

Harnessing Support for Costly Climate Policies: The Impact of Educational Climate Workshops*

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Abstract

Despite widespread concern about climate change, citizens tend to be resistant to policies that entail significant individual costs. What kind of interventions may harness support for costly climate policies? We evaluate the impact of a real-world educational intervention: a standardised three-hour climate policy workshop designed by the French NGO “2tonnes”. We employ randomised control trials in university settings to estimate the effect of workshop participation on support for costly policies related to flying and meat consumption. Preliminary findings from ongoing data collection (comprising 876 respondents from 82 workshops at five universities) suggest that workshop participation increased policy support by 5-11 percentage points. By taking the workshop, participants update their priors about the effectiveness of climate policies. Interestingly, the treatment effect is not lower for participants who would incur higher personal costs. We find no evidence that the increased policy support translated into a more active and engaged support, as measured via commitments to donate to a relevant climate advocacy organisation.

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1 Introduction

To avoid the worst impacts of climate change, urgent action is needed to transition away from fossil fuels and drastically reduce greenhouse gas emissions.¹ Governments must incentivise rapid and profound transformations across all sectors of the economy. One crucial part of this effort is mass-level behavioural change, such as sharp reductions in meat consumption and air travel. Changes like these require what we term costly climate policies: policies that involve concentrated costs, which are highly visible to voters. How can governments harness support for these types of policy? Can educational interventions play a role in expanding citizen support for costly climate policies? An existing literature documents the determinants of public opinion on climate change (Bergquist et al. 2022). A more recent literature considers the impacts of interventions on outcomes such as knowledge or awareness of climate change, or pro-environmental attitudes (Maestre-Andrés, Drews and Van Den Bergh 2019; van Beek et al. 2022). Our study builds on this by examining the impact of a real-world immersive educational experience on participants’ climate policy preferences and their propensity to donate to a relevant climate advocacy NGO. Understanding which types of interventions can increase public support for costly climate policies is a question of vital importance. We know that when voters have negative views about climate policies, this can lead to political backlash (Stokes 2016), which often favours the radical right (Colantone et al. 2024; Voeten 2022). In contrast, achieving broad buy-in from citizens for costly climate policies can help governments achieve the dual goals of satisfying their electorate and implementing the ambitious types of policies needed to urgently and drastically reduce greenhouse gas emissions.

Understanding the impacts of standardised climate workshops is of particular relevance as they become increasingly widely implemented in higher education institutions.² The intervention we study takes the form of a standardised three-hour climate workshop designed by the French NGO “2tonnes”. The workshop is now widely implemented across France and worldwide (via an online version), with more than 200,000 people having participated since the first workshops launched in 2019. Having first started by targeting interested members

¹A Pre-Analysis Plan for this project was registered with OSF. Deviations from the Pre-Analysis Plan are documented in the Appendix Section C.

²For example, the French Ministry for Higher Education set in 2022 the objective that by 2025, all students in their bachelors should have followed a training on the ecological transition (Ministère de l’Enseignement Supérieur et de la Recherche 2022)

of the public, 2tonnes workshops are now also widely taken in French universities, businesses and in the civil service. We conceptualise the experience of this workshop as a treatment which combines a traditional educational component with the experience of a multi-round interactive game which projects participants into future scenarios.

In this paper, we report preliminary results from ongoing data collection. Drawing on data collected from 876 respondents across 82 workshops in five universities, we present evidence that workshop participation increased support for costly climate policies, at least in the short term. Participant support for policies which ban flights to destinations reachable within six hours via public transportation, a tax doubling the price of beef, and a meat-free university canteen increased by a range of 5-11 percentage points. We find evidence supporting our hypothesised mechanism that the workshop leads participants to update their priors about the effectiveness of costly climate policies. We find that the effect of the treatment is not lower for participants who would incur greater personal costs (i.e., consume more red meat or fly more frequently). We find no evidence that the increased policy support translated into a more active and engaged support, as measured via commitments to donate to a relevant climate advocacy NGO. Our design, which incorporates endline surveys taken six weeks after the completion of the workshop, will allow us to eventually report results on the persistence of the observed effects.

Our study contributes to the literature on climate politics and the determinants of support for costly pro-climate policies (Bergquist et al. 2022). Using a novel field experiment, we emphasise the role of distributional concerns in shaping climate policy preferences among a sample of young, well-educated adults. We also add to the literature on interventions that promote pro-environmental behaviour by examining an intervention that combines information intake, gamification, and social comparison (Maestre-Andrés, Drews and Van Den Bergh 2019; van Beek et al. 2022). Our findings highlight the potential of such interventions to boost support for climate policies that are not yet highly politicised, though the intervention appears less effective at fostering pro-climate political behaviour. We also contribute to ongoing debates on how the distributional impacts of climate policies shape political backlash (Colantone et al. 2024; Voeten 2022). We show that participation in a 2tonnes workshop can increase support for pro-climate policies, even among individuals with higher levels of personal costs arising from the proposed policies. This is a significant finding given the widespread political backlash against climate policies in many countries.

2 Costly climate policies

We define costly climate policies as government-implemented measures which aim to stimulate actions or behaviours to mitigate against climate change, whilst carrying significant visible direct costs to the actors involved. We focus on costly climate policies directly levied upon individual behaviours (i.e., beef consumption or air travel), as opposed to those levied directly on industry which may entail indirect costs for consumers, for example via higher prices for goods and services. Recent literature on climate change politics has emphasised the distributional characteristics of climate policies, portraying climate politics as a domestic-level conflict over who bears the costs and who benefits from climate policies (Aklin and Mildenerger 2020; Colgan, Green and Hale 2021). This work considers not only *who* bears the costs of climate policies, but also whether the costs are distributed in a *concentrated* or *diffuse* manner (Meckling and Karplus 2023). Climate policies that have diffuse costs and concentrated benefits (such as subsidies) tend to be among the most popular as they are generally non-coercive and often imply financial benefits (Ejelöv et al. 2022; Steg, Dreijerink and Abrahamse 2006). Indeed, recent years have seen many such policies implemented by various governments (e.g., feed-in-tariff energy policies across Europe and the Inflation Reduction Act in the U.S.). However, to sufficiently reduce greenhouse gas emissions, other types of climate policies are also needed.

We examine climate policies that have concentrated costs but diffuse benefits (e.g., taxes and regulatory bans). These policies are generally much less popular (Drews and Van Den Bergh 2016; Ejelöv and Nilsson 2020), are coercive in nature (Steg, Dreijerink and Abrahamse 2006), entail clear distributional costs (Colgan, Green and Hale 2021), and often generate political backlash (Furceri, Ganslmeier and Ostry 2023). For example, Colantone et al. (2024) demonstrate how a ban on high-emitting cars in Milan led to political backlash against the implementation of social democratic government in the form of increased voting for the far-right Lega. This finding is in line with other work showing that the more impacted a group is by a policy, the more inclined they will be toward backlash (Gaikwad, Genovese and Tingley 2022; Stokes 2016; Voeten 2022). In other words, when a policy entails concentrated costs, those who bear the costs will be highly motivated to oppose the policy. This raises the question of how support for such policies can be built and under what conditions or in which contexts this may occur.

3 Building support for climate policies

What kinds of events, experiences, or interventions can drive support for costly climate policies? Existing literature provides examples of events and interventions which can impact support for climate policies. First, exposure to climate change has the potential to shift people’s preferences for policies to address climate change. The literature on the political effects of direct experiences with extreme weather events has found evidence of such an effect, materialised in an increase in beliefs or concern about climate change (Bergquist and Warshaw 2019; Egan and Mullin 2012) and even pro-environmental voting (Baccini and Leemann 2021; Garside and Zhai 2022; Holub and Schündeln 2023). However, the effects observed in these studies tend to be substantively small, can be moderated by factors such as pre-existing ideology, and tend to fade over time (Hazlett and Mildemberger 2020; Hilbig and Riaz 2024; Howe et al. 2019; Sisco 2021).

Second, information treatments can be a source of change in public opinion on climate change. This intuition underlines calls for more climate education, as exemplified by Article 6 of the United Nations Framework Convention on Climate Change (UNFCCC), which calls upon participating states to promote and facilitate education, training, and public awareness about climate change. Studies have sought to test this intuition empirically. Lack of information on the benefits or rationale behind a policy weakens support, as shown in the case of carbon taxes (Baranzini and Carattini 2017; Maestre-Andrés, Drews and Van Den Bergh 2019). Exposure to scientific consensus on climate change increases belief in human-caused climate change and support for climate action (Lewandowsky, Gignac and Vaughan 2013; van der Linden, Maibach and Leiserowitz 2019). Experiments based on exposure to educational videos or visits to informal science learning centres also report an increase in participants’ engagement in climate change discussion (Geiger, Swim and Fraser 2017). However, too much information provision can lead to “mitigation overload”, as people exposed to a long list of potential actions are less likely to engage in mitigation behaviour (Andrews et al. 2022). Scholars have also found that the source of the information message tends to matter for this effect to hold (Bolsen, Palm and Kingsland 2019), that information provision about policies can have long-term effect (Kawata and Nakabayashi 2023) and that responsiveness to exposure to scientific consensus is higher among conservative publics (Zhang et al. 2018). In addition, interpersonal discussions are found to play a role in increasing the acceptance of climate science, pro-environmental attitudes, and the likelihood of engagement with the

topic (Goldberg et al. 2019; Nordbrandt 2021).

Interventions relying on social influence or social comparison are also deemed to play a role in determining mitigation behaviours, perhaps more effectively than simple educational treatments (Bergquist et al. 2023; Grilli and Curtis 2021). For example, exposure to dynamic norms on sustainable behaviour, i.e. information about how others’ behaviours are changing over time, has been shown to affect behaviour, as demonstrated in experiments on norms about meat consumption (Sparkman and Walton 2017). Combining information exposure with peer interactions, scholars have also explored how serious games affect outcomes related to climate change engagement, including cognitive understanding, emotional investment, and in-game behavioural actions related to climate change (Galeote et al. 2021). These types of science-policy engagement tools help participants envision future scenarios and impacts of climate change (van Beek et al. 2022; Wu and Lee 2015). For example, a study found that a role-playing simulation game reduced the psychological distance of tipping points, making them more “real”, proximate and tangible for participants (van Beek et al. 2022).

Our study on the effect of the 2tonnes educational workshop on policy preferences builds on these findings and contributes to this field in two main ways. First, it focuses on whether this intervention influences a specific outcome, i.e. support for costly climate policies. Second, it takes the form of a bundled treatment, mixing information provision on scientific consensus and on the effectiveness of policies (in terms of reduction of carbon footprints), peer interaction and social influence, cognitive engagement through role play and projection into the future. Our study advances the existing literature by exploring the effect of such a bundled treatment on preference updating towards climate policies.

4 The 2tonnes workshop

Taking its name from indications made by climate models that the average global carbon footprint must be reduced to 2 tonnes of CO₂eq per person in order to meet the goals agreed under the Paris Agreement, the 2tonnes workshop teaches participants about the impacts of individual and collective actions to reduce greenhouse gas emissions.³ The workshop emerged from the context of a large-scale deployment of climate education in France. In

³Recent estimates put the average French carbon footprint at 9 tonnes of CO₂eq per person per year (French Ministry for Ecological Transition and Cohesion of the Territories, 2022).

2020, higher education institutions were given a new legal mission, namely to mainstream climate education in their pedagogical activities.⁴ Since launching in 2019, over 200,000 people have participated in 2tonnes workshops. Starting with members of the public, 2tonnes workshops are now widely taken in French universities, businesses, and in the civil service. The workshop also has an online version and has been translated into other languages to reach an international audience.

The three-hour workshop teaches participants about climate change and the impacts of individual and collective actions to reduce greenhouse gas emissions. We conceptualise this workshop as a treatment with the potential to increase participants' knowledge about the climate crisis and actions that can be taken to reduce greenhouse gas emissions. We understand the workshop as an experience which reduces participants' psychological distance to climate change. This is both because participants spend a full three hours engaging with and learning about the subject, and because the workshop incorporates a dimension of time horizons which projects participants into future scenarios in which the climate crisis intensifies. Compared with other interventions in the existing literature, the 2tonnes workshop constitutes a more complex treatment, bundling together information treatments, group interaction and social comparison, projection into the future, and cognitive engagement.

2tonnes workshops have a standardised format with two distinct steps. First, in the week before the workshop, participants are sent a link to an online tool to calculate their individual carbon footprint. The survey takes around 15 minutes and asks an array of questions about the respondent's lifestyle: the use of transport, home energy use, diet, and the consumption of other goods and services. Immediately after completing the survey, the respondent can visualise their carbon footprint compared to the average French citizen. Participants are encouraged to complete this step before starting the workshop, as it allows them to participate in the workshop game using their own data. Participants who do not calculate their carbon footprint before the workshop still take part in the game but are assigned the carbon footprint of a random character. In the second step, participants take the workshop. The three-hour session consists of an introduction, the simulation game, and a debrief. The introduction takes around 30-40 minutes. The facilitator educates participants on topics related to greenhouse gas emissions and carbon footprints, and participants answer quiz-style questions. Participants learn which activities are the most polluting and how their carbon

⁴Article 41 of Law no. 2020-1674 of December 24, 2020 on research programming for the years 2021 to 2030 and various provisions relating to research and higher education.

footprint compares to the averages of the national and workshop groups. A list of topics covered in the introduction is available in Appendix B.2.

The simulation itself takes around one and a half hours. Participants share the common goal of reducing their individual and group average carbon footprint to less than 2 tonnes of CO₂eq by 2050. The game takes place over eight rounds, alternating between “individual” and “collective” rounds, each taking place three years later than the previous. As each round progresses, participants project themselves further into the future, with climate conditions continually worsening. In each round, participants are given action cards. Actions cost varying amounts of points and players have limited points to spend. More expensive actions require more points. In individual rounds, players make their own decisions based on the actions they feel would be most effective in reducing their individual carbon footprint and on what they feel ready to implement. They may also play “influence” cards that involve raising awareness among friends, colleagues, and family about climate change, or taking political action such as protest, changing to a “green” job, or running as an MP. In the collective rounds, players discuss the options available and reach a consensus on how to spend their points, acting, for example, as members of an inter-ministerial meeting. Various topics are covered during the course of the workshop rounds, including food, transportation, housing, energy production, industry and consumption, and international co-operation. The consequences of policy choices taken during the past collective decision rounds are explained and calculated in the update of the collective and individual carbon footprints.⁵ The workshop ends with a debrief during which participants are asked to share how they feel after taking the workshop, their main takeaways, and one action they would like to implement in their lives going forward. Further information about the workshops can be found in the Appendix Section B.

5 Hypotheses

We hypothesise that the experience of taking the workshop will drive support for costly climate policies.⁶

⁵These calculations are based on the hypotheses of several scenarios, such as ones developed by RTE (Réseau de Transport d’Electricité - France’s Electricity Transportation Network), Ademe (France’s Environmental Agency), négaWatt (an NGO focused on sufficiency, energy efficiency and renewable energy) and Solagro (an NGO focused on the ecological transition in the agricultural sector).

⁶Deviations from the Pre-Analysis Plan are documented in the Appendix.

H1: Taking the 2tonnes workshop makes participants more likely to support costly climate policies.

We identify two key mechanisms through which we expect the 2tonnes workshop experience to influence preferences for costly climate policies amongst participants. First, we consider the role of beliefs about the effectiveness of policies, a factor that has been established as one of the main determinants of policy support. A meta-analysis of 15 different determinants of climate policy preferences, which incorporated 89 data sets from 51 articles in 33 countries for a total sample of nearly 120,000 respondents found that policy-specific beliefs, i.e. perceptions of the effectiveness and fairness of policies, are much stronger predictors of support compared to all other determinants, including socio-demographic factors and general personal orientations of citizens (Bergquist et al. 2022). An individual’s assessment of the effectiveness of a climate policy is primarily dependent on their belief that a given policy can or will fulfil its objective (Ejelöv and Nilsson 2020). If people believe that a policy aimed at addressing the impacts of climate change will have a material effect on reducing emissions or improving biodiversity, they will be much more likely to support the policy. It follows that contexts or information which updates a citizen’s belief in the effectiveness of a policy should lead them to display more positive preferences towards the policy. In our case, the educational element of the workshop places considerable emphasis on which individual-level behaviours disproportionately contribute to climate change, including beef consumption and air travel. Implicit in this is the learning that when individuals collectively reduce such behaviours, there will be a society-wide reduction in CO₂ emissions, which in turn will have positive effects on climate change mitigation. Participants learn about the effectiveness of certain actions in relation to others. During the multi-round game, participants play cards which represent individual actions or policies and are able to see which actions reduce carbon emissions relative to other possible actions. Over the course of multiple rounds, the costs of inaction become more concrete. The treatment thus simultaneously teaches participants which policies are the most effective in reducing carbon emissions and demonstrates this as part of the game. We thus hypothesise:

H1a: The effect in H1 is driven by an increase in the participants’ belief in the effectiveness of the policy.

Second, we consider the role of personal costs. The previously cited meta-analysis by Bergquist et al. (2022) also identifies fairness as an important policy-specific belief that

influences support for climate policies. We can distinguish between at least two types of fairness. On the one hand, perceptions of fairness could concern how individuals perceive the costs or benefits of a policy to them personally. Alternatively, fairness could concern how fair an individual finds the distribution of the policy's costs and benefits across society. We focus on the former, which can be captured by factors relating specifically to the personal situation of an individual. For example, one could suppose that car owners will be more likely to oppose a carbon tax on fuel since it disproportionately affects them. The lens of assessment here is of an individualised nature and focusses specifically on the degree of personal cost entailed in a policy for a given individual. We thus hypothesise:

H1b: The effect in H1 is stronger for participants who would incur lower levels of personal cost from the proposed policy.

We also consider the moderating role of political trust. Ultimately, governments implement policies. Thus, in theory, a citizen's policy preferences should be partially dependent on who is in government and whether they trust that that government will deliver the policy in a way they prefer (Hetherington 1998; Rudolph and Evans 2005). This has been shown to be the case for costly climate policies, with trust in both partial and impartial government institutions predicting policy support (Kulin and Johansson Sevä 2021). A further example of how trust in government increases policy support can be seen in the work of Gazmararian and Tingley (2023), who study climate policy preferences among workers in the US coal country. These workers and their local communities face devastating material consequences from the energy transition and generally display strong opposition to climate policies. Other work shows that some of this opposition can be offset by policies which include compensatory mechanisms and investments in local economies (Bolet, Green and González-Eguino 2024; Gaikwad, Genovese and Tingley 2022). However, as argued by Gazmararian and Tingley (2023), such promises are conditional on the credibility of the government's promises. Such credibility challenges are partially a result of the low levels of trust these citizens have in the government to deliver policies which are both effective in addressing climate change and fair to them and their community. While the case of US coal workers is a very specific example which does not represent the broader dynamics of support for climate policies amongst the general public, it illustrates an important point. Unless governments possess at least some degree of credibility, citizens are unlikely to increase their support for costly climate policies. This should be the case regardless of whether they update their beliefs about the effectiveness

of a policy. A policy may be deemed effective, but if there is insufficient trust in government in the first place, then citizens are unlikely to support it. We thus argue that political trust and credibility play a moderating role in the relationship between taking the 2tonnes workshop and preferences for costly climate policies. We thus hypothesise:

H1c: The effect in H1 is stronger for those who have higher levels of trust in government.

Finally, we hypothesise that the effect observed in H1 could translate into observable behaviour in the form of donations to a related climate advocacy NGO.

H2: Taking the workshop makes participants more likely to donate money to a climate advocacy NGO that campaigns in support of the proposed policies.

6 Design

Between August 2024 and April 2025, we are conducting randomised control trials across 12 French universities, reaching around 2,000 students in approximately 150 workshops. Through a snowball sampling procedure, we recruited participant universities that had already scheduled 2tonnes workshops for their students. Universities implementing 2tonnes workshops typically do so as part of their curriculum, which means that students are required to participate. We collaborate closely with the administrative staff at each university throughout our study, from the randomisation process to the completion of endline surveys. Conducting this research in universities, where attendance at the workshops is a curriculum requirement, helps mitigate self-selection bias, a common issue in workshops conducted for the general public. Furthermore, when university staff actively encourage student participation in our study, these settings help to maintain sufficiently low attrition rates.

Randomisation strategy

The ideal design would involve randomly assigning students to participate in the 2tonnes workshop and comparing outcomes between two groups: one that participates in the workshop and one that does not. However, this approach is difficult to implement, as universities typically integrate the workshop as a mandatory part of their curriculum. Instead, we use

a cluster-randomised trial in which we randomise the timing of survey completion. Due to the collective nature of the workshop, we randomise workshops (rather than individual students) to complete an online survey module at the beginning or end of the session. Figure 1 illustrates our research design, detailing the sequence of events in each university. Students in workshops assigned to the control group complete the survey at the start, while those in the treatment group complete it at the end. Embedding the survey within the workshop and incentivising participation with a €100 lottery help us achieve high response rates.

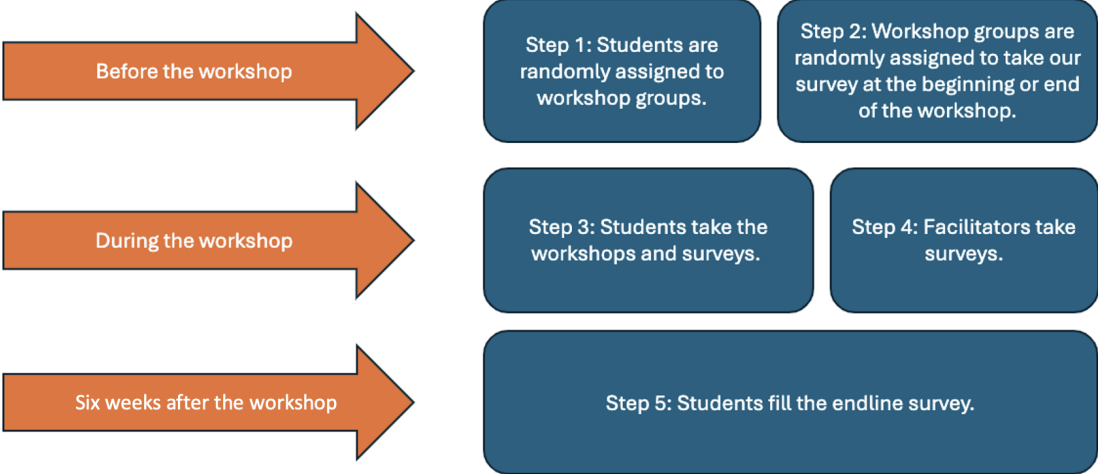


Figure 1. Order of events at each university participating in our full-scale study.

Cluster designs are known for relatively low statistical power, primarily due to information loss from intra-cluster variance. To mitigate this, we randomly assign students within control and treatment workshops, ensuring that individual characteristics are uncorrelated with treatment assignment. When this was not feasible due to administrative and logistical constraints, we used block randomisation based on characteristics we expected to explain variation in outcomes, such as a) prior university curriculum and b) the proportion of female students. To prevent any spillover effects between treated and control groups, we also blocked randomisation based on the time period in which workshops were conducted. For example, if a university held workshops in both the morning and afternoon, we allocated treatment based on time of day, comparing workshops only within the morning or afternoon slots. Additionally, the experiment spans multiple universities across France, and to account for this multi-site structure, we used blocked randomisation at the university level. Our goal

is to collect data from at least 100 workshop groups: 50 in the treatment condition and 50 in the control condition.

The between-subject design presents challenges in assessing randomisation quality, as we did not collect pre-treatment covariates. However, the survey gathers data on variables expected to remain constant across treatment and control groups, allowing us to assess covariate balance based on this information. Table 1 reports the results of the balance test for 21 covariates, covering a range of survey, socioeconomic, and political variables. Overall, the F-test reveals statistically significant differences between the control and treatment samples. Respondents in the treatment group are, on average, less likely to have previously attended a "Climate Fresk" (a different climate workshop) (31% vs. 41% in the control group), more likely to have previously attended a 2tonnes workshop (8% vs. 2%), and less likely to have measured their carbon footprint (80% vs. 86% in the control group). Consequently, we control for these covariates in our analysis.

Measurement strategy

To assess the impact of the workshop on climate policy preferences, we collect data on support for two policies: a tax on beef products and a ban on flights. The choice of these policies is justified on three grounds. First, these are robust climate policies that require substantial state involvement for implementation and a significant commitment to reducing carbon emissions. We therefore anticipate that the average citizen might be opposed to such measures. Second, they target two high-emission sectors using distinct policy instruments: fiscal measures (taxes) and regulatory measures (bans). Third, although these policies have been discussed in the public sphere in France, they are not politically charged, which minimises the likelihood of responses being influenced by partisan cues. In the survey, participants are presented with the following descriptions of the two policies:

- *"Imagine that, to fight climate change, the government decides to limit the consumption of beef. A high tax on beef is put in place, doubling its price."*
- *"Imagine that, to fight climate change, the government decides to limit the use of aeroplanes. A ban on national and international flights for destinations accessible by train or bus within 6 hours is put in place."*

Table 1. Covariate balances for the covariates expected to not be impacted by the workshop

	Control (C)	Treatment (T)	(C) - (T)
Progress	99.62	99.63	0.01
Survey finished	0.98	0.98	0.00
Survey length	2366.37	603.71	-1762.66
Length of the political party section	20.79	20.02	-0.77
Length of the salience section	39.89	36.16	-3.73*
Length of the emotion section	47.72	47.16	-0.56
Length of the political	36.55	34.79	-1.76
Length of the responsibility section	25.49	25.42	-0.07
Length of the lottery section	10.76	10.15	-0.62
Age	20.18	20.16	-0.03
Female	0.41	0.44	0.02
Highest parent's income	3827.44	3681.21	-146.24
Participation in the climate fresque	0.41	0.31	-0.09***
Participation in the 2tonnes workshop	0.02	0.08	0.06***
Carbon footprint measured	0.86	0.80	-0.06*
Political activism index	0.05	0.07	0.02
Environmental activism	0.02	0.01	-0.01 ⁺
Donation to a climate NGO	0.06	0.04	-0.01
Sharing information on climate change	0.16	0.19	0.03
Vegetarian	0.09	0.08	-0.01
Flight consumption	0.22	0.23	0.01
Meat consumption	2.47	2.47	-0.00
Corruption belief	3.43	3.47	0.04

F test: 2.1

Note: *** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$; + $p < 0.1$. The table displays the average of all covariates for the control and treatment group, and the adjusted differences in means.

We also assess support for a hypothetical policy measure which would be implemented at the university level: a meat-free canteen. This is highly relevant to the daily lives of our population of study. Furthermore, with this question, respondents should be more likely to feel that their responses could potentially have real-life implications. We measure policy support and beliefs about the effectiveness of policies as a way to combat climate change on a 5-point Likert scale.

Towards the end of the survey, we include a behavioural outcome that relates to the policy preferences we are testing. This takes the form of a donation-based measure. Towards the end of the survey all respondents are given the option to enter a lottery with a prize draw of €100. If they opt in they have the option to donate a portion of their potential prize winnings to “Réseau Action Climat”, an environmental NGO which does advocacy work on the topics of the policies we ask about earlier in the survey. Respondents will see the following text, followed by a donation slider:

- *"If you win the lottery, would you be willing to donate part or all of your 100 euros to the climate NGO Réseau Action Climat [(Randomise between three options): committed to fighting climate change/ committed to reducing beef consumption/ committed to reducing air travel]? Please indicate the amount of your donation on a slider from 0 (nothing) to 100 (all)."*

The full survey instrument can be found in Appendix A. As shown in Figure 1, we also collect data from workshop facilitators in a separate online survey. The impact of the workshop is likely to be mediated by the quality of the facilitation and how enjoyable the workshop experience was. To verify whether those elements are also balanced between control and treated workshops, we gather information on how the experience levels of the facilitators and dynamics of the workshops. Finally, we conduct an endline survey six weeks after the workshop for all participants, with the objective of evaluating the longevity of any attitudinal changes over time.

Empirical strategy

The randomisation strategy allows us to identify the immediate effect of the workshop on climate policy preferences. Our main estimand of interest is a finite population-student

estimand. More specifically, we are interested in the average treatment effect of the workshop on our target population of students. We use the following estimation strategy:

$$Y_{iju} = \beta_0 + \beta_1 Z_{iju} + \beta_2 X_{iju} + \theta_u + \epsilon_i + \varepsilon_u \quad (1)$$

where i is the individual in the workshop j and university u , Z is a dummy for the treatment indicator, X is the matrix of unbalanced covariates, and Y is the outcome of interest. The unbalanced covariates added in all specifications are past participation in a climate workshop, in a 2tonnes workshop and whether the participant measured their carbon footprint before the workshop. We use a university fixed effect (θ). Because of the group-level treatment, we need to correct the standard errors for such patterns in the data. We use cluster-robust standard errors CR2 to account for the collective nature of the treatment. β_1 is the average treatment effect we are interested in.

It is important to note that the effect may also be confounded by the time of day. Control participants always complete the survey at the start of either the morning or afternoon session, whereas treatment participants complete the survey at the end of these sessions. The covariate balance table indicates no substantial difference in survey completion time between treated and control participants, suggesting that survey fatigue due to time-of-day differences is likely negligible. To address any remaining concerns, we employ two alternative model specifications. First, we will compute a robustness check with the duration of the survey as a control which measures how much attention participants dedicate to the survey. Second, we will also compare how preferences change before the workshop to six weeks later using a within design.

As explained in Section 4, workshop participants are asked to calculate their carbon footprint before the start of the workshop. Due to logistical constraints, we have no way to perfectly isolate the effect of taking the workshop conditional on having calculated a carbon footprint and simply taking the workshop without calculating a carbon footprint (i.e., randomising who calculates their carbon footprint and those who do not). We expect that some number of participants will fail to take their carbon footprint calculation and that these students will be distributed randomly between the treatment and control groups. In the absence of any possibility to randomise or prime participants to take their carbon footprint survey, we will leverage this self-selection into treatment.

Descriptive statistics

Table 2 shows the locations, workshops and student numbers, and attrition rates for the five universities where we have collected data so far. The universities cover a range of study programmes: two of the universities specialise in social sciences, one specialises in aerospace engineering, one in civil aviation, and one in environmental engineering. Table 3 shows the summary statistics of key variables across the students we surveyed. The average age of the students was 20, and 44% of respondents were female. A majority of students had at least one parent earning above the national average income.

Table 2. Descriptive statistics of universities reached as of November 2024

University	Location	Workshops	Students	Missing Observations (%)
UNI1	Paris	12	130	12.00
UNI2	Lyon	19	197	5.00
UNI3	Toulouse	16	168	30.00
UNI5	Toulouse	14	192	10.00
UNI6	Toulouse	21	189	21.00

Table 3. Summary statistics

Variable	N	Mean	Min.	Q1	Q2	Q3	Max.	NA
Age	869	20.23	17.00	19.00	20.00	21.00	27.00	7
Female	871	0.44	0.00	0.00	0.00	1.00	1.00	5
Highest parents' income (in €)	755	3856.23	1550.00	2050.00	2900.00	4150.00	7500.00	121
Childhood spent in rural areas	873	0.46	0.00	0.00	0.50	1.00	1.00	3
Enjoyed the workshop (%)	435	0.82	0.20	0.70	0.80	1.00	1.00	441
Finished the survey (%)	876	0.98	0.00	1.00	1.00	1.00	1.00	0
Length of the survey (min)	876	23.94	1.48	5.88	7.07	8.49	7484.18	0
Support for bans on domestic flights (%)	862	0.70	0.00	0.50	0.75	1.00	1.00	14
Support for beef tax (%)	856	0.52	0.00	0.25	0.50	0.75	1.00	20
Support for ban on meat in canteen (%)	866	0.51	0.00	0.25	0.50	0.75	1.00	10
Effectiveness belief for bans on domestic flights (%)	861	0.75	0.00	0.75	0.75	1.00	1.00	15
Effectiveness belief for beef tax (%)	859	0.61	0.00	0.25	0.75	0.75	1.00	17

Manipulation checks

As shown in Table 3, students tended to have positive experiences during the workshop, with 82% of respondents who took the workshop saying they enjoyed it. In Table 4 we show that students who had taken the workshop were more likely to pass our knowledge check,

which included two questions about the contributing factors to the carbon footprint of the average French citizen. They were also more likely to report positive emotions associated with climate change. In a question asking how respondents feel about climate change, a list of possible emotions was presented, of which they could select two. The positive emotions listed were: "motivated", "optimistic", "hopeful", and "calm". The questions are reported in full in the Appendix Section A.

Table 4. Causal effects of workshop participation on a knowledge check and reporting positive emotions when thinking about climate change

	Knowledge check		Positive emotions	
	(1)	(2)	(3)	(4)
Treatment	0.23*** (0.03)	0.23*** (0.03)	0.07* (0.03)	0.06+ (0.03)
Control Mean	0.50	0.50	0.39	0.39
DV Range	{0, 0.5, 1}		{0, 1}	
Block FE	Yes	Yes	Yes	Yes
Covariates	No	Yes	No	Yes
Estimator	ITT	ITT	ITT	ITT
Adj. R ²	0.12	0.12	0.06	0.06
Num. obs.	865	860	876	871
N Clusters	82	82	82	82

Covariates refer to three variables which were unbalanced between treated and control groups. *** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$; + $p < 0.1$.

7 Results

We present preliminary results for data collected as of November 2024. This includes 876 respondents across 82 workshops in five universities.⁷ To test whether participation in the workshop increases support for costly climate policies, we compare responses from students who completed our survey at the end of the workshop with those who completed it at the beginning. Table 5 main results. As expected, we find that workshop participation substantially increases support for costly climate policies, with an effect size ranging from

⁷This does not include data collected during two pilot studies which is reported separately in Appendix Section D.

5 to 11 percentage points. The policy with the least support in the control group is the meat-free university canteen policy, with an average support level of 0.46. Support for this policy, measured on a 5-point Likert scale standardised to range from 0 to 1, increases by 11 percentage points after workshop participation, reaching an average of 0.57. For the tax which would double the price of beef, the average support in the control group is 0.49. The workshop raises support for this policy by a marginal 5 to 6 percentage points. Finally, a ban on flights for trips where a train or bus alternative exists within six hours garners the highest support in the control group, with an average of 0.66. Workshop participation increases support for this policy by 7 percentage points.

Table 5. Causal effects of workshop participation on support for costly climate policies

	Flight ban		Beef tax		Meat-free canteen	
Treatment	0.07** (0.02)	0.07** (0.03)	0.05* (0.03)	0.06* (0.03)	0.10*** (0.02)	0.11*** (0.02)
Control mean	0.66	0.66	0.49	0.49	0.46	0.46
DV range	[0, 1]					
Block FE	Yes	Yes	Yes	Yes	Yes	Yes
Covariates	No	Yes	No	Yes	No	Yes
Estimator	ITT	ITT	ITT	ITT	ITT	ITT
Adj. R ²	0.12	0.12	0.08	0.08	0.11	0.12
Num. obs.	862	859	856	852	866	862
N Clusters	82	82	82	82	82	82

Note: Results reported using an intent-to-treat (ITT) estimator, experimental block fixed effects, and cluster-robust standard errors at the workshop level. Outcome variables are measured on a 5-level Likert scale, standardised to range from 0 to 1. *** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$.

Given that mediation analyses are susceptible to omitted variable bias, making causal identification of these pathways challenging, we evaluate each mediation pathway as an intermediate outcome using a regression framework similar to the one developed in the previous section. Table 6 shows that participation in the workshop improves beliefs about the effectiveness of costly climate policies, with increases ranging from 8 to 13 percentage points. In the control group, the average belief in the effectiveness of the beef tax was 0.54, and 0.71 for the flight ban. These beliefs, measured on a standardised 5-point Likert scale ranging from 0 to 1, increased by 13 percentage points for the beef tax and by 8 to 9 percentage

points for the flight ban following the workshop.

Table 6. Causal effects of workshop participation on beliefs about policy effectiveness

	Policy effectiveness belief on:			
	Beef tax		Ban on flights	
Treatment	0.13*** (0.02)	0.13*** (0.03)	0.08*** (0.02)	0.09*** (0.02)
Control mean	0.54	0.54	0.71	0.71
DV range	[0, 1]			
Block FE	Yes	Yes	Yes	Yes
Covariates	No	Yes	No	Yes
Estimator	ITT	ITT	ITT	ITT
Adj. R ²	0.09	0.09	0.10	0.10
Num. obs.	859	855	861	857
RMSE	0.28	0.28	0.26	0.26
N Clusters	82	82	82	82

Note: Results use an intent-to-treat estimator, experimental block fixed effects, and cluster-robust standard errors at the workshop level. Outcome variables are measured on a 5-level Likert scale, standardised to range from 0 to 1. *** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$; + $p < 0.1$.

We expect the effect of treatment on support for costly climate policies to vary by its distributional effects. That is, we expect treatment effects to be smaller for individuals who face higher individual costs as a result of the policies. Figure 2 illustrates the distribution of support for the three policies, disaggregated by personal costs and treatment status. Personal costs for the flight ban are measured by the number of flights in the past year within Europe, which is then log-transformed and categorised by quartile. For the beef tax and the meat ban in the canteen, personal costs are defined as the frequency of red meat consumption per week. In the control group, higher personal costs (whether from meat consumption or flying) are associated with lower support for the policies. This trend is particularly pronounced for the meat ban and the beef tax, and less so for the flight ban. The distribution of support by personal costs in the treatment groups shows similar patterns.

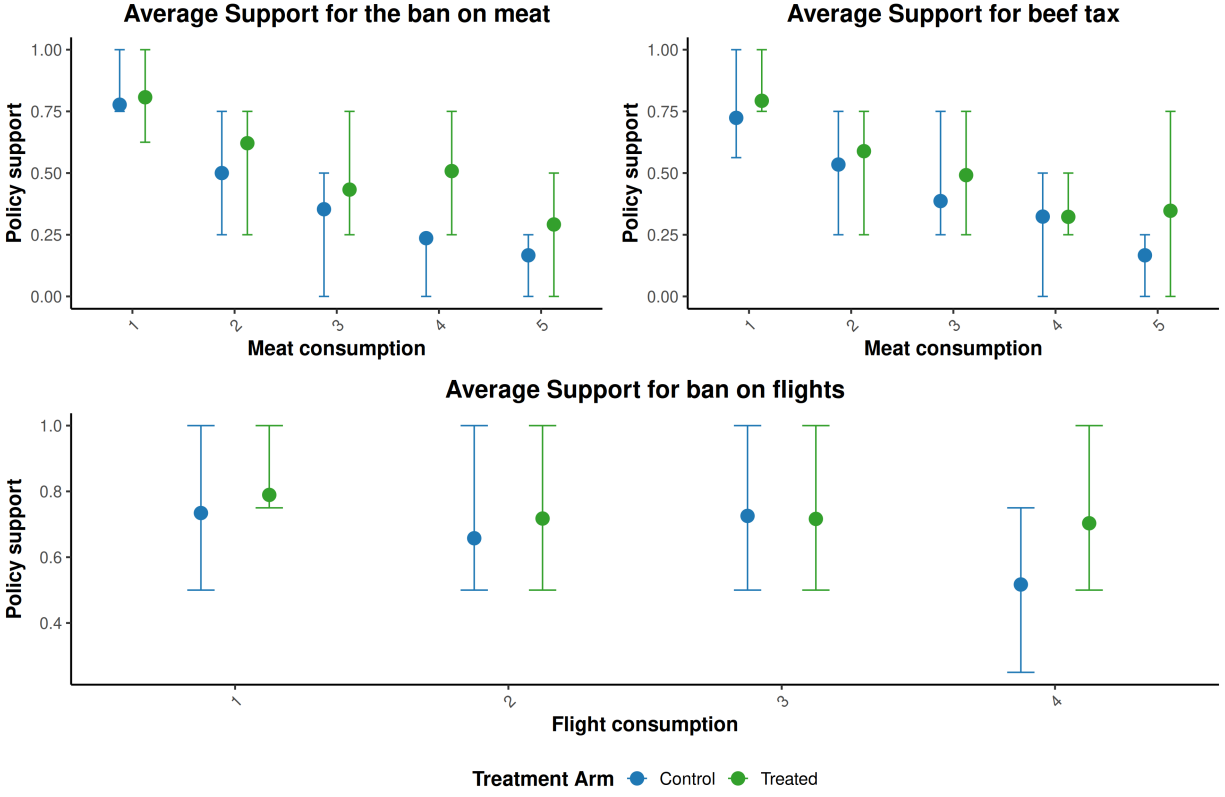


Figure 2. Distribution of support for costly climate policies by personal costs incurred by the policies and treatment status. Dots represent average support and bars the first and third quartile.

Table 7 presents heterogeneous treatment effects for the impact of the workshop on support for costly climate policies, based on participants' individual costs. Contrary to our expectations, the effect of the workshop is not concentrated among participants with the highest costs. In fact, the effect is relatively stronger for individuals with higher costs, particularly when it comes to the flight ban. A one standard deviation increase in flight consumption is associated with a 20 percentage point increase in the workshop effect, although this effect is statistically significant only at the 10% level. We also examine whether the workshop is more impactful for individuals with higher trust in the government, as measured by perceptions of government corruption. Contrary to our expectations, beliefs about corruption are not associated with a weaker treatment effect on support for the flight ban or the beef tax. However, interestingly, we observe a sharp increase in support for the meat ban in the canteen, but only among individuals with high trust in the government, with an increase of about 25 percentage points.

Table 7. Causal effects of 2tonnes workshop participation on support for costly climate policies by personal costs and attitudes towards the government

	Personal costs			Trust in government		
	Ban flights	Beef tax	Ban meat	Ban flights	Beef tax	Ban meat
Treatment	0.02 (0.03)	0.02 (0.08)	0.03 (0.08)	0.04 (0.09)	-0.09 (0.09)	0.25** (0.09)
Personal costs	-0.37*** (0.08)	-0.12*** (0.02)	-0.13*** (0.02)			
Treatment * Personal costs	0.20+ (0.12)	0.02 (0.03)	0.03 (0.03)			
Corruption				0.01 (0.02)	-0.00 (0.02)	0.03+ (0.02)
Treatment * Corruption				0.01 (0.03)	0.04 (0.03)	-0.05+ (0.03)
Adj. R ²	0.14	0.16	0.19	0.11	0.08	0.11
Num. obs.	862	790	800	831	828	835
N Clusters	82	81	81	82	82	82

Note: Outcome variables are measured on a 5-level Likert scale, standardised to range from 0 to 1. *** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$; + $p < 0.1$

We assess whether, beyond changes in stated policy preferences, the workshop influences political action for the environment, as measured by donation behaviour toward a climate NGO. Table 8 shows the effects of participation in the workshop on participants' propensity to donate to Reseau Action Climat, an environmental NGO that advocates for each of the proposed policies we ask about earlier in the survey. When given the opportunity to participate in a lottery to win €100 and then donate part of the prize money, 84% of the participants chose to participate, and of these, the average amount they opted to donate was €34. We find no evidence to suggest that the workshop had an effect on either of these outcomes.

Table 8. Causal effects of participation in the 2tonnes workshop on participation in the lottery and donation for an NGO advocating for the implementation of costly climate policy

	Lottery participation		Donation (in €)	
Treatment	0.03 (0.03)	0.03 (0.03)	-1.53 (2.79)	-1.46 (2.69)
Control mean	0.84	0.84	34	34
DV range	{0, 1}		[0, 100]	
Block FE	Yes	Yes	Yes	Yes
Covariates	No	Yes	No	Yes
Estimator	ITT	ITT	ITT	ITT
Adj. R ²	0.05	0.06	0.05	0.05
Num. obs.	876	871	748	743
N Clusters	82	82	82	82

*** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$; + $p < 0.1$

We also find no evidence that taking the workshop increased respondents’ beliefs that they will be personally impacted by climate change in the next ten years. We also find no evidence to suggest that the workshop increased the salience of climate change or energy issues compared to other political issues.⁸

8 Discussion

This paper presents preliminary results from the ongoing data collection for a study that uses randomised control trials in university settings to assess the impact of a real-world climate workshop on participants’ support for costly climate policies, and their propensity to donate to a relevant climate advocacy NGO. The results show that workshop participation increased support for costly policies aimed at high-emission behaviours by 5–11 percentage points. The workshop increased support for a ban on flights for trips to destinations reachable in six hours by public transport by an average of 7 percentage points. Support for a tax which would double the price of beef increased by 5-6 percentage points. The largest effects were observed for a proposed university-level policy for a meat-free canteen, with workshop participants

⁸These results will be reported in full in the next version of the paper.

11 percentage points more supportive of the proposal. We find evidence supporting our hypothesised mechanism that participants update their priors about the effectiveness of climate policies after taking the workshop.

Our finding that the treatment effect is not lower for participants who would incur greater personal costs (i.e. those who consume more meat, or fly more frequently) suggests that educational interventions such as the 2tonnes workshop may be effective in increasing support for pro-climate policies, even among individuals who would incur higher personal costs. A possible interpretation of this finding is that moral, normative, or collective action framings introduced during the workshop could have mitigated concerns about personal burden, at least in the immediate aftermath of the workshop.⁹

The observed increase in policy support among workshop participants could be interpreted not only as a manifestation of feelings of individual responsibility, but also as a sense of need for collective action. However, the fact that the increased policy support did not appear to translate into a more active and engaged form of support in the form of commitment to donate to a related climate advocacy NGO indicates that the workshop is unlikely to produce strong behavioural effects for the average participant. The fact that the participants who opted into the lottery chose to donate an average of €34 of the €100 euro prize fund indicates that widespread distrust in NGOs or lack of belief in their effectiveness is unlikely to explain the null finding. However, it is possible that the workshop, which primarily emphasises individual and government action, had no effect on participants' views about the role of advocacy work.

When considering how the effects we observe may translate to other types of climate policy, we consider that these policies are highly relevant to the key messages of the workshop and are directly relevant to the population we study. They are also policies for which respondents may not already have pre-formed opinions. In contrast, a policy like a fuel-based carbon tax might be less relevant or tangible to a population with low car ownership and is likely an area where opinions are already established due to extensive public debate.

⁹In the next draft, we will examine qualitative answers from the surveys to support this point.

9 Conclusion

This study demonstrates the potential of structured educational interventions to increase public support for ambitious climate policies, at least in the short term. In the absence of evidence that the workshops lead to behavioural change, as measured through donations to a relevant climate advocacy NGO, we consider the broader relevance of the changes we observe in beliefs about policy effectiveness and policy support. In a political context where backlash against costly climate policies can stymie government action, latent public support remains a relevant consideration even in cases where it does not translate into direct political action.

Our work also bears relevance in the context of a debate about the use of educational climate workshops such as the Climate Fresk and 2tonnes in university settings. Critics have drawn attention to the "depoliticised" nature of the workshops, and it has been argued that they disproportionately focus on individual carbon footprints, whilst failing to adequately address the systemic political and economic forces that hinder significant climate action (?). It has been argued that, by emphasising personal responsibility, these types of widely implemented climate workshops could divert attention from the need for structural changes and broader policy reforms that are necessary to achieve a just and ambitious transition to a low-carbon future. Our finding that the workshops increase support for costly climate policies even amongst participants with higher personal costs provides evidence that workshop participants do, on average, leave the workshops with a greater sense that collective action should be taken. However, the fact that participants' policy preferences do not translate into a more active and engaged form of collective action highlights the potential limits of this effect.

This study opens many possibilities for further avenues of study into the effects of educational interventions related to climate change. For example, future work could examine the impact of group dynamics or study the role of social norms. Future work could also expand the focus of the study to different populations, and even explore the effects of mixing different types of populations (e.g., high-emitting and low-emitting populations) within the same workshops. As greenhouse gas emissions continue to rise and lacking political will is regularly cited as the reason for inadequate climate action on the part of high-emitting countries, questions of how to harness support for costly climate policies are of pressing importance. As initiatives to promote and expand climate education are gaining momentum, our study presents evidence

of the impact such workshops could have on attitudes toward costly climate policies.

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Appendix

A Survey Instrument

We are a team of researchers from the European University Institute in Florence. We would like to know your views on certain environmental issues in France.

Your personal information will be stored separately from your responses to this questionnaire and will not be shared with anyone outside our team. The questionnaire takes approximately 5 to 10 minutes to complete. By answering it, as well as a follow-up questionnaire in a few weeks, you will have the opportunity to enter a lottery to win 100 euros.

The next page contains more details on data confidentiality and protection in the context of this survey and requests your consent.

Privacy Statement and Consent Form

[Omitted.]

Section 1: Demographics

d_age How old are you? [Terminate if under 17]

d_email Please enter your university email address.

d_treatment Is it the beginning or end of your workshop?

d_facilitator What is the name of your facilitator? (Please provide first and last names.)

d_female What is your gender?

d_rural Where did you grow up: in a rural or urban area? (If both, choose where you spent the majority of your time from age 10-18.)

d_income What is the total monthly income of the parent with the highest income after taxes? [Choice from list.]

d_party To which political party do you feel closest? [Choice from list.]

d_salience What do you think are the two most important issues facing France at the

moment? [Crime, economic situation, rising prices/ inflation/ cost of living, taxation, unemployment, terrorism, housing, government debt, immigration, health, education system, pensions, environment and climate change, energy supply, other, none, I don't know]

d_corrupt Please tell whether you agree or disagree with the following? There is corruption in the national public institutions in France.[1-5 Likert scale]

d_meat In the past week, how many times have you eaten red meat?

d_fly In the past year, how many flights have you taken within Europe? (A return flight indicates two separate flights.)

d_psy To what extent do you feel that climate change will affect your life personally in the next 10 years? [1-5 Likert scale]

d_participate Have you taken any of the following workshops before today? [2tonnes, Fresque du Climat, neither]

d_emotion When you think about climate change, what is your reaction? Please choose up to 2 options [Motivated, anxious, optimistic, concerned, indifferent, calm, hopeful, guilty, sad, angry, none of these emotions, I don't know]

d_cf Have you already calculated your carbon footprint using 2tonnes?

activism Have you ever? [Protested, protested for the environment or climate, donated money to an environmental association or organisation, shared content around you to raise awareness about climate and the environment, none of the above]

Section 2: Climate Policies

p_beef A high tax on beef

Imagine that, to combat climate change, the government decides to limit the consumption of beef and dairy products. For this purpose, a high tax on beef products is implemented, doubling the price of beef. Do you agree or disagree with the following statements? (1-5 Likert scale)

- I am in favour of a high tax on beef products.
- A high tax on beef products would be an effective means to combat climate change.

p_flying Ban on flights to destinations accessible by train or bus within 5 hours

In 2023 the French government introduced a ban on any flight between two locations which

could be reached by up to 2.5 hours via train. Now imagine this ban was increased to cover all locations, both domestic and international, which are up to 6 hours away via bus or train.

Do you agree or disagree with the following statements ? (1-5 Likert scale)

- I am in favour of implementing a ban on all flights between locations which are 6 hours apart via bus or train.
- Such a ban on flights would be an effective means to combat climate change.

p_canteen Would you support a ban on meat being served in the canteen of your university?

Section 3: Knowledge

k_car Which of the following contributes the most to the carbon footprint of the average French citizen? [Car usage, meat consumption, airplane travel, heating, use of digital and online services, I don't know]

k_beef What is the estimated contribution of beef consumption to the carbon footprint of the average French person? [3%, 15%, 30%, I don't know]

Section 4: Behavioural Change

b_enough On a scale of 0 (not nearly enough) - 10 (more than enough), are the following actors currently doing enough to address climate change: Individuals, Government, Firms/Private Business.

p_lottery By completing this questionnaire and a follow-up questionnaire, you can enter a lottery to win 100 euros. Would you like to participate? (Results by March 1, 2025)

p_donation If you win the lottery, would you be willing to donate part or all of your 100 euros to the climate NGO Réseau Action Climat [(**Randomise between three options**): **committed to fighting climate change/ committed to reducing beef consumption/ committed to reducing air travel**]? Please indicate the amount of your donation on a slider from 0 (nothing) to 100 (all).



Section 6: Workshop Feedback

w_enjoyed On a scale of 0 (did not enjoy) - 10 (enjoyed a lot), did you enjoy the workshop?
[Treatment only]

w_interview Would you be willing to be contacted in order to participate in a short interview about your experience taking the 2tonnes workshop? [Treatment only]

w_footprint_consent Do you consent to our team receiving your carbon footprint data from 2tonnes?

Section 7: Network Effects [Endline only]

e_network Have you discussed the content of the 2tonnes workshops with: students from other classes? your family? your friends?

B The 2tonnes Workshop

B.1 The Invention of the 2tonnes Workshop

The French Ministry for Higher Education set as objective that by 2025, all students in their bachelors should have followed a training on climate change, biodiversity and the ecological transition (Ministère de l’Enseignement Supérieur et de la Recherche 2022). Alongside these targets, entrepreneurial NGOs designed standardised climate change workshops which educate participants about the science of climate change and the types of changes needed to reduce greenhouse gas emissions to levels required by targets set by the Paris Agreement. Since their beginning in 2018, more than a million people have participated in the “Climate Fresk”, which aims to educate participants about the fundamental science of climate change. Since their launch in 2019, over 200,000 people have taken the “2tonnes” workshop, which take a more policy-oriented approach to the climate crisis, focusing on individual- and societal-level changes needed to transition to a low-carbon society where individual carbon footprints are reduced to 2tonnes of CO₂ equivalent per year by 2050. The 2tonnes workshops are deployed jointly by two organisations, headed by the same founders and CEOs. One organisation is a non-profit association responsible for running free workshops for a large and not predefined audience (“the general public”). The other is a social economy start-up (i.e. simplified joint stock company) which organises workshops in professional settings, i.e. for companies and public authorities.¹⁰ The theory of change behind the 2tonnes workshops centres on the idea that learning about the problem and its solutions can encourage people to change both the way they think about the climate crisis, and how they act to address it.

B.2 Workshop Content

This section gives details of the main questions and points covered during the three-hour 2tonnes workshop.

Part 1: Introduction

1. How have poverty rates changed over time?
2. What is the average life expectancy?
3. How much have global temperatures risen since the last glacial period?

¹⁰See: <https://www.2tonnes.org/a-propos>

4. Are humans responsible for this?
5. What is the Paris Agreement goal? And how does this relate to the concept of “2tonnes”?
6. What are greenhouse gases?
7. What is a carbon footprint?
8. Which are the greatest sources of emissions amongst French citizens?
9. How do carbon footprints vary across countries?
10. How does your footprint compare to the average French citizen? And to others in the workshop group?

Part 2: Simulation Game

Below we summarise the main learning points from each of the rounds of the game. The discussion points can vary according to the composition and topics of discussion of each workshop group. The points summarised here are those given most prominence on the slide deck, thus representing the most likely learning points.

- Round 1: Reduction in red meat consumption has by far the largest impact of any action that can be taken regarding individual food consumption habits.
- Round 2: changing agricultural practices (for example, using less fertiliser) and switches to biogas instead of "natural" gas are impactful policies.
- Round 3: Travelling alone in a combustion engine car is highly emitting, and can reach levels comparable with flying. Car-sharing reduces this. Reducing or stopping flying, investing in an electric vehicle, using public transport and travelling less are effective ways to reduce your carbon footprint.
- Round 4: Investment in vehicle technologies and public transport are effective ways to reduce emissions.
- Round 5: Investing in a heat pump or insulation in your home are effective ways to reduce your carbon footprint. Changing to a green electricity supplied can also be beneficial, although in countries such as France, the energy mix is already low-carbon meaning there are fewer gains to be made here.

- Round 6: Optimising energy in the tertiary sector, investing in the circular economy (using fewer raw materials) and supporting other countries in their energy transitions are beneficial ways to reduce carbon emissions.
- Round 7: If you have not yet become vegan and stopped flying, these are by far the most impactful actions you can take.
- Round 8: The group must choose between developing renewable energies and renewing investment in nuclear power (or opt for both). Radical policies such as import bans on products from high-emitting countries or carbon quotas on individuals are discussed. Participants learn that radical measures can be very effective, but will debate how desirable or feasible such policies are.

Part 3: Debrief

Below are the key points covered during the workshop debrief:

1. Whether the goal of an average of 2tonnes per person is reached depends on decisions made by the participants during the game.
2. Reaching the goal of 2tonnes is an ambitious target. The model used in the game is a simplification of reality, but it shows that significant reductions in greenhouse gas emissions are possible.
3. Action should be taken in all sectors, both at the individual and collective levels.
4. Citizens, governments and firms must all act to create change.
5. The facilitator presents a recap of actions that can be taken to reduce greenhouse gas emissions in the topics covered in the workshop.
6. The group are invited to share reflections on how they feel after taking the workshop, one key thing they have learnt and one action they want to commit to moving forward.
7. The workshop concludes with the message that reaching the goal of 2tonnes is ambitious, but necessary. It is reaffirmed that there are many ways to reach this goal, and the energy transition also presents opportunities.
8. The workshop ends with information about how participants can themselves become a volunteer facilitator.

C Deviation from the Pre-Analysis Plan

In the pre-analysis plan, we included an additional hypothesis related to psychological distance, which stipulated that the workshop would reduce participants' psychological distance to climate change. The variable we used in our survey to capture psychological distance was a question asking "To what extent do you feel that climate change will affect your life personally in the next 10 years?". We now consider that this single variable does not adequately capture the multi-faceted nature of the concept of psychological distance, and have accordingly chosen to remove this hypothesis from the main text. We nonetheless report the relevant results in the main text.

D Pilot Studies

In January - April 2024, we implemented pilot studies at two French universities. The first took place at the INP-Toulouse engineering school, and the second at French campuses of the Kedge Business School. Due to logistical constraints, we were unable to conduct these studies using the design we will use in our full-scale study (see Section 6). Pilot Study 1 uses a within-subject design, relying on baseline and post-treatment data from the same individuals. Pilot Study 2 uses a between-subject design, drawing on comparisons between treatment and control groups. Characteristics of both these designs, which we detail in the sections below, lead us to interpret our findings as preliminary and indicative.

D.1 Pilot Study Designs

D.1.1 Pilot Study 1

This study took place at the Toulouse Graduate School of Chemical, Materials, and Industrial Engineering (INP-ENSIACET). INP-ENSIACET is an engineering school which specialises in chemistry, materials, chemical engineering, process engineering and industrial engineering. Our sample comprises of approximately 230 first-year students at the institute (equivalent to third-year undergraduate of a Bachelors of Science). The cohort is divided into five classes. Each of these five classes share around half of their courses in a commonseminar room. Each class took the 2tonnes workshop on a different day. The five workshop days were held on 12th, 19th, and 23rd January, and 7th and 9th February 2024. Students completed the baseline surveys anywhere from three weeks to several days before the workshop. The endline survey

was answered at the end of the workshop session¹¹. Reflecting the working language of the university, the workshops and surveys were administered in French.

We leverage the panel data structure to implement a within-subject design using a fixed effect estimation strategy estimating the following equation:

$$Y_{it} = \beta_0 + \beta_1 Post_{it} + \theta_i + \omega_{it} \quad (2)$$

with i being individuals and t being the baseline or the endline survey. Y represents one of the outcome of interest, $Post$ is a dummy for whether the workshops happens already or not (0 at baseline and 1 at endline), and β_1 is the parameter of interest estimating the impact of workshop. θ_i represents the individual fixed effects. To account for the collective nature of the treatment and the classroom sites, we cluster standard errors at the classroom level and at the workshop level for robustness check.

The design identifies the causal effect of the workshop under the assumptions of no interference between units and the absence of time-variant unobserved heterogeneity. Spillovers are likely to occur due to the staggered nature of the workshop implementation. However, this is expected to increase baseline support among students who have not yet taken the workshop, thereby reducing our ability to detect the workshop’s effect. In this sense, the approach is conservative. Nevertheless, between the baseline and endline surveys, other courses related to the environment might have influenced changes in climate policy attitudes. Consequently, we interpret the results drawn from Pilot 1 to provide suggestive evidence of the workshop’s causal effect.

Table 9 provides descriptive statistics of the students answering the survey. Among the 230 students who participated in our study, 184 completed the baseline survey. Fifty-eight of these participants also completed the endline survey, and passed the attention checks in both surveys. Our sample included in the analysis has an average age of 20. Fifty percent of respondents reported having a parent with higher income than the French average. Thirty percent grew up in an urban area, and 50% in a rural area. Despite only 3% having said they are an active member of an environmental NGO, around a quarter of respondents reported already being aware of the 2tonnes workshop.

¹¹Additionally, in order to capture long-run effects we attempted to run an additional follow-up survey 2-3 months after the workshops concluded. However, we achieved a very low response rate and thus only report these results in the Appendix C.5. (see also Section 7.3 below)

Table 9. Pilot Study 1: Descriptive statistics for the sample of students who completed the baseline survey

	All	Sample
Number of students	184	58
<i>Baseline characteristics</i>		
Year of birth	2003 (0.60)	2003 (0.59)
Share of female (%)	0.52 (0.50)	0.52 (0.50)
Grew up in rural area (%)	0.37 (0.48)	0.47 (0.50)
Grew up in urban area (%)	0.28 0.45 (0.44)	0.26 (0.44)
Top-earning parent's monthly income (€)	3347 (1515)	3358 (1582)
Already participated in 2tonnes (%)	0.03 (0.18)	0.03 (0.18)
Heard of 2tonnes	0.24 (0.43)	0.21 (0.41)
Active in an environmental NGO (%)	0.05 (0.22)	0.03 (0.18)
Carbon footprint already calculated (%)	0.10 (0.31)	0.12 (0.33)
Carbon footprint perception	-0.31 (0.80)	-0.36 (0.70)
<i>Baseline outcomes</i>		
Climate knowledge (in %)	40.04 (10.62)	42.24 (8.95)
Policy support (in %)	48.60 (24.56)	51.32 (21.75)
Policy effectiveness (in %)	56.61 (23.20)	60.20 (19.50)
Policy fairness (in %)	38.68 (21.78)	41.37 (18.96)
Political activism index	55.56 (20.40)	57.42 (15.33)

Note: These statistics cover all students (second column) and the sub-sample of those who completed the endline survey and passed the attention checks in both surveys (third column). We include statistics for socio-demographic characteristics and outcome variables at baseline.

D.1.2 Pilot Study 2

The study took place on 16th January 2024 at the Paris, Marseilles, and Bordeaux campuses of Kedge Business School, a private international business school. Students in our sample are final-year masters students enrolled in courses including international business, global supply chain management, banking and finance, marketing, logistics, entrepreneurship and data analytics. The students can be considered to represent an international elite. From our sample of 206 respondents, over half of the students are international and amongst them almost 40 nationalities are represented.¹² Reflecting the main working language of the university, both the 2tonnes workshops and our surveys were administered in English.

The university administrative staff allocated students to workshops either in the morning or in the afternoon based on alphabetical order, creating a quasi-experimental variation. We leveraged this opportunity to compare morning and afternoon groups. Students attending the morning workshops took our online survey at the end of the workshop (treated group), while students attending the afternoon workshops filled out the survey at the beginning of their workshop (untreated group). To estimate the effect of the workshop, we use a between-subject design using the following equation:

$$Y_{ics} = \beta_0 + \beta_1 \text{Morning}_{ics} + \beta_2 X_{ics} + \theta_c + \epsilon_s + \omega_{it} \quad (3)$$

Y_{ics} represents the outcome of interest for student i at campus c in specialisation s , Morning is a dummy variable indicating whether the student participated in the workshop in the morning or in the afternoon, β_1 is the parameter of interest estimating the effect of the workshop, X_{ics} is a matrix of control variables, θ_c is the campus fixed effect, and ϵ_s is the specialisation fixed effect. We use cluster standard errors at the workshop and campus levels.

From the 450 students who should have participated in the workshop (the workshop was compulsory), we collected data from 206 students across 27 workshops, all of which took place on one day across three different campuses. Assuming the randomisation procedure conducted by the university was effective, the design identifies the causal effect of the workshop. However, attrition rates were significantly unbalanced between the treated and control groups. Table 2 displays descriptive statistics of the treated and control groups. More than half of the students in the afternoon workshop (untreated group) did not participate in

¹²Within the French context, where annual fees for master’s programmes at public universities tend to be around €250 per year, Kedge Business School can be considered an expensive private university. Fees for master’s students are currently €17,400 per year, although scholarships and other forms of financial aid are available for international students.

the workshop. As a consequence, only 76 students took the survey, compared to a quarter of the students in the morning workshop with 130 students taking the survey (treated group). Due to this discrepancy in attrition rates, the groups are not comparable between the morning and afternoon workshops (treated and untreated groups). To mitigate concerns of unobserved heterogeneity, we account for and control for gender, age, and self-reported attendance of climate marches. Students in our sample were on average 24 years old, with slightly a higher share of women compared to men (around 52%). Treated students were on average more likely to report having participated in a climate march (17%, compared with 9% in the control group).

	Untreated (C)	Treated (T)	T-C
Number of students	76	130	–
<i>In Bordeaux campus</i>	38	50	–
<i>In Marseille campus</i>	26	51	–
<i>In Paris campus</i>	12	29	–
Non-French citizens (in %)	0.539	0.569	0.03
Female (in %)	0.461	0.546	0.09
Already participated in 2tonnes (in %)	0.013	0.000	–0.01
Climate strike participation (in %)	0.092	0.162	0.07
Year of birth	1999.355	1998.962	–0.39

Table 10. Pilot Study 2: Descriptive statistics for the sample of students who completed survey and passed the attention check. These statistics cover the untreated group (students who participated in the afternoon workshop, filling the survey at the start of the workshop), and the treated group (who were in the morning session and responded to our survey after the workshop). We include statistics for socio-demographic characteristics.

D.1.3 Manipulation checks

We determined whether the workshops were delivered as expected to the students along two dimensions. The first dimension is information uptake. Table 3 presents the results of the manipulation checks. We measured how much knowledge the students gained from the workshop using three questions covering various aspects of carbon footprints. In Pilot Study 1, after the workshop, students scored on average 8 percentage points higher on the knowledge questions. In Pilot Study 2, students scored on average 28 percentage points higher on the knowledge questions after the workshop. Overall, the workshop increased knowledge and information uptake among participants. The wide differences in effect size between the two studies can be attributed to the differences in the choice of knowledge questions we asked. The knowledge questions were adjusted in Pilot Study 2 after identifying pitfalls in the choice and wording of questions in Pilot Study 1. The questions used can be found in Appendix Section D.3.1.

Table 11. Workshop impact on knowledge uptake and emotions

	Pilot 1			Pilot 2		
	Within design			Between design		
	Knowledge	Hope	Concern	Knowledge	Hope	Concern
Post	7.18*** (0.66)	0.38** (0.08)	0.05+ (0.02)	27.88* (5.354)	-0.00 (0.0548)	0.03 (0.0529)
Baseline mean	42.2	0.14	0.78	51.3	0.17	0.81
DV range	[0, 100]	[0, 1]	[0, 1]	[0, 100]	[0, 1]	[0, 1]
Control	No	No	No	Yes	Yes	Yes
Classroom cluster SE	Yes	Yes	Yes	Yes	Yes	Yes
Individuals FE	Yes	Yes	Yes	No	No	No
Observations	116	116	116	206	206	206
R ²	0.62	0.70	0.84	0.24	0.11	0.09
Within R ²	0.37	0.35	0.12			

*Signif. Codes: ***: 0.001, **: 0.01, *: 0.05, +: 0.1*

The second dimension is based on the reported emotions after the workshop when thinking about climate change. The workshop aims to provide a positive immersion into how individual and collective actions can effectively reduce one’s carbon footprint, typically leading to positive feelings of empowerment after the workshop. In Pilot Study 1, there was a 40 percentage point increase in associating climate change with hope after the workshop. How-

ever, in Pilot Study 2, we did not observe such an emotional pattern. This suggests that the workshop experience was different in Pilot Study 2, possibly because the workshop was delivered in English and mostly facilitated by French students, which may have decreased the impact of the workshop.

D.2 Pilot Study Results

D.2.1 Support for costly climate policies

The following tables present the results from our pilot studies, which, due to design characteristics discussed in the previous section, we interpret as indicative evidence. Table 4 shows the impact of the workshops on support for costly climate policies. In Pilot Study 1, we asked respondents about their support for three different policies: (a) a ban on combustion engine cars, (b) a carbon tax with uniform redistribution across households, and (c) a tax on beef products. We also created an index of overall change in support for these three policies. In Pilot Study 2, due to limitations on the length of our survey, we only asked respondents about their support for carbon taxes. Full wording of the survey questions can be found in Appendix D.3.2. We measured policy support on a Likert scale (1-5), and used a linear transformation to render the range of possible values from 0-1.

Table 4 shows the impact of workshop participation on support for costly climate policies. In Pilot 1, when using the overall policy index, students answering the survey at endline report a 7.9 percentage point increase in policy support, from 51.7% at baseline to almost 60% at the endline. The results are statistically significant at the 5% level. However, this significant change is driven solely by a change in policy support for the beef tax. At baseline for the beef tax, students' average levels of support were at 44.6%. At the endline, just after taking the workshop, support for the policy increased by 18.5 percentage points, resulting in an average support level of 63.1%. The results are statistically significant at the 1% level. However, the workshop does not seem to produce any effect on changes in support for the ban on combustion engine cars or carbon taxes. The null result for the carbon tax policy is corroborated by Study 2, where the policy question focused solely on carbon taxes. Overall, the results suggest that our treatment may increase support for only a subset of costly climate policies, partially corroborating Hypothesis 1.

Table 12. Workshop impact on support for costly climate policies

Policy support	Index (%)	Pilot 1			Pilot 2
		Within design		Beef Tax	Between design Carbon Tax
Post	7.90* (1.761)	0.043 (0.038)	0.004 (0.051)	0.185** (0.0295)	-0.029 (0.054)
Baseline mean	51.7	0.504	0.599	0.446	0.603
DV range	[0, 100]	[0, 1]	[0, 1]	[0, 1]	[0, 1]
Control	No	No	No	No	Yes
Classroom cluster SE	Yes	Yes	Yes	Yes	Yes
Individual FE	Yes	Yes	Yes	Yes	No
Observations	115	116	115	116	189
R ²	0.83	0.82	0.69	0.85	0.14
Within R ²	0.16	0.03	0.00	0.39	

Signif. Codes: ***: 0.001, **: 0.01, *: 0.05, +: 0.1. In Pilot 1, respondents were asked about their support for policies banning the sale of combustion engine by 2030, implementing a carbon tax with uniform redistribution across households, and a tax on beef products. In Pilot study 2, we only gather attitudes about carbon taxes with redistribution. All attitudes were measure using a 5-point Likert scale and transformed into a measure ranging from 0-1.

D.2.2 Perceptions of the effectiveness of costly climate policies

We expect the change in support for climate policies to be driven by a change in the perception of the effectiveness of the policies, as underlined in Hypothesis 1a. Table 5 shows the impact of the workshops on participants' perceptions of effectiveness of the climate policies in Table 4. As with the policy support questions detailed in the previous section, we measured perceptions of effectiveness on a Likert scale (1-5) and used a linear transformation to render the range of possible values from 0-1.

Table 13. Workshop impact on perceptions of effectiveness for costly climate policies

Effectiveness	Index (%)	Pilot 1			Pilot 2
		Within design		Beef Tax	Between design Carbon Tax
Post	17.98** (3.47)	0.138* (0.03)	0.207* (0.05)	0.189* (0.04)	-0.008 (0.04)
Baseline mean	60.2	0.642	0.569	0.595	0.608
DV range	[0, 100]	[0, 1]	[0, 1]	[0, 1]	[0, 1]
Control	No	No	No	No	Yes
Classroom cluster SE	Yes	Yes	Yes	Yes	Yes
Individual FE	Yes	Yes	Yes	Yes	Yes
Observations	115	116	116	115	193
R ²	0.70	0.61	0.62	0.78	0.13
Within R ²	0.42	0.16	0.27	0.34	0.03

Signif. Codes: ***: 0.001, **: 0.01, *: 0.05, +: 0.1. In Pilot 1, respondents were asked about the effectiveness of policies banning the sale of combustion engine by 2030, implementing a carbon tax with uniform redistribution across households, and a tax on beef products. In Pilot study 2, we only gather attitudes about carbon taxes with redistribution. All attitudes were measure using a 5-point Likert scale transformed into a 0 to 1 measure.

Table 5 shows that participants in Pilot 1 increased their perceptions of effectiveness across all three climate policies. When using the overall policy index, students answering the survey at endline reported an 18 percentage point increase in the perceived effectiveness of the three policies, from 60% at baseline to almost 80% at endline. The results are statistically significant at the 1% level. Unlike the change in support, the change in perception occurred at relatively similar levels across all policies. At baseline, the average effectiveness perception for the ban on combustion engine cars was 64%. At endline (just after taking the workshop) this perception increased by 14 percentage points, resulting in an average perception level of 78%. For carbon taxes and the tax on beef, effectiveness perception increased by 20 and

19 percentage points respectively. All specific policy changes in perception are statistically significant at the 5% level. However, in Pilot 2, the workshop does not seem to produce any effect on the perceived effectiveness of carbon taxes. One hypothesis for the drastic difference in effect size between the two pilots is that in Pilot 2, the workshop was delivered in English, and as indicated by the manipulation check shared in the previous section, the workshop seemed to generate less enthusiasm. This could have hindered changes in beliefs about the policies.

For Pilot Study 1, we have baseline data on effectiveness beliefs. To assess whether the increase in support caused by the workshop is mediated by updates in effectiveness perceptions, we divided the sample by baseline effectiveness belief (low and high) and investigated whether the workshop had a similar effect on policy support. The results are displayed in Appendix D.2.5. Overall, the results suggest that support for climate policies increases mostly for students who had low effectiveness beliefs at baseline, corroborating the hypothesis. Nevertheless, this pattern could also be explained by the high correlation between baseline support and effectiveness beliefs. Results of the impact of the workshop on the perceived fairness of the policies are displayed in Appendix D.2.6. These results present no evidence for a change in fairness perceptions.

D.2.3 Persistence of effects in Pilot Study 1

In Pilot Study 1, we were able to trace eight students at baseline, endline, and the additional follow-up (2-3 months after the workshop). Appendix D.2.9 displays the graphical results. Using a scatter plot, we report the average of their answers for knowledge, feelings of hope, and the overall policy index, as well as the beef policy, which generated the most significant changes. We observe a similar proportion of students reporting feelings of hope when thinking about climate change. The knowledge level also remains consistent between the endline and additional follow-up surveys. We see a reduction in the level of support and effectiveness belief from the endline (just after the workshop) to the follow-up (2-3 months later). However levels of support and effectiveness beliefs remain higher 2-3 months after our intervention than at the baseline levels.

D.2.4 Stated behavioural change and other attitudinal changes

Our pilot surveys encompass a wider range of individual-level outcomes. We asked questions about who holds the greatest responsibility for reducing the national carbon footprint, interest in politics, voting behaviour, joining climate strikes, and refusing a paid internship at a polluting company. Appendix D.2.7 displays the results.

Across the two pilot studies, we observe two patterns. First, after the workshop, students are less likely to state that companies hold the greatest responsibility for reducing carbon footprints, with an average effect size of 10% in both pilot studies. This effect is statistically significant at the 5% level in Pilot Study 2 and at the 10% level in Pilot Study 1. Instead, students seem to attribute more responsibility to individual citizens, with a similar level of change around 10 percentage points, although none of these results are statistically significant. We also find that across the pilot studies, students report being more interested in politics after the workshop. The effect size is about 5 percentage points, statistically significant at the 5% level in Pilot Study 2 and at the 10% level in Pilot Study 1. We do not find any significant change in stated political behaviour, either for joining a climate strike or voting in national elections. However, in Pilot Study 2, students in the treated group are more likely to state they would refuse a paid internship at a polluting company, with an effect size of 5%, statistically significant at the 5% level.

D.2.5 Heterogeneous effect of the workshop on climate policies' support based on baseline effectiveness perception level

Table 14. Heterogeneous effect of the workshop on climate policies' support based on baseline effectiveness perception level

<i>Baseline Effectiveness level</i>	Car ban		Carbon tax		Beef tax	
	Low	High	Low	High	Low	High
Post	0.08 (0.0616)	0.02 (0.0271)	0.13** (0.0257)	-0.11+ (0.0525)	0.21** (0.0424)	0.17+ (0.0716)
Baseline support	0.41	0.56	0.46	0.73	0.26	0.57
Classroom SE	Yes	Yes	Yes	Yes	Yes	Yes
Individual FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	46	70	57	58	50	66
R ²	0.75	0.85	0.82	0.60	0.80	0.80
Within R ²	0.09	0.01	0.22	0.10	0.45	0.35

*Signif. Codes: ***: 0.001, **: 0.01, *: 0.05, +: 0.1*

D.2.6 Impact of the workshop on fairness perception

Table 15. Workshop impact on perceptions of fairness for costly climate policies

Fairness	Index (%)	Pilot 1		Pilot 2	
		Within design		Between design	
		Car ban	Carbon tax	Beef tax	Carbon tax
Post	3.13 (2.23)	-0.009 (0.034)	0.013 (0.038)	0.092 ⁺ (0.038)	-0.023 (0.047)
Baseline mean	41.4	0.38	0.48	0.37	0.60
DV range	[0, 100]	[0, 1]	[0, 1]	[0, 1]	[0, 1]
Control	No	No	No	No	Yes
Classroom cluster SE	Yes	Yes	Yes	Yes	Yes
Individual FE	Yes	Yes	Yes	Yes	Yes
Observations	114	115	115	115	194
R ²	0.87	0.80	0.72	0.84	0.13
Within R ²	0.04	0.001	0.002	0.15	0.06

Signif. Codes: ***: 0.001, **: 0.01, *: 0.05, +: 0.1

D.2.7 Other attitudinal and stated behavioural changes

Pilot Study 1

Table 16. Workshop impact on political interest, vote, participation in a climate strike and refusing internship for polluting companies

	Pilot 1			
	Within design			
	Political Interest	Vote	Climate Strike	Refuse Internship
Post	0.065 ⁺ (0.029)	-0.017 (0.019)	0.046 (0.055)	0.035 (0.038)
Baseline mean	0.496	0.931	0.296	0.121
DV range	[0, 1]	[0, 1]	[0, 1]	[0, 1]
Control	No	No	No	No
Classroom cluster SE	Yes	Yes	Yes	Yes
Individual FE	Yes	Yes	Yes	Yes
Observations	116	116	116	116
R ²	0.84	0.94	0.76	0.71
Within R ²	0.08	0.017	0.03	0.01

*Signif. Codes: ***: 0.001, **: 0.01, *: 0.05, +: 0.1*

Pilot Study 2

Table 17. Workshop impact on political interest, vote, participation in a climate strike and refusing internship for polluting companies

	Pilot 2			
	Between design			
	Political Interest	Vote	Climate Strike	Refuse Internship
Treated	0.052* (0.008)	0.038 (0.040)	-0.055 (0.027)	0.045* (0.009)
Baseline mean	0.447	0.889	0.530	0.378
DV range	[0, 1]	[0, 1]	[0, 1]	[0, 1]
Control	Yes	Yes	Yes	Yes
Classroom cluster SE	Yes	Yes	Yes	Yes
Campus FE	Yes	Yes	Yes	Yes
Master FE	Yes	Yes	Yes	Yes
Observations	203	183	202	185
R ²	0.10	0.07	0.19	0.14
Within R ²	0.05	0.02	0.10	0.04

*Signif. Codes: ***: 0.001, **: 0.01, *: 0.05, +: 0.1*

D.2.8 Perceptions of responsibility

We asked respondents which actor they think holds the primary responsibility for addressing climate change: citizens, governments or businesses. The question wording in Pilot 1 (translated from French) was: “Which of the following entities do you think should take priority action to combat climate change in your country? (private companies / government /citizens)”. In Pilot 2, the question asked was “In your opinion, which of the following actors hold the primary responsibility for reducing greenhouse gas emissions in France? (individuals /governments /businesses /I don’t have an opinion)”. Due to the lack of variation in respondents’ statements that governments hold primary responsibility for reducing carbon footprints, we could not estimate the model with individual fixed effects.

Table 18. Workshop impact on individuals' perceptions of who holds greatest responsibility to address climate change

	Pilot 1		Pilot 2	
	Within design		Between design	
	Citizens	Firms	Citizens	Firms
Post	0.10 (0.06)	-0.10 ⁺ (0.04)	0.11 (0.06)	-0.10* (0.02)
Baseline mean	0.138	0.207	0.28	0.36
DV range	[0, 1]	[0, 1]	[0, 1]	[0, 1]
Control	No	No	Yes	Yes
Classroom cluster SE	Yes	Yes	Yes	Yes
Individual FE	Yes	Yes	No	No
Observations	116	116	206	206
R ²	0.74	0.56	0.12	0.07
Within R ²	0.06	0.04	0.09	0.02

*Signif. Codes: ***: 0.001, **: 0.01, *: 0.05, +: 0.1*

D.2.9 Long-term effects in Pilot Study 1

We were able to trace eight individuals through the baseline, endline, and follow-up survey of Pilot Study 1. We report the means of their responses in the following scatter plots.

Policy outcomes

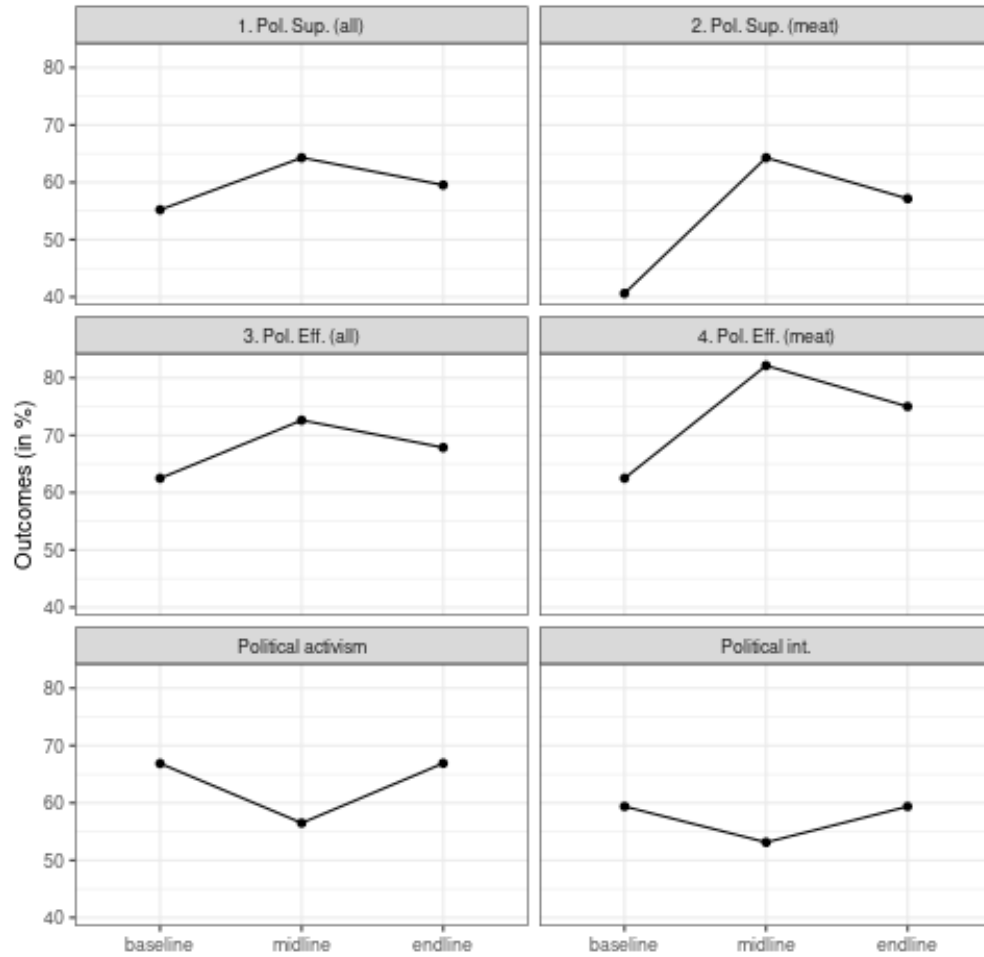


Figure 3. Scatter plot of the average outcomes at baseline, midline (just after the workshop), and endline (2-3 months later) for the eight students we were able to trace along all three surveys.

Other outcomes

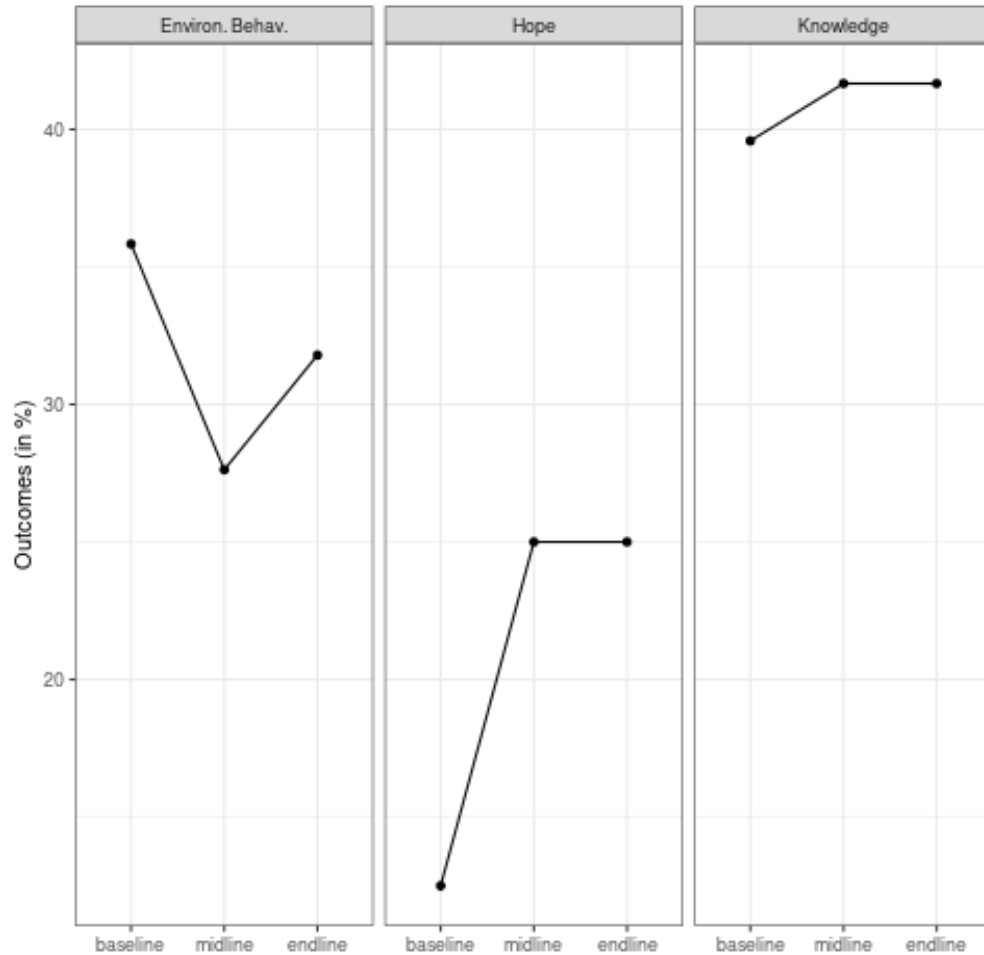


Figure 4. Scatter plot of the average outcomes at baseline, midline (just after the workshop), and endline (2-3 months later) for the eight students we were able to trace along all three surveys.

D.3 Selected Pilot Study Survey Questions

This section gives the full text of select policy questions asked in the pilot studies. English translations are given for questions from Pilot Study 1, which was conducted in French.

D.3.1 Knowledge

Pilot Study 1

1. In the average lifestyle of a French person, what is the most significant source of emissions? (Cars / Trash / Meat / Flying / Heating / Digital / I don't know)

2. Which dish emits the most greenhouse gases? We consider each dish weighs 200 g. (Chicken / Beef steak / Pasta / Soy burger / I don't know)
3. You are traveling alone from Paris to Toulouse. Rank the following options according to their carbon footprint, from the largest (1) to the smallest (4). (Car / Plane / Train / Bus)
4. Rank the following geographical areas by their ecological footprints per capita, from the largest (1) to the smallest (4). (USA / EU / China / India)

Pilot Study 2

1. Which of the following elements counts towards France's carbon footprint? (Direct GHG emissions from households / GHG emissions from domestic production for domestic demand / GHG emissions from imported goods for final use by households / All of the above / I don't know)

The answer to the previous question was all of the above. A country's carbon footprint represents the amount of greenhouse gases (GHGs) from: Direct GHG emissions from households; GHG emissions from domestic production of goods and services for domestic demand (i.e. excluding exports); GHG emissions associated with imported goods and services. Taking this into account, please answer the following questions:

2. Which of the following contributes the most to the carbon footprint of the average French citizen? (Car usage / meat consumption / airplane travel / heating / use of digital and online services / I don't know)
3. Max and Nina are friends at university who want to reduce their carbon footprint. The table above summarises their change in behaviour related to food. "Max regularly eats meat and does his shopping only at local organic markets, taking his own bags to reduce waste from packaging. He decides to reduce his meat consumption. Nina regularly eats meat, imported avocados and tropical fruits. She decides to do her shopping only in organic markets taking her own bags to reduce waste from packaging." Who achieved the biggest reduction in their carbon footprint after changing their behaviour? (Max / Nina / I don't know)

D.3.2 Policy support

Pilot Study 1

1. **A ban on combustion engine cars in 2030**

To combat climate change, car manufacturers may be required by law to limit the average CO₂ emissions per kilometre of the vehicles they sell in any given year. This limit is lowered each year, with the aim of ensuring that only electric or hydrogen-powered vehicles are sold after 2030. This policy is called a ban on combustion-powered cars. Do you agree or disagree with the following statements?

- I am in favour of a ban on combustion engine cars by 2030
- A ban on combustion engine cars would be an effective means to combat climate change
- A ban on combustion engine cars would be fair

2. **Carbon tax with transfers**

To combat climate change, the French government can make greenhouse gas emissions costly, to encourage people and businesses to change their equipment and reduce their emissions. The government could do this through a measure known as a carbon tax with transfers. Under such a measure, the government would tax all products that emit greenhouse gases. For example, the price of petrol would rise by 10 cents per litre. To compensate households for the price increases, the revenue from the carbon tax would be redistributed to all households, regardless of income. Each adult would receive a payment of €160 a year. Do you agree or disagree with the following statements?

- I am in favour of a carbon tax with transfers
- (Randomised order) A carbon tax with cash transfers would be an effective means to combat climate change
- (Randomised order) A carbon tax with transfers would be fair

3. **A high tax on beef products**

Imagine that to combat climate change, the government decides to limit the consumption of beef and dairy products. To do this, a high tax on beef products is introduced so that the price of beef doubles. Do you agree or disagree with the following statements?"

- I am in favour of raising taxes on beef products
- (Randomised order) Raising taxes on beef products would be an effective means to combat climate change
- (Randomised order) Raising taxes on beef products would be fair

Pilot Study 2

1. In this question, we are asking you about a carbon tax with cash transfers. To combat climate change, the French government can make greenhouse gas emissions costly to encourage individuals and businesses to reduce emissions. To achieve this, the government could implement a carbon tax with cash transfers. The government would tax all products emitting greenhouse gases. For example, the price of gasoline would increase by 10 cents per litre. To compensate households for price increases, the revenue from the carbon tax would be redistributed to all households, regardless of their income. Each adult would receive a payment of €160 per year. Do you agree or disagree with the following statements?

- I am in favour of a carbon tax with transfers
- (Randomised order) A carbon tax with cash transfers would be an effective means to combat climate change
- (Randomised order) A carbon tax with transfers would be fair