992). Therefore, our sample size is more than adequate for the complexity of the proposed models.

A total of 624 Spanish university students (79.3% women; mean age 20.09, SD = 1.73, range = 18–24 years) participated in the study. Participants were distributed across different years of study and academic disciplines, including Education/Social Work, Law/Business, Psychology, and Translation and Interpretation/International Relations, with the approval of the University's Ethics Commission Dictamen: 074/24–25.

Concerning religiosity, on a Likert-type scale of five options, 25% said not at all (1), and 13.6% declared very much (5) (mean = 2.79, SD = 1.39). In terms of political orientation, 19.9% declared themselves as right-wing (1) and 5% as left-wing (5) (mean = 2.57, SD = 1.14).

Instruments

The study employed validated instruments to assess environmental values, attitudes, and behaviours.

Pro-environmental behaviours. A 12-item scale was developed to measure the frequency of private-sphere pro-environmental behaviours (PEB) in everyday life (e.g. "I use public transport except when private transport is essential", "I use refillable water bottles", "I throw my rubbish in the correct bin for recycling"; see Table A1 in the Appendix). Items, written in Spanish and based on previous questionnaires (Chuvieco *et al*., 2018; Heeren *et al*., 2016; Kurisu, 2015; Maki and Rothman, 2017), were answered on a five-point Likert scale (1 = never, 5 = always). An exploratory factor analysis (principal axis factoring) supported a single-factor solution (KMO = 0.81; χ^2 (66) = 826.85, $p < 0.001$; eigenvalue = 2.95; 18.18% of variance), with all items loading on the general factor ($\lambda = 0.35$–0.59). Internal consistency was acceptable (Cronbach's alpha = 0.702). T5

Environmental activism. Public-sphere activities were assessed with four items (see Table A2 in the Appendix) rated on a five-point scale (1 = never; 5 = always; $\alpha = 0.748$). EA correlated significantly with PEB ($r = 0.468$, $p < 0.001$, $n = 624$). T6

Schwartz's values of universalism and benevolence. Five of the 19 Schwartz's (2017) values were included (15 items, three per value), rated on a 6-point Likert scale (1 = not like me at all; 6 = very much like me). The Cronbach's alphas were: universalism-nature = 0.801; universalism-concern = 0.670; universalism-tolerance = 0.714; benevolence-care = 0.662;

T7 benevolence-dependability = 0.783 (See for means and SD in Table A3 in the Appendix; items and Spanish translation in Schwartz and Cieciuch, 2022).

Environmental concern. Environmental concern (EC) was measured following Amérigo *et al.* (2012), who distinguish four dimensions: environmental apathy, anthropocentrism, connectedness with nature, and emotional affinity with nature. Cronbach's alphas were: apathy = 0.816; anthropocentrism = 0.735; connectedness = 0.829; emotional affinity = 0.913

T8 (means and SD in Table A4 in the Appendix). EC dimensions and self-reported concern about

AQ: 9 ecology (CAE) correlated significantly ($p < 0.001$: anthropocentrism = −0.188, connectedness = 0.338, environmental apathy = −0.570, and emotional affinity = 0.288).

Self-position concerning ecology. Three items assessed self-perception regarding ecology: "I consider myself to be very concerned about ecological issues (e.g. global warming, pollution, nature protection)"; "I consider myself a *green consumer*"; and "My family is aware of ecological issues". Responses were given on a 10-point scale (1 = not at all; 10 = very much).

Procedure. The survey was administered online to facilitate access and dissemination. Before starting, participants received information about the study's aims, procedures, and ethical safeguards, including anonymity, confidentiality, and the voluntary nature of participation. Informed consent was obtained prior to completing the questionnaire.

Data analysis. All analyses were conducted with IBM SPSS Statistics 29. Given the sample size ($N = 624$), the study was powered to detect at least medium-sized effects in correlation, mediation, and moderated mediation analyses. Missing data were handled using pairwise deletion, allowing the inclusion of participants with partial responses and accounting for missing values while maximising available information.

To evaluate H1-H3, we calculated Pearson correlations between Schwartz's values, EC dimensions, CAE, and PEB and EA. For H4a and H4b, we conducted correlations between personal self-definition, religiosity, political orientation, and measures of PEB, EA, and EC dimensions.

We then conducted sequential mediation analyses to examine psychological mechanisms linking values to behaviours (Hayes, 2018). Simple mediation models (PROCESS Model 4) examined whether CAE ("I consider myself to be very concerned about ecological issues") mediated the association between universalism-nature values and each behavioural outcome (PEB/EA). Analyses used 5,000 bootstrap samples and excluded gender and age as covariates because their bivariate correlations with mediator and outcome were trivial ($|r| < 0.15$). Although Amérigo *et al.*'s (2012) multidimensional EC scale offers a nuanced assessment, we selected the single global item for mediation due to its stronger preliminary correlations with PEB and EA and to reduce model complexity and multicollinearity.

Next, exploratory moderated mediation analyses (PROCESS Model 21) assessed whether political orientation and green consumer identity moderated specific mediation paths, guided by VBN theory and observed correlations. Separate models were estimated for PEB and EA. In both, political orientation was tested as a moderator of the universalism-nature-to-CAE path, and green consumer identity as a moderator of the CAE-to-PEB/EA path.

To test H5, we conducted independent-samples *t*-tests comparing first-year and senior students on the PEB, EA, and EC dimensions. For H6, we performed one-way ANOVAs on the PEB, EA, and EC dimensions across study areas, followed, where significant, by post hoc tests (Scheffé for PEB and emotional affinity; Dunnett's T3 for anthropocentrism). We calculated means and standard deviations for all variables across groups (e.g. year of study, area of study) and effect sizes (Cohen's *d* for *t*-tests, eta-squared η^2 for ANOVAs). All tests used $\alpha = 0.05$ and, where relevant, 95% confidence intervals.

Results

Values and pro-environmental behaviours

Our first hypothesis predicted positive associations between universalism values and PEB and EA. Universalism-nature exhibited the strongest positive correlations with PEB and EA (large

effects), while universalism-concern and universalism-tolerance showed small-to-medium correlations. In contrast, benevolence values showed weak or non-significant associations with PEB and EA (Table 1). T1

Dimensions of environmental concern and pro-environmental behaviours AQ: 10

As hypothesised (H2), all EC dimensions correlated significantly with PEB and EA (see Table 2). T2

Regarding H2a, the single-item concern about ecology (CAE) showed stronger correlations with public-sphere (EA) and private-sphere (PEB) behaviours than any multidimensional EC subscale, indicating a large effect size and fully supporting the hypothesis. Connectedness with nature and emotional affinity displayed medium-positive associations with PEB and EA; anthropocentrism exhibited small negative correlations; and environmental apathy was the strongest negative predictor. Together, these findings indicate that CAE has superior predictive power, outperforming even the most strongly correlated EC dimensions.

Personal and contextual factors

Hypothesis 3a proposed that personal self-definition factors, such as a green family environment and green consumption habits, would be positively associated with PEB, EA, EC, and CAE. The results (Table 3) strongly support this hypothesis: both factors showed medium-to-large positive correlations with PEB and EA, medium positive correlations with connectedness, emotional affinity, and CAE (single item), and medium (apathy) to small (anthropocentrism) negative correlations with the negative EC dimensions. These patterns indicate that defining oneself and one's family as environmentally aware and green consumers are robustly linked to pro-environmental attitudes and behaviours. However, CAE remains the single most influential predictor of environmental engagement. T3

Table 1. Correlations of Schwartz's values with PEB and EA

Values	Pro-environmental behaviour			Environmental activism		
	r	*p*	*n*	*r*	*p*	*n*
Universalism-nature	*0.470*	<0.001	543	*0.515*	<0.001	543
Universalism-concern	*0.275*	<0.001	543	*0.190*	<0.001	543
Universalism-tolerance	*0.205*	<0.001	543	*0.143*	0.001	543
Benevolence-care	0.044	0.302	541	−0.023	0.590	541
Benevolence-dependability	0.001	0.983	540	*−0.089*	0.038	540

Note(s): Following Schwartz and Cieciuch's (2022) instructions, centred values were used

Table 2. Correlations of EC dimensions and CAE with PEB and EA

Environmental concern	Pro-environmental behaviour	Environmental activism
Apathy	−0.400	−0.312
Anthropocentrism	−0.135	−0.187
Connectedness	0.334	0.348
Emotional affinity	0.275	0.338
Concern about ecology (single item)	0.551	0.527

Note(s): In all EC dimensions, $n = 624$. In CAE: $n = 583$. All cases, $p < 0.001$

Table 3. Correlations between family awareness and green consumerism and PEB, EA, dimensions of EC, and CAE

	My family is aware	Green consumerism
Pro-environmental behaviour	0.424	0.515
Environmental activism	0.387	0.468
Environmental concern		
Apathy	−0.379	−0.412
Anthropocentrism	−0.113	−0.119
Connectedness	0.243	0.321
Emotional affinity	0.176	0.250
Concerned about ecology (CAE, single item)	0.597	0.652

Note(s): Family awareness: all cases $n = 589$, except for CAE: $n = 569$; Green consumerism: $n = 591$, except for CAE: $n = 566$. All cases, $p < 0.001$, except Anthropocentrism with Family awareness ($p = 0.006$) and with Green consumerism ($p = 0.004$)

Hypothesis 3 b proposed that contextual factors such as religious beliefs and political ideas would be associated with differences in PEB, EA, EC, and CAE. The results (Table 4) largely support this hypothesis.

Higher religiosity is associated with lower PEB and CAE and slightly higher anthropocentrism and apathy, whereas its other correlations are small. In contrast, political orientation shows stronger, more consistent associations: a more left-wing orientation is moderately associated with higher PEB, EA, CAE, connectedness, and emotional affinity, and with lower apathy and anthropocentrism, highlighting political ideology as a more powerful contextual correlate of environmental engagement than religiosity.

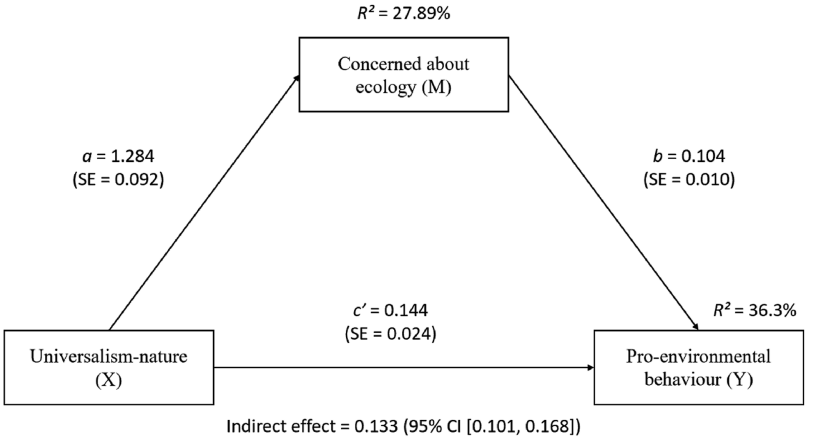
Mediation role of concern about ecology

We tested whether CAE mediated the association between universalist-nature values and environmental actions (PEB and EA). Universalism-nature significantly predicted CAE (Figure 1; path $a = 1.284$, SE $= 0.092$, $p < 0.001$), explaining 27.89% of its variance. CAE, in turn, significantly predicted PEB (path $b = 0.104$, SE $= 0.010$, $p < 0.001$), and the direct effect of universalism-nature on PEB remained significant when CAE was included ($c' = 0.144$, SE $= 0.024$, $p < 0.001$). The indirect effect was significant and small-to-medium ($b = 0.133$,

Table 4. Correlations of religiosity with PEB, EA, EC dimensions, and CAE

	Religiosity		Political orientation (left)	
	r	*p*	*r*	*p*
Pro-environmental behaviour	*−0.228*	<0.001	*0.325*	<0.001
Environmental activism	−0.061	0.130	*0.296*	<0.001
Environmental concern				
Apathy	*0.106*	0.008	*−0.307*	<0.001
Anthropocentrism	*0.147*	<0.001	*−0.181*	<0.001
Connectedness	−0.041	0.308	*0.239*	<0.001
Emotional affinity	*0.084*	0.036	*0.142*	<0.001
Concern about ecology (CAE, single item)	*−0.151*	<0.001	*0.332*	<0.001

Note(s): In all cases, $n = 623$, except CAE, where $n = 583$



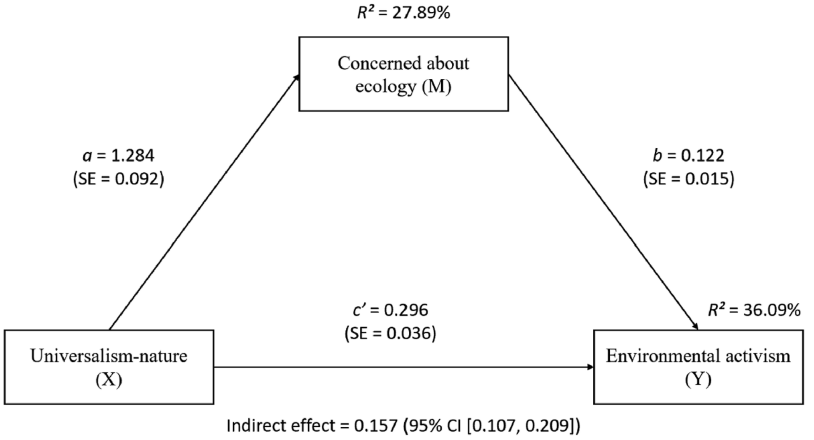
Path coefficients (*a*, *b*, and *c'*) are standardised regression weights. For all paths, $p < 0.001$.

Figure 1. Mediation model of the relationship between universalism-nature (X), CAE (M), and PEB (Y) AQ: 11

95% CI [0.101, 0.168]), indicating partial mediation: stronger universalism-nature values relate to higher private-sphere PEB via increased ecological concern.

To examine public-sphere engagement (EA), we conducted a parallel mediation with EA as the outcome (Figure 2). AQ: 12 F2

Universalism-nature again significantly predicted CAE ($a = 1.284$, SE = 0.092, $p < 0.001$), and CAE significantly predicted EA ($b = 0.122$, SE = 0.015, $p < 0.001$), while the direct effect of universalism-nature on EA remained significant ($c' = 0.296$, SE = 0.036, $p < 0.001$). The indirect effect via CAE was also significant ($b = 0.157$, 95% CI [0.107, 0.209]) and slightly larger than for PEB, suggesting a somewhat stronger role of CAE in activism than in private-sphere behaviours. In both models, universalism-nature and CAE together



Path coefficients (*a*, *b*, and *c'*) are standardised regression weights. For all paths, $p < 0.001$.

Figure 2. Mediation model of the relationship between universalism-nature (X), CAE (M), and EA (Y)

explained approximately one-third of the variance in PBE and EA ($R^2 \approx 36\%$). In contrast, universalism-nature alone accounted for approximately 28% of the variance in CAE.

Moderated mediation: politics and green identity

To examine the relationships between universalism-nature values, CAE, and PEB, we estimated a moderated mediation model with political orientation and green consumer identity as moderators (Figure 3). Universalism-nature significantly predicted CAE, which in turn significantly predicted PEB, and the direct effect of universalism-nature on PEB remained significant, indicating partial mediation (total indirect effect $b = 0.133$, BootSE $= 0.017$, 95% CI [0.101, 0.168]).

Political orientation had a small but significant positive effect on CAE ($b = 0.459$, $p < 0.001$), with more left-leaning individuals reporting greater ecological concern. The interaction between universalism-nature and political orientation on CAE approached significance ($a_2 = 0.134$, SE $= 0.074$, $p = 0.071$), suggesting a trend toward stronger value–concern links among left-leaning students; conditional effects showed that the universalism-nature to CAE path was significant at all political orientations but increased from $b = 0.959$ at -1.57 SD (right-wing) to 1.360 at $+1.43$ SD (left-wing).

Green consumer identity did not significantly moderate the CAE-to-PEB path ($b_2 = 0.003$, SE $= 0.003$, $p = 0.406$), although it showed a small, marginally significant main effect on PEB ($b = 0.041$, $p = 0.062$). Conditional indirect effects of universalism-nature on PEB via CAE were significant across all levels of political orientation and green consumer identity ($b = 0.0619$–0.1072). However, the overall index of moderated mediation with both moderators was very small and not significant (index $= 0.0004$, BootSE $= 0.0007$, 95% CI [-0.0008, 0.0020]). These findings suggest that political orientation shapes the strength of the universalism-nature and CAE link, whereas green consumer identity does not materially alter the overall mediation pattern for PEB.

For EA, we applied the same moderated mediation framework (Figure 4). Universalism-nature significantly predicted CAE, CAE significantly predicted EA, and the direct effect of

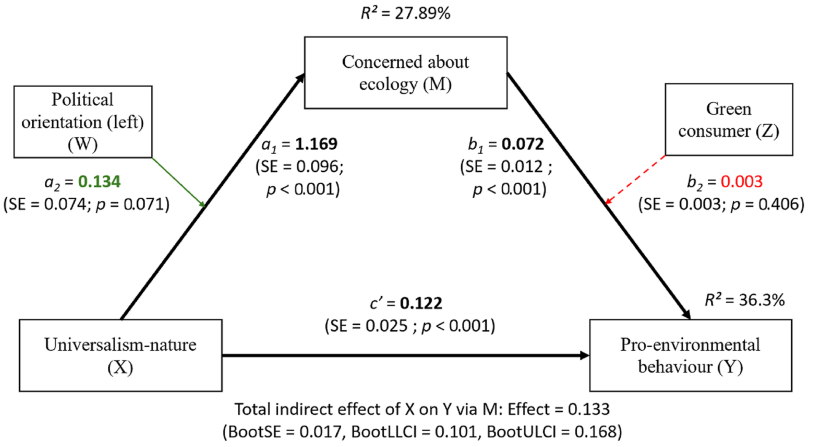


Figure 3. Moderated mediation model of the relationship between universalism-nature (X), CAE (M), and PEB (Y), moderated by political orientation (W) and green consumerism (Z)

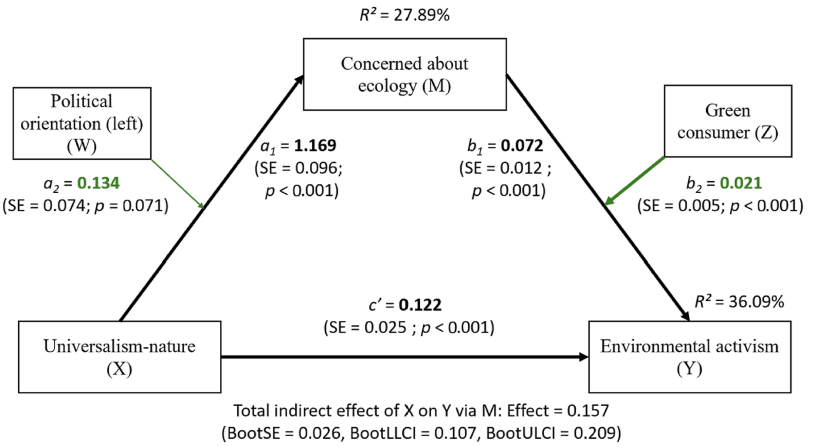


Figure 4. Moderated mediation model of the relationship between universalism-nature (X), CAE (M), and EA (Y), moderated by political orientation (W) and green consumerism (Z)

universalism-nature on EA remained significant, again indicating partial mediation (total indirect effect $b = 0.157$, BootSE = 0.026, 95% CI [0.107, 0.209]).

The effects of political orientation and its interaction with universalism-nature on CAE replicated the PEB model. In contrast to PEB, green consumer identity significantly moderated the CAE to EA path: the association between CAE and EA strengthened with higher green consumer identity (Low −2.52 SD: $b = 0.054$, SE = 0.020; Medium 0 SD: $b = 0.115$, SE = 0.018; High +2.48 SD: $b = 0.156$, SE = 0.023). Conditional indirect effects of universalism-nature on EA via CAE were significant across all levels of political orientation and green consumer identity ($b = 0.0513$–0.2128). However, the combined index of moderated mediation remained small and non-significant (index = 0.0028, BootSE = 0.0020, 95% CI [−0.0005, 0.0073]). Overall, political orientation consistently strengthens the link between universalism-nature and ecological concern. In contrast, green consumer identity primarily amplifies the translation of concern into environmental activism, particularly among students who strongly identify as green consumers, highlighting different pro-environmental pathways in private (PEB) versus public (EA) spheres.

Effect of university education

Our fourth hypothesis posited that students with more years of university education would score higher on PEB, EA, EC, and CAE. However, comparisons between first-year and senior students did not show significant increases in PEB, EC, or CAE over time (see Table A5 in the Appendix). Instead, senior students scored slightly and significantly lower than first-year students on EA ($p = 0.013$; $d = 0.23$) and connectedness with nature ($p = 0.029$; $d = 0.20$), reflecting small effect sizes. T9

Differences between areas of study

Our fifth hypothesis proposed that students in more socially oriented degree programmes would score higher on PEB, EA, EC, and CAE. Significant differences emerged for PEB ($p < 0.001$; $\eta^2 = 0.04$), anthropocentrism ($p < 0.001$; $\eta^2 = 0.03$), and emotional affinity ($p = 0.029$; $\eta^2 = 0.02$; see Table A6 in the Appendix), corresponding to small-to-medium T10

effects. Post hoc tests revealed that Psychology, Translation and Interpretation/International Relations students scored higher on PEB than Law/Business students, Psychology students scored lower on anthropocentrism than Education/Social Work and Law/Business students, and Translation and Interpretation/International Relations students scored significantly higher on emotional affinity than Education/Social Work students. No significant differences appeared between study areas for EA, apathy, connectedness, and CAE scores, thus only partially supporting H5.

Discussion

This study clarifies how personal values and environmental concern jointly shape pro-environmental behaviours among Spanish university students. Universalism values, especially universalism-nature, showed strong positive correlations with PEB and EA, aligning with Schwartz's value theory and prior environmental psychology research, reinforcing the role of self-transcendence as a core driver of public- and private-sphere engagement (De Groot and Steg, 2007; Schwartz, 1992). In contrast, benevolence showed weak or non-significant associations, possibly because it prioritises close others, whereas broad-scope environmental actions are more directly linked to universalism and biospheric values (Katz-Gerro *et al*., 2017; Schwartz, 2012; Stern *et al*., 1999).

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Environmental concern dimensions displayed differentiated patterns. In line with previous research (Amérigo *et al*., 2007; Schultz *et al*., 2005), connectedness with nature and emotional affinity correlated most strongly and positively with PEB and EA, whereas anthropocentrism and apathy showed negative associations, with apathy emerging as the strongest negative correlate. These findings suggest that university programmes should prioritise strengthening nature connectedness and reducing apathy.

The single-item concern about ecology (CAE) outperformed multidimensional EC subscales in predicting both private-sphere PEB and public-sphere EA, supporting evidence that global concern measures can be powerful behavioural predictors despite the attitude–behaviour gap (Gifford and Sussman, 2012; Kollmuss and Agyeman, 2002). The strong correlations between CAE and both types of behaviour highlight its utility as a concise yet powerful indicator of environmental engagement and justify its use as the mediator in our conditional process models. CAE's brevity is advantageous for large-scale surveys and educational settings, but its simplicity limits the analysis of distinct affective, cognitive, and normative components; future research should therefore complement CAE with qualitative approaches or multidimensional scales to provide a more nuanced picture of environmental concern.

Personal and contextual factors also played a central role. Students reporting a green family environment, green consumption habits, and great personal concern showed higher PEB and EA and stronger positive EC dimensions, in line with earlier work on the importance of personal contexts for environmental engagement (Kollmuss and Agyeman, 2002). Political orientation emerged as a stronger correlate than religiosity: left-wing self-placement was consistently associated with higher PEB and EA, lower apathy, and more positive concern dimensions, highlighting the importance of ideological context in environmental attitudes and behaviours (Gifford and Nilsson, 2014).

Contrary to expectations, senior students did not show higher PEB, EA, or EC than first-year students; instead, EA and connectedness with nature were slightly lower among seniors, suggesting that the cumulative impact of current environmental education in universities is unclear (Arbuthnott, 2009). Possible explanations include eco-fatigue, shifting priorities toward career concerns, and sustainability content presented as isolated or optional rather than integrated into an overall curriculum. These results suggest that universities cannot assume that exposure to sustainability content will automatically lead to stronger engagement; instead, sustained experiential learning, opportunities for collective action, and explicit support for turning values and concern into behaviour are needed across all study years.

Disciplinary context further shaped engagement. Students in Psychology and Translation and Interpreting/International Relations reported higher PEB than those in Law/Business. They showed lower anthropocentrism or higher emotional affinity, respectively, than Education/Social Work and Law/Business students, aligning with previous research on the influence of academic disciplines on environmental attitudes (Chuvieco *et al*., 2018). However, EA did not differ significantly across disciplines, indicating that factors beyond academic focus also influence collective action. Overall, promoting public-sphere environmental behaviour on campus appears to require discipline-sensitive strategies.

The complex pattern of associations among values, attitudes, and behaviours reflects broader challenges in Environmental Psychology, where strong links between universalism- and nature coexist with weaker or context-dependent relations for other factors (Gifford and Sussman, 2012). Our findings are compatible with norm-activation perspectives, which posit that action is more likely when people recognise environmental harm and feel personally responsible (Schwartz, 1977).

Implications for environmental interventions

The relationships observed between environmental attitudes and behaviours have important implications for the design of interventions. Rather than focusing only on changing attitudes or increasing knowledge, strategies should also address contextual barriers and support behaviour change through enabling environments, for instance, by strengthening pro-PEB social norms on campus, improving access to sustainable options, and implementing policies that make eco-friendly choices easier.

The strong role of political orientation suggests that tailoring interventions to resonate with diverse ideological perspectives may enhance their impact. In line with Velasco and Harder (2014), environmental education must be embedded in institutional infrastructures, regulations, and incentives, implying that universities should build an institutional ecosystem that facilitates and rewards sustainable practices rather than relying solely on curriculum content, thereby helping to narrow the intention–action gap.

The decline in environmental activism and connectedness with nature among senior students points to the need for sustained engagement throughout the degree. Interventions should aim to maintain students' involvement via experiential learning, internships with environmental organisations, and student-led sustainability initiatives.

Conclusion

Among university students in Spain, PEB and EA are shaped primarily by universalism values and key personal contexts, with universalism-nature as a central driver and personal factors such as a green family environment and green consumption habits as strong predictors. Contrary to expectations, years of university education did not consistently increase environmental engagement, underscoring the need for more targeted environmental education strategies across academic programmes.

Future work should examine the diversity of PEB and its interaction with moderating factors to build a more nuanced picture of student engagement.

Overall, the findings point to the importance of targeted, sustained, interdisciplinary programmes that engage students throughout their studies and foster long-term behavioural change. By addressing these multifaceted influences, universities can help cultivate environmentally responsible citizens and contribute to a more sustainable future.

This study has several limitations. First, all key variables (PEB, EA, EC, CAE) were assessed via self-report, which may reflect willingness or self-presentation rather than actual behaviour and is susceptible to social desirability bias (Lange and Dewitte, 2019); consequently, observed PEB and EA scores should be interpreted as upper-bound estimates -additionally, convenience sampling from selected programmes limits generalisability. Second, the private sphere PEB scale, although supported by a one-factor structure and

acceptable internal consistency, was developed for this study and tested in a single university sample; thus, it requires validation in more diverse populations. Third, while the single-item CAE measure showed strong associations with PEB and EA and was advantageous for modelling, it offers limited detail on distinct cognitive, affective, and normative facets of concern. Future research should therefore employ multi-method and longitudinal designs, combining validated multi-item scales and behavioural indicators.

Ethics: Universidad Pontificia Comillas Ethics Commission

A questionnaire was applied based on a computer program that does not collect data that identifies participants, so that they will always remain anonymous, as requested by the Ethics Commission. Ethics Commission Approval: 074/24-25.

Data availability statement

The Database has been uploaded to the Universidad Pontificia Comillas Open Access. Repository: http://hdl.handle.net/11531/98736 and in the EU Open Research Repository. (Zenodo): https://zenodo.org/records/15394569.

AQ: 7 **Appendix**

Table A1. Pro-environmental behaviours items and their means and standard deviations

	Pro-environmental behaviours	Mean	SD
1	I use public transport except when private transport is essential	3.93	1.19
2	I use refillable water bottles	4.21	1.08
3	I use digital media rather than paper	3.86	1.02
4	I print on both sides	4.29	1.13
5	I turn off lights in empty rooms	4.67	0.68
6	I buy second-hand or recycled products	2.53	1.07
7	I throw my rubbish in the correct bin for recycling	4.00	1.23
8	I tend to take my own bag when I go shopping	3.93	1.28
9	I avoid buying single-use packaging	2.71	1.08
10	I change my diet to make it more sustainable (organic products, reduced meat consumption, local food, etc.)	2.39	1.27
11	I do not waste water (short showers, running the dishwasher when it is full, etc.)	3.60	1.18
12	I only buy clothes when I need them	3.07	1.30
	Total pro-environmental behaviour	3.60	0.55

Table A2. Environmental activism items and their means and standard deviations

	Environmental activism	Mean	SD
1	I have participated in actions in favour of the environment	2.27	1.15
2	I read blogs or participate in social networks related to environmental protection	1.77	1.05
3	I belong to associations that fight for the environment	1.37	0.83
4	I promote businesses committed to sustainability (restaurants, shops, etc.)	2.74	1.20
	Total environmental activism	2.04	0.80

Table A3. Schwartz's values of universalism and benevolence: their means, standard deviations, and Cronbach's alpha

Values	Mean	SD
Universalism-nature	−0.67	0.94
Universalism-concern	0.54	0.65
Universalism-tolerance	0.49	0.68
Benevolence-care	0.70	0.54
Benevolence-dependability	0.91	0.52

Note(s): Following Schwartz and Cieciuch's (2022) instructions, the mean and standard deviation were calculated using a correction for individual differences (centred)

Table A4. Environmental concern dimensions: their means and standard deviations

Environmental concern	Mean	SD
Apathy	2.15	0.80
Anthropocentrism	2.82	0.76
Connectedness	3.67	0.78
Emotional affinity	3.87	0.86

Table A5. Differences between first year and senior students in pro-environmental behaviour, environmental activism, and environmental concern

		Mean	SD	*t*
Pro-environmental behaviour	1st year	3.59	0.49	$t\,(434) = 0.785$, $p = 0.433$, CI 95% [−0.06, 0.14], $d = 0.08$
	Senior	3.55	0.59	
Environmental activism	1st year	2.13	0.79	$t\,(434) = 2.481$, $p = 0.013$, CI 95% [0.03, 0.34], $d = 0.23$
	Senior	1.94	0.79	
Apathy	1st year	2.15	0.74	$t\,(434) = -1.057$, $p = 0.291$, CI 95% [−0.22, 0.07], $d = -0.10$
	Senior	2.23	0.83	
Anthropocentrism	1st year	2.81	0.71	$t\,(434) = -1.003$, $p = 0.316$, CI 95% [−0.20, 0.07], $d = -0.10$
	Senior	2.88	0.71	
Connectedness	1st year	3.72	0.72	$t\,(425.943) = 2.187$, $p = 0.029$, CI 95% [0.01, 0.31], $d = 0.20$
	Senior	3.56	0.85	
Emotional affinity	1st year	3.84	0.88	$t\,(434) = -0.105$, $p = 0.916$, CI 95% [−0.17, 0.15], $d = -0.01$
	Senior	3.85	0.88	
Concerned about ecology (CAE)	1st year	6.03	2.34	$t\,(405) = 1.400$, $p = 0.162$, CI 95% [−0.13, 0.78], $d = 0.13$
	Senior	5.71	2.33	

Note(s): In all cases, 1st year: $n = 215$, Senior: $n = 221$. Except for CAE where 1st year is $n = 196$

Table A6. Differences between participants' areas of study in pro-environmental behaviour, environmental activism, and environmental concern

	Mean	SD	Anova
Pro-environmental behaviour			
Education/Social Work	3.58	0.56	F (3, 586) = 7.674, $p < 0.001$, CI 95% [3.55, 3.63], $\eta^2 = 0.04$. Post hoc test: Scheffe. Differences are between * and +
Law/Business	3.43*	0.61	
Psychology	3.69+	0.48	
Translation/IR	3.67+	0.49	
Total	3.59	0.55	
Environmental activism			
Education/Social Work	1.96	0.77	F (3, 586) = 2.038, $p = 0.107$, CI 95% [1.96, 2.09], $\eta^2 = 0.01$
Law/Business	2.00	0.84	
Psychology	1.99	0.77	
Translation/IR	2.19	0.79	
Total	2.02	0.79	
Apathy			
Education/Social Work	2.18	0.80	F (3, 586) = 1.559, $p = 0.198$, CI 95% [2.08, 2.21], $\eta^2 = 0.01$
Law/Business	2.22	0.85	
Psychology	2.04	0.72	
Translation/IR	2.13	0.77	
Total	2.14	0.79	
Anthropocentrism			
Education/Social Work	2.91*	0.68	F (3, 586) = 5.813, $p < 0.001$, CI 95% [2.77, 2.89], $\eta 2 = 0.03$. Post hoc test: Dunnett's T3. Differences are between * and +
Law/Business	2.98*	0.74	
Psychology	2.68+	0.74	
Translation/IR	2.73	0.85	
Total	2.83	0.75	
Connectedness			
Education/Social Work	3.68	0.68	F (3, 586) = 0.807, $p = 0.490$, CI 95% [3.60, 3.72], $\eta^2 = <0.01$
Law/Business	3.58	0.85	
Psychology	3.70	0.74	
Translation/IR	3.69	0.84	
Total	3.66	0.77	
Emotional affinity			
Education/Social Work	3.71*	0.89	F (3, 586) = 3.030, $p = 0.029$, CI 95% [3.80, 3.94], $\eta^2 = 0.02$. Post hoc test: Scheffe. Differences are between * and +
Law/Business	3.90	0.89	
Psychology	3.91	0.83	
Translation/IR	4.01+	0.81	
Total	3.87	0.86	
Concerned about ecology (CAE)			
Education/Social Work	6.00	2.40	F (3, 547) = 1.440, $p = 0.230$, CI 95% [5.68, 6.07], $\eta^2 = <0.01$
Law/Business	5.54	2.25	
Psychology	6.05	2.32	
Translation/IR	5.87	2.38	
Total	5.87	2.37	

Note(s): In all cases, except CAE, Education/Social Work: $n = 157$, Law/Business: $n = 155$, Psychology: $n = 174$, Translation/International Relations: $n = 105$. Total = 590. For CAE: CAE, Education/Social Work: $n = 146$, Law/Business: $n = 146$, Psychology: $n = 165$, Translation/International Relations: $n = 94$. Total = 551

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Corresponding author
Heike Clara Pintor Pirzkall can be contacted at: hcpintor@comillas.edu

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