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Who is taking climate action in university? Drivers of personal and professional climate action in higher education

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Abstract

Purpose – Climate change (CC) poses significant risks to society, but there are ways people can address it – including in their personal and professional lives. One professional context – higher education – has a unique role in tackling CC through educating future leaders and researching potential solutions. This study aims to identify the predictors that determine climate action in the university.

Design/methodology/approach – The predictors of climate action (including both personal behaviour change and academic subject choice) are examined amongst both university students and staff at a UK university. The authors present the results of an online survey (N = 3,326).

Findings – Climate education and research were associated with early and mid-career researchers, years working/studying and academic field, with engineering staff/students most involved. Climate anxiety and awareness of university climate emergency declarations and credible climate information sources significantly explain academic behaviour among students and academics. In addition, activities with substantial carbon footprints, such as driving and eating ruminant meat, could be associated with CC research and teaching.

Originality/value – These results highlight the importance of improving climate literacy, and sustainability initiatives within higher education. To address the urgent issues of CC, higher education institutions must integrate climate education, research and sustainable practices.

Keywords Climate action, Higher education, Climate change, University research, Climate anxiety

Paper type Research paper

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1. Introduction

Climate change (CC) is a critical societal challenge. Technological change alone cannot solve CC, behaviour change is also necessary (IPCC, 2018). This must occur in both professional and domestic contexts (Nielsen *et al.*, 2021). Nearly two-thirds of the UK's emission reductions are due to consumer behaviour change, with the rest involving professional adoption of low-carbon technologies and practices (CCC, 2020).

Higher education is key in addressing CC through innovation (technological and social) and by shaping future leaders. Universities worldwide are integrating climate change education (CCE) and sustainability into their efforts (Timmerman and Metcalfe, 2009). They aim to inspire students and staff to tackle CC (Hou and Wang, 2021; Leal Filho *et al.*, 2021; Molthan-Hill *et al.*, 2019). Teachers prioritizing CC can empower students to advocate for sustainability (Dunlop *et al.*, 2022).

Moreover, universities lead CC research (Lozano *et al.*, 2015) and advise societal leaders on climate action. Their own efforts in climate action across operations, research and teaching can enhance or undermine their credibility (Attari *et al.*, 2016).

Addressing CC requires behaviour change in all contexts, including workplaces (Neilsen *et al.*, 2021). Although universities study climate action (Salvia *et al.*, 2022), most research on CC behaviour change focuses on home behaviours. University decarbonisation depends on staff and students taking climate action, such as reducing car use, eating less ruminant meat and cutting energy and material consumption (Latter and Capstick, 2021). In addition, societal decarbonisation requires young people choosing green careers and academics studying climate solutions. Despite high climate knowledge in universities, barriers to behaviour change exist; for example, climate scientists fly more for work than other scientists, indicating that knowledge alone is not enough (Whitmarsh *et al.*, 2020).

This research aims to answer: "What factors predict climate action in higher education, considering both personal and professional behaviour, and how can this understanding accelerate behaviour change among staff and students to contribute to societal transformation?" The study addresses climate action in higher education, filling a literature gap. Understanding both personal and professional behaviour is crucial, as actions in one context can influence the other. For instance, saving energy at home can lead to energy saving at work (Littleford *et al.*, 2014) and workplace carbon literacy programmes can prompt carbon-saving actions both domestically and professionally (Frezza *et al.*, 2019). This study aims to provide a holistic view of behaviour change.

2. Literature review

2.1 Predictors of academic climate action

Numerous studies have explored the determinants of professional academic choices related to learning, teaching and researching CC at university (Leal Filho *et al.*, 2021; Molthan-Hill *et al.*, 2019). These studies have identified factors influencing the focus on climate and environment in academic work. *Demographic factors*, such as age, predict involvement in CC and sustainability, with undergraduates more engaged than postgraduates and early/mid-career academics more interested than senior ones (Chowdhury *et al.*, 2021; Leal Filho *et al.*, 2021; Shealy *et al.*, 2021; Yuan and Zuo, 2013). Academic disciplines also play a role, with Engineering students and academics more exposed to environmental topics than those in Social Sciences and Economics (Kim *et al.*, 2016).

Psychological factors, such as values and emotions, are significant determinants of CC engagement. Climate anxiety (CA), which involves worry about CC effects disrupting daily life, is linked to climate action despite its negative feelings (Tam *et al.*, 2023; Whitmarsh *et al.*, 2022). This can manifest in environmental activism, including choosing environmental degrees or researching environmental issues (Schwartz *et al.*, 2022). However, CA within higher education has not been thoroughly explored, despite young people being more affected by the climate crisis compared to older generations.

Institutional factors are also crucial. Universities' commitments to climate action through declarations or policies can create a supportive context for staff and student climate action (Young *et al.*, 2015). Increased knowledge of climate emergency declarations and access to climate-related information through university websites boost academics' interest in sustainability and CC (Lozano *et al.*, 2015; Amey *et al.*, 2020; Blasco *et al.*, 2021). This underscores the importance of facilitating access to climate action information and fostering low-carbon norms within universities.

Individual behaviours with high carbon footprints, such as car use and eating ruminant meat, impact student learning, teaching and research related to CC and sustainability. Kim *et al.* (2016) suggest that the number of environmental modules correlates with sustainable transport attitudes in undergraduates. The willingness to teach CC is positively linked to the perception of action possibilities (Vukelić *et al.*, 2022). Similarly, Iqbal *et al.* (2018) affirm a positive relationship between working on sustainability and sustainable behaviour.

2.2 Predictors of personal climate actions

Impactful personal climate actions include avoiding flying and driving and reducing ruminant meat, dairy, material and energy consumption (Ivanova *et al.*, 2020; Wynes and Nicholas, 2017). Wynes and Nicholas (2017) identified four key behaviours with the greatest impact on an individual's greenhouse gas emissions: eating plant-based, avoiding air travel, living car-free and having fewer children. These actions are more impactful than waste behaviours like recycling. This conclusion was drawn from 39 studies, carbon calculators and government sources on lifestyle choices in industrialized countries. Ivanova *et al.* (2020) found similar results in a meta-review. Twenty-five percent of emissions come from food (Poore and Nemecek, 2018) and 30% from transportation (Khan *et al.*, 2020). Dietary changes, particularly going vegan, offer significant carbon reduction, with an average and median mitigation potential of 0.9 and 0.8 tCO2eq/cap, respectively (Ivanova *et al.*, 2020). Ruminant meat (beef and lamb) and dairy are the most emitting foods due to methane emissions from ruminant digestion processes (Mogensen *et al.*, 2020).

Living car-free provides the highest median mitigation effectiveness of any option, at 2.0 tCO2eq/cap (Ivanova *et al.*, 2020). Therefore, this study examines car use and eating ruminant meat, behaviours that can be influenced by CC education (Cordero *et al.*, 2020). However, different factors predict these behaviours (Whitmarsh *et al.*, 2021). Travel behaviours are more often shaped by the built environment and service provision (e.g. urban density, public transport availability and price) than by attitudinal factors like CC concern (Whittle *et al.*, 2019). Consumption behaviours, including food choice, are influenced by social, economic and attitudinal factors (Wolstenholme *et al.*, 2020). Climate concern and anxiety influence certain consumption choices (e.g. avoiding waste; Whitmarsh *et al.*, 2021), but other factors (e.g. price, availability) are stronger predictors (Whitmarsh, 2009).

Relatively little research has explored the relationship between personal and professional behaviours, or the potential causal relationship between them (so-called contextual spillover, whereby changing a behaviour in one context can lead to change in the same behaviour in another context; Littleford *et al.*, 2014). Studies that have looked at equivalent behaviours across contexts show that they are often only weakly related – people who recycle at home are more likely to do so at work but are also strongly influenced by contextual factors specific to each environment that can militate against being consistent across domestic and professional contexts (Whitmarsh *et al.*, 2018). This may be due to motivational or infrastructural differences – one may be more motivated to save energy at home as the economic incentives are greater than at work; or recycling at home may be easier than at work if recycling bins or collections are not provided at work (Nash *et al.*, 2017).

2.3 Present study

Students and staff in universities play crucial roles in sustainability transitions. This study investigates individual and institutional factors shaping climate choices, including personal low-carbon behaviours and academic field preferences, within higher education. The personal and professional behaviours of academics remain under-researched. This study aims to provide a comprehensive understanding of climate engagement among university staff and students.

3. Methods

A Qualtrics online questionnaire surveyed staff and students at a UK university. The instrument was emailed to the university community (n = 20,740), yielding 3,326 usable responses (16% response rate). Data were collected from November 9–30, 2022, with 2,356 respondents completing the measures. The study received ethical approval from the university's psychology ethics committee.

3.1 Participants

The sample broadly represented the university community by gender and role: 42.4% male, 53.8% female, 3.8% other, 62.5% undergraduate students, 13.8% master's students, 11.8% doctoral students, 4.9% early career academics and 7.0% senior academics (Table 1). Staff tenure: 10.5% <1 year, 31.2% 1–5 years, 22.9% 6–10 years, 10.8% 11–15 years and 24.6% >16 years.

3.2 Measures

Academic behaviour or professional climate action (involvement of studies or work with CC and sustainability) involves engaging in climate-conscious behaviours and practices in professional or academic environments. This includes teaching climate topics, researching CC and participating in climate initiatives. We measured professional climate action with the question: "Does your work or studies involve researching or learning about CC or

Table 1. Participants' characteristics from each population

	Students			Academics	
	N	%		*N*	%
School or faculty			*School or faculty*		
Engineering and design	646	19.4	Engineering and design	53	17.7
Humanities and social science	949	28.5	Humanities and social science	107	35.8
Science	837	25.2	Science	112	37.5
School of management	483	14.5	School of management	27	9
Aware climate actions			*Aware climate actions*		
Climate Emergency 2020	1,326	47.5	Climate Emergency 2020	243	66.9
Climate action team	1,822	64.6	Climate action team	295	81.3
Website	975	33.8	Website	182	50.1

Source: Table created by authors

sustainability?" Responses were on a three-point scale: "Yes – this is a *major* part of my course/work" (3), "Yes – this is a *minor* part of my course/work" (2) and "No" (1).

To explore research on CC and sustainability, we asked: *If you conduct research, does it align with a 1.5°C future or projects related to the university's transition to net zero?* with answer options "Yes" (2) and "No" (1). Additional research details were requested through open-ended text input. To explore the inclusion of CC in learning and teaching, we included the item: *To what extent do you think climate action is embedded into the course/teaching that you study?* Climate action features in a number of units and includes links to the sustainable development goals, with answer options "Yes" (2) and "No" (1).

CA motivates individual and academic climate actions. Our investigation examines the link between CA and sustainable behaviours in academia. We assessed CA using a shortened Climate Change Anxiety Scale based on Clayton and Karazsia (2020), comprising three items: *I think, why cannot I handle climate change better?; I have problems balancing my concerns about climate change with the needs of my family; and Thinking about climate change makes it difficult for me to concentrate.* Responses were on a five-point scale from "never" (1) to "almost always" (5), preceded by *Please rate how often the following statements are true of you.* The scale showed good reliability ($\alpha = 0.74$).

Awareness of university climate action measures participants' knowledge of their university's climate efforts and how institutional policies affect individual and academic behaviours. This was assessed with the item: "Before today, were you aware of any of the following? The University Declared a *Climate Emergency in 2020* (CE-2020); The University has a *Climate Action Team* (CAT); and there is a *Climate Action Website* where you can find out more about the Climate Action work taking place at the University". Response options were Aware (2) or Unaware (1).

Personal climate actions were operationalized with two behaviours that have high carbon impacts (Ivanova *et al.*, 2020): *meat consumption and car use*. For the former, we asked: *In a typical week, how many times do you eat the following…* and the response options: …Beef and lamb (1); …other ruminant meat (including pork, bacon, etc.) (2); …white meat (e.g. chicken, turkey) (3); …fish (including shellfish) (4). It was measured as the sum of the frequency of ruminant meat (beef and lamb) consumption in a given week. Car use was measured by asking "In a typical term-time week, how many single journeys do you take to or from the University of Bath by the following modes?" with response options: …Walking or Wheelchair, …Bicycle, …E-scooter, electric bike or mobility scooter, …Motorcycle, … Car (alone), …Car share/pool, … Bus, …Train. Car use was measured as a proportion of all trips. These two individual behaviours are part of this variable that contributes to CC mitigation.

Personal climate actions were measured through two high-carbon impact behaviours: meat consumption and car use (Ivanova *et al.*, 2020). For meat consumption, we asked*: In a typical week, how many times do you eat the following?* with response options for beef and lamb (1), other ruminant meat (2), white meat (3) and fish (4). The frequency of ruminant meat (beef and lamb) consumption was summed. Car use was measured by asking: *In a typical term-time week, how many single journeys do you take to or from the University of Bath by the following modes?* with options for walking, bicycle, e-scooter, motorcycle, car (alone), car share, bus and train. Car use was calculated as a proportion of all trips. These behaviours contribute to CC mitigation.

3.3 Data analysis

We analysed the entire 2022 data set. In Section 4.1, we described CC and sustainability learning and teaching using frequencies and percentages. Conventional qualitative content analysis (Hsieh and Shannon, 2005) was applied to determine the distribution of CC and sustainability research topics, coded with the classification of Leal Filho *et al.* (2018a) using MAXQDA (version 2020). In Section 4.2, chi-squared and Kruskal–Wallis tests determined the groups with the most learning/teaching and research on CC or sustainability across demographic groups. In Section 4.3, correlational analyses explored relationships between all predictors. In Section 4.4, logistic regression analysed predictors of involvement in CC and sustainability studies or work, reporting odds ratios (ORs) and 95% confidence intervals (CIs). The dependent variable was involvement in CC and sustainability-related studies/work. In Section 4.5, the same approach explored predictors of meat consumption and car use as personal climate actions. Jamovi (version 2.3.18.0) was used for statistical analysis.

4. Results

4.1 Learning or teaching and research on climate change and sustainability

Approximately 53.9% of the university is engaged in CC and sustainability studies, teaching and research. Of this, 37.5% have minor involvement, whereas 16.4% have major involvement. Around 20% reported climate action inclusion in their courses and about 20% of researchers aligned their work with a 1.5°C future. A total of 418 open-ended responses were obtained from doctoral students and staff, with 213 responses (47% of doctoral students and 51% of academics) focusing on CC and sustainability. Figure 1 provides additional details.

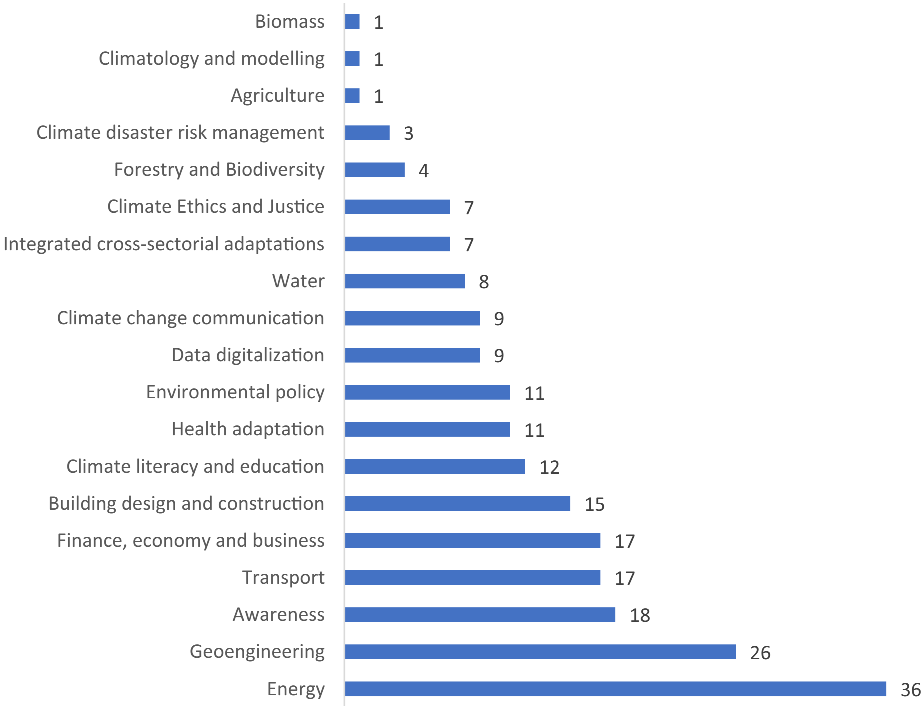
4.2 Participant demographics and the involvement of studies or work with climate change and sustainability

Figure 2 shows research distribution by school or faculty. School or faculty had a significant association with CC research (χ^2 (3, n = 389) = 38.21, $p < 0.001$). The Bonferroni correction revealed that engineering and design students and academics conducted the most research on CC. Figure 2 also indicates a significant association between school/faculty and learning/teaching about climate action (χ^2 (3, n = 3289) = 212.77). The Bonferroni correction showed that CC content was highest in classes taught to engineering and design students and academics.

Table 1 (supplementary material) presents participant demographics and median involvement in CC and sustainability learning/teaching and research. Median scores significantly differed across demographics ($p < 0.01$), except for academic type. Undergraduate students had more involvement in CC and sustainability studies and research (H (2) = 10.23, $p < 0.001$) compared to doctoral students ($p < 0.001$). Science students had lower involvement (H (3) = 618.60, $p < 0.001$) compared to other faculties ($p < 0.001$). Similarly, science academics had lower involvement in teaching and research on CC and sustainability (H (3) = 54.28, $p < 0.001$) compared to engineering and design academics ($p < 0.001$). Academics with over 16 years of experience had less involvement in CC and sustainability research (H (4) = 9.81, $p = 0.04$) than those with one to five years ($p = 0.02$) and 11–15 years ($p = 0.04$).

4.3 Correlational analyses

Correlational analyses revealed several variables related to levels of academic behaviour (major, minor or no involvement in learning/teaching and research on CC and sustainability, Table 2). For students, CA (r_s = 0.16, $p < 0.001$) predicted increased academic behaviour. University responses to CC were also related to increased academic behaviour: awareness of CE-2020 (CE 2020: r_s = 0.13, $p < 0.001$), CAT (r_s = 0.11, $p < 0.001$) and the CAT website



Note: Responses only for doctoral students and staff
Source: Figure created by authors

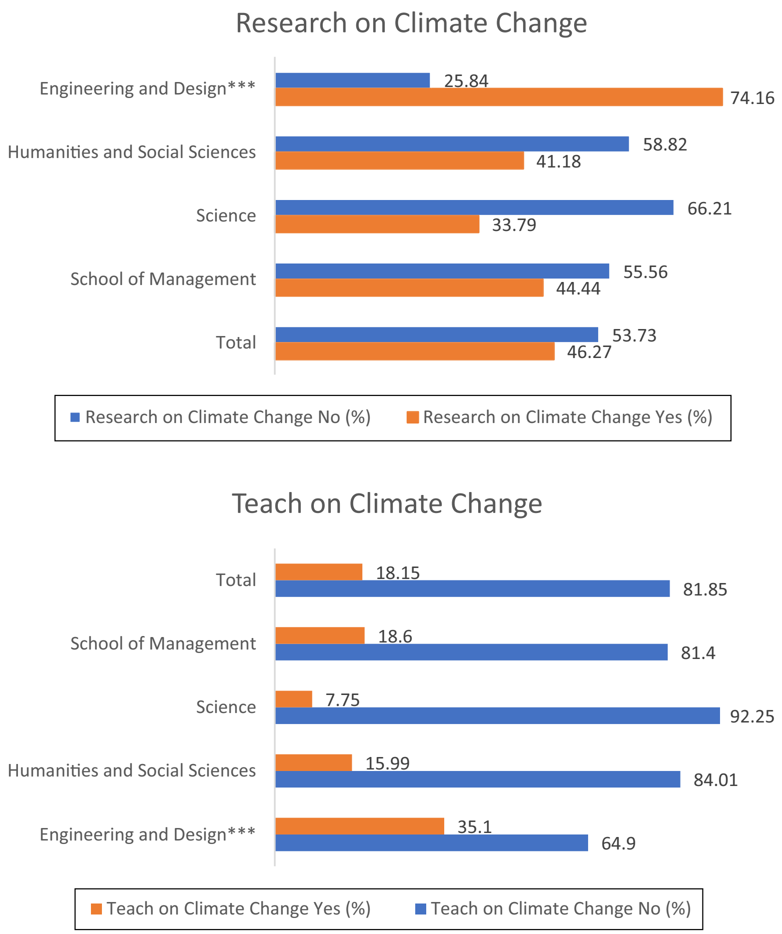
Figure 1. Participants' responses focused on CC and sustainability research (213 responses)

(r_s = 0.13, p < 0.001). High-carbon footprint actions, like using a car alone (r_s = 0.09, p < 0.01), were related to lower levels of involvement in CC and sustainability.

Academics showed similar results; higher CA (r_s = 0.14, p < 0.01) was associated with increased involvement in CC and sustainability teaching and research. University responses to CC, such as awareness of CE-2020 (r_s = 0.14, p < 0.001) and the CAT website (r_s = 0.13, p < 0.001), also predicted increased levels of involvement, except for the CAT (r_s = 0.09, p > 0.05). More personal car use (r_s = −0.10, p < 0.07) was close to being significantly related to academic behaviour.

4.4 Regression analysis: predicting involvement of studies or work and research with climate change and sustainability

Given the greater involvement of several groups in CC and sustainability studies or work and the correlations with this involvement, we conducted a logistic regression to understand the unique contributions of each predictor. The model for students included eight independent variables: student type, school or faculty, CA, CAT, CE 2020, website, car use and meat consumption. The full model was statistically significant (χ^2 (12) = 603.17, p < 0.001), explaining 28% (Nagelkerke R^2) of the variance in academic behaviour.



Notes: *$p < 0.05$; **$p < 0.01$; ***$p < 0.001$
Source: Figure created by authors

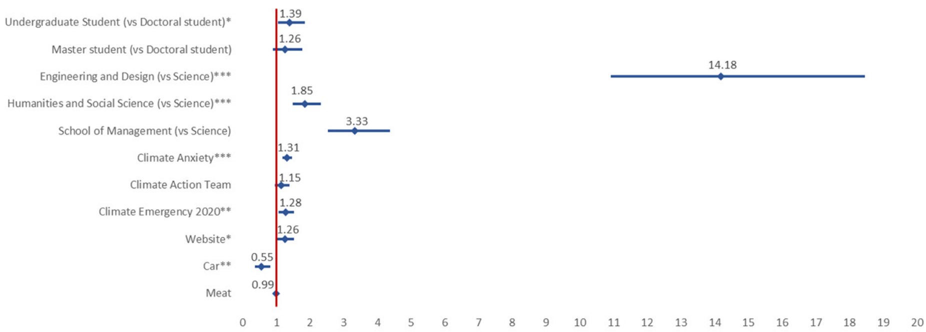
Figure 2. Climate change research and teaching by faculty

Figure 3 shows that only six independent variables made a unique significant contribution to the model. Undergraduate students (*OR* = 1.39, CI95 [1.06–1.84], $p < 0.02$) have the strongest CC and sustainability involvement in their learning and research (39% more likely) compared to doctoral students. Likewise, students with higher involvement in learning and research with CC and sustainability were engineering and design (OR = 14.18 [14 times more likely], CI95 [10.94–18.47], $p < 0.001$), humanities and social sciences (OR = 1.85 [85% more likely], CI95 [1.48–2.32], $p < 0.001$) and school of management (OR = 3.33 [three times more likely], CI95 [2.53–4.48], $p < 0.001$). On the other hand, increased CA (OR = 1.31 [31% more likely], CI95 [1.18–1.46], $p < 0.001$), awareness of CE 2020 (OR =

Table 2. Correlations between different variables

Variable	1	2	3	4	5	6
Students						
1. Academic behaviour	—					
2. Climate anxiety	0.16***	—				
3. CE 2020	0.13***	0.16***	—			
4. CAT	0.11***	0.12***	0.27***	—		
5. Website	0.13***	0.12***	0.25***	0.38***	—	
6. Consumption of meat	−0.01	−0.20***	−0.11***	−0.07**	−0.01**	—
7. Use of car	−0.09**	−0.08***	−0.01	−0.07***	−0.03	0.06**
Academics						
1. Academic behaviour	—					
2. Climate anxiety	0.14**	—				
3. CE 2020	0.14**	−0.02	—			
4. CAT	0.09	−0.04	0.44***	—		
5. Website	0.20***	0.01	0.41***	0.42***	—	
6. Consumption of meat	−0.10	−0.17*	−0.03**	−0.05	−0.07	—
7. Use of car	−0.10	−0.04	−0.08	−0.04*	−0.02	0.21***

Notes: Climate Emergency in 2020 (CE-2020); Climate Action Team (CAT); *$p < 0.05$, **$p < 0.01$; ***$p < 0.001$
Source: Table created by authors



Notes: Nagelkerke R^2 ($R^2 = 0.28$); $X^2(12) = 603.17$; $p = \leq 0.001$; *$p < 0.05$; **$p < 0.01$; ***$p < 0.001$
Source: Figure created by authors

Figure 3. Logistic regression analysis on students of academic behaviour (involvement of studies with climate change and sustainability)

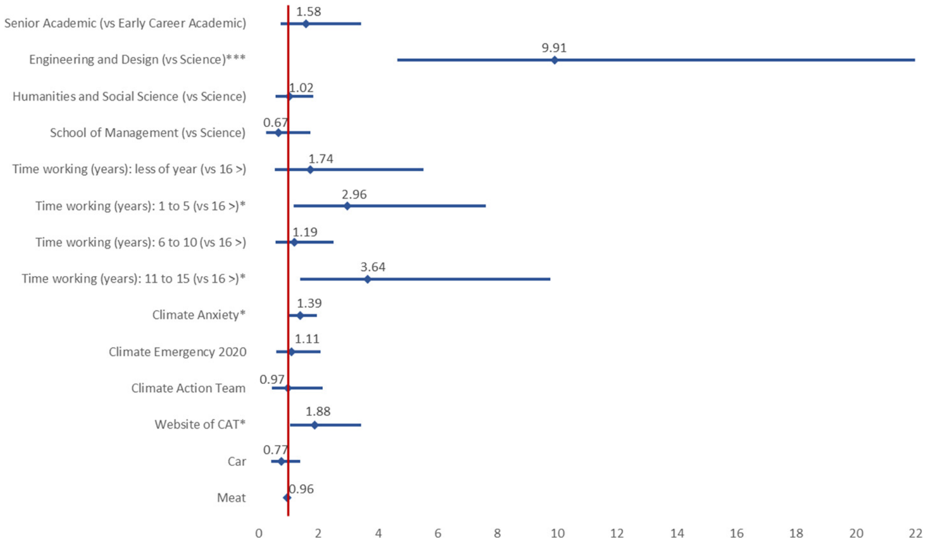
1.28 [28% more likely], CI95 [1.07–1.53], $p < 0.001$), website of CAT (OR = 1.26 [26% more likely], CI95 [1.04–1.53], $p < 0.001$) uniquely predicted increased the involvement of learning and research with CC and sustainability. Interestingly, increased car use (OR = 0.55 [45% more likely], CI95 [0.37–0.82], $p < 0.001$) produces less involvement between CC and sustainability learning and research, but meat consumption did not predict it. Likewise, master's students and awareness of the CAT are not predictors of this involvement.

Similarly, the academic model included nine independent variables: academic type, school or faculty, time working, CA, CAT, CE 2020, website, car use and meat consumption. The full model was statistically significant ($\chi^2(15) = 79.17$, $p < 0.001$), indicating it could distinguish between academics involved in CC and sustainability work (teaching or researching). The model explained 31% (Nagelkerke R^2) of the variance in academic behaviour.

Four independent variables made a significant contribution to the model (Figure 4). The teaching and research on CC and sustainability were more common among academics of engineering and design (OR = 9.91 [nine times more likely], CI95 [4.65–22.11], $p < 0.001$), with one to five years work experience (OR = 2.96 [three times more likely], CI95 [1.17–7.62], $p < 0.05$), or with 11–15 years of experience (OR = 3.64 [close to four times more likely], CI95 [1.40–9.78], $p < 0.001$). Likewise, academics with increased CA (OR = 1.39 [39% more likely], CI95 [1.01–1.94], $p < 0.001$) and awareness of the website of CAT (OR = 1.88 [88% more likely], CI95 [1.04–3.44], $p < 0.001$) are more likely to teach and conduct research on CC and sustainability. However, awareness of CE 2020, awareness of CAT and senior academics do not predict teaching and conducting research on CC and sustainability. The statement also applies to actions with different carbon footprint impacts.

4.5 Regression analysis: predicting personal climate actions (meat consumption and car use)

We conducted four regression analyses to assess the impact of student type, academic behaviour, CE-2020 awareness, CAT and website on car use and meat consumption. The model explained 11% of the variance for students [$F(12, 2177) = 24.28$, $p < 0.001$] and was



Notes: Nagelkerke R^2 ($R^2 = 0.28$), $X^2(12) = 603.17$, $p \leq 0.001$; *$p < 0.05$; **$p < 0.01$; ***$p < 0.001$

Source: Figure created by authors

Figure 4. Logistic regression analysis on academics of academic behaviour (involvement of work with climate change and sustainability)

not significant for academics [F (15, 241) = 1.55, $p = 0.088$] regarding car use, as shown in Tables 2 and 3 of the supplementary material. Four significant predictors were identified on students but only one on academics. Undergraduate ($B = -0.22$, $p < 0.001$) and master students ($B = -0.15$, $p < 0.001$) use the car less than doctoral students. Similarly, social sciences and humanities students ($B = -0.04$, $p < 0.001$) tend to use cars less than science students. Interestingly, an increase in CA ($B = -0.02$, $p = 0.002$) and CC learning and research results in a decrease in car use ($B = -0.04$, $p = 0.008$). Similarly, knowledge of climate action ($B = -0.02$, $p < 0.04$) produces the same effect. On the other hand, according to Table 5, meat consumption ($B = 0.03$, $p < 0.001$) produces an increase in car use in academics.

Similar is the case with the predictors of meat consumption, where the significantly explained variance was 5% [F (12, 2177) = 11.42, $p < 0.001$, $R^2 = 0.06$, $R^2_{adj} = 0.05$] and 11% [F (15, 241) = 3.09, $p < 0.001$, $R^2 = 0.16$, $R^2_{adj} = 0.11$] for students and academics, respectively. Doctoral students ($B = -0.72$, $p = 0.026$) consume less meat compared to undergraduate students (Table 4 of supplementary file). Interestingly, engineering ($B = 1.1$, $p < 0.001$) and management school ($B = 0.88$, $p = 0.012$) students consume more meat than science students. An increase in CA ($B = -1.16$, $p < 0.001$) and awareness of CE 2020 ($B = -0.44$, $p = 0.041$), climate CAT ($B = -0.51$, $p = 0.033$) and its website ($B = -0.90$, $p < 0.001$), leads to a decrease in meat consumption among students. Similarly, for academics, according to Table 5 (supplementary file), a rise in CA ($B = -0.96$, $p = 0.001$), as well CAT ($B = -1.41$, $p = 0.\ 025$) leads to a decrease in meat intake among students. However, awareness of the 2020 CE-2020 ($B = -0.78$, $p = 0.147$) and website of CAT ($B = -0.51$, $p = 0.\ 313$) was not found to be statistically significant, but an increase in car consumption did produce an increase in meat consumption ($B = 1.52$, $p < 0.001$).

5. Discussion

5.1 Summary of findings

This research investigated the determinants of learning/teaching in CC and sustainability at the university level, focusing on students and academics. Over half of the studies, teaching and research focus on CC and sustainability, aligning with Wachholz *et al.* (2014). Content analysis shows that 51% of research projects focus on this topic, with energy and geoengineering being the most researched areas. Similarly, energy is a common topic in university CC studies (Leal Filho *et al.*, 2018b). Chi-square tests indicate that engineering and design faculties prioritize research and climate action content more than other schools. Logistic regression analysis highlights the factors influencing engagement levels in this critical area, emphasizing the need for a holistic approach to promote climate and sustainability involvement in the university community.

Our results indicate stronger undergraduate involvement in CC and sustainability learning/research compared to doctoral students. Similarly, Ayanlade and Jegede (2016) found that 90% of postgraduate participants thought universities should offer CC studies as a major discipline, compared to 70% of undergraduates. This may be because undergraduate programs often include more CC and sustainability courses (Leal Filho *et al.*, 2021). For instance, Orr *et al.* (2020) noted that universities increasingly require undergraduates to complete coursework on environmental issues, leading to greater CC and sustainability knowledge. In addition, most US undergraduates live on-campus for at least 12 months, promoting sustainability awareness (Leal Filho *et al.*, 2018a).

Undergraduates are interested in CCE and universities are adapting their curricula accordingly (Jordan *et al.*, 2023). In contrast, postgraduate education, being more focused on specific topics and less linked to campus life, may present fewer opportunities to pursue CC or sustainability topics.

Our study highlights the importance of academic discipline in determining involvement in CC and sustainability learning and research for both students and academics, with engineering and design being more involved. Engineering students are more likely to address CC in their careers (Kim *et al.*, 2016; Shealy *et al.*, 2021) because institutions have incorporated sustainability into their curricula to meet societal challenges and job market demands (Kolmos *et al.*, 2016). However, our findings contradict Yuan and Zuo (2013), who found that pure science students at a Chinese university have greater sustainability awareness. Leal Filho *et al.* (2023) also reported that research in social sciences and engineering are the largest fields. It is important to recognize that curricula and educational focus vary between institutions and national programmes.

Teaching and researching CC and sustainability vary by academics' experience levels. Academics with 1–5 and 11–15 years of experience are more likely to work on climate-related topics than those with over 16 years. This may be due to recent university actions on CC and sustainability (Cretney and Nissen, 2022; Latter and Capstick, 2021) influencing newer recruits. Mid-career academics (11–15 years) may incorporate climate concerns into their work due to growing awareness of the issue. Chowdhury *et al.* (2021) found that teachers with over 20 years of experience consider teaching CC less important and highly experienced researchers may be less familiar with these debates compared to mid-career educators.

Notably, increased CA significantly predicted higher involvement in CC and sustainability for both students and academics. Although CA includes fear and worry about the planet's future (Whitmarsh *et al.*, 2022), these emotions can also motivate individuals to address climate concerns and support sustainable habits (Tam *et al.*, 2023; Whitmarsh *et al.*, 2022). This motivation can lead to environmental activism and influence teaching and research content on CC in universities. For instance, students may feel more urgency and accountability, driving them to seek opportunities to learn and research CC and sustainability (Tam *et al.*, 2023). Similarly, academics' CA may shape their teaching curricula and research choices, making them CC advocates within their universities. Awareness of the CE-2020 also predicted greater student involvement in CC and sustainability learning and research, as the declaration emphasizes the urgent need to address CC (Cretney and Nissen, 2022).

Moreover, a CE-2020 declaration can influence research focus on sustainability and CC (Latter and Capstick, 2021). The CAT website exemplifies the impact of digital resources in climate education and building a community. University websites offer resources, reports, research findings and educational materials supporting sustainability and CC learning and research (Amey *et al.*, 2020). Blasco *et al.* (2021) show that universities' online presence raises awareness of the SDGs among stakeholders, demonstrating their dedication to these objectives and being influential and persuasive (Cretney and Nissen, 2022).

Surprisingly, students who actively learned and researched CC and sustainability used cars less frequently. This suggests that sustainable transportation practices indicate a person's dedication to combating CC, which might inspire further learning and research on sustainability (Sierra-Barón *et al.*, 2021). Similarly, Kim *et al.* (2016) found that civil engineering students supporting sustainable transportation are more likely to study environmental subjects.

Our exploratory regression indicated that students with better academic behaviour use cars less frequently. Undergraduates and master's students drove less than doctoral students. Similar results were found among individuals with higher CA, CAT awareness and major academic behaviour. Interestingly, students in humanities and social studies tended to use cars more. These results support the idea that academic behaviour motivates effective CC action (Molthan-Hill *et al.*, 2019; Reimers, 2021). Among students, undergraduates show reduced car use (Zhou, 2012, 2016), increased CA (Borek and Bohon, 2008; Melia, 2011), awareness of climate action agents at university (Pedreira Junior *et al.*, 2022) and learning on CC (Cattaneo *et al.*, 2018; Cordero *et al.*, 2020).

On the other hand, meat consumption was related to student type and field of study. Doctoral students eat less meat than undergraduates, potentially due to more frequent use of university canteens (Figueiredo *et al.*, 2021). Menu variety at canteens may influence meat consumption. CA was associated with lower meat consumption, supported by Arnaudova *et al.* (2022) and De Groeve and Bleys (2017). Greater involvement in university environmental actions was also linked to lower meat consumption, consistent with Chang *et al.* (2023), who noted that menu changes, informational messaging, financial incentives and dining area layout affect meat consumption. Learning about CC negatively impacts meat consumption (De Groeve and Bleys, 2017). Interestingly, car use and meat consumption were positively associated among academics.

5.2 Implications for practice

Our study impacts several areas. Firstly, university policies and initiatives must personalize climate education programs, especially in less engaged disciplines like social sciences. Adapting strategies for climate literacy to academic specialties is crucial. Understanding academic behaviour factors can inform effective awareness campaigns, emphasizing early and mid-career academics and university CE-2020 declarations.

Secondly, recognizing the link between high-carbon activities and climate studies is vital for behavioural change interventions. Interventions should target behaviours like driving and dietary choices, contributing to effective sustainability programmes. Acknowledging the impact of career stage on climate engagement and incorporating climate understanding into professional development is essential. This strategy promotes a sustainable culture among staff and students by integrating organizational practices with climate action.

5.3 Theoretical implications

The research underscores the role of individual differences and situational variables in climate psychology, linking CA to academic behaviour and showing that anxiety can motivate long-term sustainable behaviours (Whitmarsh *et al.*, 2022). This insight can inform therapies that harness emotions for positive transformation.

The study also highlights the connection between high-carbon-footprint behaviours and climate participation, emphasizing the need to consider personal and professional contexts in behaviour change campaigns. This helps researchers and policymakers understand the diverse settings influencing sustainable practices.

In addition, the study shows how contextual factors, like academic discipline, affect sustainable practices, aiding in understanding behaviour and informing policies and education.

5.4 Conclusion

In summary, this research illuminates the factors influencing university students' and academics' involvement in CC and sustainability learning, teaching and research. Both groups show that CA is a substantial predictor of involvement, highlighting its importance as a motivator of climate participation. By understanding these factors, universities can create targeted strategies and educational interventions to nurture climate-conscious students and academics, ultimately supporting collective efforts to fight CC and create a sustainable future. Common predictors between students and academics underscore the need for multidisciplinary methods and teamwork in addressing climate concerns at the university level.

5.5 Limitations

The study has limitations. Regarding predictors, we did not use the full CA scale; instead, we used its most representative items due to length constraints. Actions with larger carbon footprints, such as car use, were measured as a proportion of total trips, leading to low correlation values and difficult interpretation. More response options on the Likert scale would have improved our measure of involvement in CC.

The findings may not be generalizable due to the specific institutional context. In addition, result accuracy may be influenced by participants' responses being affected by researchers' expectations or social desirability. Although the study identifies significant predictors, it does not explore the underlying mechanisms through which these factors influence engagement in CC and sustainability learning, teaching and research.

5.6 Future research

These study results warrant further investigation. Future research should explore additional psychological aspects impacting CCE. Although CA was a key predictor, the results suggest a need for more psychological predictors. Investigating self-efficacy, environmental ideals and perceived responsibility can provide insights into motivations for CC action among students and academics. Studying self-efficacy and *locus* of control in the university context could inform how individual actions relate to policy implementation by university managers.

Comparing universities and regions can validate and generalize the findings. Identifying differences and patterns in attitudes and behaviours regarding CC across various institutional environments can be insightful.

Universities aiming to improve environmental sustainability can benefit from feedback on the impact of campus sustainability programmes on academic and student involvement in CC. Investigating the relationship between sustainable practices on campus and climate engagement among students and academics would be valuable.

Ultimately, research is needed to monitor the evolution of CCE and teaching among students and academics.

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Further reading

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Supplementary material

The supplementary material for this article can be found online.

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