How well do people understand the climate impact of individual actions?

Online Resources

Climatic Change

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Online Resource 1: Comparison of the two samples, figures and analysis

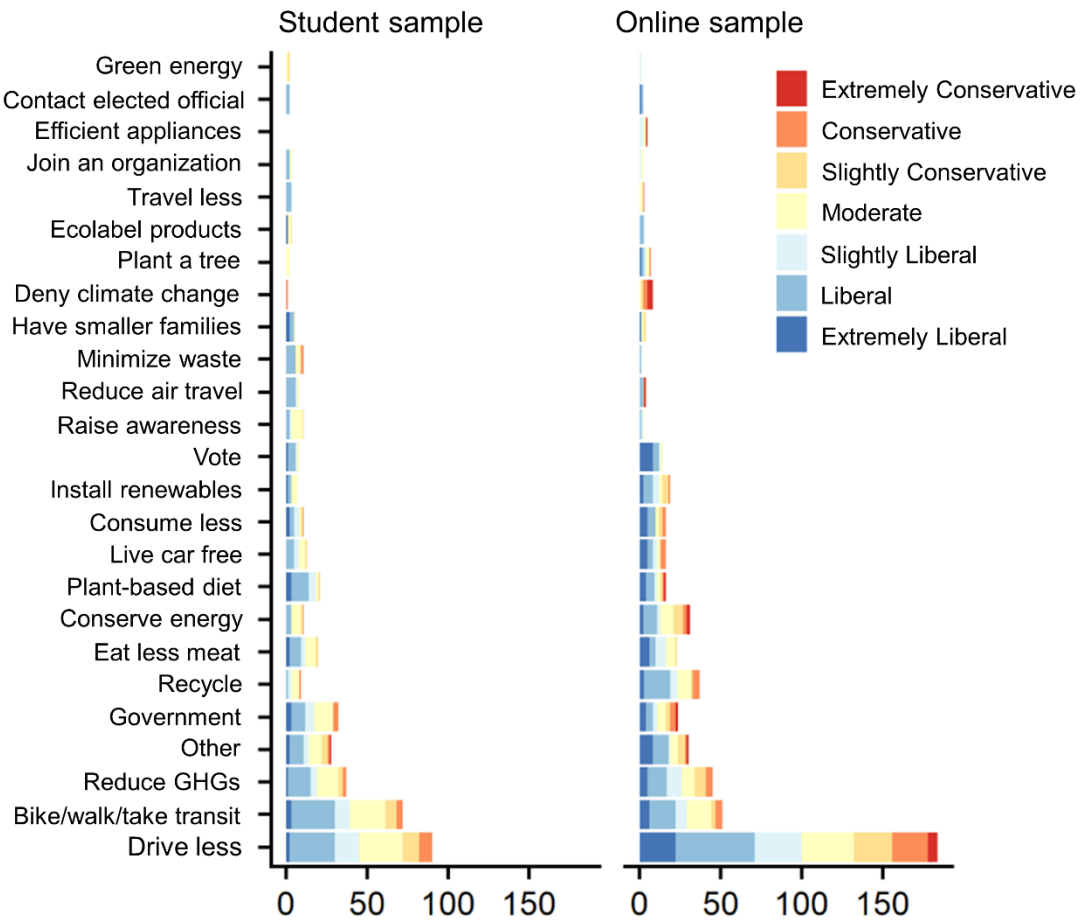

Fig. S1 The 25 most common responses to an open-ended question about the single most effective action the participant could take to reduce greenhouse gases. Color indicates self-reported political orientation.

Table S1: Breakdown of Figure 1

Action code	Student Sample	Online Sample	Total
Green energy	2	1	3
Contact elected official	2	2	4
Efficient appliances	0	5	5
Join an organization	4	2	6
Travel less	4	3	7
Ecolabel products	4	3	7
Plant a tree	2	7	9
Deny climate change	1	8	9
Have smaller families	6	4	10
Minimize waste	11	1	12
Reduce air travel	8	4	12
Raise awareness	11	3	14
Vote	8	14	22
Install renewables	7	20	27
Consume less	11	16	27
Live car free	13	16	29
Plant-based diet	21	16	37
Conserve energy	11	31	42
Eat less meat	20	23	43
Recycle	9	37	46
Government	32	24	56
Other	28	30	58
Reduce GHGs	37	45	82
Bike/walk/take transit	72	51	123
Drive less	90	185	275
Total	414	551	965

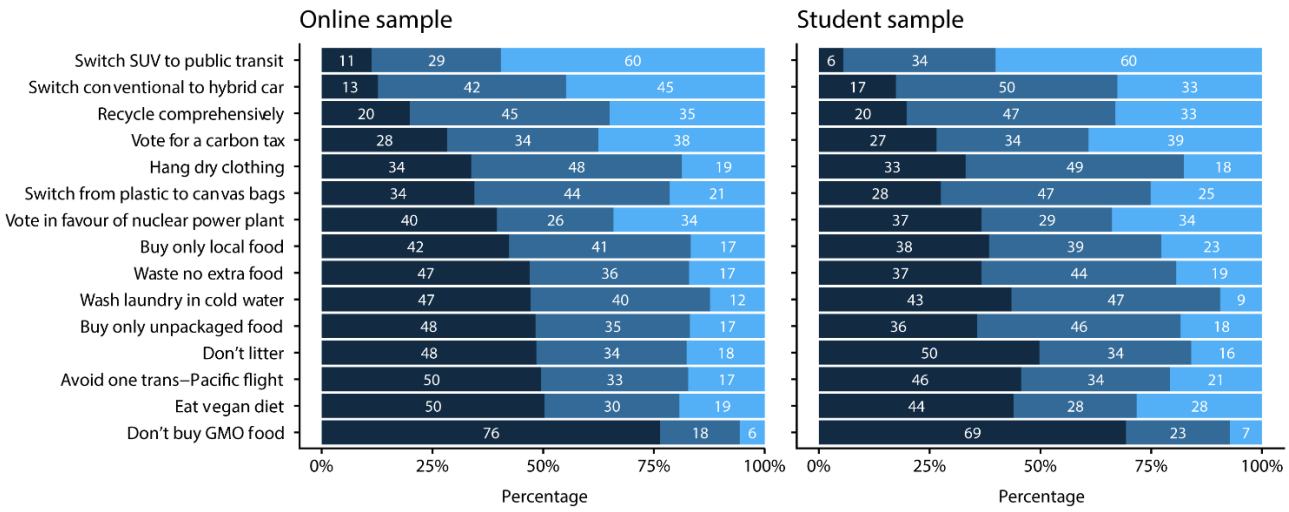

Fig. S2 Proportion of participants that ranked each of the 15 actions as low (dark blue), moderate (medium blue) or high impact (light blue). Note that not all percentage values in the figure add to 100% due to rounding.

Table S2: Hierarchical regression for tradeoff accuracy (average error) on four tradeoff questions, undergraduate student sample

Model	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Basic numeracy	-0.03***	-0.03***	-0.03**	-0.02**	-0.02**	-0.02*	-0.02*
	(-0.05, -0.01)	(-0.04, -0.01)	(-0.04, -0.01)	(-0.04, -0.01)	(-0.04, -0.01)	(-0.04, -0.003)	(-0.04, -0.003)
Rank score		-0.03***	-0.03**	-0.02**	-0.02**	-0.02**	-0.02**
		(-0.05, -0.01)	(-0.05, -0.01)	(-0.04, -0.01)	(-0.04, -0.01)	(-0.04, -0.01)	(-0.04, -0.01)
Climate score			-0.01	-0.01	-0.01	-0.01	-0.01
			(-0.01, 0.002)	(-0.01, 0.002)	(-0.02, 0.002)	(-0.02, 0.001)	(-0.01, 0.003)
Year of program				-0.04**	-0.03**	-0.03*	-0.03*
				(-0.07, -0.01)	(-0.06, -0.01)	(-0.06, -0.003)	(-0.06, -0.004)
Age					0.01	0.004	0.004
					(-0.003, 0.01)	(-0.004, 0.01)	(-0.004, 0.01)
Gender						0.03	0.03
(Female)						(-0.03, 0.09)	(-0.03, 0.09)
Political orientation							-0.01
(1=Extremely liberal, 7=Extremely conservative)							(-0.03, 0.01)
Observations†	414	414	414	413	413	408	408
R^2	0.02	0.04	0.04	0.05	0.06	0.05	0.05
Adjusted R^2	0.02	0.03	0.03	0.04	0.05	0.04	0.04

*Note: 90% confidence intervals in parentheses. *p<.1, **p<0.05, ***p<0.01*
†Models 4-7 have fewer observations due to the removal of participants who selected gender responses other than male or female, and participants who did not complete questions on year of program

Table S3: Hierarchical regression for tradeoff accuracy (average error) on four tradeoff questions, online sample (Amazon Mechanical Turk)

Model	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Basic numeracy	-0.04***	-0.04***	-0.04***	-0.04***	-0.04***	-0.04***	-0.04***	-0.04***
	(-0.05, -0.03)	(-0.05, -0.03)	(-0.05, -0.03)	(-0.05, -0.02)	(-0.05, -0.02)	(-0.05, -0.02)	(-0.05, -0.02)	(-0.05, -0.02)
Rank score		-0.03***	-0.03***	-0.03***	-0.03***	-0.03***	-0.03***	-0.03***
		(-0.04, -0.01)	(-0.04, -0.01)	(-0.04, -0.01)	(-0.04, -0.01)	(-0.04, -0.01)	(-0.04, -0.01)	(-0.04, -0.01)
Climate score			-0.001	-0.001	-0.001	0.0000	0.0002	0.0002
			(-0.01, 0.003)	(-0.01, 0.003)	(-0.005, 0.003)	(-0.005, 0.005)	(-0.004, 0.005)	(-0.004, 0.005)
Age				0.001	0.001	0.001	0.001	0.001
				(-0.001, 0.003)	(-0.001, 0.003)	(-0.001, 0.003)	(-0.001, 0.003)	(-0.001, 0.003)
Gender (Female)					0.004	0.005	0.002	0.002
					(-0.04, 0.05)	(-0.04, 0.05)	(-0.04, 0.05)	(-0.04, 0.05)
Political orientation						-0.01	-0.01	-0.01
(1=Extremely liberal, 7=Extremely conservative)						(-0.02, 0.01)	(-0.02, 0.01)	(-0.02, 0.01)
Income							-0.004	-0.004
(1= <$10,000, 12 = >$150 000)							(-0.01, 0.004)	(-0.01, 0.004)
Education (1= Less than high school, 8=Professional/doctoral degree)								0.0003
								(-0.02, 0.02)
Observations†	551	551	551	551	548	546	546	544
R^2	0.06	0.07	0.07	0.07	0.08	0.08	0.08	0.08
Adjusted R^2	0.06	0.07	0.07	0.07	0.07	0.07	0.07	0.06

*Note: 90% confidence intervals in parentheses. *p<.1, **p<0.05, ***p<0.01*

†Models 5-8 have fewer observations due to the removal of participants who selected gender responses other than male or female, and participants who did not complete questions on political orientation or education

Online Resource 2: Methods and results from the pilot study

Methods

The pilot survey was distributed in three classes at the University of British Columbia in January of 2017. 178 students completed the survey. The survey began with a set of questions intended to elicit level of participant concern for climate change. Next, participants were asked an open-ended question regarding the most effective action they could take to reduce climate change. Third, the participants were asked "Please rank these actions from most effective (1) to least effective (15) at reducing climate change". The listed actions were the same as the 15 actions provided in the main study, except for two differences: students were not asked about hybrid vehicles and instead asked about the efficacy of turning down the thermostat by 1 degree for one winter, and they were not asked about food with no packaging and were instead asked about the efficacy of eating only organic food for one year. The survey concluded with a series of demographic questions. Unlike in the main study, there were no tradeoff questions and no corresponding control questions.

Results

Six students chose to not provide their gender and eight students chose to not provide their political orientation. Of those who did provide this information, 65% were female, 74% described themselves as liberal (scores 5-7), 6% described themselves as conservative (scores 1-3) and 20% as moderates (score 4).

We found significant differences in ranking between the different actions according to the Kruskal–Wallis test ($H(14)= 396.95$, $p<.001$). We used the Dunn test for multiple comparisons of groups with p-values adjusted with the Benjamini-Hochberg method to identify significant differences between actions (summarized by letter groupings in Fig. S3).

Despite this ranking approach differing from the methodology used in the main study to assess understanding of the relative efficacy of fifteen actions, results roughly conformed to the findings from the main study. On average, participants considered switching from an SUV to public transit to be the most effective action, whereas not buying GMO food for a year was considered the least effective (see Fig. S3 and Fig. S4). Furthermore, eating a vegan diet and avoiding one trans-Pacific flight (which are both high-impact) received significantly lower rankings than recycling (which is moderate-impact).

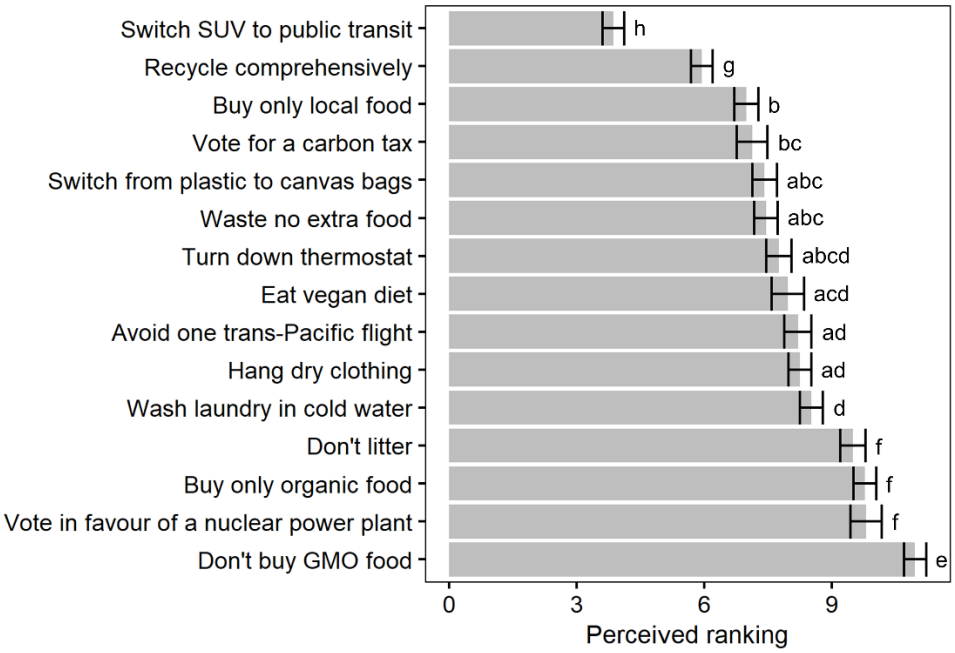

Fig. S3 Perceived ranking of 15 actions, sorted from the action that is perceived to be most effective at the top to least effective at the bottom. Error bars indicate one standard error. Actions sharing a letter are not significantly different from one another (alpha = 0.05).

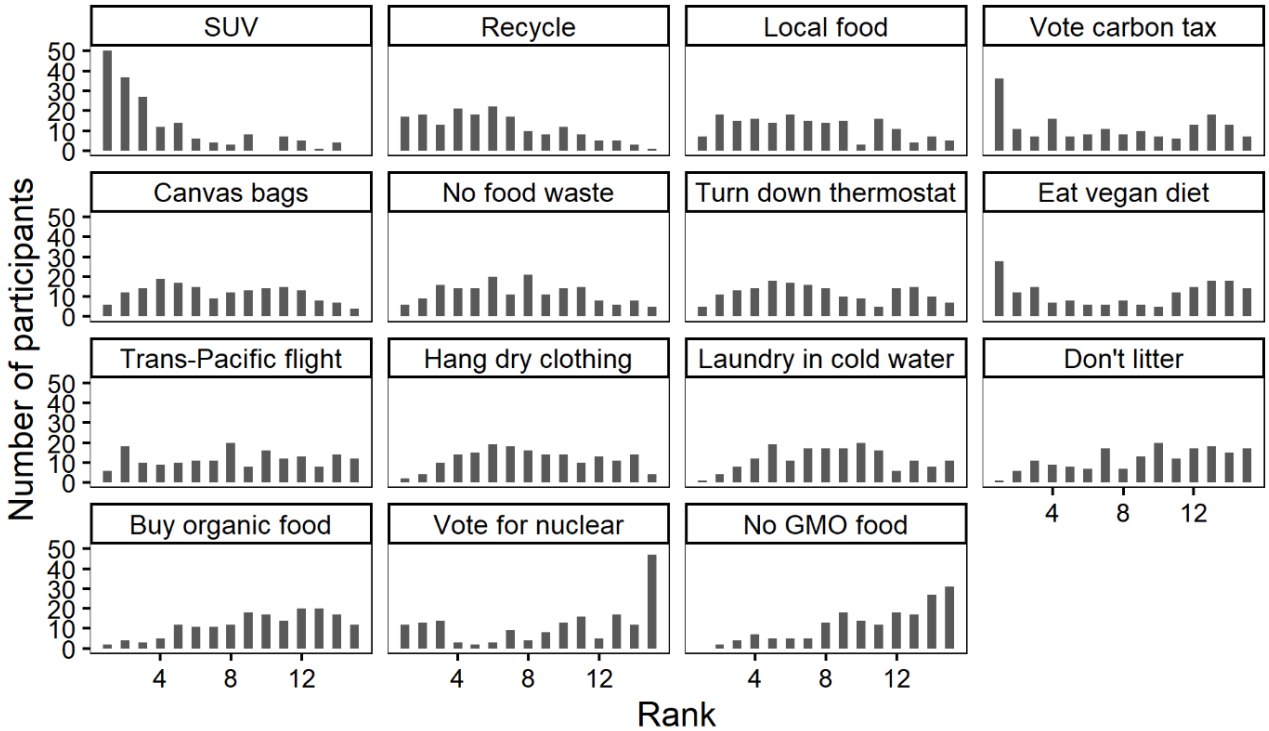

Fig. S4 Histograms showing the number of survey participants who assigned each action a given rank. Actions are arranged by average perceived rank with the action perceived to be most effective in the top left and the action perceived to be least effective in the bottom right.

Online Resource 3: Supplementary Methods

Full Survey Questions

Q1 What do you believe is the single most effective action you can take to reduce greenhouse gas emissions that contribute to climate change?

Q2 Please categorize these actions as high, medium or low impact in terms of reducing greenhouse gases. Each high impact action accounts for more than 5% of the average North American's annual carbon footprint. Each medium impact action accounts for 1-5% of an average North American's annual carbon footprint. Each low impact action accounts for less than 1% of an average North American's annual carbon footprint.

	Low Impact	Medium Impact	High Impact
Don't litter for one year	❍	❍	❍
Avoid one trans-Pacific flight	❍	❍	❍
Switch from an SUV to public transit for one year	❍	❍	❍
Recycle as much as possible for one year	❍	❍	❍
Waste no extra food for one year	❍	❍	❍
Don't buy GMO food for one year	❍	❍	❍
Switch from a midsize car to a midsize hybrid car for one year	❍	❍	❍
Vote for a political party that is proposing a carbon tax	❍	❍	❍
Eat a vegan diet for one year	❍	❍	❍
Use canvas bags instead of plastic shopping bags for one year	❍	❍	❍
Vote in favour of a nuclear power plant	❍	❍	❍
Buy only unpackaged food for one year	❍	❍	❍
Buy only local food for one year	❍	❍	❍
Wash your laundry in cold water for one year	❍	❍	❍
Hang dry clothing rather than using a dryer for one year	❍	❍	❍

Q3 Someone takes a trip that requires driving 100 miles in a standard, midsize car. If they switch from a standard, midsize car to a midsize hybrid car, how many miles can they now drive while still producing the same amount of greenhouse gases as they did on their trip in the standard car? Please give your best guess.

Q4 Eating meat and flying in a plane both result in greenhouse gas emissions. A person taking a one-way, economy flight from New York to London might try and make up for their emissions by giving up quarter-pound hamburgers. How many quarter-pound hamburgers would they need to give up to offset this flight? Please give your best guess.

Q5 Hang drying clothing instead of using a dryer saves electricity, which reduces greenhouse gas emissions. If someone chooses to hang dry one load of laundry, how long can they leave an LED light bulb switched on and still produce the same amount of greenhouse gases as if they had used the dryer? Please give your best guess.

Q6 Someone decides to reduce greenhouse gas emissions by switching to a vegetarian diet for one year. Another person tries to save the same amount of greenhouse gases by purchasing only unpackaged foods. How long would it take for the second person to save the same amount of greenhouse gases as the first one? Please give your best guess.

Q7 Recent research on decision making shows that choices are affected by context. Differences in how people feel, their previous knowledge and experience, and their environment can affect choices. To help us understand how people make decisions, we are interested in how you are currently feeling. In addition to emotions, we are interested in whether you are paying attention to the instructions. This is a test to see whether you actually take the time to read the instructions. If you do not follow the instructions, we won’t be able to use your data. To show that you have read the instructions, please ignore the question below about how you are feeling and instead check only the "none of the above" option as your answer.

- ❍ Interested
- ❍ Distressed
- ❍ Excited
- ❍ Upset
- ❍ Strong
- ❍ Guilty
- ❍ Scared
- ❍ Hostile
- ❍ Enthusiastic
- ❍ Proud
- ❍ Irritable
- ❍ Alert
- ❍ Ashamed
- ❍ Inspired
- ❍ Nervous
- ❍ Determined
- ❍ Attentive
- ❍ Jittery
- ❍ Active
- ❍ Afraid
- ❍ None of the above

Skip logic: If participant does not answer "None of the above": End of Survey: Failed attention check message

Thank you for taking our survey.

You are seeing this message because you are not eligible to complete the study. This may be because you failed to answer a question that checked to see if you read and understood the instructions.

Q8 We have provided more information to this question. Someone takes a trip that requires driving 100 miles in a standard, midsize car (fuel efficiency: 3 gallons/100miles). If they switch to a midsize hybrid car (fuel efficiency: 2 gallons/100 miles), how many miles can they now drive while still producing the same amount of greenhouse gases as they did on their trip in the standard car? Please give your best guess.

Q9 We have provided more information to this question. Hang drying clothing instead of using a dryer saves electricity, which reduces greenhouse gas emissions. If someone chooses to hang dry their clothes

for one load (thereby saving 3400Wh), how long can they leave an LED light bulb switched on (10W per hour) and still produce the same amount of greenhouse gases as if they had used the dryer? Please give your best guess.

Q10 We have provided more information to this question. Someone decides to switch to a vegetarian diet for one year (thereby saving 1100kg of greenhouse gases). Another person tries to save the amount of greenhouse gases by purchasing only unpackaged foods (which reduces greenhouse gases by 100kg a year). How long would it take for the second person to save the same amount of greenhouse gases as the first one? Please give your best guess.

Q11 We have provided more information to this question. Eating meat and flying in a plane both result in greenhouse gas emissions. A person taking a one-way, economy flight from New York to London (which produces 800kg of carbon dioxide) might try and make up for their emissions by giving up quarter-pound hamburgers (which produces 2kg of carbon dioxide per hamburger). How many hamburgers would they need to give up to offset this flight? Please give your best guess.

Q12 You are in a race and you overtake the runner who is in third place. What position are you in now?

Q13 What number should come next in this series? 3,5,8,12,17,

- ❍ 20
- ❍ 21
- ❍ 22
- ❍ 23
- ❍ 24

Q14 You are planning to rent an apartment for $800 per month. How many cups of coffee ($2 per cup) would you have to give up to pay for one month's rent? Please give your best guess.

Q15 A scientist finds a very old tree and calculates that it is 3400 years old. How many decades (1 decade = 10 years) has this tree been alive? Please give your best guess.

Q16 A local grocery store has two cashiers who can service 100 customers in an hour. They hire a third cashier. How many customers can they now service in one hour? Please give your best guess.

Q17 Two people are climbing a mountain. The first person started early and is already waiting at the top (1100 meters in height). The second person is climbing at a speed of 100 meters an hour. How many hours will it take for the second person to join the first at the top of the mountain? Please give your best guess.

Q18 Please indicate how strongly you agree or disagree with each of the following statements.

	Completely agree	Agree	Somewhat agree	Neither agree nor disagree	Somewhat disagree	Disagree	Completely disagree
Humans are responsible for climate change	❍	❍	❍	❍	❍	❍	❍
Humans do not need to change their lifestyles to address climate change	❍	❍	❍	❍	❍	❍	❍
I believe that my actions contribute to climate change	❍	❍	❍	❍	❍	❍	❍
I believe that I need to change my lifestyle to address climate change	❍	❍	❍	❍	❍	❍	❍

Q19 What percent of climate scientists think that climate change is caused mostly by human activities? Please write a number between 0 and 100 without decimals.

Q20 You're almost done with the. Please answer the following questions about yourself and your situation.

Q21 What is your year of birth?

Q22 What is your gender?

- ❍ Male
- ❍ Female
- ❍ Other
- ❍ Prefer not to say

Q23 What year are you in? (UNDERGRADUATE SAMPLE ONLY)

- ❍ 1st Year
- ❍ 2nd Year
- ❍ 3rd Year
- ❍ 4th Year

Q24 What course are you in? (UNDERGRADUATE SAMPLE ONLY)

Q25 What faculty are you in? (UNDERGRADUATE SAMPLE ONLY)

- o Audiology and Speech Sciences
- o Business, Sauder School of
- o Community and Regional Planning
- o Continuing Studies
- o Dentistry
- o Education
- o Forestry
- o Graduate and Postdoctoral Studies
- o Journalism
- o Kinesiology
- o Land and Food Systems
- o Law, Peter A. Allard School of
- o Library, Archival and Information Studies
- o Medicine
- o Music
- o Nursing
- o Pharmaceutical Sciences
- o Population and Public Health
- o Science
- o Social Work
- o UBC Vantage College
- o Vancouver School of Economics
- o Other

Q23 What city do you currently live in? (ONLINE SAMPLE ONLY)

Q24 What is the highest level of school you have completed or the highest degree you have received? (ONLINE SAMPLE ONLY)

- ❍ Less than high school degree
- ❍ High school graduate (high school diploma or equivalent including GED)
- ❍ Some college but no degree
- ❍ Associate degree in college (2-year)
- ❍ Bachelor's degree in college (4-year)
- ❍ Master's degree
- ❍ Doctoral degree
- ❍ Professional degree (JD, MD)

Q25 Please indicate your total annual personal income before taxes. (ONLINE SAMPLE ONLY)

- ❍ Less than $10,000
- ❍ $10,000 to $19,999
- ❍ $20,000 to $29,999
- ❍ $30,000 to $39,999
- ❍ $40,000 to $49,999
- ❍ $50,000 to $59,999
- ❍ $60,000 to $69,999
- ❍ $70,000 to $79,999
- ❍ $80,000 to $89,999
- ❍ $90,000 to $99,999
- ❍ $100,000 to $149,999
- ❍ $150,000 or more

Q26 How would you describe your political orientation?

- ❍ Extremely liberal
- ❍ Liberal
- ❍ Slightly liberal
- ❍ Moderate
- ❍ Slightly conservative
- ❍ Conservative
- ❍ Extremely conservative

Q26 How would you describe your political orientation?

- ❍ Extremely liberal
- ❍ Liberal
- ❍ Slightly liberal
- ❍ Moderate
- ❍ Slightly conservative
- ❍ Conservative
- ❍ Extremely conservative

Q27 What party did you vote for in the last election federal or national election?

Q28 Thank you for completing the survey! Do you have any additional thoughts about climate change, or any comments about the survey that you would like to share with us?

Online Resource 4: Supplementary Calculations

Hamburger versus flight

"Eating meat and flying in a plane both result in greenhouse gas emissions. A person taking a one-way, economy flight from New York to London might try and make up for their emissions by giving up quarter-pound hamburgers. How many quarter-pound hamburgers would they need to give up to offset this flight? Please give your best guess."

We use data from North American research (Beauchemin et al., 2010) to find 22 kgCO_2e/kg of carcass. Other studies have found similar results, although values do vary based on methodology and especially with country studied; Peters et al. (2010), based on data from other sources (Vergé et al., 2008), conclude that beef in Canada has a CF of 19.6 kg of CO_2e per kg of carcass weight. These studies do not include transport and are based on carcass weight and we therefore take them as a conservative lower bound. Others (Heller et al., 2013) estimate beef at 29 kgCO_2e/kg which represents a typical value for a life cycle assessment of beef in a western nations (see also, for example, research (Hoolohan et al., 2013) which places the estimate at 25 kgCO_2e/kg of beef). Although some life cycle assessments calculate extremely high values for the footprint of beef (if for instance land use change impacts from mangrove deforestation is included in the LCA of tropical beef production (Boone Kauffman et al., 2017)), we do not consider these values to be representative of what the average North American consumer should be expected to consider.

We specify a "quarter-pound" hamburger which works out to 0.113 kg of beef. The carbon footprint therefore ranges from a low value of 2.21 kgCO_2e (based on the Canadian CF of 19.6kg of CO_2e per kg of carcass weight) to a higher value of 3.3 kgCO_2e (based on the highest life cycle assessment value of 29 kgCO_2e/kg of meat), per meat in the burger depending on which life cycle assessment study is used.

An economy-class flight from JFK to LGW, using BEIS methodology (https://www.gov.uk/government/publications/greenhouse-gas-reporting-conversion-factors-2018) totals 907 kg of CO_2e (477 kg without radiative forcing).

Therefore 146-410 hamburgers are equivalent with one flight.
CENTRAL ESTIMATE: 278 hamburgers.

Hang dry clothing vs turning off light bulb

> ***"Hang drying clothing instead of using a dryer saves electricity, which reduces greenhouse gas emissions. If someone chooses to hang dry one load of laundry, how long can they leave an LED light bulb switched on and still produce the same amount of greenhouse gases as if they had used the dryer? Please give your best guess."***

3.4 kWh are saved by hang drying clothing instead of using a typical modern dryer (Attari et al., 2010). Wynes and Nicholas (2017) calculate the emissions value associated with these savings at 210 kgCO_2e per person per year or 1.9 kgCO_2e per use, which is the value shown in the caption in Figure 3 (but is not necessary for the ratio calculation here).

For a 75W-99 W equivalent (reasonable for a hallway light) LEDs range from 9.6-12.5 W (http://oee.nrcan.gc.ca/pml-lmp/index.cfm?action=app.search-recherche&appliance=LAMP_CFL)

3.4kWh/0.0096 kW = 354 hours (for a dim, efficient LED)

3.4kWh/0.0125 kW = 272 hours (for a bright, less efficient LED)

You could leave an LED light on for 272-354 hours and have the same carbon footprint as hang drying one load of laundry.

CENTRAL ESTIMATE: 313 hours

Drive hybrid versus drive conventional car

> ***"Someone takes a trip that requires driving 100 miles. If they switch from a standard, midsize car to a midsize hybrid car, how far can they drive while still producing the same amount of greenhouse gases? Please give your best guess."***

Five popular mid-size vehicles (http://www.autofocus.ca/news-events/canadian-car-and-truck-sales/cars-the-30-best-selling-in-canada) and five mid-size hybrid vehicles were selected for comparison. Where two different carbon intensities were given (i.e. for different number of cylinders in engine) we chose smallest value.

Midsize cars	**gCO_2/km**	**Midsize hybrids**	**gCO_2/km**
Toyota Camry	199	Ford Fusion hybrid	131
Mazda 3	174	Toyota Prius	105
Hyundai Elantra	174	Toyota Camry hybrid	137
Toyota Corolla	176	Hyundai Sonata hybrid	137
Honda Civic	153	Kia Optima Hybrid	132

The lowest possible shift would be from a Honda civic (153 gCO_2/km) to a Toyota Camry/Hyundai Sonata hybrid (both 137 gCO_2/km). A person making such a shift could drive 112 miles while producing the same amount of emissions (25 $kgCO_2e$) as they previously did while driving 100 miles (note that because this is a ratio of efficiency, the same would be true for kilometers, e.g. someone driving 100 km in the typical midsize vehicle could then drive 112 km in a hybrid vehicle while producing the same emissions).

The greatest possible shift would be from a Toyota Camry (199 gCO_2/km) to a Toyota Prius (105 gCO_2/km). A person making such a shift could drive 190 miles while producing the same amount of emissions (32 $kgCO_2e$) as they previously did while driving 100 miles.

Emissions calculated using Natural Resources Canada, Fuel consumption ratings search tool: https://fcr-ccc.nrcan-rncan.gc.ca/en (Accessed 2019-05-08)

You could drive 112-190 miles if you switch to a hybrid vehicle.

CENTRAL ESTIMATE: 151 miles

Vegan vs unpackaged foods

"Someone decides to reduce greenhouse gas emissions by switching to a vegetarian diet for one year. Another person tries to save the same amount of greenhouse gases by purchasing only unpackaged foods. How long would it take for the second person to save the same amount of greenhouse gases as the first one? Please give your best guess."

Hoolohan *et al.* quantify the emissions attributable to the average consumer for both meat consumption *and* food packaging (Hoolohan et al., 2013).

On a daily basis they suggest 3.05 $kgCO_2e$ saved by not eating meat and 0.29 $kgCO_2e$ by not buying any packaging (this equates to 1113 $kgCO_2e$ per year from a meat-free diet). Because the estimate for packaging is suggested as a maximum possible value we estimate a lower range as 10% below this value: 0.26-0.29 $kgCO_2e$.

It would therefore take 10.52-11.73 years with a central estimate of 11.125 years.

For the range of uncertainty we round generously to include 10-12 years since a person estimating is unlikely to pick 11 exactly.

Online Resource 5: Additional analyses

How political orientation affected open-ended responses

Differences can be observed between participants with different political orientations on the open-ended question responses. For instance, no conservative described voting as the most effective action and few selected eating a plant-based diet or eating less meat. We collapsed the open-ended responses into two categories, e.g. those where participants selected eating a plant-based diet/less meat, and those where they did not, in order to conduct logistic regression. Political orientation was found to be a significant predictor (p=.003) of choosing a plant-based diet or eating less meat as the most effective action in the open-ended question, even when controlling for gender (p=.347) and age (p=.883).

Testing for differences between the two survey samples

We also collapsed the open-ended responses into two categories to look for differences between the online sample and the student sample using chi-squared tests. There were significant differences between the student sample and the online sample in the "Drive less" category, ($\chi^2(2)=16.25$, $p<.001$), and the "Recycle" category ($\chi^2(2)=10.74$, p=.001) but not for the combined "Eat less meat" and "Plant-based diet" categories ($\chi^2(2)=2.48$, p=.115).

We found no difference between the undergraduate students' absolute log error scores (M=0.85) and the online participants' (M=0.88), (t=-1.11, 95% CI [-0.074, 0.021], p=.27). Breaking this down further we found minimal differences between the absolute log error scores on the four estimation questions for these two groups. Differences were not significant for the hybrid tradeoff question (t=-1.64, 95% CI [-0.085, 0.008], p=0.10), the LED tradeoff question (t=-0.39, 95% CI [-0.134, 0.089], p=.69), or the hamburger tradeoff question (t=1.06, 95% CI [-0.044, 0.146], p=.29) and were marginally significant for

the vegetarian tradeoff question (t=-1.68, 95% CI [-0.169, 0.013], p=.09). In the case of the vegetarian tradeoff question, the undergraduate students had lower error (M=1.04) than the online participants (M=1.12). Note that in additional linear regression models that were tested, the sample (student versus online) was not a significant predictor of accuracy when rank score and numeracy were accounted for.

There was a significant difference (p=.029) in rank score (the number of correctly ranked actions) between the student sample (M=4.184) and the online sample (M=3.967), although this amounts to a small practical effect (on average students were able to correctly rank 0.2 questions more than online participants out of 13 questions).

Testing for differences in accuracy between estimations and controls

We conducted pairwise chi-square tests to investigate whether participants were more accurate at making tradeoffs if they were given numerical inputs and when they answered questions requiring the same mathematical process but outside of a climate context. We found in all cases that participants made significantly more accurate estimates when given numerical inputs, and that their responses to non-climate questions were significantly more accurate than their estimates to climate questions with numerical inputs.

Miles of driving hybrid vs 100 miles in conventional car: Climate estimate (22.6% accurate) compared to control estimate with mathematical inputs (46.2% accurate), ($\chi^2(1)=119.35$, $p<.001$).

Control estimate with mathematical inputs (46.2% accurate) compared to non-climate control question (83.2% correct), ($\chi^2(1)=289.19$, $p<.001$).

Numbers of hamburgers vs one trans-Atlantic flight: Climate estimate (17.4% accurate) compared to control estimate with mathematical inputs (82.6% accurate), ($\chi^2(1)=819.98$, $p<.001$).

Control estimate with mathematical inputs (82.6% accurate) compared to non-climate control question (95.5% correct), ($\chi^2(1)=83.14$, $p<.001$).

Hours of LED usage vs one load of hang-dried laundry: Climate estimate (2.6% accurate) compared to control estimate with mathematical inputs (71.0% accurate), ($\chi^2(1)=880.92$, $p<.001$).

Control estimate with mathematical inputs (71.0% accurate) compared to non-climate control question (91.0% correct), ($\chi^2(1)=125.33$, $p<.001$).

Years of unpackaged food vs one year vegetarian food: Climate estimate (2.6% accurate) compared to control estimate with mathematical inputs (68.2% accurate), ($\chi^2(1)=881.77$, $p<.001$).

Control estimate with mathematical inputs (68.2% accurate) compared to non-climate control question (85.1% correct), ($\chi^2(1)=76.88$, $p<.001$).

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