

Three Essays on Behavioral and Experimental Economics

DOCTORAL THESIS

Presented to the Faculty of Management, Economics and Social Sciences
at the University of Fribourg (Switzerland)

by

Bénédicte DROZ

Le Locle, NE

in fulfillment of the requirements for the degree of
Doctor of Philosophy in Economics (PhD)

Accepted by the Faculty of Management, Economics and Social Sciences
on December 15, 2025 at the proposal of
Prof. Dr. Berno Buechel (first referee)
Prof. Dr. Nicolas Treich (second referee)
Prof. Dr. Holger Herz (chairman of the committee)

Fribourg, Switzerland, 2025

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Introduction

Economics is fundamentally a science of human behavior – it seeks to understand the world we live in by analyzing the choices individuals and institutions make. For decades, the dominant assumption in economics was that individuals are rational agents who act consistently in their self-interest and aim to maximize utility: the so-called *homo economicus* (Mill, 1844; Persky, 1995). This simplified view enabled economists to model complex systems and derive predictions through optimization frameworks – for instance, assuming that consumers maximize utility given budget constraints or that firms maximize profit given production costs.

However, over the course of the 1970s and 1980s, a more realistic view of human behavior began to enter the field, complementing traditional economics. Scholars questioned the assumption of strict rationality, pointing out violations such as individuals not always displaying stable preferences or behavior that seemed to be driven by more than just self-interest. Drawing from psychology and sociology, this emerging perspective gave rise to behavioral economics – a field grounded in empirical investigation of when, how, and why people diverge from the *homo economicus*. While it is difficult to pinpoint a single founder of behavioral economics, many consider the field to have crystallized with the heuristics and biases program developed by Daniel Kahneman, Amos Tversky, and later Richard Thaler in the 1980-90s (Tversky and Kahneman, 1974; Kahneman et al., 1991).

Earlier efforts to bridge economics and psychology, however, date back to the 1750s. In *The Theory of Moral Sentiments*, Adam Smith uses a framework that closely resembles the “dual-process” models later formalized by psychologists and behavioral economists. Drawing on insights from both psychology and philosophy, Adam Smith offers early observations on cognitive biases that continue to be explored today (Ashraf et al., 2005). For example, he anticipates the concept of *loss aversion*, noting that “Pain... is, in almost all cases, a more pungent sensation than the opposite and correspondent pleasure” (Smith, 1759). Similarly, in *An Inquiry into the Nature and Causes of the Wealth of Nations*, he comments on *overconfidence*, writing that “the chance of gain is by every man more or less overvalued, and the chance of loss is by most men undervalued...” (Smith, 1776). Nearly two centuries later, in the 1950s, Herbert Simon introduced the idea of *bounded rationality*, challenging the notion of perfect decision-making by emphasizing cognitive limits (Simon, 1955). In 1953, Maurice Allais presented what became known as the Allais paradox, showing that individuals often violate the independence axiom of expected utility theory, by displaying inconsistent preferences based on how options are framed, even when the underlying probabilities and outcomes remain the same (Allais,

1953). Similarly, Daniel Ellsberg, in 1961, demonstrated that people prefer known risks over unknown risks – a behavior known as *ambiguity aversion* – even when the expected outcomes are mathematically equivalent (Ellsberg, 1961). These insights played a crucial role in nudging economics toward greater psychological realism. In addition to theoretical innovations, behavioral economists have run numerous experiments to understand in which situations “anomalies” or “violations of rationality” occur. These studies and new findings gave rise to experimental economics. Today, behavioral economists increasingly rely on randomized controlled trials (RCT) – conducted in the lab, online, and in the field – to assess the causal effect of interventions on preferences, decisions and behavior.

This thesis contributes to the growing literature on behavioral economics by presenting three independent studies, each using experimental methods. The first is a lab-based RCT conducted with university students from multiple subject pools in Switzerland. The second is also an RCT, this time conducted online with students from the University of Fribourg. The third study, by contrast, is based on an online survey using a sample of UK residents, recruited via the Prolific platform. All three studies were carefully pre-planned; ethical approval was obtained for all chapters and pre-registration of hypotheses was completed for Chapters 1 and 3.¹

Chapter 1 applies the well-established concept of information avoidance to the relatively unexplored context of meat consumption. Drawing on a rich body of literature examining how, when, and why people avoid information that evokes moral conflict or discomfort, the study first addresses clear, testable hypotheses. This motivated the use of an RCT to empirically examine whether meat consumption leads to a change in individuals’ preferences for information about the environmental, health, and animal-welfare consequences of meat production and consumption.

Chapter 2 contributes to the growing but comparatively less extensive literature on interventions aimed at reducing meat consumption, particularly through commitment-based strategies such as pledges and month-long challenges. While the research in this specific area is still emerging, the study draws on well-established findings from analogous domains – such as smoke-free months or *Dry January*. These parallels allow the development of more defined and testable hypotheses regarding behavioral change. Using an RCT, the study examines whether a one-month meat reduction initiative has short- and long-term effects on meat consumption, meat substitute consumption, and justifications for meat consumption.

Chapter 3 explores the influence of gender *and* sexual orientation on confidence. While the gender gap in confidence is well-documented – showing that women often report lower confidence than equally-performing men – very little research has been done on how sexual orientation intersects with gender to influence confidence. Given the novelty of this field, this study reveals confidence gaps across gender and sexual orientation, providing a foundation for further exploration of how these intersections may influence various economic behaviors.

¹Chapter 2 was originally conceived as a pilot study for a larger experiment. Following the pilot phase, the decision was made not to proceed with the main experiment. As a result, pre-registration was not pursued to completion.

The following abstracts offer a summary of each chapter.

Chapter 1: Appetite for Ignorance: Does Eating Meat Cause Information Avoidance About Its Harms?

Meat consumption is associated with environmental and animal-welfare harms, and many people consume more than is healthy. Past research has shown that conflicted consumers manage their beliefs in a variety of domains. Based on two independent studies, we test whether eating meat affects people’s preferences for information about the environmental, animal-welfare, and health harms of meat, as well as the alleged environmental benefits of animal agriculture. Our findings are mixed. Eating beef causes information avoidance about the environmental effects of cattle, and eating pork causes people to avoid information about the health effects of pork. Other results were not significant. We interpret these mixed results as suggesting that eating meat causes information avoidance, but the effects are nuanced as they are meat-specific and topic-specific. This project combines the independent explorations of two teams regarding the same research question. The joint conclusion reached differs from the initial independent conclusions. Consequently, this paper also serves as a case study about the sensitivity of scientific interpretation to experimental design.

Chapter 2: From Pledge to Plate: Investigating the Effects of a Temporary Meat Reduction Initiative

Despite the well-documented environmental, health, and animal welfare concerns associated with meat consumption, global intake has significantly risen in recent decades. While various strategies, such as promoting plant-based alternatives, aim to reduce meat consumption, it remains relatively stable and resistant to change. Pledge-based campaigns, in which individuals commit to reducing meat consumption for a specified period, offer a promising approach to address this issue. This study examines whether a one-month pledge influences meat and meat substitute consumption, as well as the justifications for meat consumption, through a randomized experiment. The results indicate that participation in the program – pledging to reduce meat consumption and receiving support – leads to a decrease in meat consumption both in the short and long term, while increasing consumption of meat substitutes in the short term only. Additionally, participants in the pledge initially justified their meat consumption less, though this effect diminished over time.

Chapter 3: What Can Sexual Orientation Reveal About the Gender Gap in Confidence?

The gender gap in wages and representation has broad implications for equity and efficiency. Research often attributes these disparities to gaps in confidence, competitiveness, or risk preferences between men and women. Studies show that, on average, women are less confident than equally-performing men. However, little attention has been given to

confidence gaps across gender and sexual orientation. Using an established experimental design, I show that while the gender gap in confidence is reproduced, sexual orientation affects women's outcomes but not men's. Lesbian women exhibit a much smaller gender gap in confidence than the typical gap observed between men and women.

Note to the reader

All three chapters contribute to the broader field of behavioral and experimental economics, with the first two focusing on environmental economics and the final chapter on gender economics. Despite thematic and methodological similarities, each chapter is a stand-alone essay and can be read independently.

Chapter 1

Appetite for Ignorance: Does Eating Meat Cause Information Avoidance About Its Harms?¹

1.1 Introduction

Meat consumption has substantial environmental and ethical implications. Livestock contribute to greenhouse gas emissions, freshwater usage, agricultural land use (Poore and Nemecek, 2018), air and water pollution (Mateo-Sagasta et al., 2017; Lavaine et al., 2020) and deforestation (FAO, 2022). Animal farming is linked to suffering for the farmed animals. These animals are often raised in confined conditions that prevent them from extending their appendages or turning around (Singer, 2023; Lusk and Norwood, 2011). In recent decades, global meat production has more than tripled, exceeding 350 million tons annually (Ritchie et al., 2023). As research has documented the negative externalities of meat production, there is growing scientific consensus that governments in developed countries should aim to reduce meat consumption (Hedenus et al., 2014; Tilman and Clark, 2014).

Most consumers want to eat meat but do not want to harm the environment (Clayton et al., 2015) or animals (Plous, 1993; Herzog and Foster, 2010; Joy, 2020). These conflicting attitudes present a dilemma as people’s ethical values conflict with their consumption

¹This chapter is based on the article of the same name, co-authored with Berno Buechel, Mónica Capra, Xi Chen, Anis Nassar, Seong Gyu Park, Jin Xu, Shanshan Zhang and Joshua Tasoff and published in the *European Economic Review* as Droz et al. (2025). The published paper replaces two former papers entitled “The Effect of Contemporaneous Meat Consumption on Attitudes and Behaviors Towards Animal Welfare” and “Meat Consumption Can Trigger Information Avoidance”. We thank Thibaut Arpinon, Tom Bry-Chevalier, Raphael Epperson, Romain Espinosa, Mehdi Farsi, Emiliano Huet-Vaughn, and Nicolas Treich for their very helpful comments. We also thank participants at the Western Economic Association’s International Annual Conference (2024), the European Economic Association’s Annual Meeting (2024), and Romain Espinosa’s informal online animal-welfare economics seminar, for useful feedback. We would also like to thank the Fletcher Jones Foundation for a Faculty Research Grant, the Swiss National Bank for a Department Research Grant, and the Fondation SAES which made the experiments possible.

choices. In contrast to the classical economic interpretation in which Bayesian beliefs are given and agents choose their actions to maximize expected utility, actual human behavior suggests motivated reasoning in which people attempt to resolve their cognitive dissonance not only by changing their choices but by manipulating their beliefs (Kunda, 1990). In the domain of meat consumption, Loughnan et al. (2010) showed how consuming meat distorts beliefs. They presented participants with either nuts or beef jerky and tasked them with rating the taste. Then, participants completed a survey indicating feelings of moral obligation towards 27 different animals, including a cow. Those assigned to the beef jerky condition showed moral concern for fewer animals and less moral concern specifically for cows, compared to those assigned to the nuts condition. In a subsequent experiment, Bastian et al. (2012) showed that, compared to consuming fruit, consuming lamb or beef lowered people’s assessment of the mental capacities and pain tolerance of cows and sheep. The results of these two studies suggest that eating meat (or the anticipation of eating meat) motivates people to deny moral concern toward animals.

A natural implication of motivated reasoning is that the consumption of meat will *cause* consumers to avoid information about its negative consequences. In this paper, we present the results of two experiments designed to test whether contemporaneous meat consumption causes information avoidance. We would view such a result as evidence supporting motivated reasoning in this domain. Furthermore, though the psychology literature has shown that eating meat can shift moral attitudes about animals, it remains to be shown whether eating meat can affect economically meaningful behavior, such as information choice, with real stakes.

Our paper also reflects the synthesis of an unusual collaboration. Two teams independently designed two experiments to answer essentially the same research question. The experiments led to results that appear contrary when viewed in isolation. However, as we jointly evaluate the results, we are led to a third, more subtle conclusion. Our collaboration, therefore, also exemplifies a largely masked feature of the scientific process: interpretations and conclusions can be contingent on the details of an experimental design.

The first study uses a laboratory experiment to test whether eating beef and pork triggers avoidance of information concerning the environment, animal welfare, or health. Participants’ willingness to pay for information regarding the consequences of meat consumption is elicited in an incentive-compatible way. The second study explores a similar question but with a slightly different approach. All participants are served plant-based “faux” chicken nuggets, but only the control group is informed that the nuggets are meat-free. The “faux” meat design allows for studying the effects of meat consumption without actually serving meat to anyone. This study investigates whether the belief that one is consuming meat affects the demand for information on animal welfare and information about the alleged importance of animal agriculture for the environment, contributions to an animal charity, and signing various political petitions.

In the former, the Beef-Pork study, we find that meat consumption increases information avoidance on the environmental impact of beef production and the health consequences of pork consumption. We observe no significant effects on attitudes. In contrast, in the latter, the Chicken study, we do not find significant effects of the treatment on

information choice. In the treatment condition, where participants are not informed that the nuggets are plant-based, we observe a shift in their attitudes towards animals that aligns with findings in psychology literature. Specifically, they perceive farmed animals as having lower intelligence. The treatment neither causes information avoidance towards the animal welfare video nor increases preferences towards the pro-animal agriculture video. The treatment also has no direct downstream effects on other behaviors, such as contributions to charity or signing political petitions.

Our paper connects to the literature on motivated beliefs, information avoidance, and meat consumption, as formulated in the economic model by Hestermann et al. (2020). This model captures the idea that individuals wish to eat meat without thinking about the potential harm associated with it. Survey evidence based on self-reports show that consumers tend to ignore how chickens are raised (Onwezen and van der Weele, 2016) and about half do not want to know how animals are slaughtered (Reisch et al., 2021). Leach et al. (2022) present two studies in which individuals who report a high “commitment to eating meat” are less interested in learning about animal sentience and less inclined to read an article about pig intelligence but more inclined to read an article about pig unintelligence. Stronger evidence exists in the form of several revealed preference studies. Bell et al. (2017) show that about one-third of consumers avoid learning how pigs are raised (they prefer to look at a blank screen than view pictures). Epperson and Gerster (2024) and Huet-Vaughn et al. (2024) find that 30% and 78% of students have negative willingness to pay to view a video of animals’ living conditions in intensive farms. Espinosa and Stoop (2021) use incentivized survey data and a structural model to estimate the fraction of their population that is resistant to information about the negative externalities of animal-based diets. Information resistance in this negative-externality context is characterized as information avoidance, pretending ignorance, or outright denial of facts. They estimate that 13.2% of their population is information resistant, higher than in the contexts of alcohol consumption and immigration. Serra-Garcia and Szech (2022) pay participants for correct answers about cows’ conditions on a dairy farm, with the option to watch a 1-minute informational video with the answers. Despite the incentive, 29% of participants do not watch the video.²

Our paper relates to information avoidance in other contexts. Nordström et al. (2023) find information avoidance about the caloric content of food, which is thematically similar to the health information provided in our Beef-Pork experiment. Freddi (2021) finds that more refugees in a municipality cause fewer news click-throughs on articles sympathetic to asylum seekers. The evidence suggests that natives avoided news articles that exerted moral pressure in favor of admitting more asylum seekers. There is also a large lab literature on the avoidance of morally relevant information beginning with Dana et al. (2007) and Larson and Capra (2009) and summarized in Golman et al. (2017).

The main contribution of this paper is to show that contemporaneous meat consump-

²Relatedly, Haile et al. (2021) measure the impact of vegetarian advocacy pamphlets (primarily animal-welfare-based) on real meat consumption using over 100,000 meals. As they observed no detectable treatment effect, they suspected that many participants disposed of the pamphlets rather than read them.

tion can *cause* information avoidance about the harms of meat production. This is consistent with motivated-reasoning models. We view this as a possibility result. Though we find that eating beef causes people to avoid information about the environmental impacts of cows, and eating beef and pork causes people to avoid information about the negative health effects of pork, we also find several null results. Beef does not significantly influence people’s preferences for information about cow welfare or the health effects of consuming beef. Additionally, the combination of beef and pork does not significantly affect preferences for information related to the environmental impacts of pigs or their welfare. Believing that one is eating chicken has no significant effect on information preferences regarding generic animal welfare or the alleged environmental need for animal farming. Taken together, the estimated effects are both weaker and less robust than what we inferred from our reading of the psychology literature. Hence, the effects of meat consumption on information demand appear to be meat-specific and topic-specific, making it difficult to predict them in advance.

The joint project is also a case study of how subtle design choices could lead to divergent conclusions. Before the two teams shared results, the Beef-Pork Team concluded that the primary result was positive and the Chicken team concluded that the primary result was null. In consideration of both results, we arrived at a more nuanced conclusion. In Section 1.4 we discuss insights from our collaboration.

1.2 Experimental design

1.2.1 Hypothesis

The central hypothesis of the two experiments is that (believing one is) eating meat will reduce information demand, with the presumed mechanism as cognitive dissonance.

Hypothesis (info). *Meat consumption lowers the demand for information about meat.*

This hypothesis is justified as follows: To reduce cognitive dissonance and keep a positive self-image, subjects who eat meat may demand less information about the harms of meat consumption. In the lab, the treated subjects have just eaten meat, or believe to have done so. Being confronted with facts about the consequences of meat consumption would arguably create stronger feelings of cognitive dissonance than for the control group.

1.2.2 Beef-Pork Experiment

Overview

The experimental design of the Beef-Pork Experiment is illustrated in Table 1.2.1. We exogenously varied consumption of meat by serving small portions of it to the treatment group called *T-Meat*, but not to the control group called *T-Control*. This difference in meat consumption was the only distinction between the two groups. In both groups, we

elicited each participant’s willingness to pay (WTP) for information about meat and further elicited attitudes towards meat and measured knowledge about meat. We selected two types of meat (beef and pork) because we imagined they would trigger different psychological mechanisms. For instance, people may associate beef with a stronger negative environmental impact compared to pork. On the other hand, pigs might be perceived as being treated less well than cows, which are more commonly seen grazing in open fields. By including two types of meat and three key dimensions (health, animal welfare, and the environment), we aimed to capture a range of information that individuals may obtain or avoid depending on the type of animal involved. For beef we served chips of beef jerky. For pork we served rich salami sticks. Pictures of both types of meat and details on how the meat was served to participants are provided in Appendix 1.A.7.

We recruited participants with no dietary restrictions, which means both the treatment and control groups are made up of omnivores. The treatment may only slightly change how much meat a participant has eaten in their life, but it does affect how recently they consumed meat. Therefore, one way to understand the treatment is that it made people more aware of being a meat eater.

Table 1.2.1: Experimental design for the Beef-Pork Experiment

Control		Info demand about beef		Info demand about pork	Attitudes	Knowledge	Information received
T-Meat	Eating beef	Info demand about beef	Eating pork	Info demand about pork	Attitudes	Knowledge	Information received

Eliciting information demand

To elicit information demand, participants received a multiple price list, starting at negative prices – meaning participants would be compensated for receiving the information item – and went up to positive prices, where participants would need to pay to access the information. (Please refer to the Appendix 1.A.3 for more details.) From this multiple price list, we created a dummy variable *Info Avoidance*. This variable takes the value of 1 if the participant refused the information item even when it was for free. Conversely, it takes the value of 0 if the participant was seeking information. This variable is comparable to the Chicken Experiment, which also uses dummy variables to represent information demand.³

The presentation of the information items was worded as follows, retaining the original emphasis:

“You will now be offered 3 information items (some news article or video displayed on your screen) regarding the way cows are treated for beef meat pro-

³A complementary variable uses the midpoints of the intervals as proxy for the willingness to pay, see Appendices 1.A.3 and 1.A.4.

duction (**animal welfare**), the consequences of beef meat production on the **environment** and the relationship between beef consumption and **health**.”

Likewise we measured information avoidance for each combination of pork and the three information items: animal welfare, the environment, or health. From these six combinations, only two decisions – one for beef and one for pork – were randomly selected and implemented. If an “accept” decision was made, the corresponding information item would be provided at the end of the experiment. Alternatively, if a “refuse” decision was chosen, an unrelated information item would be given at the end. Each information item had to be viewed for a minimum of three minutes before proceeding to the payoff. The articles on meat were either scientific or journalistic, whereas the two articles provided after a “refuse” decision were taken from *The Economist*. Examples of these are available in Appendix Figures 1.A.16 and 1.A.17.

Implementation

The Beef-Pork Experiment was preregistered on the American Economic Association’s platform AEA RCT Registry platform with identification number AEARCTR-0008904.⁴ For this experiment we received the approval of the Internal Review Board of the University of Fribourg (reference number 570 R1, 15 July 2020) and of the HEC ethics commission of the University of Lausanne (12 January 2022). The Beef-Pork Experiment was conducted in the laboratory of the University of Fribourg (FriLab) and in the laboratory of the University of Berne (Aare-Lab) in Switzerland (see pictures of the lab and computer desks in Appendix 1.A.7). Participants were recruited by the respective recruitment systems of these two labs, plus the University of Lausanne’s laboratory (LABEX) whose lab pool members were also invited to the nearby FriLab.⁵

The payoff of the participants included a fixed fee of CHF 15 (CHF 3 for a 15-minute online survey and CHF 12 for the 40-minute lab session). 1 CHF was about 1 USD.

⁴All the information can be found here: <https://www.socialscienceregistry.org/trials/8904>. Pre-registration, as currently practiced by economists, varies in terms of having or not having a pre-analysis plan (PAP) and, given an analysis plan, its level of stringency (Brodeur et al., 2024). We preregistered the experiment with a pre-analysis plan that states the hypotheses and how they can be tested in principle without providing the details. To find the pre-analysis plan please open the Analysis Plan tab or see Appendix 1.A.2. In follow-up projects with a less exploratory nature it makes sense to additionally preregister the specific tests that will be run, as already common in other disciplines, e.g., psychology, and as warranted by the conclusions of Brodeur et al. (2024). In this paper, we focus on the first hypothesis, the one that addresses information demand. A report that addresses all hypotheses is also provided at the registry platform under the name *Report Meat Consumption Can Trigger Information Avoidance*.

⁵We used three pools of laboratory participants because we anticipated that it could be difficult to recruit participants with no dietary restrictions – even more so after the pandemic, where laboratory pools declined to a trough. Still, we were not able to recruit the necessary number of participants for the two treatment variations that we originally planned. Therefore, we had to discontinue one of the meat treatments. The discontinued treatment was a variation in which meat was not immediately served but delayed to the end of the experiment. This change was transparently documented in the update to the pre-registration online.

Participants could also gain additional variable payoff from the knowledge questions and the implementation of the WTP decisions. The lab experiments were programmed in oTree (Chen et al., 2016).

Two weeks before the lab experiment, participants filled out an online survey. The survey was computerized using SoSci survey. The participants were asked to answer different questions about their eating behavior (e.g., how frequently they consume different types of food). After some socio-demographic questions, they faced a series of 26 questions on their attitudes. Finally, they faced a third series of eight incentivized questions that explored the participants' knowledge. The knowledge and attitudes questions in the survey are exactly the same as the ones used in the lab two weeks later.⁶

Descriptive statistics

Table 1.2.2 provides descriptive statistics for the main variables in the Beef-Pork Experiment. The outcome variables consist of information avoidance dummies for beef or pork across the three dimensions: animal welfare, environment, and health. The main control variables are: *Female*, *Age*, *Lab dummy*.

Table 1.2.2: Descriptive statistics of main variables: Beef-Pork Experiment

Outcome Variables	Mean	Std. Dev.	Min	Max
Info-avoid. Beef Env.	0.30	0.46	0	1
Info-avoid. Beef A-W	0.32	0.47	0	1
Info-avoid. Beef Health	0.24	0.43	0	1
Info-avoid. Pork Env.	0.31	0.46	0	1
Info-avoid. Pork A-W	0.32	0.47	0	1
Info-avoid. Pork Health	0.27	0.44	0	1
Control Variables				
Female	0.60	0.49	0	1
Age	23.56	4.33	19	46
Lab dummy	0.45	0.50	0	1
Observations	146			

Notes: *Info-avoid. Beef Env.* is a dummy variable which is 1 if a respondent avoided the information on beef & environment even if it was free. The same holds for all information items. A-W stands for Animal Welfare. The variable *Lab dummy* is 1 for the observations from the Aare-Lab in Berne and 0 for the observations from the FriLab in Fribourg.

⁶Here we focus on the effects on information demand. The construction of the attitudes and knowledge scores, along with the corresponding analyses, can be found in Appendices 1.A.5 and 1.A.6.

1.2.3 Chicken Experiment

Overview

To test the hypothesis that eating meat (or, believing that one is eating meat) will reduce information demand for animal welfare in farms, we manipulated information about the food being consumed. Table 1.2.3 shows the experimental design for the Chicken experiment.

In the experiment, all participants ate plant-based chicken nuggets (faux nuggets); however, only those randomly assigned to the control group were explicitly told that the food consisted entirely of plant-based ingredients. Participants in the treatment group were not informed of the plant-based nature of the nuggets, leaving them with the natural presumption that the nuggets were real chicken. An essential feature of the design is to create a gap in participants' expectations about the food item across the conditions by withholding information.

There are heterogeneous views in the profession on whether withholding information should be considered deception. Charness et al. (2022) survey the experimental economics community on their views about designs that omit information or are misleading (without explicit lies). Depending on the particular case and circumstances, some uses of omission are considered appropriate by the community, and others somewhat less so. One of the paper's main points is that benefit-cost analysis ought to play a role in the consideration of these "deceptive grey zones." We try to follow practices shown in similar setups for studying animal-welfare issues (e.g., Espinosa and Treich, 2023). Our team considered feeding real chicken nuggets to the treatment group, but preferred the faux chicken-nugget design out of animal-welfare concerns (Norwood and Lusk, 2011; Espinosa, 2024). The harm in producing the several hundred nuggets consumed for the experiment would be on the order of about 100 chicken-days in a factory farm.⁷ Furthermore, the omission of information does not violate incentive compatibility, which is often the main concern about deception in economic experiments.

We chose Impossible Chicken Nuggets because our informal taste tests showed that this brand's faux nuggets taste almost identical to real chicken nuggets. Furthermore, to ensure the effectiveness of our manipulation, we asked all participants to write down the first three ingredients of the nuggets. Participants in the control condition who only listed plant-based ingredients and participants in the treatment condition who included "chicken" or a meat ingredient passed the manipulation check and were included in subsequent

⁷It is unclear how many chicken nuggets can be produced from the meat of a single chicken because exact recipes for large producers of chicken nuggets (Tyson, McDonald's) are not available. The meat of a whole chicken can vary but is approximately 1kg. The weight of a chicken nugget is approximately 16g. Given that chicken nuggets have many ingredients, it is likely that a large fraction of their mass is not from chicken. If we assume 50% of the mass is chicken, then about 120 chicken nuggets can be produced from a single chicken. This would require about 3 chickens to produce the amount of nuggets used in the experiment. A factory farmed broiler takes about 47 days to raise to slaughter in the U.S., yielding a back-of-the-envelope estimate of 150 chicken-days in a factory farm to produce the requisite number of nuggets.

analysis.⁸ Of the 129 participants in the control condition, 82 passed the manipulation check (63.6%), whereas 121 of 138 participants in the treatment condition passed the manipulation check (87.7%).

Table 1.2.3: Experimental design for the Chicken Experiment

Control	Informed that nugget is plant-based	Video selection	Video watching	Attitudes	Knowledge	Behavior
T-Meat	Uninformed that nugget is plant-based	Video selection	Video watching	Attitudes	Knowledge	Behavior

The experiment started with a few brief questions about whether participants had eaten anything in the last 3 hours and their current hunger level. Participants were then presented with positive product reviews of the nuggets they were about to consume, emphasizing the product’s taste. The intention was to increase the salience of the nuggets.

Participants were presented with an image and a collection of customer reviews related to the food item. After reading the reviews, participants were directed to a table where they were served the nuggets. Once they finished eating, they returned to their seats to continue with the survey.⁹ Participants then rated their satisfaction with the product to further increase the salience of the nuggets.¹⁰

Eliciting information demand

Participants were provided with written descriptions of two TED Talk videos (of length 10 minutes each), each representing contrasting perspectives on animal agriculture. One was a pro-farm video, emphasizing the positive effects of animal agriculture on the environment, whereas the other was a pro-animal video, discussing issues related to factory farming and advocating for animal welfare. Neither video contained any graphic imagery.¹¹ After reading the descriptions, participants were asked to make their video selections. They were presented with three questions: whether they would like to watch

⁸As a robustness test, we also ran the analyses with all subjects, including those who did not pass the manipulation check. The results were essentially the same. We report these results in Tables 1.B.10–1.B.13 in Appendix 1.B.7.

⁹Due to the Covid-19 pandemic, the IRB required consumption of the food to occur outside the experimental lab.

¹⁰The average food rating is 17.87 in control vs. 16.18 among uninformed. The difference is statistically significant $p = 2.8 \times 10^{-5}$. This is consistent with the finding in Belot and Teh (2024), who find that people rate a plant-based product higher in taste when they know that it is plant-based.

¹¹The videos are a TED Talk *How to fight desertification and reverse climate change* by Allan Savory in 2013 (https://www.ted.com/talks/allan_savory_how_to_fight_desertification_and_reverse_climate_change) and a TEDx Talk *The ostrich effect: The truth we hide from ourselves* by Ed Winters in 2019 (<https://www.youtube.com/watch?v=nrVEYtSe-o8>). We edited both videos to be of a similar length, approximately 10 minutes each. The edited versions have been uploaded to our OSF website. The pro-animal video, though not about chickens specifically, is a moral condemnation of factory farming as a whole, which includes chickens (and they are specifically mentioned). The pro-farm video is less

the pro-farm video or not, whether they would like to watch the pro-animal video or not, and which video they preferred to watch. If they received no video, participants had to wait for others to catch up before proceeding to the next stage.

We designed this with the intention that the treatment – believing that one is eating meat – would lead one to increase their demand for the pro-farm video and decrease their demand for the pro-animal welfare video. That said, in Appendix 1.B.6 we also estimate the effect of the treatment on downstream behavior. Specifically, we estimate the treatment effects on donations to a pro-animal agriculture organization and donations to an animal-welfare organization. We estimate treatment effects on signing a petition to ban farrowing crates and signing a petition to support agricultural education.¹² In Appendix 1.B.5, we also estimate the effects of the treatment on mediator variables: knowledge in an incentivized quiz, the bias of mistakes in the quiz towards the direction of pro-animal welfare (we use this as an incentivized measure of pro-animal welfare beliefs), attitudes about animal farming, and attitudes about animal intelligence.¹³

Implementation

Our pre-analysis plan was registered at the American Economic Association’s Social Science registry AEARCTR-0010214.¹⁴ Protocols #3573 and #4564 were deemed exempt from IRB supervision by CGU IRB. We recruited subjects from college campuses in California, USA. A total of 267 students participated in the study, with 194 recruited from the Claremont Colleges and 73 from Cal State University, Long Beach.¹⁵ The entire experiment took about 40 minutes, and average earnings were \$12. During the experiment, we also instructed participants not to engage in conversations throughout the entire survey, particularly while they were eating. We did not encounter any adverse events. The instructions are available in Appendix 1.B.9.

related to chickens as the focus is on grazing livestock. This could be construed by participants as irrelevant. We presumed that the video would be construed broadly in favor of animal farming, and the treatment condition as broadly about “eating meat”, as opposed to the video being construed more narrowly as in favor of cattle farming and the treatment condition more narrowly about “eating chicken”. Our presumption of broad construal is based on the results in Loughnan et al. (2010), which showed that eating dried beef reduced self-reported moral concern for a list of 27 animal species.

¹²Effects on similar outcome variables have been found for undercover videos on intensive farming (Espinosa et al., 2024).

¹³The construction of the attitudes and knowledge scores, along with the elicitation of behavior can be found in Appendices 1.B.3 and 1.B.4.

¹⁴To find the pre-analysis plan please open the *Analysis Plan* tab and click *PAP*. It can also be found in Appendix 1.B.1. While we focus on demand for information in this paper, the results on the outcomes of behavior, attitude, and knowledge, are discussed in Appendices 1.B.5 and 1.B.6. Additional analyses specified in our pre-analysis plan are reported in Appendix 1.B.8.

¹⁵Our PAP states, “The ideal sample is N=300. We have struggled in the past with recruitment. If we cannot reach N=300 by Jan 2023 we may need to revise this number lower in an update.” We exhausted our Claremont Colleges sample and proceeded to move the experiment to CSULB. By the end of January 2023, in the aftermath of the COVID-19 pandemic, attendance for lab experiments had dried up on our campuses. Sessions had to be canceled due to zero attendance, and so we concluded recruitment with 11% below our targeted sample size.

Descriptive statistics

Table 1.2.4 shows the descriptive statistics of our sample. “Number of farmers” and “Number of vegans” refers to the number of friends and family the subject has who fit the label.

Table 1.2.4: Descriptive statistics of main variables: Chicken Experiment

Outcome Variables	Mean	Std. Dev.	Min	Max
Video Pro-farmer	.96	.21	0	1
Video Pro-animal	.88	.33	0	1
PF over PA	.67	.47	0	1
Control Variables				
Eat before	.37	.48	0	1
Hunger	5.1	1.3	1	7
Female	.62	.49	0	1
White	.39	.49	0	1
Highschool in US	.81	.39	0	1
Political orientation	.29	.46	0	1
Eat on campus	.56	.5	0	1
Pomona College	.72	.45	0	1
Number of farmers	1.1	1.9	0	10
Number of vegans	2.2	2.4	0	10
Observations	203			

Note: The descriptive statistics are generated for the sample that excludes participants who did not pass the manipulation check.

1.2.4 Key differences between the Beef-Pork and Chicken experimental designs

Table 1.2.5: Comparison between the Beef-Pork and Chicken Experiments

Main Differences Beef-Pork Experiment		Chicken Experiment
Treatment (Eating)	Beef and Pork vs. No meat	Uninformed nugget is plant-based (PB) vs. Informed nugget is PB
Demand for Information	Multiple price list. Information avoidance dummy for Beef/Pork & Environment/Animal Welfare/Health	Yes/No to watch video A and B. Selection between video A and B.
Types of Information	Beef/Pork production & Environment article. Beef/Pork production & Animal Welfare article. Beef/Pork consumption & Health article. (Randomized.)	Pro-Animal Agriculture video. Pro-Farmed Animal Welfare video. No video. (Randomized.)
Knowledge	Knowledge score: 8 multiple-choice questions with “I don’t know” (IDK) option.	8 multiple-choice questions. Questions were designed not to assess knowledge conveyed from the videos, but to assess belief in facts either supporting animal welfare or supporting animal agriculture.
Attitudes	Consequences score: 6 questions (Likert scale 1-7) Justification score: 10 questions (Likert scale 1-7)	Animal-farming industry: 8 questions (Likert scale 1-7) Farmed animal intelligence: 7 questions (Likert scale 1-7)
Behavior	–	Donation to a animal-welfare charity. Donation to an animal-farmer charity. Sign a petition to ban farrowing crates (pro-animal welfare). Sign a petition to support agricultural education (pro-farmer).

1.3 Results on information demand

1.3.1 Results on information demand in the Beef-Pork Experiment

The hypothesis stipulates that treated subjects are less willing to pay for information about meat. We measure the information demand with the dummy variable *Information Avoidance*, which is 1 if a subject avoids information even when it is offered for free and 0 otherwise. There are three information items for each beef and pork, as we offer information about environment, animal welfare, and health for both.

Figure 1.3.1 shows the frequency of information avoidance for each information item. This bi-variate analysis already indicates that the treatment had a mixed effect across the outcome variables. Information avoidance seems to be triggered for some information items but not for others.

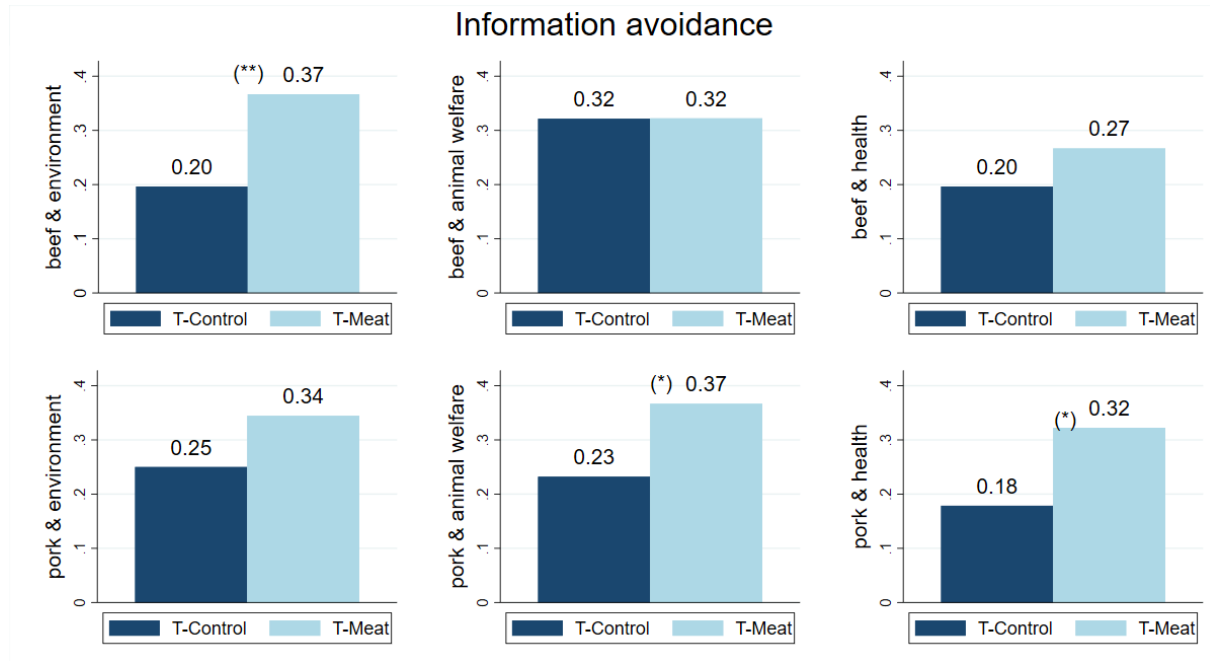


Figure 1.3.1: Information avoidance by information item

Notes: The variable information avoidance reflects the proportion of participants who refused the information item even if it is for free. The stars come from the χ^2 -test performed and express $*p < 0.1$, $**p < 0.05$, $***p < 0.01$. $n=146$.

To test effects, we run logistic regressions with robust standard errors. We run each model with and without control variables.¹⁶ In particular, we control for age, gender and

¹⁶Due to the randomization of treatments, it is in principle not necessary to have control variables for causal identification. We still want to test this, as there could be differences between treatment group and control due to noise, which can be substantial given our relatively small sample size. Moreover, including

Table 1.3.1: Information choice in Beef-Pork Experiment

	(1)	(2)	(3)	(4)	(5)	(6)
	Info-avoid. Beef Env.	Info-avoid. Beef Env.	Info-avoid. Beef A-W	Info-avoid. Beef A-W	Info-avoid. Beef Health	Info-avoid. Beef Health
T-Meat	0.179** (0.0821)	0.186** (0.0867)	0.000794 (0.0798)	-0.00115 (0.0839)	0.0720 (0.0746)	0.0964 (0.0779)
Controls	No	Yes	No	Yes	No	Yes
Mean Dep Var	0.301	0.301	0.322	0.322	0.240	0.240
Observations	146	145	146	145	146	145

	Info-avoid. Pork Env.	Info-avoid. Pork Env.	Info-avoid. Pork A-W	Info-avoid. Pork A-W	Info-avoid. Pork Health	Info-avoid. Pork Health
T-Meat	0.0967 (0.0807)	0.0852 (0.0857)	0.139* (0.0820)	0.151* (0.0878)	0.151* (0.0788)	0.178** (0.0814)
Controls	No	Yes	No	Yes	No	Yes
Mean Dep Var	0.308	0.308	0.315	0.315	0.267	0.267
Observations	146	145	146	145	146	145

Notes: Logit average marginal effects of information choice. *Info-avoid. Beef Env.* is a dummy variable which is 1 if a respondent avoided the information on beef & environment even if it was free. The same holds for all information items. A-W stands for Animal Welfare. Robust standard errors are in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

the lab in which the sessions were conducted. The marginal effects of the regression are presented in Table 1.3.1 (while the original regressions are reported in Appendix 1.A.4). The upper parts of Columns (1)–(2) show the effect of the treatment on information avoidance with respect to beef & environment, with and without controls. The further parts of the table address the other information items in the same way.

The table supports the previous observations. The consumption of meat appears to trigger the avoidance of information specifically related to the environmental impacts of beef production. In terms of marginal effects, meat consumption increases the probability of avoiding information about beef & environment by 17.9 percentage points ($p = 0.029$). For pork, meat consumption increases the probability of avoiding information about pork & animal welfare by 13.9 percentage points ($p = 0.09$) and raises the probability of avoiding information about pork & health by 15.1 percentage points ($p = 0.056$). Although the effects on pork are only weakly significant, they are also quite sizable.

The effects remain significant and do not decrease in size even when control variables are included. Adjusting for multiple hypothesis testing by the Romano-Wolf correction, the effects on beef & environment, and the effects on pork & health remain significant, while this is not the case for pork & animal welfare.¹⁷ Hence, we conclude from the Beef-

control variables is generally more efficient, yielding more precisely estimated treatment effects.

¹⁷The results of the Romano-Wolf correction are displayed in Appendix 1.A.4.

Pork experiment that meat consumption *can* reduce the probability of seeking information for specific information items. It seems that the effect of eating meat on information acquisition may be specific to some dimensions linked to the currently consumed animal. This suggests that the contemporaneous effects of meat consumption are limited in scope, but they can be potentially large.

While we have been ex-ante largely agnostic about which dimensions are more or less prone to be affected by our treatment, as the theory did not provide us with much guidance on this, we observe that the results are ex-post plausible. For beef, which embodies red meat, environmental concerns are a significant issue. In contrast, when it comes to pork, particularly in the form of rich salami sticks, health concerns naturally arise. However, animal welfare considerations for cows in Switzerland do not seem to be a major concern.

The elicitation using a multiple price list allows us to closely examine the extent of information avoidance and information-seeking behavior. The distribution of the willingness-to-pay proxy, shown in Figure 1.A.3 of Appendix 1.A.4, reveals that the most common responses are near zero. Specifically, in the control group, the modal answer for any information item is to accept it when it is offered for free, but to reject it when the cost is the lowest positive amount of 25 points, which is approximately 0.25 USD. In the treatment group, more participants avoid information when it is free, but most of them would still accept it when paid a small amount (25 points). The observation that the shift of behavior happens around zero suggests that the effects on information demand that we find are relatively small.

1.3.2 Results on information demand in the Chicken Experiment

In the Chicken Experiment, 203 out of the 267 subjects who participated successfully passed the manipulation check. To test for selection based on the manipulation check, we regress the treatment status on the control variables and then conduct an F-test for the joint significance of the control variables. This shows whether treatment assignment can be jointly predicted by the control variables. The resulting p-value of 0.901 indicates no significant difference between the two conditions.¹⁸ We also run a Wilcoxon-Mann-Whitney test for each control variable. No significant differences between treatments are detected. P-values are reported in Appendix Table 1.B.5.

In the treatment group, participants were not informed that the nuggets they consumed were plant-based. We hypothesize that the conflict arising from cognitive dissonance will lead those who believe they are eating meat to be less inclined to seek information about the treatment of animals in factory farms. Conversely, participants who think they are eating meat may exhibit a greater interest in the pro-farmer video, as it offers an ethical justification for consuming meat.

Table 1.3.2 shows the results of regressing the information choice on the treatment

¹⁸The descriptive statistics without the manipulation check are presented in Appendix Table 1.B.4.

and shows the average marginal effects.¹⁹ Only subjects who passed the manipulation check are included in our analysis. We also include controls on whether the participants have eaten anything, their hunger level, gender, race, whether they went to high school in the US, their political orientation, where they eat more often, location of the experiment, how many friends and family members are farmers, how many friends and family members are vegans. Columns (1)–(2) show the effect of the treatment on choosing the pro-farmer video, with and without controls, whereas Columns (3)–(4) show the effect of the treatment on choosing the pro-animal video, with and without controls. We also asked subjects to choose between these two videos. Columns (4)–(6) show the results for the choices of pro-farmer video over pro-animal video.

Contrary to our hypothesis in Section 1.2.1, none of the estimated coefficients of the treatment variable are statistically significant. We cannot reject the null hypothesis, that the manipulation had no effect on the demand for information about the treatment of animals.²⁰

Table 1.3.2: Information choice in Chicken Experiment

	(1) Pro-Farm Video	(2) Pro-Farm Video	(3) Pro-Animal Video	(4) Pro-Animal Video	(5) Pro-Farm or Pro-Animal	(6) Pro-Farm or Pro-Animal
T-Meat	-0.038 (0.036)	-0.041 (0.035)	0.018 (0.047)	0.020 (0.046)	0.031 (0.067)	0.023 (0.065)
Controls	No	Yes	No	Yes	No	Yes
Mean Dep Var	0.956	0.956	0.877	0.877	0.665	0.665
Observations	203	203	203	203	203	203

Notes: Logit average marginal effects of information choice. Robust standard errors are in parentheses.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

1.4 Discussion and conclusion

1.4.1 Reconciling the mixed results

The Beef-Pork Experiment showed that eating beef causes avoidance of information about the environmental impact of cows, and eating beef and pork causes avoidance of the health effects of pork. For preferences on cow animal-welfare, beef and health, pigs and the environment, and pig animal-welfare we are unable to reject the null hypotheses. Likewise the Chicken Experiment showed no detectable effect on information preferences for the animal-welfare video or the pro-animal farming video. What explains the difference in results? We consider several explanations.

¹⁹The results of the Ordinary Least Squares (OLS) analysis are presented in Appendix Table 1.B.6 and the results without manipulation check are presented in Appendix Table 1.B.10.

²⁰Proportion tests are also performed for the same analyses. The results are presented in Appendix Table 1.B.7.

First, the specific type of animal and type of meat appears to play a role. We see different effects from cows versus pigs versus chickens. People have different associations with these animals, and they may perceive the harms differently.

Second, linking the information to the specific type of meat may matter. The Beef-Pork Study found significant effects on information avoidance for topics directly linked to the consumed meat (environmental impacts for beef and health risks for pork), while the Chicken Study, which provided more general information about animal welfare, did not show similar patterns. The effect of eating meat on information preference may be specific to only information about the currently consumed animal.

Third, the topic of the information also appears to be relevant. While the Beef-Pork Experiment observed significant effects related to environmental and health concerns, no detectable effects were found for animal welfare, which was also the focus of the Chicken Experiment. This might indicate that certain information domains may evoke stronger avoidance behaviors due to the perceived severity of the issues involved.²¹

Digging deeper, we speculate that avoiding the messages may not be about avoiding information per se (or a desire to manipulate one’s own beliefs), but about avoiding attention towards the topic.²² Specifically, in the domain of animal welfare and information preferences, Epperson and Gerster (2024) show that animal-welfare information-avoiders seem to avoid mostly from distaste of viewing violence. Their beliefs do not update much from viewing the information (a virtual-reality video), but it does cause them greater negative affect. Many people are concerned about climate change and the effect of cows on climate change is widely discussed in popular media. Likewise, pork is often perceived as the least healthy meat (Verbeke et al., 1999). Subjects may be aware of the messages’ contents and avoid them to avoid feeling guilty about their current consumption. They may expect that the most negatively loaded content for cows will relate to the environment, and the most negatively loaded content for pigs will relate to health. Under this interpretation, information avoidance of this kind does not change one’s beliefs, as avoiders are already familiar with the content. Instead, it shifts their attention, which causes disutility. The relationship between attention and information remains a fascinating avenue for future research.

Fourth, differences in results may stem from differences in samples. Although both experiments used university students, the Swiss sample in the Beef-Pork Experiment may have different baseline attitudes towards climate change, diet, and animal welfare compared to the Californian sample in the Chicken Experiment. Different baselines may

²¹Consumption can have additional effects on information demand, besides inducing motivated beliefs. Information about a product that one consumes is more relevant and, hence, more valuable than information about a product that is not consumed. Consistently, we find in an additional online experiment (see Appendix 1.C) that the demand for information is larger when it concerns one’s own favorite product compared to a hypothetical product. Similarly, before starting the Beef-Pork Experiment, we made first tryouts with crocodile meat. Our impression from these tryouts was that those treated had higher net information demand because they were curious to learn more about the meat they had just consumed.

²²Several recent papers have emphasized the role of attention in information preferences (Tasoff and Madarasz, 2009; Golman and Loewenstein, 2015; Ganguly and Tasoff, 2017; Golman et al., 2022; Falk and Zimmermann, 2023; Saccardo and Serra-Garcia, 2023; Bolte and Raymond, 2024; Capra et al., 2024).

potentially lead to different effects. Ex ante, we would not expect any relevant effect differences between the samples, but cultural attitudes about diet and climate change are likely to differ somewhat. Our casual observation is that Europeans tend to be more concerned about climate change than Americans. We do not think the difference in samples is likely driving the difference in results, but it is possible. Similarly, the possibility of sample variation cannot be ruled out. Replication experiments are especially warranted given the mixed findings.

These results also offer valuable lessons for designing future experiments. Researchers should carefully consider the type of animal and meat, as people associate different harms and perceptions with different animals. They should also consider linking the information to the specific type of meat being consumed and carefully think about the topic of the information. Lastly, the cultural context may influence results and should be taken into account.

1.4.2 Maybe the real results are the friends we made along the way ...

Originally, the Beef-Pork Experiment and Chicken Experiment were independently designed, run, and analyzed. The different results led the two teams to different initial conclusions. The Beef-Pork team affirmed the possibility result. Their results showed that eating meat could change information preferences. In contrast, the Chicken team found only null results (aside from replicating the treatment effect on attitudes found in the psychology literature) and concluded that the attitudinal shift found in the psychology literature did not translate to a shift in behavior.

Jointly, we arrive at a yet different third conclusion. We interpret the evidence as showing that eating meat does change information preferences, but this change is contingent on the specific details about the meat and the information, and is less robust overall than what we inferred from our reading of the psychology literature.

In experimental research, scientific teams often work sequentially, with the lead team creating an experimental paradigm which becomes the foundational precedent for the following team. Additional teams may continue along this path, all based on the original framework. But how sensitive were those initial results to the original design?

In our case, we were lucky because the two research teams decided to pursue the research question in parallel. If instead we had worked sequentially, the sensitivity of the results to design choice may not have been uncovered. We wonder to what extent research in experimental economics fits this description. This remains an open question.

Meat consumption is associated with many harms. Finding ways to reduce it is important for the environment, animal welfare, and human health. If eating meat causes motivated reasoning in this domain, it may be relevant for the efficacy of various policies. For example, if eating meat reduces demand for information about the harms of meat, policies that time information when people are not eating meat (avoiding typical lunch and dinner times; using Meatless Mondays, Lent, etc.) may be more effective. Likewise, packaging information with incentives to temporarily reduce meat consumption may be

particularly effective.

Finally, more research is needed to better understand the importance of motivated reasoning in maintaining high-meat diets. Our study found evidence consistent with motivated reasoning but that does not imply that motivated reasoning is a key consideration in shifting meat demand. The effects of culture, price, habit, attention, convenience, and contextual cues may swamp the relative importance of motivated reasoning. Future research should help to quantify the relative importance of motivated reasoning in sustaining high-meat diets.

Declaration about generative AI

During the preparation of this work the author(s) used Claude Sonnet and GPT 4o in order to improve language of the introduction. After using these tools, the authors reviewed and edited the content as needed and take full responsibility for the content of the publication.

Appendices

1.A Beef-Pork Experiment appendices

1.A.1 Theoretical background: the meat paradox

Based on the literature on motivated beliefs (Bénabou and Tirole, 2016) and information avoidance (Golman et al., 2017), we conjecture that eating meat fosters the tendency to avoid and disregard information concerning meat, in particular concerning the negative consequences of meat consumption. Hestermann et al. (2020) formally develop this argument and our hypotheses follow more or less directly from their model. Formally, the model assumes a moral cost $\omega\tilde{x}c$ of consuming meat, where c is the level of consumption, $\tilde{x}$ the perceived size of the negative externalities, and ω the degree of empathy or guilt. Agents can reduce this moral cost by engaging in self-deception, which lowers belief $\tilde{x}$. Applying this model of Hestermann et al. (2020) to our experiment, the treatment literally lowers the price of a given amount of meat to zero and hence increases consumption c . This increases the benefits of self-deception and consequently its equilibrium level (their Proposition 3), which is the reason for information avoidance (their Proposition 7). One difference is that in our experiment subjects do not freely choose the level of consumption. This could reduce the empathy/guilt (ω) they feel and hence we would rather find smaller effects.

1.A.2 Pre-analysis plan (PAP) documents

Since this paper merges the Beef-Pork Experiment with the Chicken Experiment, not all parts of each experiment can be included in the joint paper. In particular, the joint paper focuses on information demand, whereas both experiments contain further outcomes, as it can be seen from the respective pre-analysis plans. As mentioned in a footnote of the paper, pre-registration, as currently practiced by economists, varies in terms of having or not having a pre-analysis plan (PAP) and, given an analysis plan, its level of stringency (Brodeur et al., 2024). We preregistered the Beef-Pork Experiment with a pre-analysis plan that states the hypotheses and how they can be tested in principle without providing the details.

Original analysis plan

ANALYSIS PLAN FOR INFORMATION AVOIDANCE IN MORAL DECISIONS: AN EXPERIMENT ON MEAT CONSUMPTION

Berno Buechel, Benedicte Droz, & Anis Nassar*

February 11, 2022

1 Set-Up

The study consists of a sequence of online survey and lab experiment. In the survey and the experiment we ask participants questions about their eating behavior. In the lab participants complete a sequence of tasks in which we elicit their attitudes towards animals and meat as well as, in an incentive compatible way, their knowledge about meat and willingness to pay (WTP) for information regarding meat. We use two treatments and a control, to assess if the consumption of meat in the lab influences attitudes, knowledge and willingness to pay for information (WTP) about meat. Subjects are randomly assigned to the two treatments *T-Past* and *T-Future* and to the baseline treatment *T-Control*, constituting the exogenous variation in this study. Subjects in *T-Past* are served meat before their WTP, attitudes and knowledge are elicited. Subjects in *T-Future* anticipate that they will be

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served meat after their WTP, attitudes and knowledge are elicited. Subjects in *T-Control* only differ in that they are not served any meat before or after their WTP, attitudes and knowledge are elicited.

Consuming meat may create cognitive dissonance when confronted with its consequences for animal welfare, the environment, and own health. Based on the literature on motivated beliefs (Bénabou and Tirole, 2016) and information avoidance (Golman et al., 2017), we conjecture that eating meat fosters the tendency to avoid and disregard information concerning meat, in particular concerning the negative consequences of meat consumption. Hestermann et al. (2020) formally develop this argument and our hypotheses follow more or less directly from their model.¹

2 Hypotheses

- **Meat consumption lowers the willingness to pay for information about meat.**
 - Justification: To reduce dissonance and keep a positive (self-)image, subjects who eat meat may demand less information about the consequences of meat consumption.
 - Analysis: Compare subjects' WTP for information about meat (concerning animal welfare, the environment, and health) in *T-Past* and *T-Future* with the WTP in *T-Control*.
- **Meat consumption lowers estimation of its negative consequences.**
 - Justification: To reduce dissonance and keep a positive (self-)image, subjects who eat meat may disregard and downplay information

¹One difference is that in our experiment subjects do not choose the level of consumption. This could reduce the empathy/guilt (ω) they feel and hence we would rather find smaller effects.

about negative consequences of meat consumption.

- Analysis: Compare subjects' estimation of negative consequences of meat consumption (concerning animal welfare, the environment, and health) in *T-Past* and *T-Future* with the estimation in *T-Control*. Repeat the comparison for the change in estimation between survey and experiment.

- **Meat consumption hampers knowledge concerning meat.**

- Justification: If meat eaters disregard and downplay information about negative consequences of meat consumption, this may come at the cost of reduced accuracy of their knowledge about meat.
- Analysis: Compare subjects' level of knowledge about meat in *T-Past* and *T-Future* with the level of knowledge in *T-Control*. Repeat the comparison for the change in knowledge between survey and experiment.

- **Meat consumption fosters meat justification attitudes.**

- Justification: Agreeing to meat justification arguments (such as, it is natural, normal, necessary, or nice to eat meat) may relax dissonance between meat consumption and its negative consequences and help preserve a positive (self-)image.
- Analysis: Compare meat justification score in *T-Past* and *T-Future* with the score in *T-Control*. Repeat the comparison for the change in meat justification score between survey and experiment.

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Update of analysis plan

ANALYSIS PLAN FOR INFORMATION AVOIDANCE IN MORAL DECISIONS: AN EXPERIMENT ON MEAT CONSUMPTION

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August 4, 2022

Update in August 2022

On February 11, 2022, we pre-registered the hypotheses and analysis plan for the project entitled “Information avoidance in moral decisions: an experiment on meat consumption.” This update notes that we keep the plan as it is, but we discontinue one of its experimental treatments, *T-Future*, due to exogenous constraints.

By June 2022, we have exhausted the pool of participants in our lab and a large part of our funding without having reached the planned number of observations (of 70 per treatment). The reason might be that our eligibility criteria for participating in this lab experiment are restrictive (e.g. no dietary restrictions, fluent in English) such that we had to conduct many sessions with fewer participants than expected. We will continue data collection at another lab, but focus on one instead of two treatments, besides the control.

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That is, we keep the original experimental design, the hypotheses and the analysis plan (of 2022-02-11) as it is, but discontinue what is called the Future treatment, *T-Future*.

T-Future is a variation of the other treatment *T-Past*. Both differ from the control treatment *T-Control* by the intervention that participants are served meat. Subjects in *T-Past* are served meat before their WTP, attitudes and knowledge are elicited. Subjects in *T-Future* are served meat after their WTP, attitudes and knowledge are elicited. The literature that we used to develop our hypotheses and our hypotheses are agnostic about any differences between *T-Past* and *T-Future*. They postulate the differences of both these treatments to the control treatment *T-Control*, in which participants are not served any meat.

To allocate treatments to sessions, the computer had randomly drawn a sequence of the three treatments. We have strictly followed this sequence. As it happened, we have had 40 participants in *T-Control*, 40 participants in *T-Past*, and only 28 in *T-Future*. We will strictly stick to the originally drawn sequence, which gives us the order of *T-Control* and *T-Past*. *T-Past* might now just be called *the* treatment or *T-Meat*.

1.A.3 Eliciting information demand

In order to elicit the participants' willingness to pay (WTP) for an information item in the Beef-Pork Experiment, we asked the following seven questions, displayed in Figure 1.A.1 for the example of animal welfare in beef production.

In the sequences of seven questions on an information item displayed in Figure 1.A.1, there are fewer and fewer monetary benefits of accepting the item, starting with being paid 75 points down to having to pay 75 points.²³ Consistent choices hence show a switching point where the answer switches from "Yes" to "No"; unless the true switching point is outside of this range such that all answers are "Yes" or "No". The switching points are characteristic of a participant's true WTP. Table 1.A.1 shows in the second cell all theoretical true WTP values that are consistent with each choice. Each choice corresponds to an interval of possible WTP values. Instead of working with these cumbersome intervals, we use two complementary measures.

The first measure is the dummy variable *Info Avoidance* that is used throughout the paper; it takes value 1 if the participant refused the information item even when it was for free, and it takes value 0 (information seeking) otherwise. The second is a cardinal but only approximate measure called *WTP proxy*, as illustrated in Table 1.A.1. It takes the midpoint of each interval; and for the extreme values (always Yes and always No) it takes a value that is equidistant to the others.

²³The choice was made consistent by design: When a participant answered one question with "No" all questions in lower lines switched to "No" too. The participant could always revise her choices before going to the next screen. The underlying assumption is that if some information item is refused at some price p , it must be refused at a higher price as well.

Item 1: Information on animal welfare in the beef production

If you are paid 75 points for this information item, would you accept?	☐	☐
	Yes	No
If you are paid 50 points for this information item, would you accept?	☐	☐
	Yes	No
If you are paid 25 points for this information item, would you accept?	☐	☐
	Yes	No
If you are paid 0 points for this information item, would you accept?	☐	☐
	Yes	No
If you have to pay 25 points for this information item, would you accept?	☐	☐
	Yes	No
If you have to pay 50 points for this information item, would you accept?	☐	☐
	Yes	No
If you have to pay 75 points for this information item, would you accept?	☐	☐
	Yes	No

Figure 1.A.1: WTP question

Notes: Participants were asked to answer these questions for six different items. These six items are: information on animal welfare in beef production, information on the environment and beef production, and information on health and beef consumption, and likewise for pork. 100 points is 1 CHF (Swiss franc), which corresponds to roughly 1 USD.

Table 1.A.1: Representation of the WTP variable

Switch to “No”	WTP	WTP proxy	Info Avoidance
at paid 75 (always “No”)	$\in (-\infty, -75]$	-87.5	1
at paid 50	$\in [-75, -50]$	-62.5	1
at paid 25	$\in [-50, -25]$	-37.5	1
at zero	$\in [-25, 0]$	-12.5	1
at price 25	$\in [0, 25]$	12.5	0
at price 50	$\in [25, 50]$	37.5	0
at price 75	$\in [50, 75]$	62.5	0
never (always “Yes”)	$\in [75, \infty)$	87.5	0

1.A.4 Additional results on information demand

In addition to the analyses presented in the main text using the variable *Info avoidance*, we also conducted analyses with the cardinal measure *WTP proxy* reported in Figure 1.A.2 and Figure 1.A.3.

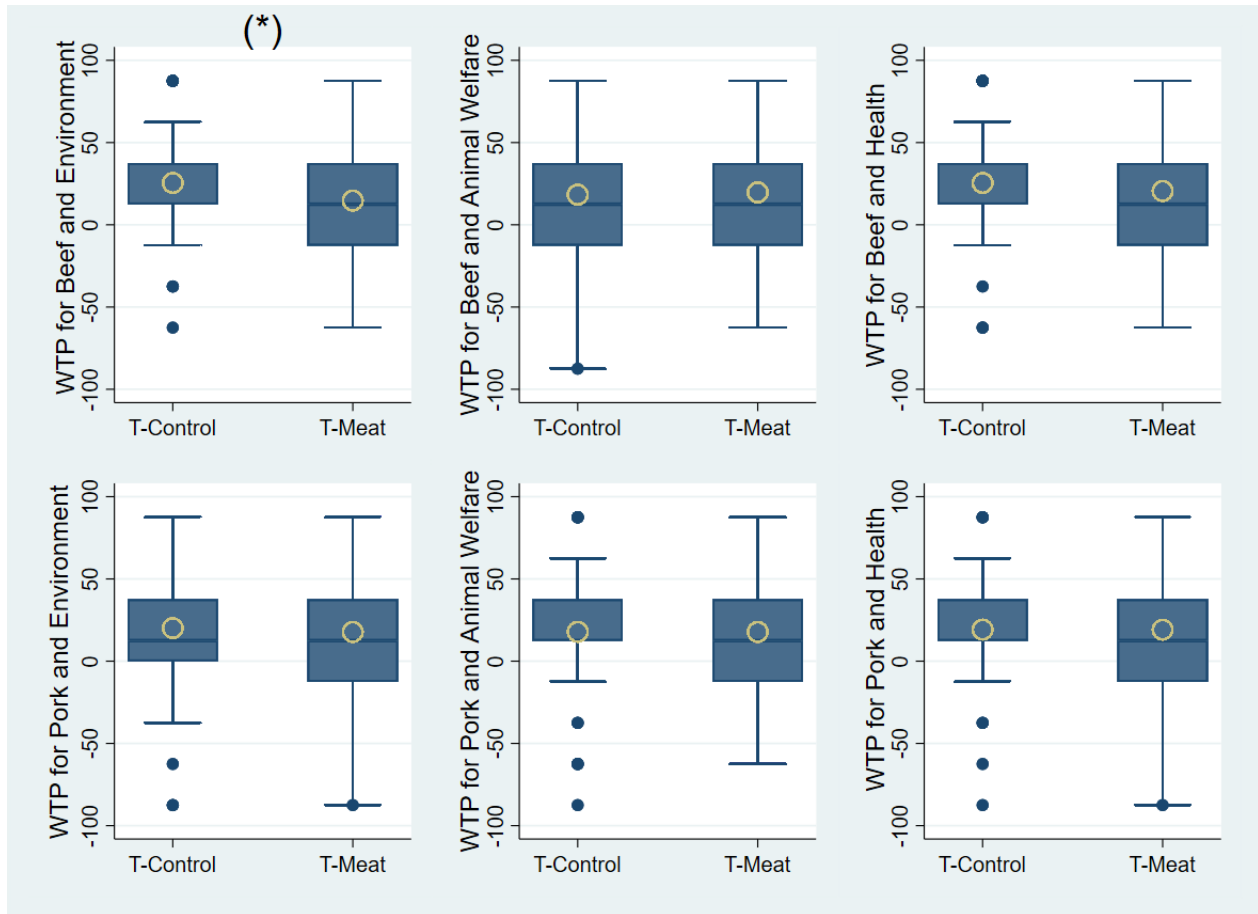


Figure 1.A.2: WTP proxy – 6 items

Notes: The box represents the interquartile range (25th percentile to 75th percentile). The median is represented by the horizontal line inside the boxplot, while the circle symbol indicates the mean value. Stars indicate significance levels from the Wilcoxon-Mann-Whitney test: $*p < 0.1$, $**p < 0.05$, $***p < 0.01$.

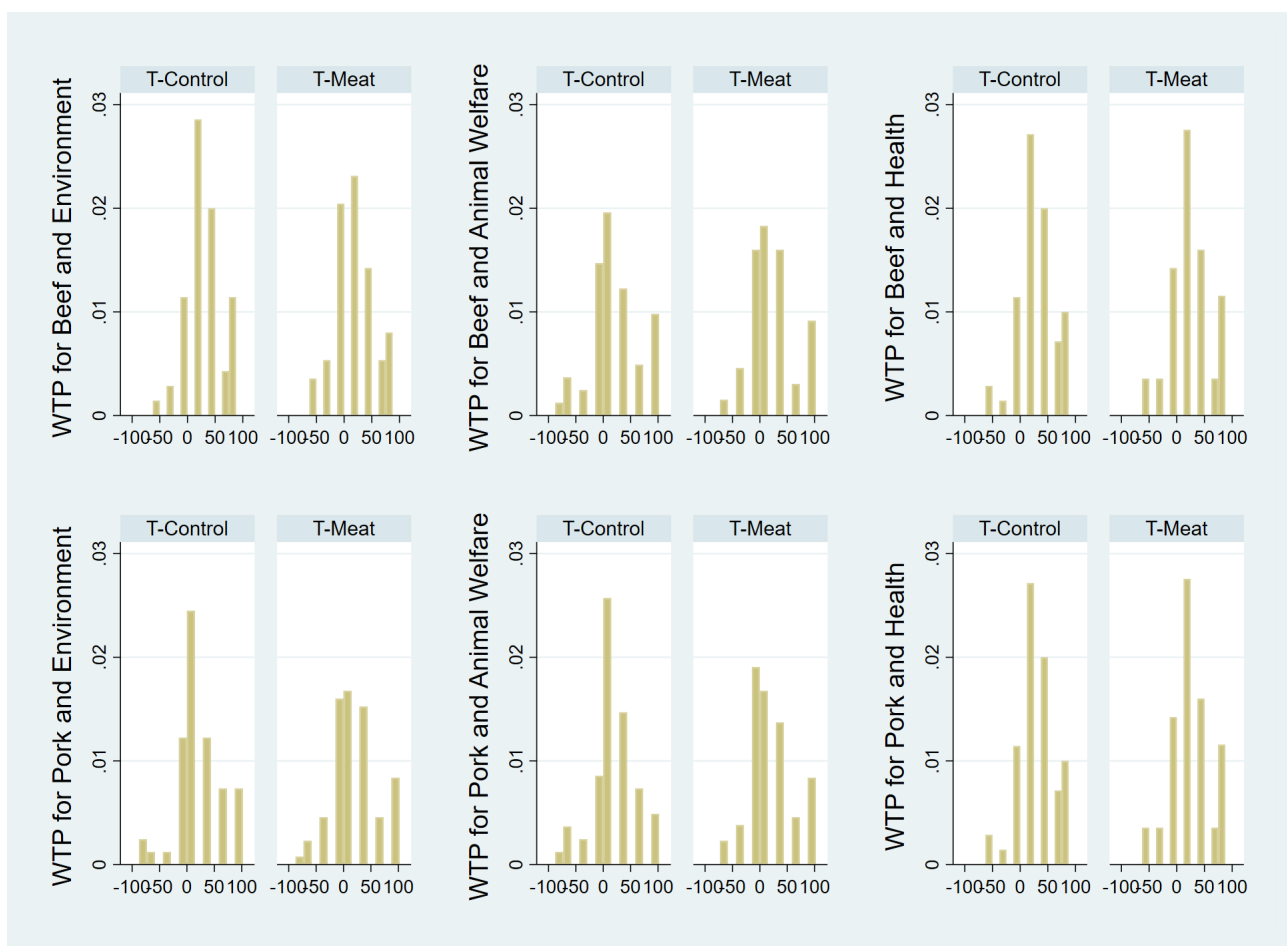


Figure 1.A.3: WTP proxy histograms

Logit regressions

Table 1.A.2: Logit model: information avoidance for beef

	(1)	(2)	(3)	(4)	(5)	(6)
	Beef Env. info-avoid.	Beef Env. info-avoid.	Beef A-W info-avoid.	Beef A-W info-avoid.	Beef Health info-avoid.	Beef Health info-avoid.
T-Meat	0.862** (0.403)	0.905** (0.431)	0.00364 (0.366)	-0.00531 (0.388)	0.397 (0.414)	0.554 (0.460)
Female		0.116 (0.389)		0.262 (0.389)		0.659 (0.443)
Age		0.128*** (0.0424)		0.152*** (0.0435)		0.120*** (0.0437)
Lab-dummy		0.0155 (0.389)		0.0262 (0.379)		-0.476 (0.446)
Constant	-1.409*** (0.338)	-4.545*** (1.143)	-0.747*** (0.287)	-4.519*** (1.125)	-1.409*** (0.338)	-4.595*** (1.262)
Observations	146	145	146	145	146	145

Robust standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 1.A.3: Logit model: information avoidance for pork

	(1)	(2)	(3)	(4)	(5)	(6)
	Pork Env. info-avoid.	Pork Env. info-avoid.	Pork A-W info-avoid.	Pork A-W info-avoid.	Pork Health info-avoid.	Pork Health info-avoid.
T-Meat	0.455 (0.381)	0.403 (0.406)	0.650* (0.386)	0.703* (0.414)	0.782* (0.417)	0.933** (0.438)
Female		-0.300 (0.378)		-0.146 (0.378)		0.0231 (0.407)
Age		0.0751* (0.0391)		0.0552 (0.0407)		0.0800* (0.0420)
Lab-dummy		0.187 (0.391)		-0.186 (0.390)		-0.522 (0.413)
Constant	-1.099*** (0.310)	-2.751*** (1.044)	-1.196*** (0.318)	-2.358** (1.101)	-1.526*** (0.350)	-3.306*** (1.175)
Observations	146	145	146	145	146	145

Robust standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Pairwise correlation matrix

Table 1.A.4: Pairwise correlation matrix – information avoidance

	Beef Env.	Beef A-W	Beef Health	Pork Env.	Pork A-W.	Pork Health
Beef Env.	1.0000					
Beef A-W	0.7296***	1.0000				
Beef Health	0.7151***	0.6089***	1.0000			
Pork Env.	0.6607***	0.5878***	0.6675***	1.0000		
Pork A-W.	0.6149***	0.6372***	0.5516***	0.6968***	1.0000	
Pork Health	0.6493***	0.5449***	0.7125***	0.7704***	0.7235***	1.0000

Notes: Phi coefficients (i.e., Pearson's correlation coefficients applied to binary variables). *Beef Env.* is a dummy variable which is 1 if a respondent avoided the information on beef & environment even if it was free. The same holds for all information items. A-W stands for Animal Welfare. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. n=146.

Correction for multiple hypothesis testing

We correct the p-values obtained from the logit regression with robust standard errors by the Romano-Wolf correction. The foundation for this correction is provided in Romano and Wolf (2005) and its implementation in Stata is documented in Clarke et al. (2020). The family of hypotheses for beef includes information items concerning environment, animal welfare, and health. Likewise for pork.

Table 1.A.5: P-values for information avoidance (with controls) LOGIT – robust s.e.

Outcome Variable	Model p-value	Resample p-value	Romano-Wolf p-value
Beef Env. info-avoid.	0.0337	0.0180	0.0689
Beef A-W info-avoid.	0.9892	0.9880	0.9880
Beef Health info-avoid.	0.2087	0.2198	0.3327

Independent variable: T-Meat
Number of resamples: 1000

Table 1.A.6: P-values for information avoidance (with controls) LOGIT – robust s.e.

Outcome Variable	Model p-value	Resample p-value	Romano-Wolf p-value
Pork Env. info-avoid.	0.3114	0.3347	0.3347
Pork A-W info-avoid.	0.0792	0.0989	0.1469
Pork Health info-avoid.	0.0327	0.0370	0.0829

Independent variable: T-Meat
Number of resamples: 1000

1.A.5 Eliciting attitudes and knowledge and constructing scores

In order to elicit the displayed knowledge in the Swiss experiment, we created eight incentivized questions about meat consumption and production (see Appendix 1.A.5). Each knowledge question had four possible answers, besides one “I don’t know” answer. Among the four answers only one was correct and gave the participant points. We pointed out that guessing is a valid option by writing “If you are not sure, you can take a guess. There are no negative points for wrong answers.”

We summed up the correct answers and created a *Knowledge score* which takes value 8 if the participant perfectly answered all eight questions and 0 if the participant answered no question correctly. We also created a dummy variable *IDK respondent* which took the value of 1 if the respondent had ticked “I don’t know” at least once and the value of 0 if the respondent never answered “I don’t know” in the eight knowledge questions.

To elicit the displayed participants’ attitudes in the Beef-Pork Experiment we gathered 26 questions on the attitudes towards meat consumption and its justifications. Using a Likert-scale, this allowed us to know to which extent participants would agree or not to those 26 statements. The first series (13 questions) concerned the meat-eating justifications. We base our 13 questions on the papers of Ruby (2012) and Espinosa and Treich (2021). The second series of questions consisted of the remaining 13 questions and investigated the participant’s personal attitudes towards the environment, animal welfare and health. Among these 26 questions, we asked for instance the “four Ns” questions (eating meat is natural, normal, necessary and nice) as described in Piazza et al. (2015). Using those attitude questions, we constructed a *Consequences score* (i.e., a score for judging negative consequences due to meat consumption) based on six questions. Furthermore, we established a meat *Justification score* which is based on ten questions, as proposed in Espinosa and Treich (2021). How these scores were constructed is detailed below.

1. Meat Justification Score

Justification Score:

- God created animals for us to eat them.
- It is acceptable to eat meat because animals are raised for this purpose.
- It is acceptable to eat meat because the animals killed for our consumption have lower intellectual capacities than humans.
- It is acceptable to eat meat because the animals killed for our consumption do not really suffer.
- Eating meat may be bad for the environment, but no more so than eating vegetables or cereals.
- Eating meat is healthy.
- It's natural to eat meat, it's written in our genes.
- It's normal to eat meat.
- Eating meat is necessary for good health.
- I like meat too much to stop eating it.

2. Consequences Score

Consequences Score:

- It is acceptable to eat meat because the animals killed for our consumption do not really suffer.
- Eating meat may be bad for the environment, but no more so than eating vegetables or cereals.
- Animals are mostly treated well in farms in Switzerland.
- The way meat is produced in Switzerland is morally wrong.
- Preserving jobs is more important than reducing CO2 emissions.
- Deforestation is a major concern for humanity.

Knowledge questions

You will now face a series of 8 factual questions.

Each of these questions has one and only one right answer. Please tick the correct answer. If you are not sure, you can take a guess. There are no negative points for wrong answers.

You can gain 50 points for each correct answer.

According to the WHO, which of these are carcinogenic (increase risk of cancer)?

- ☒ White meat and red meat
- ☐ White meat and processed meat
- ☐ Red meat and processed meat
- ☐ Fish and white meat
- ☐ I don't know

In Swiss farms, what is the minimum space per pig that is legally required?

- ☐ 1.8 square meter
- ☐ 3.2 square meter
- ☐ 4 square meter
- ☐ 0.9 square meter
- ☐ I don't know

According to the Swiss Confederation's nutrition strategy 2017-2021: on average, how much meat do the Swiss eat compared to what would be optimal for their health?

- ☐ Meat consumption is approximately at the right level
- ☐ Meat consumption is 3x too high
- ☐ Meat consumption is 7x too high
- ☐ Meat consumption is 2x too low
- ☐ I don't know

The production of which of the following items requires the largest land use?

- ☐ 100g of protein from beef
- ☐ 100g of protein from lentils
- ☐ 100g of protein from chicken
- ☐ 100g of protein from tofu
- ☐ I don't know

What is the maximum number of chicken a 'BIO' labeled egg laying farm can have in Switzerland?

- ☐ 8'000
- ☐ 4'000
- ☐ 500
- ☐ 100
- ☐ I don't know

Which of the following food choices have more protein?

- ☐ 100g of almonds
- ☐ 100g of beefsteak
- ☐ 100g of chickpeas
- ☐ 100g of chicken breast
- ☐ I don't know

One vitamin that is only found in animal derived products, and is therefore a common deficiency in vegan diets is:

- ☐ Magnesium
- ☐ Vitamin E
- ☐ Vitamin B12
- ☐ Folic Acid
- ☐ I don't know

In Swiss farms, the percentage of pigs that live their whole life without having the possibility to go outside is:

- ☐ 58%
- ☐ 36%
- ☐ 88%
- ☐ 0%
- ☐ I don't know

Next

Figure 1.A.4: Knowledge questions

1.A.6 Results on attitudes and knowledge

Table 1.A.7 shows the descriptive statistics of the four outcome variables on attitudes and knowledge.

Table 1.A.7: Descriptive statistics of main variables

Variable	Obs	Mean	Std. Dev.	Min	Max
Knowledge score	146	4.62	1.50	1.00	8.00
IDK respondent	146	0.13	0.34	0.00	1.00
Consequences score	146	4.81	0.71	2.83	6.33
Justification score	146	3.39	0.99	1.10	5.80

Notes: *Knowledge score* represents the number of correct answers out of eight knowledge questions. *IDK respondent* is a dummy variable that equals 0 if the participant never selected “I don’t know” and 1 if they selected it at least once. Details on *Consequences score* and *Justification score* are in Appendix 1.A.5.

Figure 1.A.5 compares these outcomes conditional on the treatment. When looking at the mean knowledge score (upper part of Figure 1.A.5), we do not find any reduction. However, when looking at the frequency of the IDK respondents, i.e., respondents who tick at least once “I don’t know”, we found that this frequency increases significantly (χ^2 -test $p = 0.03$) as shown in the lower part of Figure 1.A.5.

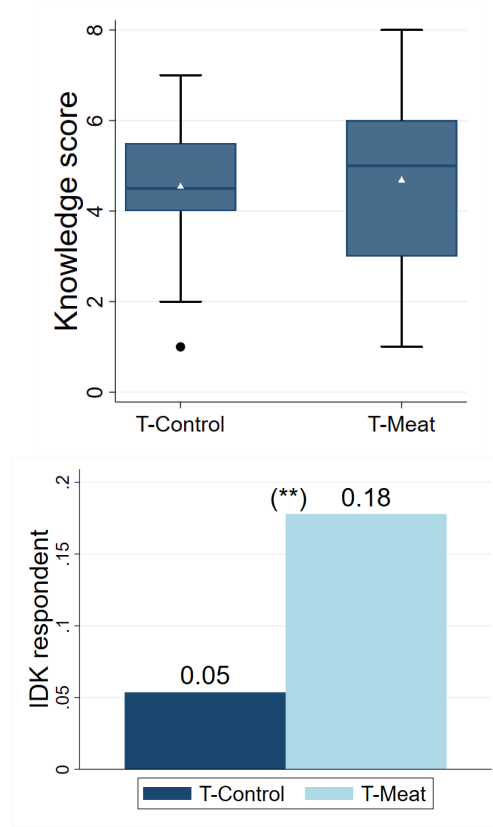


Figure 1.A.5: Knowledge score and IDK respondent

Notes: In the upper part, the boxplot depicts the distribution of the variable *Knowledge score*, where the triangle stands for the mean. In the lower part, the variable *IDK respondent* stands for I don't know respondent, a dummy variable which takes 0 if participant has never ticked "I don't know" and 1 if (s)he has ticked this option at least once in the knowledge questions. The stars come from the χ^2 test performed and express * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. $n=146$.

After this bivariate analysis, we test this insight with a logit regression whose marginal effects are presented in Table 1.A.8. The raw coefficients together with the coefficients of the control variables are reported in Table 1.A.9. Since the knowledge questions have already been asked in the online survey before the experiment, we can also control for whether a participant was an "I don't know" respondent before the treatment. Model 3 of Table 1.A.8 only uses this control variable and Model 4 adds the usual control variables (*Female*, *Age*, *Lab Dummy*). All results confirm the observation from the bivariate illustration. Meat consumption increases the probability of becoming an "I don't know" respondent. Without control variables this effect is of the size 13.6 p.p. ($p = 0.02$). The control variables do not reduce significance of this effect and leave its estimated marginal effect above 8 p.p. ($p = 0.049$). Hence, we conclude meat consumption does not significantly lower the knowledge about meat, but it seems to significantly increase the probability of ticking "I don't know". This finding relates to the result on information acquisition and is in line with the theory of imperfect memory. Perhaps, eating meat increases displayed ignorance about consequences of its consumption.

Table 1.A.8: Marginal effects for IDK respondent (logit)

	(1)	(2)	(3)	(4)
	IDK respondent	IDK respondent	IDK respondent	IDK respondent
T-Meat	0.136** (0.0586)	0.140** (0.0547)	0.0759* (0.0399)	0.0818** (0.0415)
Controls	no	yes	no	yes
Survey IDK resp.	no	no	yes	yes
Observations	146	145	146	145

Robust standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Notes: *IDK respondent* stands for I don't know respondent, a dummy variable which takes 0 if participant has never ticked "I don't know" and 1 if (s)he has ticked this option at least once in the knowledge questions. Model (1) includes no controls and no variable *Survey IDK respondent*. Model (2) includes controls but no variable *Survey IDK respondent*. Model (3) includes no controls but includes the variable *Survey IDK respondent*. Finally, Model (4) includes controls and the variable *Survey IDK respondent*.

Table 1.A.9: Logit model: IDK respondent

	(1) IDK respondent	(2) IDK respondent	(3) IDK respondent	(4) IDK respondent
T-Meat	1.340** (0.657)	1.599** (0.630)	1.805** (0.742)	2.312*** (0.824)
Female		0.0999 (0.539)		-0.745 (0.794)
Age		0.146*** (0.0512)		0.0534 (0.0565)
Lab-dummy		-0.949* (0.565)		-0.915 (0.743)
Survey IDK respondent			3.899*** (0.709)	3.958*** (0.846)
Constant	-2.872*** (0.596)	-6.287*** (1.457)	-5.020*** (0.825)	-5.934*** (1.737)
Observations	146	145	146	145

Robust standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Notes: *IDK respondent* stands for I don't know respondent, a dummy variable which takes 0 if participant has never ticked "I don't know" and 1 if (s)he has ticked this option at least once in the knowledge questions. Model (1) includes no controls and no variable *Survey IDK respondent*. Model (2) includes controls but no variable *Survey IDK respondent*. Model (3) includes no controls but includes the variable *Survey IDK respondent*. Finally, Model (4) includes controls and the variable *Survey IDK respondent*.

There was no detectable effect of meat consumption on attitudes. In particular, the mean *Consequences score* does not decrease significantly (t-test) and the mean *Justification score* does not increase significantly (t-test).

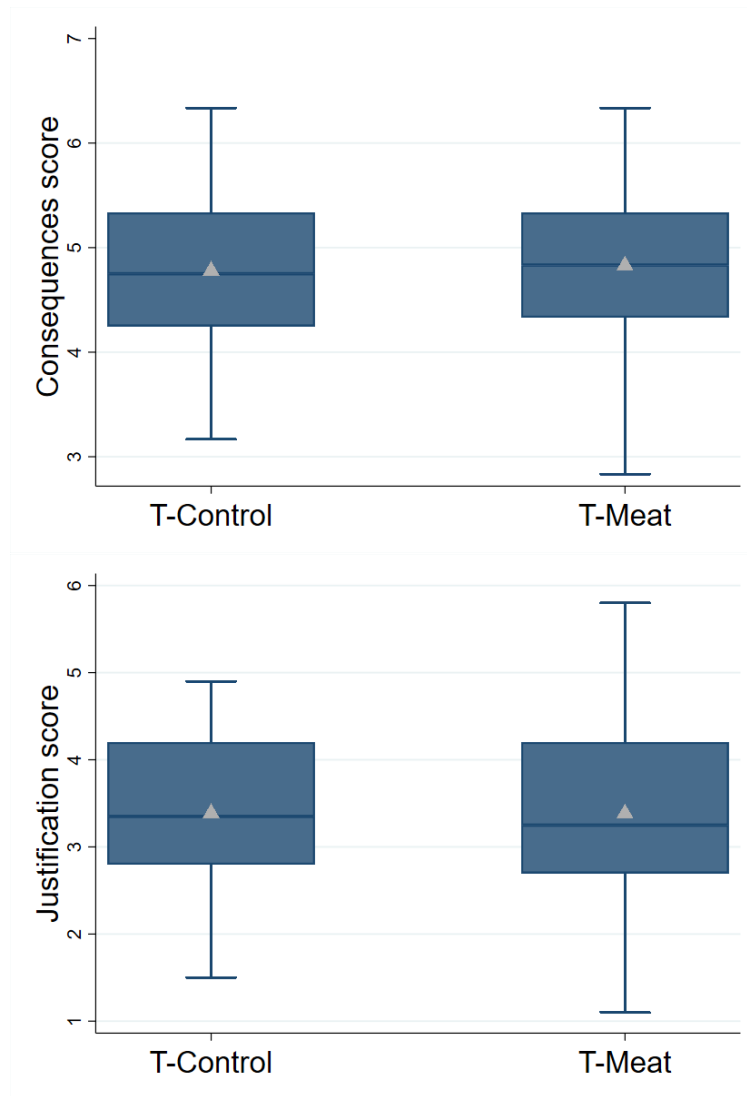


Figure 1.A.6: Meat consequences score and meat justification score

Notes: In the upper part, the boxplot depicts the distribution of the variable *Consequences score*, an attitude index for judging negative consequences due to meat consumption. In the lower part, the boxplot depicts the distribution of the variable *Justification score*, an attitudes index for the justification of meat consumption. In both parts the triangles stand for the means. n=146.

1.A.7 Pictures from the lab

The lab and computers



Figure 1.A.7: Lab



Figure 1.A.8: Desk with beef and pork placed in the two cups

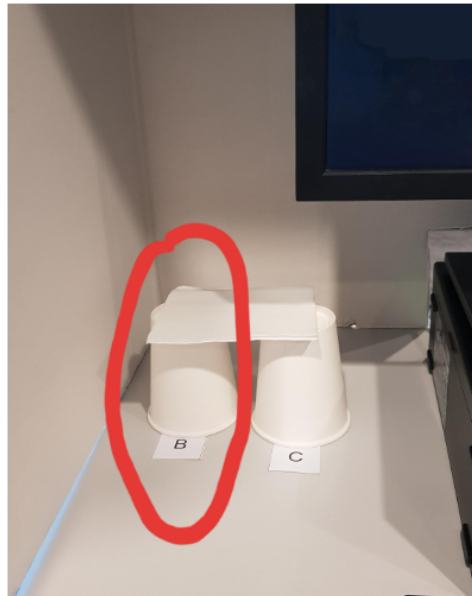
Presentation of the meat

Beef

You will now eat some beef meat.

Beef jerky is a type of dried beef meat that is available in Switzerland.

To your left, there is a cup marked "B". Please lift the "B" cup up to reveal the beef meat.



Please eat it and confirm only when you are done eating.

(If you cannot eat the meat, please raise your hand.)

I confirm I have eaten the beef

Figure 1.A.9: Presentation of the beef chip



Figure 1.A.10: The beef chips (left) and the pork sticks (right)

1.A.8 Screenshots of the laboratory experiment

Instructions

Welcome

You are now taking part in a scientific study. Please read the following instructions carefully. Everything that you need to know in order to participate in this study is explained below.

This is the second part of the study. You should have completed Part 1 online already. If you have not completed the online questionnaire, please raise your hand.

This part of the study should last less than 60 minutes. You earn 1'200 points for completing Part 2 today. This comes on top of your previous gains from Part 1. Today, you will also get opportunities to earn more extra points by answering questions and by completing the experiment. It will always be clear when and how you can gain or spend points.

The exchange rate is 100 points = 1 CHF.

The combined earnings of Part 1 and Part 2 will be paid in CHF at the end of the session today.
Please do not use the computer for any other purpose than completing this study and do not use your phone.

What is your personal 8 characters combination from the online survey? (please use capital letters only)

Consent form (click to expand)

START - I consent

Figure 1.A.11: Instructions and general information

What is your personal 8 characters combination from the online survey? (please use capital letters only)

Consent form (click to expand)

The experiment is conducted by researchers in the Department of Economics, University of Fribourg, Switzerland, which is also the funding institution.

There are no risks associated with this research. The benefits from this study include monetary payment as indicated by the researchers.

Your participation in this research is completely voluntary and anonymous. If you choose to participate, you may change your mind and leave the study at any time. You may also withdraw your participation or your data at any time during the study. Refusal to participate, stopping your participation or withdrawing your data will involve no penalty other than losing compensation for which tasks have not been completed.

Your data will be kept completely anonymized by not recording your name in combination with your data, only anonymous choices are kept. This means once you have left the lab, we cannot erase your data (because we could not recognize it). The purpose of this research is understanding behaviours. Your participation starts by clicking the "Start – I consent"- button which means you consent to participating to the study.

I have read the description of this study, my questions have been answered, and I give my consent to participate. Consent is indicated by clicking the "Start – I consent"-button.

For questions or concerns regarding this research, please contact: Bénédicte Droz, Department of Economics, University of Fribourg, Bd de Pérolles 90, CH-1700 Fribourg. Email: benedicte.droz (at) unifr.ch.

The University of Fribourg, Department of Psychology, has an Ethics Committee on the use of human subjects in research to which complaints or problems concerning any research project may, and should, be reported if they arise. If you have concerns about this project, please contact Petra Klumb, Department of Psychology, University of Fribourg, Rue P.-A.- de Faucigny 2, CH-1700 Fribourg. Email: petra.klumb (at) unifr.ch.

START - I consent

Figure 1.A.12: Consent form opened by the button "click to expand"

Information on beef meat production

You will now be offered 3 information items (some news article or video displayed on your screen) regarding the way cows are treated for beef meat production (**animal welfare**), the consequences of beef meat production on the **environment** and the relationship between beef consumption and **health**.

For each item you will have to answer 7 questions. Only one of these 7 choices will be implemented.

The computer will choose one of the three information items (animal welfare, environment or health) at random, generate an offer and compare it to your choice. The other two will not be implemented (neither information item, nor payoff).

If the offer from the computer is refused, you will be redirected to equally long, but unrelated information.

Next

Figure 1.A.13: Instructions on the information about beef

Item 1: Information on animal welfare in the beef production

If you are paid 75 points for this information item, would you accept?	☐	☐
	Yes	No
If you are paid 50 points for this information item, would you accept?	☐	☐
	Yes	No
If you are paid 25 points for this information item, would you accept?	☐	☐
	Yes	No
If you are paid 0 points for this information item, would you accept?	☐	☐
	Yes	No
If you have to pay 25 points for this information item, would you accept?	☐	☐
	Yes	No
If you have to pay 50 points for this information item, would you accept?	☐	☐
	Yes	No
If you have to pay 75 points for this information item, would you accept?	☐	☐
	Yes	No

Next

Reminder: You earn 1'200 points for completing Part 2 today. This comes on top of your previous gains from Part 1.

The exchange rate is 100 points = 1 CHF.

Figure 1.A.14: WTP for information on beef and animal welfare

Information offer results

Beef

For beef, the computer has drawn an offer with information about animal treatment and a payoff of 75.

You agreed to this offer.

You will receive the payoff and information about animal treatment.

Pork

For pork meat, the computer has drawn an offer with information about environmental impact and a payoff of -50.

You agreed to this offer.

You will receive the payoff and information about environmental impact.

Next

Figure 1.A.15: Information offer results

Notes: Participants could scroll to read the whole article. The button “next” only appeared after 3 minutes. Next, a few examples of what participants could be shown depending on the randomly picked dimension (animal welfare, health or environment) and randomly picked payoff-relevant choice. Recall that we measured information avoidance for each combination of pork and the three information items: animal welfare, the environment, or health. From these six combinations, only two decisions – one for beef and one for pork – were randomly selected and implemented. If an “accept” decision was made, the corresponding information item would be provided at the end of the experiment. Alternatively, if a “refuse” decision was chosen, an unrelated information item would be given at the end.

Information: Refused offer for beef

Please read the below article from The Economist concerning Pulitzer prize winners.

You can take as long as needed to complete reading the document.

Note, the "next" button will only be available in 3 minutes at the bottom of the screen.

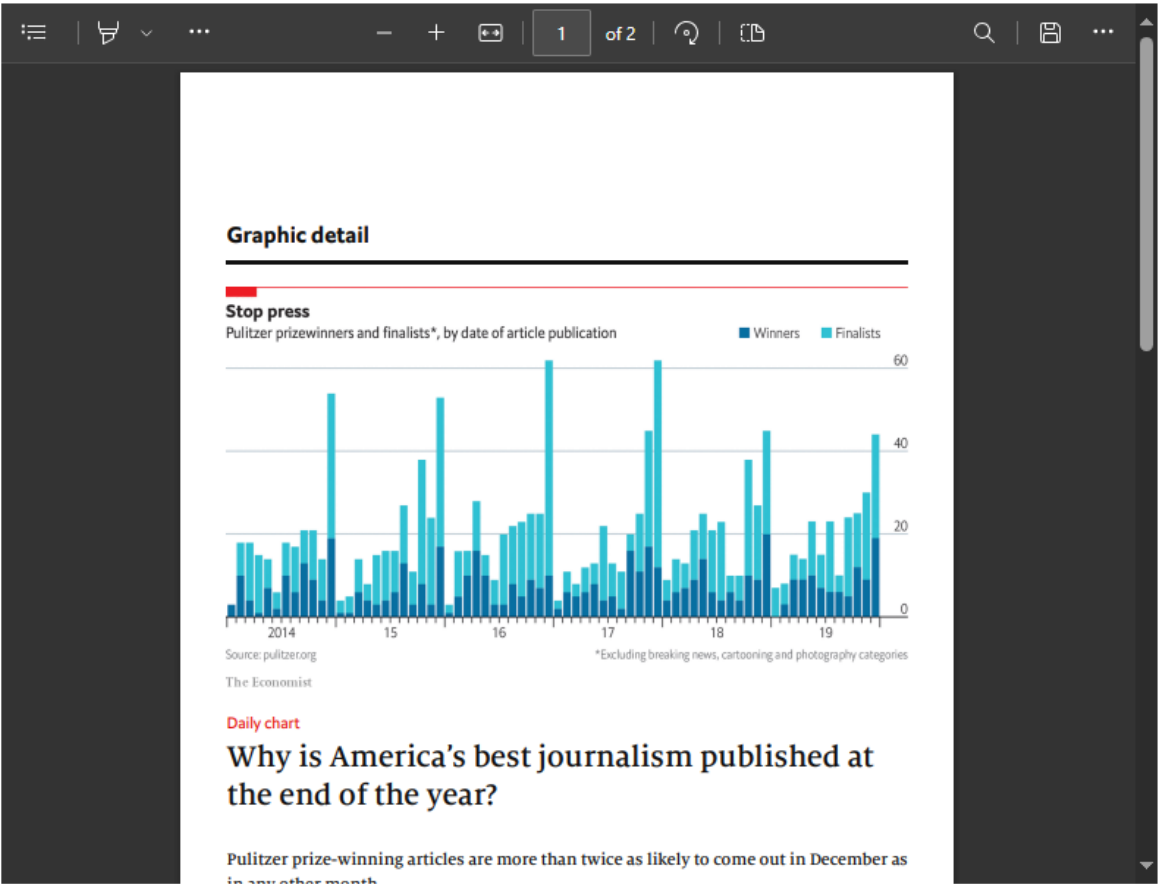


Figure 1.A.16: Article received when “refuse” decision was implemented – unrelated information item

Information: Beef production & the environment

Please read the below. This is an extract of an article from The Guardian, published on their site, that summarizes the findings of a scientific article published in the magazine Science in 2018. You can take as long as needed to complete reading the document.

Note, the "next" button will only be available in 3 minutes at the bottom of the screen.



The screenshot shows a web browser window with a dark theme. The address bar at the top displays navigation icons, a page indicator showing '1 of 3', and search, print, and share icons. The main content area features the Guardian logo at the top right. Below it is a large photograph of a herd of sheep grazing in a lush green field with a dense forest in the background. The article title, 'Avoiding meat and dairy is 'single biggest way' to reduce your impact on Earth', is prominently displayed in bold. A subtitle follows: 'Biggest analysis to date reveals huge footprint of livestock - it provides just 18% of calories but takes up 83% of farmland'. The author's name, 'Damian Carrington', and his role, 'Environment editor', are listed below the subtitle. The publication date and time, 'Thu 31 May 2018 19.00 BST', are shown. The beginning of the article text is visible at the bottom of the screenshot.

The Guardian



Avoiding meat and dairy is 'single biggest way' to reduce your impact on Earth

Biggest analysis to date reveals huge footprint of livestock - it provides just 18% of calories but takes up 83% of farmland

Damian Carrington *Environment editor*

Thu 31 May 2018 19.00 BST

Avoiding meat and dairy products is the single biggest way to reduce your environmental impact on the planet, according to the scientists behind the most comprehensive analysis to date of the damage farming does to the planet.

Figure 1.A.17: Article received when “accept” decision was implemented – Beef & Environment

Thank You!

Thank you very much for participating.

You have completed the experiment. **Please stay seated until all participants finish and you get called to get your payment.** Please fill in the receipt sheet while waiting for the other participants to finish.

The total of points you made completing the online questionnaire, answering knowledge questions, and accepting offers for information (if relevant) is 425 points.

You also receive 12 CHF for completing this laboratory session.

The total, rounded, payment you will now receive is 16 CHF.

If you have any comments, or anything you would like to say, you can use the below form.

Click "Finish" once you are done.

Comment

Finish

Figure 1.A.18: Acknowledgements, payoffs and finish button

1.A.9 Screenshots of the online survey

Page 01

Welcome

You are now taking part in a scientific study. Please read the following instructions carefully. Everything that you need to know in order to participate in this study is explained below. In this study you will be asked about nutrition habits and decision making. Vegetarians and vegans are not suited for this study and should not go further. To participate, you must also be able to understand english. If you are not confident with english, please do not go further. If you have already participated in this study, please do not go further.

This study is split in two parts. You will complete the first part now by answering an online questionnaire. Then, you will be invited to the second part that will take place in the laboratory of the University of Fribourg.

During the course of the study you can earn points, which is a currency for this study. For completing the first part, you earn a minimum of 300 points. During the study, you will also get the opportunity to gain points. It will always be clear when and how you can gain points.

The exchange rate will be 100 points = 1 CHF.

If you chose not to show up to the second part of the study in the laboratory, you will lose all your earnings. For completing the second part in the lab, you earn an extra 1'200 points. You will also get opportunities to earn extra points in the second part of the study. All your earnings for both parts of the study will be exchanged into cash at the end of the laboratory session.

Please complete the survey personally, do not use your computer for any other purposes and do not use your phone unless asked to.

Page 02

1. Please provide the following information. These pieces of information will only be used to send you the e-mail invitation to the lab experiment and will not be linked to your answers in order to ensure anonymity.

E-mail	
First Name	
Last Name	

Page 03

2. Please answer the below regarding your personal eating habits.

Please select how often you have eaten the following products in **the past month**

	Never	Less than once a week	Once a week	2-4 times a week	5-7 times a week	Everyday	More than once a day
Red meat (e.g. beef, pork, horse)	☐	☐	☐	☐	☐	☐	☐
Vegetables	☐	☐	☐	☐	☐	☐	☐
Fruits	☐	☐	☐	☐	☐	☐	☐
Starchy foods (e.g. wheat, bread, pasta, rice)	☐	☐	☐	☐	☐	☐	☐
Dairy products (e.g. milk, yoghurt, cheese)	☐	☐	☐	☐	☐	☐	☐
Eggs	☐	☐	☐	☐	☐	☐	☐
Pulses (e.g. lentils, chickpeas, beans)	☐	☐	☐	☐	☐	☐	☐
White meat (e.g. chicken, turkey)	☐	☐	☐	☐	☐	☐	☐
Fish	☐	☐	☐	☐	☐	☐	☐

On a scale from 1 to 7, with 1 = not hungry at all and 7 = extremely hungry, how hungry are you right now?

1	2	3	4	5	6	7
☐	☐	☐	☐	☐	☐	☐

Did you eat anything in the **past two hours**? Please select all the relevant answers.

☐ Eggs
☐ Fish
☐ I ate something else
☐ White meat
☐ Fruits
☐ Pulses (lentils, chickpeas, etc.)
☐ Starchy foods (bread, pasta, rice, etc.)
☐ Vegetables
☐ Red meat
☐ Dairy products
☐ I did not eat in the past two hours

Please answer the questions below as truthfully as possible. There is no right or wrong answer.

What is your gender?

- ☐ female
- ☐ other
- ☐ male

How old are you?

I am years old.

What religion do you associate with?

- ☐ Judaism
- ☐ Christianity
- ☐ Islam
- ☐ Hinduism
- ☐ Buddhism

- ☐ I would rather not say
- ☐ Not religious

Which is the country, you're currently living in?

Country:

What country are you originally from? (chosed the one you feel applies the most to you)

Country:

What is the highest level of education you have completed?

- ☐ Secondary school
- ☐ Collège/Gymnasium/Lycée
- ☐ Bachelor or equivalent
- ☐ Master or equivalent
- ☐ Phd

- ☐ No qualifications

If you have studied or are studying, what faculty do your studies belong to?

- ☐ Theology
- ☐ Humanities
- ☐ Law
- ☐ Science and Medicine
- ☐ Management, economics and social sciences

- ☐ Not applicable

What do you do professionally?

- ☐ Pupil/in school
- ☐ Training/apprenticeship
- ☐ University student
- ☐ Employee
- ☐ Civil servant
- ☐ Self-employed
- ☐ Unemployed/seeking employment
- ☐ Other: _____

What is your monthly net income?

[Please choose]

	Far left	Left	Center left	Center	Center right	Right	Far right	I don't know
Where do you view yourself on the political spectrum?	☐	☐	☐	☐	☐	☐	☐	☐

Page 05

3

You will now face a series of statements. Please indicate to which extent you agree or disagree with these statements.

There are no right or wrong answers. You cannot gain or lose points here.

Use the below scale where 1 = strongly disagree, 4 = neutral and 7 = strongly agree.

	1	2	3	4	5	6	7
It's normal to eat meat.	☐	☐	☐	☐	☐	☐	☐
It is acceptable to eat meat because the animals killed for our consumption do not really suffer.	☐	☐	☐	☐	☐	☐	☐
It is acceptable to eat some animals because they are raised for this purpose.	☐	☐	☐	☐	☐	☐	☐
It is immoral to harm animals for the production of food.	☐	☐	☐	☐	☐	☐	☐
The way meat is produced in Switzerland is morally wrong.	☐	☐	☐	☐	☐	☐	☐
God created animals for us to eat.	☐	☐	☐	☐	☐	☐	☐
It's natural to eat meat, it's written in our genes.	☐	☐	☐	☐	☐	☐	☐
Eating meat is healthy.	☐	☐	☐	☐	☐	☐	☐
Eating meat may be bad for the environment, but no more so than eating vegetables or cereals.	☐	☐	☐	☐	☐	☐	☐
I like meat too much to stop eating it.	☐	☐	☐	☐	☐	☐	☐
Animals are mostly treated well in farms in Switzerland.	☐	☐	☐	☐	☐	☐	☐
It is acceptable to eat meat because the animals killed for our consumption have lower intellectual capacities than humans.	☐	☐	☐	☐	☐	☐	☐
Eating meat is necessary for good health.	☐	☐	☐	☐	☐	☐	☐

Page 06

You will now face a series of statements. Please indicate to which extent you agree or disagree with these statements.

There are no right or wrong answers. You cannot gain or lose points here.

Use the below scale where 1 = strongly disagree, 4 = neutral and 7 = strongly agree.

	1	2	3	4	5	6	7
I always choose food options considering if they are healthy.	☐	☐	☐	☐	☐	☐	☐
Deforestation is a major concern for humanity.	☐	☐	☐	☐	☐	☐	☐
Eating healthy food gives me satisfaction.	☐	☐	☐	☐	☐	☐	☐
Living a healthy lifestyle is important to me.	☐	☐	☐	☐	☐	☐	☐
I prioritise tasty food over healthy food.	☐	☐	☐	☐	☐	☐	☐
I consider myself sympathetic to environmental protection.	☐	☐	☐	☐	☐	☐	☐
It is important for me to vote for politicians who care about the environment and the animal welfare.	☐	☐	☐	☐	☐	☐	☐
I would be willing to sign a petition against intensive farming if the opportunity came to me.	☐	☐	☐	☐	☐	☐	☐
I consider myself empathetic.	☐	☐	☐	☐	☐	☐	☐
Preserving jobs is more important than reducing CO2 emissions.	☐	☐	☐	☐	☐	☐	☐
I am willing to reduce my consumption of meat in the (near) future.	☐	☐	☐	☐	☐	☐	☐
Reducing human induced climate change should be a priority for governments.	☐	☐	☐	☐	☐	☐	☐
I can usually understand and share feelings from others quite easily.	☐	☐	☐	☐	☐	☐	☐

Page 07

You will now face a series of 8 factual questions.

Each of these questions has one and only one right answer. Please tick the correct answer. If you are not sure, you can take a guess. There are no negative points for wrong answers.

Each correct answer will add 50 points to your earnings.

Your personal 8 characters combination

Please note down the 8 characters below or take a photo of them with your phone (or both).

You will be required to enter these 8 characters to participate in the second part of the experiment in the laboratory. Losing this 8 character combination will mean that you cannot start the second part of the experiment and will lose all of your earnings.

If you lose your personal 8 characters combination, you could still retrieve it by giving us a personal secret word. This can be anything you choose. The name of your pet, your favorite movie, your city of origin...

Note, you might still be excluded if you lose your 8 characters combination and remember your personal secret word, if another participant chose the exact same secret word as you.

So please, do not lose your personal 8 characters combination.

Please also note this personal secret word down and take it to the second part of the experiment.

My personal secret
word is

Only click next once you have noted both down.

Last Page

Thank you! You have now completed the first part of the study.

You have earned at minimum **300 points**, and a maximum of **700 points**, depending on your answers to factual questions. The amount you earned is credited to **your personal 8 character combination**. Please do not lose it, or else you will lose your earnings.

Please make sure that you attend the laboratory session for the second part of the study. You will receive an e-mail invitation to participate to the second part of the study within the next weeks. Compensation is awarded only to participants who attend the second part of the study.

Universität Freiburg – 2022

Notes: on page 7 of the survey, the participants saw the 8 knowledge questions represented in Appendix 1.A.5. Then, participants received a personal 8 characters combination, to be used in the laboratory approximately 2 weeks post survey such that we could match the answers from the survey part and the lab part to the same participant.

1.B Chicken Experiment appendices

1.B.1 Pre-analysis plan (PAP) documents

The Effect of Motivated Beliefs on the Demand for Information About Meat

Monica Capra, Seong-Gyu Park, Joshua Tasoff, Jin Xu, and Shanshan Zhang

Target Sample Size

The ideal sample is N=300. We have struggled in the past with recruitment. If we cannot reach N=300 by Jan 2023 we may need to revise this number lower in an update.

Analysis

1. Variables

- a. Conditions: meat_condition (0,1), video_assigned (none, FF, PF)
- b. Key outcome var: video choice
 - i. WF: a binary variable measuring whether chose to watch the factory farm video
 - ii. WP: a binary variable measuring whether chose to watch the pro-farm video
- c. elicitation of subjects' belief on the credibility of videos
 - i. how convincing was the video (1-7)
- d. beliefs about factual claims related to PF and FF
 - i. Each response can be coded as correct or wrong.
 - ii. Each response can be coded as pro-farmer/pro-meat, neutral, or pro-animal.
- e. donation (to animals, to farmers, none)
 - i. donation_FF, donation_PF, donation_no
- f. sign petition (animals, farms)
- g. vote for charity (to animals, to farmers)
- h. farm attitude, 8 questions, (1-7)
- i. animal intelligence beliefs, 7 questions (1-7)
- j. eat anything (0,1) -> eat_before = 0 (no), eat_before = 1 (yes)
- k. ate something (snack, meal) -> eat_sth = 1 (snack), eat_sth = 2 (meal)
- l. how hungry (1-7) -> hungry_index
- m. gender (m,f, nb)
- n. age
- o. race
- p. HS zipcode
- q. political (1-7) -> political_index
- r. where_eat (campus, restaurant, at home, takeout)

- s. What do you think are the first three ingredients on the ingredient list?
(textinput)
- t. how many friends family members farmer (0-10)
- u. how many friends veg (0-10)
- v. know purpose (0,1)

2. Constructed Variables

- a. Incentivized factual questions about the video content
 - i. facts_correct = # correct out of 8
 - ii. facts_animalwelfare = # pro-animal minus – # pro-farmer or pro-meat
 - iii. Can do standardized version of above
- b. Animal intelligence attitude
 - i. animal_intelligence: add all questions on animal intelligence and standardize.
- c. Animal welfare attitude
 - i. attitudes_animalwelfare: add all questions animal welfare attitudes and animal intelligence, reverse code farmer questions, and standardize.

3. Simple Hypotheses

- a. H1 (Meat compared to veg decreases watching FacF video)
 - i. show CDFs
 - ii. proportions test
- b. H2 (Meat compared to veg increases watching ProF video)
Analogous analysis as part (a)
- c. H3a (Subjects belief: meat increases credibility of ProF video)
 - i. t-test
- d. H3b (Subjects belief: meat decreases credibility of FacF video)
 - i. t-test

4. Regression Hypotheses

- a. H4 (Videos affect outcomes: meat compared to veg increases pro-farm disposition/decreases pro-animal disposition, voting, donation, and petition)
outcome_i =

$$\beta_0 + \beta_1 \text{meat_condition}_i + \sum_{i=1}^3 \gamma_i \text{video_assigned}_i + \beta_2 W F_i + \beta_3 W P_i + \epsilon_i$$

outcomes: facts correct (OLS), facts animal welfare (OLS), animal attitude (OLS), donation (tobit), voting (logit), petition (logit)

- b. H5 (Mediation Analysis: How are the effects of the videos mediated by credibility, facts_animalwelfare and attitudes_animalwelfare)
 - i. Details depend on results found above.
- c. H6 (Heterogeneous treatment Effects on information choice)

$$WF_i = \beta_0 + \beta_1 \text{meat_condition}_i + \beta_2 \text{moderator}_i + \beta_3 \text{moderator}_i \times \text{meat_condition}_i + \epsilon_i$$
 moderators: female, white, liberal, veg family, veg friends

1.B.2 Timing of experiment

Figure 1.B.1 depicts the timing of decisions during an experimental session in both the treatment and control conditions.

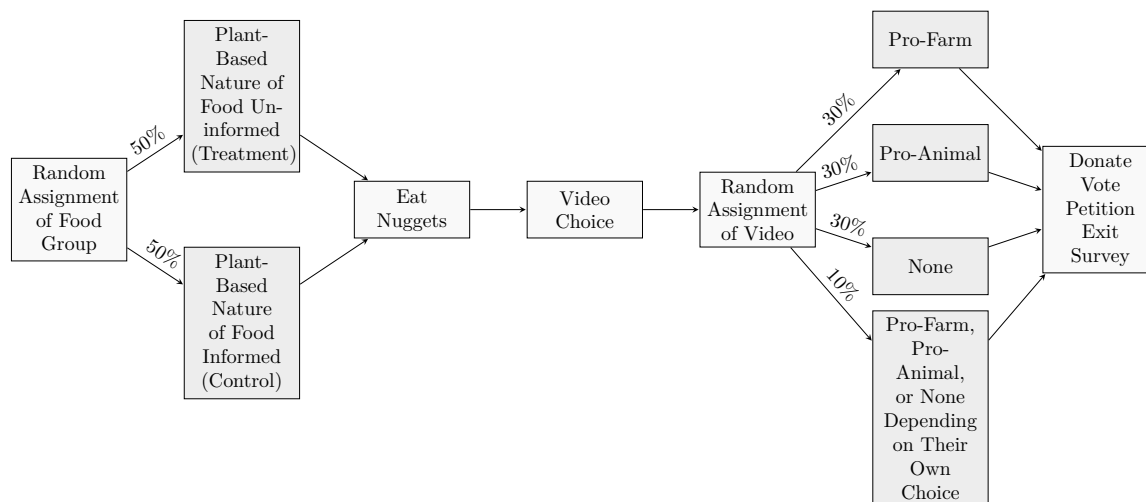


Figure 1.B.1: Timing of experiment

1.B.3 Eliciting attitudes, knowledge and behavior and constructing scores

The main manipulation of the Chicken Experiment concerns the belief of having just eaten meat and the main outcome is information demand. Because we are also interested in identifying the effect of factory-farm information on the support for animal welfare causes, a second manipulation centered on the videos assigned to the participants. Before making their video selections, subjects were told that the video they would watch depended on *both* their choices and chance. There was a 10% chance that the participant would watch the video based on her choices and a 30% chance that the participant would be assigned to each of three video conditions (pro-farm, pro-animal, and no video). This accomplished two purposes: first, it provided incentives to truthfully state video preferences, and second, it allowed for random allocation of the video treatment. Participants in the incentive-compatible group (10%) are dropped from all subsequent analyses as they self-selected into their condition. In summary, the experiment is a 2×3 factorial design: (plant-based, undisclosed) $\times$ (no video, pro-farm, animal welfare).

In the last stage, participants were asked to answer factual quiz-like questions related to meat consumption. There were eight questions and subjects could earn up to 4 additional dollars for answering factual questions correctly. For example, they were asked (correct answer is b):

Which of the following is true? The eggs served in Frary Dining Hall (Pomona College's main dining hall) come from hens that:

- (a) Are kept in cages with no more than 85 square inches of living space per hen. All of their male siblings are killed soon after they hatch.
- (b) Live in a large barn uncaged and have at least 108 square feet (15,552 square inches) of living space per hen. All of their male siblings are killed soon after they hatch.
- (c) Live on a pasture with a minimum of 16 square feet (2,304 square inches) per hen and access to an indoor shelter. All of their male siblings are killed soon after they hatch.
- (d) Live on a pasture with a minimum of 16 square feet (2,304 square inches) per hen and access to an indoor shelter. Their male siblings are raised in the same conditions.

We construct two different measures using subjects' responses. First, we can count the number of questions correct. Second, we construct a "pro-animal error" score indicating the number and degree of error in favor of animal welfare.²⁴ In the example above, (b) is the correct answer, (a) overestimates the harm to animals, (c) underestimates the harm, and (d) underestimates the harm even more so. For this particular question we give (a) a score of 1, (b) a score of zero, because it is correct, (c) a score of -1 and (d) a score of -2. We do similarly for each of the eight questions, then we sum and standardize to construct the pro-animal error score. The full factual quiz is in Appendix 1.B.4 along with our scoring scheme.

Following the factual quizzes, we posed eight questions to measure the effect of different video assignments on attitudes toward the farming industry, and seven questions to measure attitudes toward animal intelligence. Participants were requested to express their opinions on a Likert scale, where 1 indicated Strongly Disagree and 7 indicated Strongly Agree. They responded to statements such as, "Animals are mostly treated well in farms in America," which assessed their attitude toward the farming industry, and "Pigs have the equivalent level of intelligence as dogs or cats," which gauged their perspective on farmed animal intelligence. These attitudinal responses were totaled and standardized to construct "farm attitude" and "animal intelligence".

Additionally, we wished to create an index that put all of the pro-animal welfare sentiment into a single measure. We constructed the "animal welfare" index by adding pro-animal error to animal intelligence and then re-standardizing.

Finally, participants were asked to make three decisions: 1) indicate their willingness to donate money from their earnings to an animal welfare charity and an animal farmer charity, 2) sign a petition supporting either animal welfare or animal farmers, and 3) vote for a \$100 donation to go to one of two charities.²⁵ The petition in support of animal welfare – Ban Farrowing Crates, Let Mother Pigs Care for Their Babies – proposes the

²⁴To be more specific, this is more like error in favor of changing the status quo in favor of animals. For the example above, the worse the conditions for egg-laying hens at the local dining hall, the stronger the implication that one ought to reduce one's own consumption of that product.

²⁵Due to an oversight in the Qualtrics survey, some participants were not presented with the voting option and we had to exclude it from our analysis.

prohibition of farrowing crates. The petition supporting animal farmers – People Need to Be More Educated About Animal Agriculture – raises funding to support organizations and programs dedicated to agricultural education. Through these questions, we aimed to determine whether our manipulation and video assignments had an impact on the participants' behaviors beyond their effects on attitudes. Lastly, participants answered a few demographic questions.

1.B.4 Coding of factual questions and pro-animal disposition indices

For factual questions, we coded each answer based on how pro-animal it was. Correct answers are italicized. All correct answers are coded as zero. We assigned positive scores to incorrect answers in favor of animal-welfare implications, and negative scores to incorrect answers against animal-welfare implications.

1. Which of the following is true? The eggs served in Frary Dining Hall (Pomona College's main dining hall) come from hens that:
 - (a) Are kept in cages with no more than 85 square inches of living space per hen. All of their male siblings are killed soon after they hatch.
 - (b) *Live in a large barn uncaged and have at least 108 square feet (15,552 square inches) of living space per hen. All of their male siblings are killed soon after they hatch.*
 - (c) Live on a pasture with a minimum of 16 square feet (2,304 square inches) per hen and access to an indoor shelter. All of their male siblings are killed soon after they hatch.
 - (d) Live on a pasture with a minimum of 16 square feet (2,304 square inches) per hen and access to an indoor shelter. Their male siblings are raised in the same conditions.
- a, c, and d are coded as 1, -1, and -2, respectively.
2. Which of the following food choices has more protein?
 - (a) 100 g of Raw Peanuts
 - (b) *100 g of Boneless Skinless Chicken Breast*

Incorrect answers are coded as 1.

3. According to the EPA (the United States Environmental Protection Agency), which of the following cause the most greenhouse-gas emissions:
 - (a) Industry
 - (b) *Transportation*
 - (c) Agriculture
 - (d) Commercial & Residential

All answers are coded as 0.

4. Of the following athletes how many rely on plant-based diets in their training?
Serena Williams (7 time Wimbledon Tennis Champion);
LeBron James (NBA basketball player);
Patrik Baboumian (World record holder for the yoke walk, carrying 1212.54 pounds across 10 meters).

- (a) 0
- (b) 1
- (c) **2**
- (d) 3

a, b, and d are coded as -2, -1, and 1, respectively.

5. Which of the following occupations makes less than \$32,000 per year on average (which is under the poverty line for a family of 5)?

- (a) Food Inspector
- (b) Animal Advocacy Lawyer
- (c) ***Meat Packer***
- (d) Registered Nurse

a, b, and d are coded as 0, 1, and 0, respectively.

6. What is the US Department of Agriculture recommended amount of lean meat the average person should eat per day?

- (a) 0 oz
- (b) 4 oz (quarter pounder at mc Donalds)
- (c) ***5.5 oz (slightly more than a can of tuna)***
- (d) 8 oz (typical sirloin steak)

a, b, and d are coded as 2, 1, and -1, respectively.

7. Which of the following food items contains the most iron?

- (a) 8 oz of Carrots
- (b) 8 oz of Beets
- (c) a 12 oz can of Coca-Cola
- (d) ***6 oz Sirloin Steak***

All incorrect answers are coded as 1.

8. One vitamin that is difficult to obtain from plant sources, and is therefore a common deficiency in vegan diets is:

- (a) Vitamin E
- (b) ***Vitamin B12***
- (c) Folic Acid
- (d) All vitamins can be obtained in adequate supply from plants

a, c, and d and coded as 0, 0, and 1, respectively.

We standardized the score for each question, summed them up, and then standardized the sum, to generate an pro-animal error index measuring each participant’s pro-animal disposition. This score is added to the standardized animal intelligence score to construct the attitudinal outcome variable “Animal Welfare.”

1.B.5 Results on attitudes and knowledge

We are also interested in the effect of the pro-animal video and the pro-farmer video on beliefs and attitudes. Table 1.B.1 shows the results from regressing the scores on the factual questions, “Facts correct” and “Pro-animal error”, and attitudes “Farm attitude” and “Animal intelligence”, and the index “Animal welfare”. There were three video conditions: a pro-animal video, a pro-farm video, and no video.²⁶

Columns (1)–(2) show that watching the pro-animal video causes participants to get fewer factual questions right. Columns (3)–(4) show no detectable effects on pro-animal error. Columns (5)–(6) regress farm attitude on the treatments. Watching a pro-animal video decreases pro-farmer dispositions, however, the coefficient becomes statistically insignificant when we add controls. Columns (7)–(8) show the effect of the treatments on animal-intelligence attitudes. Being uninformed significantly reduces the participants attitudes toward animal intelligence by greater than a third of standard deviation. The pro-animal video, increases animal-intelligence attitudes by an even greater margin. In Columns (9)–(10) we find that all the interventions significantly affect the animal-welfare index. Surprisingly, the pro-farm video increases animal-welfare sentiment, contrary to expectation. Importantly, the uninformed condition reduces animal-welfare sentiment, consistent with the psychology literature.

²⁶The results without manipulation check are presented in Appendix Table 1.B.11.

Table 1.B.1: The effect of treatment and videos on beliefs and attitudes

	(1) Facts correct	(2) Facts correct	(3) Pro-animal error	(4) Pro-animal error	(5) Farm attitude	(6) Farm attitude	(7) Animal intelligence	(8) Animal intelligence	(9) Animal welfare	(10) Animal welfare
T-Meat	0.131 (0.220)	0.165 (0.228)	-0.113 (0.146)	-0.165 (0.151)	-0.009 (0.145)	-0.013 (0.143)	-0.361** (0.148)	-0.376** (0.149)	-0.320** (0.150)	-0.366** (0.156)
Pro-Farm Video	-0.304 (0.279)	-0.305 (0.292)	0.228 (0.168)	0.308* (0.178)	-0.204 (0.164)	-0.146 (0.166)	0.332* (0.182)	0.332* (0.192)	0.378** (0.173)	0.433** (0.184)
Pro-Animal Video	-0.555** (0.270)	-0.618** (0.273)	0.214 (0.181)	0.211 (0.176)	-0.398** (0.188)	-0.250 (0.181)	0.450** (0.183)	0.387** (0.186)	0.449** (0.180)	0.405** (0.176)
Controls Included	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Mean Dep Var	2.946	2.946	-0.030	-0.030	-0.026	-0.026	0.015	0.015	-0.011	-0.011
Observations	184	184	184	184	184	184	184	184	184	184

Note: OLS regression of pro-farmer or pro-animal dispositions on treatment T-Meat (uninformed) and video treatments. Robust standard errors are in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

1.B.6 Results on behavior

We are interested in learning whether the manipulations affected behaviors toward farmers' welfare and animals' welfare. In Table 1.B.2, we run Tobit regressions of the amount of money the subject is willing to donate to a charity supporting farmers or animals on different video assignments.²⁷ In Columns (1)–(2) we regress donations to a pro-farm organization on our treatments. There are no detectable effects of the being uninformed or of video assignment. In Columns (3)–(4) we regress donations to an animal-welfare organization on our treatments. We find that assignment to the pro-animal welfare video increases donations to the pro-animal welfare charity. This shows that selection into information has the potential to have downstream behavioral effects. However, because our “eating meat” manipulation had no detectable effect on information choice, it also has no indirect effect on donations.

²⁷The results of the OLS analysis are presented in Appendix Table 1.B.8 and the results without manipulation check are presented in Appendix Table 1.B.12.

Table 1.B.2: The effect of treatment and videos on donation

	(1) Donation (farm)	(2) Donation (farm)	(3) Donation (animal)	(4) Donation (animal)
T-Meat	1.415 (1.955)	1.259 (1.876)	0.746 (0.988)	0.465 (0.940)
Pro-Farm Video	3.266 (2.297)	2.254 (1.947)	1.065 (1.216)	1.087 (1.187)
Pro-Animal Video	0.317 (2.684)	1.659 (2.387)	2.959** (1.214)	2.334** (1.138)
Controls Included	No	Yes	No	Yes
Mean Dep Var	0.606	0.606	0.832	0.832
Observations	184	184	184	184

Note: Tobit regression of donation to charity on treatment T-Meat (uninformed) and video treatments. Robust standard errors are in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

In Table 1.B.3, we regress signing a political petition on the treatment using a logit specification. We find no evidence that the treatments affect the likelihood to sign petitions.²⁸ Though the effects would be meaningful in magnitude if significant, for instance the pro-animal video reduces signing the farm petition by 14pp, unfortunately the sample size is too small to detect effect sizes of this magnitude. To the extent that participants translate their attitudinal change into behavioral changes, the effects are too small to detect.

²⁸The results of OLS analysis are presented in Appendix Table 1.B.9 and the results without manipulation check are presented in Appendix Table 1.B.13.

Table 1.B.3: The effect of videos on petition

	(1) Petition (farm)	(2) Petition (farm)	(3) Petition (animal)	(4) Petition (animal)
T-Meat	-0.132* (0.072)	-0.115 (0.072)	-0.112 (0.073)	-0.109 (0.069)
Pro-Farm Video	-0.114 (0.088)	-0.152* (0.085)	0.036 (0.090)	0.007 (0.086)
Pro-Animal Video	-0.143 (0.091)	-0.138 (0.092)	0.058 (0.091)	-0.004 (0.089)
Controls Included	No	Yes	No	Yes
Mean Dep Var	0.516	0.516	0.500	0.500
Observations	184	184	184	184

Note: Logit average marginal effects of signing a petition on treatment T-Meat (uninformed) and video treatments. Robust standard errors are in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

1.B.7 Additional results

Table 1.B.4: Descriptive statistics of main variables: Chicken Experiment

Outcome Variables	Mean	Std. Dev.	Min	Max
Video Pro-farmer	.96	.19	0	1
Video Pro-animal	.88	.32	0	1
PF over PA	.64	.48	0	1
Control Variables				
Eat before	.38	.49	0	1
Hunger	5.1	1.3	1	7
Female	.62	.49	0	1
White	.37	.48	0	1
Highschool in US	.78	.42	0	1
Political orientation	.25	.44	0	1
Eat on campus	.54	.5	0	1
Pomona College	.73	.45	0	1
Number of farmers	1.2	2.1	0	10
Number of vegans	2.2	2.4	0	10
Passed manipulation	.76	.43	0	1
Observations	267			

Note: The table shows results for the full sample before the manipulation check is used to generate the summary statistics of the outcome and the control variables.

Table 1.B.5: Wilcoxon-Mann-Whitney tests for control variables

Control variables	p-value
Eat before	.497
Hunger	.822
Female	.462
White	.282
Highschool in US	.525
Political orientation	.794
Eat on campus	.919
Pomona College	.66
Number of farmers	.871
Number of vegans	.608

Table 1.B.6: The effect of meat on information choice (OLS)

	(1) Pro-Farm Video	(2) Pro-Farm Video	(3) Pro-Animal Video	(4) Pro-Animal Video	(5) Pro-Farm or Pro-Animal	(6) Pro-Farm or Pro-Animal
T-Meat	-0.033 (0.027)	-0.026 (0.027)	0.018 (0.048)	0.020 (0.051)	0.031 (0.068)	0.022 (0.068)
Controls Included	No	Yes	No	Yes	No	Yes
Mean Dep Var	0.956	0.956	0.877	0.877	0.665	0.665
Observations	203	203	203	203	203	203

Note: OLS regression of information choice on meat condition (treatment) a treatment dummy in column. Robust standard errors are in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 1.B.7: Proportion tests of information choice

	Informed		Uninformed		Comparison			
	Proportion	SD	Proportion	SD	Difference	SE	z-statistic	p-value
Pro-Farm Video	.976	.155	.942	.234	.0335	.0272	1.14	.256
Pro-Animal Video	.866	.343	.884	.321	-.0184	.0476	-.392	.695
Pro-Farm or Pro-Animal	.646	.481	.678	.469	-.0313	.0678	-.464	.642
Observations	82		121		203			

Table 1.B.8: The effect of videos on donation (OLS)

	(1)	(2)	(3)	(4)
	Donation (farm)	Donation (farm)	Donation (animal)	Donation (animal)
T-Meat	0.162 (0.307)	0.197 (0.273)	0.109 (0.278)	0.045 (0.279)
Pro-Farm Video	0.206 (0.365)	-0.031 (0.324)	0.206 (0.287)	0.270 (0.299)
Pro-Animal Video	0.061 (0.356)	0.090 (0.342)	0.840** (0.354)	0.686* (0.357)
Controls Included	No	Yes	No	Yes
Mean Dep Var	0.606	0.606	0.832	0.832
Observations	184	184	184	184

Note: OLS regression of donation to charity on video treatments.

Robust standard errors are in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 1.B.9: The effect of videos on petition (OLS)

	(1)	(2)	(3)	(4)
	Petition (farm)	Petition (farm)	Petition (animal)	Petition (animal)
T-Meat	-0.133* (0.075)	-0.113 (0.076)	-0.112 (0.075)	-0.109 (0.074)
Pro-Farm Video	-0.114 (0.088)	-0.151* (0.089)	0.036 (0.090)	0.013 (0.091)
Pro-Animal Video	-0.143 (0.092)	-0.140 (0.096)	0.058 (0.091)	-0.001 (0.090)
Controls Included	No	Yes	No	Yes
Mean Dep Var	0.516	0.516	0.500	0.500
Observations	184	184	184	184

Note: OLS regression of signing a petition on video treatments.

Robust standard errors are in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 1.B.10: The effect of meat on information choice including those who failed the manipulation check

	(1) Pro-Farming Video	(2) Pro-Farming Video	(3) Pro-Animal Video	(4) Pro-Animal Video	(5) Pro-Farming or Pro-Animal	(6) Pro-Farming or Pro-Animal
T-Meat	-0.029 (0.026)	-0.026 (0.026)	0.015 (0.039)	0.020 (0.039)	0.091 (0.058)	0.075 (0.056)
Controls Included	No	Yes	No	Yes	No	Yes
Mean Dep Var	0.963	0.963	0.884	0.884	0.637	0.637
Observations	267	267	267	267	267	267

Note: Logit regression of information choice on meat condition (treatment) a treatment dummy in column. Coefficients are displayed as marginal effects.

Robust standard errors are in parentheses. $*p < 0.10$, $**p < 0.05$, $***p < 0.01$

Table 1.B.11: The effect of videos on attitudes including those who failed the manipulation check

	(1) Facts correct	(2) Facts correct	(3) Pro-animal error	(4) Pro-animal error	(5) Farm attitude	(6) Farm attitude	(7) Animal intelligence	(8) Animal intelligence	(9) Animal welfare	(10) Animal welfare
T-Meat	-0.066 (0.183)	-0.040 (0.186)	-0.011 (0.126)	-0.060 (0.126)	0.063 (0.123)	0.080 (0.120)	-0.243* (0.126)	-0.262** (0.127)	-0.172 (0.127)	-0.218* (0.130)
Pro-Farm Video	-0.230 (0.239)	-0.198 (0.247)	0.229 (0.150)	0.248 (0.157)	-0.184 (0.141)	-0.098 (0.144)	0.265* (0.156)	0.265 (0.166)	0.334** (0.155)	0.347** (0.165)
Pro-Animal Video	-0.523** (0.225)	-0.587** (0.226)	0.341** (0.155)	0.332** (0.153)	-0.428*** (0.158)	-0.307* (0.156)	0.364** (0.158)	0.313* (0.161)	0.477*** (0.156)	0.437*** (0.156)
Controls Included	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Mean Dep Var	2.947	2.947	0.004	0.004	-0.010	-0.010	-0.008	-0.008	-0.003	-0.003
Observations	246	246	246	246	246	246	246	246	246	246

Note: OLS regression of pro-farmer or pro-animal dispositions on meat condition and video treatments. Robust standard errors are in parentheses. $*p < 0.10$, $**p < 0.05$, $***p < 0.01$

Table 1.B.12: The effect of videos on donation including those who failed the manipulation check

	(1) Donation (farm)	(2) Donation (farm)	(3) Donation (animal)	(4) Donation (animal)
T-Meat	1.303 (1.512)	0.953 (1.459)	1.293 (0.866)	1.180 (0.831)
Pro-Farm Video	2.426 (1.901)	1.097 (1.653)	0.388 (1.048)	0.392 (1.045)
Pro-Animal Video	0.596 (1.949)	1.084 (1.841)	1.417 (1.033)	0.862 (1.007)
Controls Included	No	Yes	No	Yes
Mean Dep Var	0.598	0.598	0.754	0.754
Observations	246	246	246	246

Note: Tobit regression of donation to charity on video treatments.
Robust standard errors are in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 1.B.13: The effect of videos on petition including those who failed the manipulation check

	(1) Petition (farm)	(2) Petition (farm)	(3) Petition (animal)	(4) Petition (animal)
T-Meat	-0.060 (0.063)	-0.053 (0.062)	-0.114* (0.062)	-0.110* (0.059)
Pro-Farm Video	-0.036 (0.078)	-0.060 (0.076)	-0.011 (0.079)	-0.013 (0.077)
Pro-Animal Video	-0.148* (0.078)	-0.139* (0.077)	-0.005 (0.077)	-0.034 (0.073)
Controls Included	No	Yes	No	Yes
Mean Dep Var	0.508	0.508	0.504	0.504
Observations	246	246	246	246

Note: Logit regression of signing a petition on video treatments. Coefficients are displayed as marginal effects. Robust standard errors are in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

1.B.8 PAP additional analyses

We have run a few additional analyses committed to reporting in the pre-analysis plan found in Appendix 1.B.1.

H1-2: Cumulative density distributions of video choices

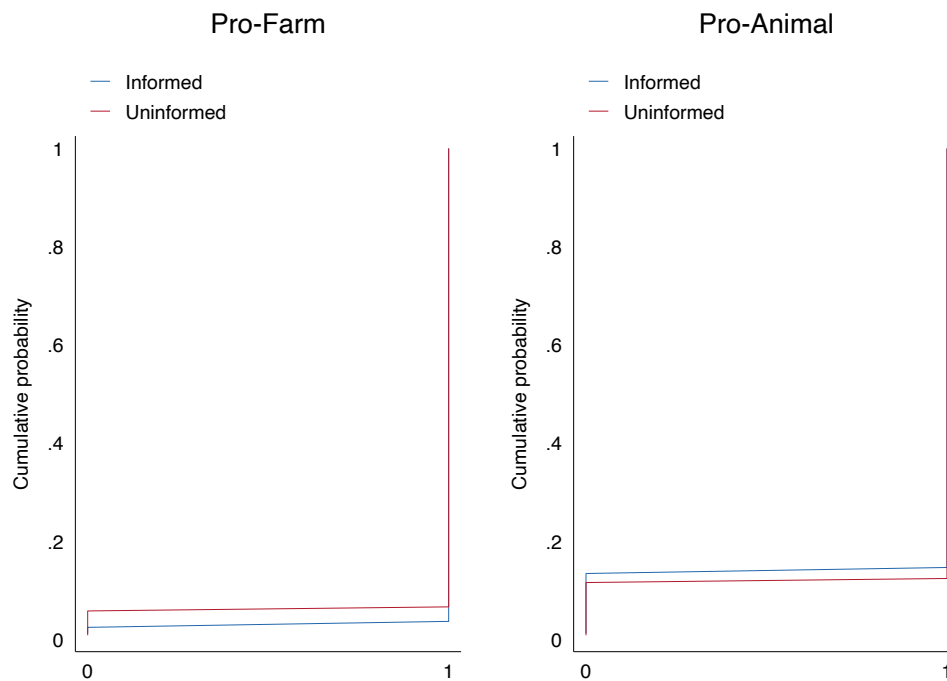


Figure 1.B.2: H1-2: Cumulative density distributions of video choices by treatment (Uninformed stands for T-Meat treatment and Informed for control group)

H3: T-tests of credibility of videos

Table 1.B.14: H3: T-Tests of credibility of videos

	T-Meat			Control			Comparison			
	Mean	SD	Obs	Mean	SD	Obs	Difference	SE	t-statistic	p-value
Convincing Pro-Farm	6.33	.692	33	6.3	.803	43	.031	.175	.177	.86
Convincing Pro-Animal	5.62	1.24	26	5.67	1.1	40	-.0596	.29	-.205	.838

H4: Results on attitudes and knowledge with video choices

We estimate the effect of the treatment, the video assignment, the video choice on outcomes including beliefs and attitudes towards animals, and behaviors toward farmers' welfare and animals' welfare. Results are presented in Tables 1.B.15, 1.B.16, and 1.B.17.

Table 1.B.15: H4: The effect of treatment and video assignment and choices on beliefs and attitudes

	(1) Facts correct	(2) Facts correct	(3) Pro-animal error	(4) Pro-animal error	(5) Farm attitude	(6) Farm attitude	(7) Animal intelligence	(8) Animal intelligence	(9) Animal welfare	(10) Animal welfare
T-Meat	0.153 (0.223)	0.192 (0.229)	-0.129 (0.148)	-0.178 (0.150)	-0.023 (0.150)	-0.028 (0.145)	-0.344** (0.153)	-0.367** (0.154)	-0.320** (0.152)	-0.368** (0.157)
Pro-Farm Video	-0.271 (0.279)	-0.304 (0.292)	0.207 (0.170)	0.305* (0.179)	-0.203 (0.167)	-0.138 (0.168)	0.346* (0.186)	0.332* (0.194)	0.374** (0.177)	0.431** (0.184)
Pro-Animal Video	-0.428* (0.259)	-0.505* (0.260)	0.166 (0.185)	0.156 (0.175)	-0.414** (0.187)	-0.267 (0.180)	0.486** (0.188)	0.399** (0.190)	0.441** (0.187)	0.375** (0.180)
Choose PF Video	-0.428 (0.748)	-0.487 (0.710)	-0.001 (0.315)	0.254 (0.299)	-0.167 (0.302)	-0.241 (0.250)	0.082 (0.243)	0.142 (0.252)	0.055 (0.324)	0.268 (0.321)
Choose PA Video	-0.635* (0.345)	-0.633* (0.366)	0.290 (0.226)	0.343 (0.216)	-0.180 (0.208)	-0.152 (0.185)	-0.139 (0.264)	0.013 (0.244)	0.102 (0.212)	0.241 (0.185)
PF over FF	-0.465** (0.231)	-0.443* (0.242)	0.183 (0.166)	0.185 (0.164)	0.284 (0.181)	0.335* (0.184)	-0.209 (0.162)	-0.153 (0.166)	-0.018 (0.169)	0.021 (0.171)
Controls	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Mean Dep Var	2.946	2.946	-0.030	-0.030	-0.026	-0.026	0.015	0.015	-0.011	-0.011
Observations	184	184	184	184	184	184	184	184	184	184

Note: OLS regression of pro-farmer or pro-animal dispositions on treatment T-Meat (uninformed), video treatments, and video choices. Robust standard errors are in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 1.B.16: H4: The effect of treatment and video assignment and choices on donation

	(1)	(2)	(3)	(4)
	Donation (farm)	Donation (farm)	Donation (animal)	Donation (animal)
T-Meat	0.876 (1.869)	0.906 (1.799)	0.885 (0.999)	0.500 (0.941)
Pro-Farm Video	3.252 (2.197)	2.260 (1.910)	1.186 (1.235)	1.309 (1.190)
Pro-Animal Video	-0.163 (2.664)	1.185 (2.440)	2.852** (1.224)	2.166* (1.141)
Choose PF Video	-2.566 (5.586)	-2.547 (4.441)	22.029*** (2.806)	23.549*** (3.001)
Choose PA Video	1.630 (2.942)	1.995 (2.693)	0.296 (1.510)	0.766 (1.404)
PF over FF	4.222* (2.164)	3.871* (2.199)	-0.621 (1.053)	-0.539 (1.095)
Controls Included	No	Yes	No	Yes
Mean Dep Var	0.606	0.606	0.832	0.832
Observations	184	184	184	184

Note: Tobit regression of donation to charity on treatment T-Meat (uninformed), video treatments, and video choices. Robust standard errors are in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 1.B.17: H4: The effect of treatment and video assignment and choices on petition

	(1) Petition (farm)	(2) Petition (farm)	(3) Petition (animal)	(4) Petition (animal)
T-Meat	-0.124* (0.073)	-0.108 (0.073)	-0.120 (0.073)	-0.118* (0.069)
Pro-Farm Video	-0.108 (0.088)	-0.149* (0.085)	0.029 (0.089)	0.002 (0.086)
Pro-Animal Video	-0.134 (0.092)	-0.129 (0.093)	0.051 (0.092)	-0.009 (0.090)
Choose PF Video	0.100 (0.173)	0.080 (0.189)	-0.126 (0.175)	-0.120 (0.173)
Choose PA Video	-0.030 (0.117)	-0.038 (0.111)	0.023 (0.117)	0.046 (0.112)
PF over FF	-0.073 (0.082)	-0.075 (0.085)	0.069 (0.084)	0.057 (0.079)
Controls Included	No	Yes	No	Yes
Mean Dep Var	0.516	0.516	0.500	0.500
Observations	184	184	184	184

Note: Logit average marginal effects of signing a petition on treatment T-Meat (uninformed), video treatments, and video choices. Robust standard errors are in parentheses. $*p < 0.10$, $**p < 0.05$, $***p < 0.01$

H5: Mediation effects of credibility of videos

We estimate the effect of the treatment on outcomes including beliefs and attitudes towards animals, and behaviors toward farmers' welfare and animals' welfare, with variables for the credibility of videos added to our analyses. Results are presented in Tables 1.B.18, 1.B.19, and 1.B.20.

Table 1.B.18: H5: Credibility and attitudes

	(1) Facts correct	(2) Facts correct	(3) Pro-animal error	(4) Pro-animal error	(5) Farm attitude	(6) Farm attitude	(7) Animal intelligence	(8) Animal intelligence	(9) Animal welfare	(10) Animal welfare
T-Meat	0.181 (0.351)	0.259 (0.339)	-0.130 (0.247)	-0.160 (0.277)	-0.259 (0.221)	0.119 (0.241)	-0.103 (0.235)	-0.291 (0.219)	-0.158 (0.252)	-0.305 (0.241)
Convincing Pro-Farm	0.041 (0.187)		-0.059 (0.149)		0.046 (0.133)		0.317** (0.157)		0.175 (0.143)	
Convincing Pro-Animal		-0.017 (0.110)		0.168 (0.161)		-0.491*** (0.148)		0.337*** (0.109)		0.342*** (0.095)
Mean Dep Var	2.923	2.678	0.052	0.033	-0.030	-0.224	0.095	0.199	0.099	0.157
Observations	65	59	65	59	65	59	65	59	65	59

Note: OLS regression of pro-farmer or pro-animal dispositions on treatment T-Meat (uninformed) and credibility of videos. Robust standard errors are in parentheses. $*p < 0.10$, $**p < 0.05$, $***p < 0.01$

Table 1.B.19: H5: Credibility and donation

	(1) Donation (farm)	(2) Donation (farm)	(3) Donation (animal)	(4) Donation (animal)
T-Meat	-1.898 (2.308)	1.026 (5.031)	1.031 (1.536)	-0.408 (1.531)
Convincing Pro-Farm	2.723 (1.859)		-0.693 (1.040)	
Convincing Pro-Animal		-0.859 (1.490)		2.868*** (0.787)
Mean Dep Var	0.715	0.576	0.692	1.331
Observations	65	59	65	59

Note: Tobit regression of donation to charity on treatment T-Meat (uninformed) and credibility of videos. Robust standard errors are in parentheses. $*p < 0.10$, $**p < 0.05$, $***p < 0.01$

Table 1.B.20: H5: Credibility and petition

	(1) Petition (farm)	(2) Petition (farm)	(3) Petition (animal)	(4) Petition (animal)
T-Meat	-0.248** (0.104)	-0.047 (0.131)	0.011 (0.126)	-0.248** (0.100)
Convincing Pro-Farm	0.116 (0.073)		-0.042 (0.079)	
Convincing Pro-Animal		0.074 (0.050)		0.237*** (0.048)
Mean Dep Var	0.492	0.458	0.508	0.525
Observations	65	59	65	59

Note: Logit average marginal effects of signing a petition on treatment T-Meat (uninformed) and credibility of videos. Robust standard errors are in parentheses. $*p < 0.10$, $**p < 0.05$, $***p < 0.01$

H5: Mediation effects of knowledge and attitudes

We estimate the effect of the treatment on behaviors toward farmers' welfare and animals' welfare, with beliefs and attitudes towards animals added as controls. Results are presented in Tables 1.B.21, and 1.B.22.

Table 1.B.21: H5: Attitude and donation

	(1) Donation (farm)	(2) Donation (farm)	(3) Donation (farm)	(4) Donation (farm)	(5) Donation (farm)	(6) Donation (animal)	(7) Donation (animal)	(8) Donation (animal)	(9) Donation (animal)	(10) Donation (animal)
T-Meat	1.647 (1.849)	1.445 (1.936)	1.168 (1.814)	1.354 (1.938)	1.600 (2.063)	0.677 (0.900)	0.667 (0.920)	0.538 (0.884)	0.833 (0.951)	1.066 (0.955)
Pro-Farm Video	1.980 (1.914)	1.997 (1.950)	2.483 (1.940)	2.134 (1.919)	1.820 (1.973)	0.948 (1.136)	0.688 (1.180)	0.627 (1.116)	0.784 (1.179)	0.406 (1.191)
Pro-Animal Video	0.976 (2.256)	1.489 (2.296)	1.891 (2.414)	1.514 (2.195)	1.218 (2.158)	1.879* (1.127)	1.947* (1.114)	1.643 (1.071)	2.066* (1.136)	1.725 (1.126)
Facts correct	-1.341* (0.772)					-0.772** (0.351)				
Pro-animal error		0.810 (1.127)					1.402*** (0.462)			
Farm attitude			1.085 (1.028)					-1.891*** (0.501)		
Animal intelligence				0.207 (0.844)					1.064** (0.425)	
Animal welfare					0.721 (1.126)					1.704*** (0.461)
Controls Included	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Mean Dep Var	0.606	0.606	0.606	0.606	0.606	0.832	0.832	0.832	0.832	0.832
Observations	184	184	184	184	184	184	184	184	184	184

Note: Tobit regression of donation to charity on treatment T-Meat (uninformed), video treatments, and attitudinal factors. Robust standard errors are in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 1.B.22: H5: Attitude and petition

	(1) Petition (farm)	(2) Petition (farm)	(3) Petition (farm)	(4) Petition (farm)	(5) Petition (farm)	(6) Petition (animal)	(7) Petition (animal)	(8) Petition (animal)	(9) Petition (animal)	(10) Petition (animal)
T-Meat	-0.479 (0.320)	-0.500 (0.319)	-0.500 (0.319)	-0.362 (0.332)	-0.403 (0.329)	-0.523 (0.328)	-0.505 (0.326)	-0.540 (0.340)	-0.249 (0.335)	-0.359 (0.327)
Pro-Farm Video	-0.689* (0.382)	-0.654* (0.380)	-0.679* (0.381)	-0.846** (0.398)	-0.792** (0.392)	0.079 (0.398)	0.043 (0.402)	-0.059 (0.417)	-0.179 (0.434)	-0.148 (0.418)
Pro-Animal Video	-0.666 (0.419)	-0.596 (0.404)	-0.630 (0.411)	-0.807* (0.427)	-0.731* (0.423)	0.073 (0.418)	-0.011 (0.413)	-0.180 (0.424)	-0.283 (0.429)	-0.206 (0.422)
Facts correct	-0.103 (0.113)					0.138 (0.114)				
Pro-animal error		-0.017 (0.165)					-0.032 (0.173)			
Farm attitude			-0.107 (0.172)					-0.620*** (0.200)		
Animal intelligence				0.437** (0.176)					0.697*** (0.189)	
Animal welfare					0.282 (0.178)					0.439** (0.187)
Controls Included	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Mean Dep Var	0.516	0.516	0.516	0.516	0.516	0.500	0.500	0.500	0.500	0.500
Observations	184	184	184	184	184	184	184	184	184	184

Note: Logit average marginal effects of signing a petition on treatment T-Meat (uninformed), video treatments, and attitudinal factors.

Robust standard errors are in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

H6: Heterogeneity analyses

We estimate heterogeneous treatment effects on information choice based on controls. OLS regression results are presented.

Table 1.B.23: H6: Heterogeneity (Female)

	(1) Pro-Farming Video	(2) Pro-Animal Video	(3) Pro-Farming or Pro-Animal
T-Meat	-0.013 (0.062)	0.050 (0.085)	0.039 (0.111)
Female	0.069 (0.048)	0.059 (0.083)	-0.014 (0.111)
T-Meat $\times$ Female	-0.029 (0.066)	-0.048 (0.103)	-0.014 (0.141)
Mean Dep Var	0.956	0.877	0.665
Observations	203	203	203

Table 1.B.24: H6: Heterogeneity (White)

	(1) Pro-Farming Video	(2) Pro-Animal Video	(3) Pro-Farming or Pro-Animal
T-Meat	-0.030 (0.034)	0.022 (0.066)	0.015 (0.092)
White	-0.006 (0.035)	0.041 (0.075)	0.086 (0.106)
T-Meat $\times$ White	-0.010 (0.058)	-0.002 (0.095)	0.064 (0.136)
Mean Dep Var	0.956	0.877	0.665
Observations	203	203	203

Table 1.B.25: H6: Heterogeneity (Liberal)

	(1) Pro-Farming Video	(2) Pro-Animal Video	(3) Pro-Farming or Pro-Animal
T-Meat	-0.059** (0.026)	0.058 (0.057)	0.060 (0.082)
Political orientation	-0.087 (0.059)	0.066 (0.076)	0.129 (0.113)
T-Meat $\times$ Political orientation	0.090 (0.075)	-0.138 (0.104)	-0.105 (0.146)
Mean Dep Var	0.956	0.877	0.665
Observations	203	203	203

Table 1.B.26: H6: Heterogeneity (Farmers)

	(1) Pro-Farming Video	(2) Pro-Animal Video	(3) Pro-Farming or Pro-Animal
T-Meat	-0.076** (0.033)	0.004 (0.070)	0.097 (0.093)
Farmer	-0.054 (0.038)	0.047 (0.075)	0.103 (0.106)
T-Meat $\times$ Farmer	0.093* (0.056)	0.031 (0.094)	-0.145 (0.137)
Mean Dep Var	0.956	0.877	0.665
Observations	203	203	203

Table 1.B.27: H6: Heterogeneity (Vegans)

	(1) Pro-Farming Video	(2) Pro-Animal Video	(3) Pro-Farming or Pro-Animal
T-Meat	-0.039 (0.030)	0.057 (0.058)	-0.016 (0.079)
Vegan	-0.022 (0.043)	0.078 (0.073)	-0.182 (0.118)
T-Meat $\times$ Vegan	0.016 (0.066)	-0.133 (0.103)	0.153 (0.154)
Mean Dep Var	0.956	0.877	0.665
Observations	203	203	203

1.B.9 Screenshots of the laboratory experiment

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Qualtrics Survey Software

Welcome

Experimenter only.

Food Treatment: 1 for meat: 2 for vegan.

Welcome to this experiment. Please sit and wait quietly until you are given a code to move forward.

Please input your subject ID to start:

Consent Form

AGREEMENT TO PARTICIPATE IN ECONOMICS STUDY (IRB #3573)

Please read this consent agreement carefully before you decide to participate in the study.

You are invited to be a subject in a research project conducted by Professors Joshua Tasoff and Monica Capra in the Department of Economics at Claremont Graduate University (CGU). Volunteering will not benefit you directly, but you will be helping us explore the science of decision making with food. If you volunteer, you will complete a questionnaire, eat some food, and possibly watch a video. This will take about one hour of your time. Volunteering for this study involves no more risk than what a typical person experiences on a regular day. Your involvement is entirely up to you. You may withdraw at any time for any reason. Please continue reading for more information about the study.

STUDY LEADERSHIP: This research project is led by Prof. Joshua Tasoff and Prof. Monica Capra in the department of Economic Sciences at the Claremont Graduate University.

PURPOSE: The purpose of the study is to examine how individuals make various decisions. During the experiment, you will answer questions about your preferences.

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Qualtrics Survey Software

ELIGIBILITY: To be in this study, you must be at least 18 years of age and have no food restrictions or food allergies to participate in this survey. You must be fluent in English.

PARTICIPATION: During the study, you will make evaluations, decisions, eat food, and answer a brief survey; you might also watch a video. The study will take approximately 30-40 minutes.

RISKS OF PARTICIPATION: The risks that you run by taking part in this study are minimal. In this experiment, you will eat food in this experiment which you may or may not like.

BENEFITS OF PARTICIPATION: we do not expect the study to benefit you personally. There will be no direct benefits to you for participating in this study. However, your participation will help us learn about decision-making.

COMPENSATION: The minimum amount you will earn is the \$7 show-up fee. Total earnings may differ from person to person. You will be paid today in cash at the end of the experiment.

VOLUNTARY PARTICIPATION: Your participation in the study is completely voluntary. You may stop or withdraw from the study at any time without it being held against you. Your decision whether to participate will have no effect on your current or future connection with anyone at CGU. Refusal to participate will involve no penalty or loss of benefits to which you are otherwise entitled (i.e. your standing in school or your classes will not be affected by your participation in the study). You have the right to withdraw from the study at any time, without penalty. If you want to withdraw from the study, tell the experimenter. There is no penalty for withdrawing and you will still earn the \$7 show-up fee.

CONFIDENTIALITY: Your individual privacy will be protected in all papers, books, talks, posts, or stories resulting from this study. We may share the data we collect with other researchers, but we will not reveal your identity. In order to protect the confidentiality of your responses, we will assign you an identification (ID) number, and your decisions will be recorded using that number. Your name will not be used in any report, and we will obtain no information linking your name to the ID number.

FURTHER INFORMATION: If you have any questions or would like additional information about this study, please contact Department of Economics at Claremont Graduate University. If you have any questions or would like additional information about this study, please contact Joshua Tasoff, Associate Professor of Economics, CGU
Address: 160 E. Tenth St, Claremont, CA 91711

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Qualtrics Survey Software

E-mail: joshua.tasoff@cgu.edu

The CGU Institutional Review Board has approved this project.

If you have any ethical concerns about this project or about your rights as a human subject in research, you may contact the CGU IRB at (909) 607-9406 or at irb@cgu.edu. A copy of this form will be given to you if you wish to keep it.

CONSENT: Your signature below means that you understand the information on this form, that someone has answered any and all questions you may have about this study, and you voluntarily agree to participate in it.

×

SIGN HERE

clear

Instructions

Instructions:

This is an experiment about decision making. Earnings for your participation and decisions will be paid to you privately in cash immediately after this experiment. Your final payment will partly depend on chance and partly depend on your decisions, so you should pay attention to the instructions. There is no deception in this study.

Notification:

Please do not talk during the experiment. Please put the headphones on and leave them on until instructed to remove them.

Please raise your hand, if you have any questions!

Have you eaten anything in the last 3 hours?

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- ☐ Yes
☐ No

What did you have to eat?

- ☐ A meal
☐ A snack

Are you hungry? How hungry do you feel now?

	Strongly agree	Agree	Somewhat agree	Neither agree nor disagree	Somewhat disagree	Disagree	Strongly disagree
I am very hungry.	☐	☐	☐	☐	☐	☐	☐

In this experiment, you are going to be asked to do a few tasks. You will be eating food, possibly watching a video, and answering questions. Every part is equally important to this experiment.

Food Instruction

We are going to serve you a food item. Please evaluate this food item based on flavor, visual appeal, freshness, and texture.

Food Selection - Meat

In a few minutes an experimenter will be coming by to give you a food item to eat.

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Here are some reviews of the food that we are going to give you.
Those reviews are gathered from several online sources.

"Was going for a more comfort food day for me and my kiddos and I was really impressed by these nuggets!"

"Following the instructions on the bag in a convection toaster oven, these come out to a *perfect* amount of crispy crumbs, juicy and great taste. "

"These chicken nuggets are the best!"

"Made them in the air fryer with some chick filet sauce and they were amazing."

Please raise your hand and make eye-contact with the experimenter to indicate that you are ready to get your food. Please come back to your seat when you finish eating.

Enter continuation code below.

Food Selection - Veg

In a few minutes an experimenter will be coming by to give you a food item to eat.



All ingredients are plant-based.

Here are some reviews of the food that we are going to give you.
Those reviews are gathered from several online sources.

"Was going for a more comfort food day for me and my kiddos and I was really impressed by these nuggets!"

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"Following the instructions on the bag in a convection toaster oven, these come out to a *perfect* amount of crispy crumbs, juicy and great taste. "

"These chicken nuggets are the best!"

"Made them in the air fryer with some chick filet sauce and they were amazing."

Please raise your hand and make eye-contact with the experimenter to indicate that you are ready to get your food. Please come back to your seat when you finish eating.

Enter the continuation code below.

Food Review Question

Answer the following questions regarding the food item.

	Extremely satisfied	Somewhat satisfied	Neither satisfied nor dissatisfied	Somewhat dissatisfied	Extremely dissatisfied
Flavor	☐	☐	☐	☐	☐
Visual Appeal	☐	☐	☐	☐	☐
Freshness	☐	☐	☐	☐	☐
Texture	☐	☐	☐	☐	☐

What do you think are the first three ingredients on the ingredient list?

Video Instruction - Section 1

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You will be randomly given one of two videos to watch. The total time for the video is about **10 minutes**.

There are contrasting perspectives on animal agriculture in America. We are interested in understanding how people evaluate information related to animal agriculture, and what sorts of messages people find persuasive.

Video A is a lecture on the positive effects of animal agriculture on the environment. **Video B** is a lecture about the issues with factory farming in America.

Each of the videos portrays one of the views.

First, you will state whether you want to watch each video. You will have the opportunity to watch only one video. Depending on your choice and chance, you may end up watching that video or not. 10% of all the participants will receive their choice. For the rest of the participants, we will randomly assign you to video A, video B, or no video. **Your choice has a chance to count for real, thus please answer the questions seriously.**

If you don't watch the video, then you will finish the experiment early and be seated quietly waiting for everyone else to catch up.

Video Instructions - Section 2

The speaker in **Video A** is Mr. Allan Savory.

He is a Zimbabwean scientist, livestock farmer, and president and co-founder of the Savory Institute. He has dedicated his life studying bunched and moving livestock as a means to heal the environment and reverse desertification.

In the video you will watch Mr. Savory explain a surprising solution to the spread of deserts around the globe: grazing. By reversing the

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transformation of grassland into desert, he said, such “holistic planned grazing” could help solve climate change.

Would you like to watch the video A? If you skip the video, you will still have to wait for everyone else to finish up.

☐

Yes, I would like to watch it.

☐

No, I would like to skip it and wait without watching.

☐

Yes, I would like to watch it.

☐

No, I would like to skip it and wait without watching.

☐

Video A

☐

Video B

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Given your choice and chance, you were assigned **Video A**.

Please evaluate the video.

Strongly Convincing

Convincing

Somewhat Convincing

Neither Convincing or Unconvincing

Somewhat Unconvincing

Unconvincing

Str

How convincing did you find the speaker's argument?

☐

☐

☐

☐

☐

☐

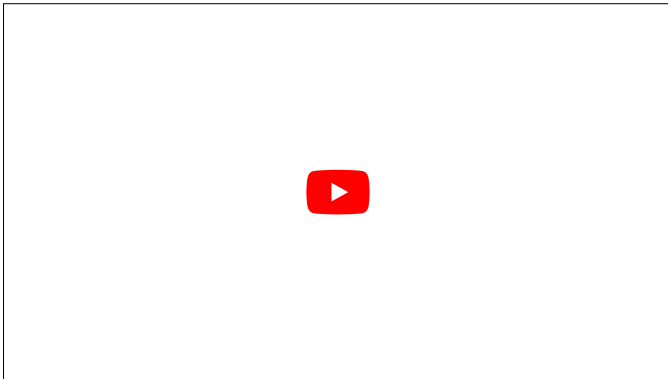
☐

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Factory Farm Video

The system is selecting the video you are going to watch...

Given your choice and chance, you were assigned **Video B**.



Please evaluate the video.

	Strongly Convincing	Convincing	Somewhat Convincing	Neither Convincing or Unconvincing	Somewhat Unconvincing	Unconvincing	Str Unco
How convincing did you find the speaker's argument?	☐	☐	☐	☐	☐	☐	

**Belief Questions**

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For getting to this point in the experiment, you have received another \$5. This is added to your show up fee for a total of \$12.

You will be asked a series of factual questions. For each question you answer correctly you will earn an additional \$0.50. Please think carefully about each question.

Which of the following is true? The eggs served in Frary Dining Hall (Pomona College's main dining hall) come from hens that:

- ☐ Are kept in cages with no more than 85 square inches of living space per hen. All of their male siblings are killed soon after they hatch.
- ☐ Live in a large barn uncaged and have at least 108 square feet (15,552 square inches) of living space per hen. All of their male siblings are killed soon after they hatch.
- ☐ Live on a pasture with a minimum of 16 square feet (2,304 square inches) per hen and access to an indoor shelter. All of their male siblings are killed soon after they hatch.
- ☐ Live on a pasture with a minimum of 16 square feet (2,304 square inches) per hen and access to an indoor shelter. Their male siblings are raised in the same conditions.

Which of the following food choices have more protein?

- ☐ 100 g of Raw Peanuts
- ☐ 100 g of Boneless Skinless Chicken Breast

According to the EPA (the United States Environmental Protection Agency), which of the following cause the most greenhouse-gas emissions:

- ☐ Industry
- ☐ Transportation
- ☐ Agriculture
- ☐ Commercial & Residential

Of the following athletes how many rely on plant-based diets in their training?

Serena Williams (7 time Wimbledon Tennis Champion)

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LeBron James (NBA basketball player)
Patrik Baboumian (World record holder for the yoke walk, carrying
1212.54 pounds across 10 meters)

- ☐ 0
- ☐ 1
- ☐ 2
- ☐ 3

Which of the following occupations makes less than \$32,000 per year on average (which is under the poverty line for a family of 5)?

- ☐ Food Inspector
- ☐ Animal Advocacy Lawyer
- ☐ Meat Packer
- ☐ Registered Nurse

What is the US Department of Agriculture recommended amount of lean meat the average person should eat per day

- ☐ 0 oz
- ☐ 4 oz (quarter pounder at mc Donalds)
- ☐ 5.5 oz (slightly more than a can of tuna)
- ☐ 8 oz (typical sirloin steak)

Which of the following food items contain the most Iron?

- ☐ 8 oz carrots
- ☐ 8 oz of beets
- ☐ a 12 oz can of Coca Cola
- ☐ 6 oz sirloin steak

One vitamin that is difficult to obtain from plant sources, and is therefore a common deficiency in vegan diets is:

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- ☐ Vitamin E
- ☐ Vitamin B12
- ☐ Folic Acid
- ☐ All vitamins can be obtained in adequate supply from plants.

Outcomes - Donation

There are two organizations which you will have a chance in a minute to donate some of your earnings to:



National FFA Organization (originally Future Farmers of America) is an American 501(c)(3) youth organization, specifically a career and technical student organization, based on middle and high school classes that promote and support agricultural education. It is an organization for those with diverse interests in the food, fiber and natural resource industries, encompassing science, business and technology in addition to production agriculture. Today FFA is among the largest youth organizations in the United States, with 669,989 members in 8,630 chapters throughout all 50 states, Puerto Rico, and the Virgin Islands. FFA is the largest of the career and technical student organizations in U.S. schools.



Mercy for Animals is an international nonprofit animal protection organization founded in 1999 by Milo Runkle. Its mission is to "prevent cruelty to farmed animals and promote compassionate food choices and policies." Mercy for animals has conducted more than 65 investigations of factory farms and slaughterhouses, many of which have resulted in animal cruelty convictions, changes in corporate animal welfare policies, and prime time media coverage. The organization has guided many of the world's largest food companies, including Nestlé, Perdue, and Walmart in adopting animal welfare policies.

Would you like to donate some of your earnings to Mercy for Animals, or the National FFA?

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- ☐ Yes, I would like to donate to National FFA, which is for students to learn more about agriculture as their future career
- ☐ Yes, I would like to donate to Mercy for Animals, which helps protect animals
- ☐ No, I would not like to donate this time

How much of your earnings would you like to donate to Mercy for Animals to help protect animals?

0 0.5 1 1.5 2 2.5 3 3.5 4 4.5 5 5.5 6 6.5 7 7.5 8 8.5 9 9.5 10 10.5 11 11.5 12

I would like to
donate this amount
of dollars.

How much of your earnings would you like to donate to National FFA, which promotes agricultural education in middle schools and high schools?

0 0.5 1 1.5 2 2.5 3 3.5 4 4.5 5 5.5 6 6.5 7 7.5 8 8.5 9 9.5 10 10.5 11 11.5 12

I would like to
donate this amount
of dollars.

We have \$100 that will be donated to one of these charities. See below for descriptions. Every participant in the entire experiment (all the sessions included) will vote, and at the end the vote will be tallied and the charity that wins will receive the donation. Which charity would you like us to donate to?

- ☐ I would like you to donate to National FFA, which is for students to learn more about agriculture as their future career
- ☐ I would like to donate to Mercy for Animals, which helps protect animals



National FFA Organization (originally Future Farmers of America) is an American 501(c)(3) youth organization, specifically a career and technical student

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organization, based on middle and high school classes that promote and support agricultural education. It is an organization for those with diverse interests in the food, fiber and natural resource industries, encompassing science, business and technology in addition to production agriculture. Today FFA is among the largest youth organizations in the United States, with 669,989 members in 8,630 chapters throughout all 50 states, Puerto Rico, and the Virgin Islands. FFA is the largest of the career and technical student organizations in U.S. schools.



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Mercy for animals has conducted more than 65 investigations of factory farms and slaughterhouses, many of which have resulted in animal cruelty convictions, changes in corporate animal welfare policies, and prime time media coverage. The organization has guided many of the world's largest food companies, including Nestlé, Perdue, and Walmart in adopting animal welfare policies.

Petition

As a way to support either the farmers' rights or the animals' rights, we have two petitions for you sign.

If you are so inclined, please do sign the petition. Once you have finished reading, or possibly signing the petition, please close the window and come back to this page to continue the survey.

Petition 1: People Need to be More Educated about Animal Agriculture (Pro-Farm)

Click [here](#) to see detail information of this petition.

Petition 2: Ban Farrowing Crates - Let Mother Pigs Care for Their Babies (Pro-Animal)

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Click [here](#) to see detail information of this petition.

Did you sign up for Petition 1: People Need to be More Educated about Animal Agriculture?

- ☐ Yes
☐ No

Did you sign up for Petition 2: Ban Farrowing Crates - Let Mother Pigs Care for Their Babies?

- ☐ Yes
☐ No

Exit Survey

Answer the following questions regarding your attitude toward the farming industry.

	Strongly agree	Agree	Somewhat agree	Neither agree nor disagree	Somewhat disagree	Disagree	Strongly disagree
I believe that it is important to support American family farms.	☐	☐	☐	☐	☐	☐	☐
Supporting local and humanely raised meat is important for encouraging better farming practices.	☐	☐	☐	☐	☐	☐	☐
Animals are mostly treated well in farms in America.	☐	☐	☐	☐	☐	☐	☐

	Strongly agree	Agree	Somewhat agree	Neither agree nor disagree	Somewhat disagree	Disagree	Strongly disagree
It is immoral to harm animals in the production of food when plant alternatives are available.	☐	☐	☐	☐	☐	☐	☐
I consider myself sympathetic to animal rights.	☐	☐	☐	☐	☐	☐	☐
Overall, I believe vegetarian diets are undesirable and worse than diets that include meat.	☐	☐	☐	☐	☐	☐	☐
The way meat (beef, chicken, pork, fish) is produced in America is morally wrong.	☐	☐	☐	☐	☐	☐	☐
Sustainable animal agriculture is necessary for good land stewardship.	☐	☐	☐	☐	☐	☐	☐

Answer the following questions regarding your attitude toward the intelligence of animals.

	Strongly agree	Agree	Somewhat agree	Neither agree nor disagree	Somewhat disagree	Disagree	Strongly disagree
Pigs are intelligent.	☐	☐	☐	☐	☐	☐	☐
Cows can feel fear and pain.	☐	☐	☐	☐	☐	☐	☐
Chickens experience happiness.	☐	☐	☐	☐	☐	☐	☐
Pigs are inquisitive, with considerable learning and problem-solving abilities.	☐	☐	☐	☐	☐	☐	☐

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	Strongly agree	Agree	Somewhat agree	Neither agree nor disagree	Somewhat disagree	Disagree	Strongly disagree
Fish can exploit the knowledge of conspecifics by following them to a secret or hidden food site.	☐	☐	☐	☐	☐	☐	☐
Cows know how to recognize themselves by using a mirror.	☐	☐	☐	☐	☐	☐	☐
Pigs have the equivalent level of intelligence as dogs or cats.	☐	☐	☐	☐	☐	☐	☐

What is your gender ?

- ☐ Male
☐ Female
☐ Other

What is your race?

- ☐ White
☐ Black or African American
☐ American Indian or Alaska Native
☐ Asian
☐ Native Hawaiian or Pacific Islander
☐ Other
☐ I do not want to answer

Did you go to high school in America?

- ☐ Yes
☐ No

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What is the zip code that you lived in when you were in high school? (If you lived in more than one choose the one you spent the most time in)

Where do you view yourself on the political spectrum?

	Very Liberal	Somewhat Liberal	Slightly Liberal	Neither Liberal nor Conservative	Slightly Conservative	Somewhat Conservative	Very Conservative
I view myself as	☐	☐	☐	☐	☐	☐	☐

Where do you eat mostly?

- ☐ Campus Dining
☐ Restaurant
☐ Cook at home
☐ Take out

How many of your friends and family members are farmers? (If you know more than 10, put 10)

0	1	2	3	4	5	6	7	8	9	10
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

How many of your friends and family members are vegans? (If you know more than 10, put 10)

0	1	2	3	4	5	6	7	8	9	10
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Do you think you know the purpose of this experiment?

- ☐ Yes
☐ No

What is the purpose of the experiment?

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Do you have any feedback about this experiment?

Here are the answers to the factual questions you were asked after watching the video.

Q1. Which of the following is true? The eggs served in Frary Dining Hall (Pomona College's main dining hall) come from hens that:

Are kept in cages with no more than 85 square inches of living space per hen. All of their male siblings are killed soon after they hatch.

Live in a large barn uncaged and have at least 108 square feet (15,552 square inches) of living space per hen. All of their male siblings are killed soon after they hatch.

[Correct answer. Pomona's eggs are cage-free sourced from Chino Valley Ranchers in Colton, CA. Chino Valley Ranchers pasture raised farms provide 108 square feet of land per hen.

Source: <https://www.chinovalleyranchers.com/about-pasture-raised>

Live on a pasture with a minimum of 16 square feet (50,176 square inches) per hen and access to an indoor shelter. All of their male siblings are killed soon after they hatch.

Live on a pasture with a minimum of 16 square feet (50,176 square inches) per hen and access to an indoor shelter. Their male siblings are raised in the same conditions.

Q2. Which of the following food choices have more protein?

100 g of Raw Peanuts

100 g of Boneless Skinless Chicken Breast

[Correct answer. 100 g of raw peanuts have 25.8 g of protein whereas 100 g of boneless skinless chicken breast have 31 g of protein.

Source: <https://www.soupsage.com/compare-nutrition/peanuts-vs-chicken#:~:text=Both%20chicken%20and%20peanuts%20are%20high%20in%20protein.,has%2024.4g>

Q3. According to the EPA (the United States Environmental Protection Agency), which of the following sectors produces the most greenhouse-gas emissions:

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Industry

Transportation

[Correct answer. The largest sources of of greenhouse gas emissions by economic sectors in 2019 (29% of U.S. greenhouse gas emissions) were transportation.

Source: <https://www.epa.gov/ghgemissions/sources-greenhouse-gas-emissions>

Agriculture

Commercial & Residential

Q4. Of the following athletes how many rely on plant-based diets in their training?

Answer: 2

Serena Williams (7 time Wimbledon Tennis Champion)

LeBron James (NBA basketball player)

Patrik Baboumian (World record holder for the yoke walk, carrying 1212.54 pounds across 10 meters)

Source: <https://allplants.com/blog/lifestyle/is-serena-williams-vegan>
<https://aretheyvegan.com/lebronjames/#:~:text=But%20is%20LeBron%20James%20vegan,>
<https://medium.com/four-pursuits-ventures/worlds-strongest-man-is-a-vegan-c2db543c62c8>

Q5. Which of the following occupations makes less than \$32,000 per year on average (which is under the poverty line for a family of 5)?

Food Inspector

Animal Advocacy Lawyer

Meat Packer

[Correct answer. The annual mean wage of meat packers is \$28,620.

Source: Bureau of Labor Statistics - US Department of Labor]

Registered Nurse

Q6. What is the US Department of Agriculture recommended amount of lean meat the average person should eat per day?

0 oz

4 oz (quarter pounder at mc Donalds)

5.5 oz (slightly more than a can of tuna)

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[Correct answer.

Source: US Department of Agriculture]

8 oz (typical sirloin steak)

Q7. Which of the following food items contain the most Iron?

8 oz carrots

8 oz of beets

a 12 oz can of Coca Cola

6 oz sirloin steak

[Correct answer: 6 oz sirloin steak contains 2.7 mg - 4 mg of Iron.

Source:

National Institutes of Health - US Department of Health & Human Services

Costco]

Q8. One vitamin that is difficult to obtain from plant sources, and is therefore a common deficiency in vegan diets is:

Vitamin E

Answer: **Vitamin B12**

[Correct answer. Followed are the main sources of vitamin B12: clams, liver, nutritional yeasts, beef, trout, salmon, tuna and other dairy products.

Source: National Institutes of Health - US Department of Health & Human Services]

Folic Acid

Magnesium

Please do not share anything about this experiment with any friends. It is important for the validity of this experiment that future participants not be told about the details prior to participating.

Final Payment

You will get paid a \$7 show-up fee plus \$5 for passing the food and video stage of the experiment, plus $\$ \{e://Field/beliefPay\}$ for all your correct answers (\$0.5 for each), minus your chosen donation of $\$ \{e://Field/donation\}$, for a total of $\$ \{e://Field/finalPay\}$.

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Your final payment is $\$ \{e://Field/finalPay\}$.

PLEASE raise hand at this time so that an experimenter can come by and get some information. This will ensure that you will receive the correct amount of money.

Please type the code to continue:

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People Need to Be More Educated about Animal Agriculture

[Sign Petition](#)**98**

Verified signatures ▾

The Issue

Nowadays, many people, who are not well informed of the role agriculture plays in our world, tend to make assumptions that are not true about farming activities. We should promote education on related topics for people to better understand agriculture.

Primarily, people think that agriculture is the main cause of global warming and greenhouse gases. In fact, agriculture is one of the lowest producers of greenhouse emissions. In terms of sustainability, farmers and ranchers use animal manure as fertilizer to ensure nutrient-rich soil and conserve resources needed for food and plant production. Farmers also adopt more advanced technologies to produce more food with limited land available. They have more efficient livestock, adapting to the rapid increase in the global population. Since 1977, U.S. Cattle ranchers raise 30% fewer cattle, but produce 31% more beef, and for each pound of beef produced they use 33% less land and 12% less water. Therefore, agriculture does not have a huge impact on greenhouse emissions.

Many people believe that majority of farms and ranches are corporate, and farmers treat animals badly. This is not true. 97% of all the farms in the U.S. are family-owned and are under 150 acres. Farmers do care about the welfare of animals because these animals bring them profit and livelihood. They work 24/7, striving to feed and provide. Farmers are educated to comply with the strict regulations and are moving along with the advancement of technology, to ensure the quality of food sent to the consumers' table, while striving to make ends meet in a constantly changing economic environment.

We propose to raise national funding to support organizations and programs devoted to agricultural education. These programs will provide future agricultural workforce with relevant trainings and increased knowledge of food and agricultural sciences. They will also inform consumers of agricultural products, where their food comes from and who grows it, so people can have more respect for the farmers and ranchers that work hard to provide for the world.

[Report a policy violation](#)

Elodie Laurent
Petition Starter

[Media inquiries](#)



Ban Farrowing Crates - Let Mother Pigs Care for Their Babies

Sign Petition

475

Verified signatures

The Issue

Imagine that you have just given birth. You have been locked inside a cage that restricts your movement. You cannot reach your arms out to hold your baby, the only contact is your nipples for feeding. This is how a farrowing crate restricts a sow and her piglets. Pig farrowing crates are barred metal crates within a pen where pregnant sows are placed shortly before giving birth. Farrowing crates prevent the sows from turning around and only allow them to move a little forward and backward in such a small 20 square feet space. Please sign this petition to demand that the U.S. bans this horrific farming method that turns mother pigs into miserable fertility machines.

The farrowing crate violates a pig's freedom to express normal behavior. This freedom is one of the "Five Freedoms", which are five identified basic rights used to guide U.S. animal welfare. Animal welfare experts also believe farrowing crates threaten two other Freedoms - freedom from discomfort and freedom from fear and distress.

People for the Ethical Treatment of Animals (PETA) has recently released a comprehensive report that backs up these concerns. The report highlights farrowing crates as a particularly cruel aspect of pigs' living conditions. Other countries including Sweden, and Switzerland have already banned the use of farrowing crates, and it's time for us to join them.

Please sign this petition demanding that we move forward and ban this inhumane practice. If enough people sign, it will send a clear message that the public believes farrowing crates have no place in a society that cares about animal welfare.

[Report a policy violation](#)



Jack Durant
Petition Starter

Media inquiries

1.C Hypothetical choice experiment appendices

1.C.1 Pre-analysis plan (PAP) documents

The Effect of Motivated Beliefs on the Demand for Information about Food

Outline of Analysis

Monica Capra, Seong-Gyu Park, Joshua Tasoff, Jin Xu, and Shanshan Zhang

Brief Description

Cognitive dissonance may arise when people experience conflict between the belief about their favorite food item and the harm its production generates. People tend to exhibit greater information avoidance towards the harm of the production of their favorite food, than that of a food item they do not care about.

Target Sample Size

The sample size is targeted at N=1000, with 500 participants randomly assigned in each condition, to ensure we have enough statistical power for two-sample proportion test.

Analysis

Individual-level data will be collected through the Qualtrics survey distributed through Prolific, an online research platform.

1. Variables

- a) Conditions: Favorite food item (treatment) or a food item that people are unlikely to have ever tried before (control).
- b) Outcome: Choice as to whether to watch a documentary exposing the unethical practices in the production of a food item, varied by assignment of conditions.

2. Hypothesis

Favorite food item compared to food item in control decreases watching documentary.

- a) Unpaired proportions z test on information avoidance by treatment.
- b) Regression (OLS / logit) information avoidance on treatment.

1.C.2 Design and results of the hypothetical choice experiment

While participants who believed they were eating meat responded with lower animal welfare attitudes, we observed no effect on information choice, donation, or political (petition) behavior. Why did the manipulation fail to produce behavioral results? We wondered whether a low valuation of the nuggets resulted in the null results. This was a food item selected by the experimenters, not by the participants. Perhaps if participants were more psychologically invested in the food item they would be more likely to respond behaviorally. To explore this possibility, we conducted a hypothetical choice experiment. We hypothesized that people would be less likely to receive incriminating information about a favorite food item, in contrast to a food item that they have never eaten before.

We recruited 1,000 participants from Prolific and limited our recruitment to U.S. residents. All participants were randomly assigned to either the treatment or control groups. During the study, subjects were asked to provide the name of their favorite food. In the treatment group, we present a description of a documentary related to their favorite food, which associates the food item with human trafficking, slavery, and child exploitation. Participants were then given the option to choose whether they wanted to watch the documentary. In the control group, we presented a description of a documentary about “blue impala steak” that contains the same negative associations as the treatment group. We deliberately selected “blue impala steak” as it is a meat from a fictional subspecies of antelope, and hence a meat that no one has ever tried, regularly eats, is desirous of eating in the future, and is unlikely to be confused with other regularly consumed foods. Upon making their decision regarding whether to watch the documentary, the experiment concluded, and the subjects received their payment code. The survey screenshots are presented in Appendix 1.C.3. The text is presented below:

Suppose there is a recent Academy Award-winning documentary exposing the unethical practices in [blue impala steak production / (favorite food)]. It’s received rave reviews and a score of 8.7/10 on IMDb.com and 91% on Rotten Tomatoes. Here’s a description of the film by a popular and well-regarded critic:

“Guilt on the Menu” is an Academy Award-winning documentary that fearlessly exposes the dark secrets lurking behind the [blue impala steak production / (favorite food)]. With relentless determination, the film delves deep into the human trafficking, slavery, and child exploitation plaguing the industry. Through stunning cinematography and a compelling narrative, it confronts viewers with the devastating humanitarian consequences of our food choices. “Guilt on the Menu” is a wake-up call, urging us to question the status quo and make responsible, compassionate decisions. This thought-provoking masterpiece will leave an indelible impression on your conscience, igniting a powerful desire for change.

Would you watch this movie? Yes / No

The proportion of subjects choosing to watch the documentary was notably higher in the treatment group (proportions test: 0.534 vs. 0.472, $p = 0.050$). Table 1.C.1 reports

the results of regressing the information choice on the treatment. This suggests that individuals are *more* inclined to seek out morally-implicating information for the food they like, as opposed to the food they are not attached to. However, this result contradicts our hypothesis that people will experience dissonance and avoid morally troubling information about the foods they like. The results are instead consistent with expected-utility theory. According to expected-utility theory, people should value information based on the extent to which it can improve decision-making. Given that no subject eats blue impala steak, a documentary on the topic would provide mostly useless information. In contrast, information about one's favorite food is highly instrumental, and therefore expected-utility theory would predict that a documentary on that topic would be of value.

Table 1.C.1: Hypothetical study: information choice

	(1) Watch
Treatment	0.062* (0.031)
Mean Dep Var	0.503
Observations	1000

Note: Logit average marginal effects of information choice.

Robust standard errors are in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

1.C.3 Screenshots of the hypothetical choice experiment

1. Consent Form

AGREEMENT TO PARTICIPATE IN ECONOMICS STUDY (IRB #4564)

Please read this consent agreement carefully before you decide to participate in the study.

You are invited to volunteer for a research project. Volunteering will not benefit you directly, but you will be helping us explore what foods people like to eat. If you volunteer, you will tell us your diet, and it will take less than 2 minutes. Volunteering for this study involves no more risk than what a typical person experiences on a regular day. Your involvement is entirely up to you. You may withdraw at any time for any reason. Please continue reading for more information about the study.

STUDY LEADERSHIP: This research project is led by Prof. Joshua Tasoff and Prof. Monica Capra in the department of Economic Sciences at the Claremont Graduate University.

PURPOSE: This study is designed to explore the relationship between food preference and the demand for a video.

ELIGIBILITY: To be in this study, you must be fluent in English, 18 years of age or older, currently living in the United States, and registered on the Prolific.

PROCESS: During the study, you will be asked to tell us your diet. It will take less than 2 minutes.

RISKS OF PARTICIPATION: The risks that you run by taking part in this study are minimal. Volunteering for this study involves no more risk than what a typical person experiences on a regular day.

BENEFITS OF PARTICIPATION: We do not expect the study to benefit you personally. This study will benefit the researchers by publishing the results in a scientific journal. This study is also intended to benefit other researchers who wonder what foods people like to eat.

COMPENSATION: On completion of the survey, you will be compensated \$0.4 at the end of the survey.

VOLUNTARY PARTICIPATION: Your participation in this study is completely voluntary. You may stop or withdraw from the study at any time without it being held against you. Your decision whether or not to participate will have no effect on your current or future connection with anyone at CGU.

CONFIDENTIALITY: Your individual privacy will be protected in all papers, books, talks, posts, or stories resulting from this study. We may use the data we collect for future research or share it with other researchers, but we will not reveal your identity. In order to protect the confidentiality of your responses, all your responses throughout the study will be recorded only with your Prolific ID which should be randomly given.

FURTHER INFORMATION: If you have any questions or would like additional information about this study, please contact Joshua Tasoff at (909) 621-8782 or at joshua.tasoff@cgu.edu. The CGU Institutional Review Board (IRB) has certified this project as exempt. If you have any ethical concerns about this project or about your rights as a human subject in research, you may contact the CGU IRB at (909) 607-9406 or at irb@cgu.edu. You may print and keep a copy of this consent form.

CONSENT: Your signature below means that you understand the information on this form, that someone has answered any and all questions you may have about this study, and you voluntarily agree to participate in it.

×

SIGN HERE

clear

A Request for Your Unique Prolific ID

To keep your responses confidential, all your responses throughout the study will be recorded only with your Prolific ID.

Please provide us below with your unique Prolific ID. We need this to pay you.

Please type in your Prolific ID:

2. Favorite Food

Your Favorite Food

What is your favorite food? Please tell us your favorite food for a meal.

9/6/23, 6:10 PM

Qualtrics Survey Software

I love eating...

3.A. (Control) Demand for Information

A Documentary

Suppose there is a recent Academy Award-winning documentary exposing the unethical practices in blue impala steak production. It's received rave reviews and a score of 8.7/10 on [IMDb.com](#) and 91% on Rotten Tomatoes. Here's a description of the film by a popular and well-regarded critic:

"Guilt on the Menu" is an Academy Award-winning documentary that fearlessly exposes the dark secrets lurking behind the blue impala steak production. With relentless determination, the film delves deep into the human trafficking, slavery, and child exploitation plaguing the industry. Through stunning cinematography and a compelling narrative, it confronts viewers with the devastating humanitarian consequences of our food choices. "Guilt on the Menu" is a wake-up call, urging us to question the status quo and make responsible, compassionate decisions. This thought-provoking masterpiece will leave an indelible impression on your conscience, igniting a powerful desire for change.

Would you watch this movie?

- ☐ Yes, I would like to watch it.
- ☐ No, I don't want to watch it.

3.B. (Treatment) Demand for Information

A Documentary

Suppose there is a recent Academy Award-winning documentary exposing the unethical practices in [\\$\(e://Field/Favorite%20Food\)](#) production. It's received rave reviews and a score of 8.7/10 on [IMDb.com](#) and 91% on Rotten Tomatoes. Here's a description of the film by a popular and well-regarded critic:

"Guilt on the Menu" is an Academy Award-winning documentary that fearlessly exposes the dark secrets lurking behind the [\\$\(e://Field/Favorite%20Food\)](#) production. With relentless determination, the film delves deep into the human trafficking, slavery, and child exploitation plaguing the industry. Through stunning cinematography and a compelling narrative, it confronts viewers with the devastating humanitarian consequences of our food choices. "Guilt on the Menu" is a wake-up call,

https://cgu.co1.qualtrics.com/Q/Edi/Section/Blocks/Ajax/GetSurveyPrintPreview?ContextSurveyID=SV_8om5ehyF0XFgyeG&ContextLibraryID=UR_ct... 3/4

9/6/23, 6:10 PM

Qualtrics Survey Software

urging us to question the status quo and make responsible, compassionate decisions. This thought-provoking masterpiece will leave an indelible impression on your conscience, igniting a powerful desire for change.

Would you watch this movie?

- ☐ Yes, I would like to watch it.
- ☐ No, I don't want to watch it.

4. End of Survey

Thank you for your participation today.

Please save the completion code below which will be required when you return to the Prolific app to prove that you completed your study.

Prolific Completion Code: **CJZWE44L**

Once you've saved the completion code, please **CLICK THE ARROW** in the bottom right-hand corner of this page to finish the survey.

<< Please don't forget to click the arrow button below to confirm that you completed the survey! >>

Hope to see you again soon! :)

https://cgu.co1.qualtrics.com/Q/Edi/Section/Blocks/Ajax/GetSurveyPrintPreview?ContextSurveyID=SV_8om5ehyF0XFgyeG&ContextLibraryID=UR_ct... 4/4

Chapter 2

From Pledge to Plate: Investigating the Effects of a Temporary Meat Reduction Initiative¹

2.1 Introduction

Over the past fifty years, global meat production has more than tripled, surpassing 350 million tons annually (Ritchie et al., 2023). This growth has led to significant environmental consequences, including increased greenhouse gas emissions, greater agricultural land use, and extensive freshwater consumption.² In addition to the environmental impact, meat consumption also raises serious concerns related to health.³ Another critical concern is animal welfare; research has highlighted the ethical dilemmas surrounding the treatment of animals in the meat industry. Economic incentives, particularly in relation to stocking density, often push producers to prioritize efficiency over the well-being of individual animals (Lusk and Norwood, 2011).

As awareness of these negative externalities has increased, many scientists argue that governments should take active steps to reduce meat consumption in developed countries (e.g., Tilman and Clark, 2014; Hedenus et al., 2014). Such a reduction is widely viewed as important for addressing the environmental, health, and animal welfare challenges posed by the meat industry. However, the appropriate methods to achieve this goal remain a topic of ongoing debate. Conventional approaches to reducing meat consumption typically include taxes and informational interventions. While meat taxes have proven politically

¹I thank Berno Buechel, Mehdi Farsi, Jana Freundt and Holger Herz for their useful comments. I would also like to thank the Swiss National Bank Fund for making the experiment possible.

²Greenhouse gas (GHG) emissions from animal-based food production account for 57% of total food-related emissions (Xu et al., 2021), while food systems (i.e., the entire process of producing, processing, distributing, consuming, and disposing of food) contribute to one-third of all human-induced GHG emissions (Crippa et al., 2021).

³Processed meat has been classified as carcinogenic to humans, with experts estimating that consuming 50 grams of processed meat daily increases the risk of colorectal cancer by 18 percent (World Health Organization – International Agency for Research on Cancer, 2015).

contentious, policymakers may find it easier to implement interventions in the form of informational campaigns. The idea behind these campaigns is that by educating consumers about the negative consequences of meat consumption, demand for meat will decrease. Recent research has explored the effectiveness of these informational interventions (Jalil et al., 2020; Espinosa and Stoop, 2021; Epperson and Gerster, 2024). However, Droz et al. (2025) suggest that eating meat *causes* information avoidance about its consequences, although the effects are nuanced as they are meat-specific and topic-specific. Therefore, delivering information during periods when people are not actively consuming meat – such as during specific campaigns like Meatless Mondays or (active) Lent – may prove more effective than during regular consumption times. Additionally, a one-off intervention might not be sufficient to alter behavior due to the stable, enduring, and trait-like nature of animal consumption (Feltz et al., 2022). Given this, it is more reasonable to aim for long-term behavioral change by focusing on habit transformation over time. One potential strategy for achieving this is to launch an information campaign centered around a meat reduction pledge, encouraging participants to reduce their meat intake with continued support and reminders. This paper examines whether a one-month pledge causally affects the consumption of meat and meat substitutes, as well as justifications for meat consumption in the short run and long run. Using a randomized experiment, I find that full program participation – including committing to the pledge, limiting meat for a month, and receiving informational and motivational support (reminders, recipes, etc.) – reduces self-reported meat consumption in both the short and long run, while it only increases self-reported meat substitute consumption in the short run. Similarly, I find that those who participated in the full program justified their meat consumption less in the short run, but this effect does not persist.⁴

This paper contributes to the literature on interventions aimed at reducing or avoiding meat consumption through pledges, month-long commitments, or initiatives like *Green Monday* or *Veganuary* (Piazza et al., 2022; Bègue and Treich, 2019; Klatt and Schulze Tillig, 2024). My paper also connects to a broader literature on commitment-based pledges in other domains like smoke-free months or *Dry January*, which aim to reduce smoking and alcohol consumption (Brown et al., 2014).⁵ The main contribution of this paper is to estimate the short- and long-run effects of a one-month meat reduction initiative on meat

⁴While empirical evidence suggests that experimenter demand effects are generally limited in online surveys, I implemented several best practices to reduce these effects in my study as recommended by Haaland et al. (2023). These included ensuring respondent anonymity, which helps minimize social desirability bias, and using neutral framing in the instructions to reduce cues about the experimenter’s expectations (for example, participants were explicitly told that “there are no right or wrong answers”). Additionally, I asked factual, behavior-based questions – such as “How many times have you had meat (beef, pork, chicken, fish,...) for breakfast in the past week?” with response options from 0 to 7 – to further limit the influence of normative pressure on responses.

⁵The *Dry January* campaign, with 2 million participants in England and Wales, estimated that 67% of participants reported drinking less alcohol six months after completing the campaign and 8% remained alcohol-free beyond January. However, the study is subject to self-selection bias; participants voluntarily opt in to the initiative and actively reduce their consumption, which may influence the outcomes (Ballard, 2016; Hamilton and Gilmore, 2016).

consumption, meat substitute consumption, and meat justification, using a randomized controlled trial.

The remainder of this paper is organized as follows: Section 2.2 outlines the experimental design, while Section 2.3 presents the key findings. Finally, in Section 2.4, I discuss the implications of these results and provide concluding remarks.

2.2 Experimental design

2.2.1 Overview

Table 2.2.1 outlines the general structure of the study, which consists of three survey waves including a one-month intervention period (“*Meat-free*” *January*) for the treatment group. All participants begin with the initial pre-treatment survey S0 (approximately 2 weeks prior to the treatment period). At the end of this survey, half of the participants are randomly assigned to the invitation group and can choose to accept or decline the pledge. Participants who commit to the pledge (the *Veganuary* group) receive ongoing motivational support, including reminders, recipes, and other resources, to help them adhere to the pledge, followed by two post-treatment surveys (S1 and S2). Those who decline or were not invited to commit to the pledge (the *Control* group) might continue with their usual diet and complete virtually the same two post-treatment surveys (S1 and S2) as the treated group. While participants are encouraged to accept the challenge, participation remains voluntary, and their decision determines whether they are classified as treated (*Veganuary*) or untreated (*Control*) in the following two questionnaires S1 and S2. This design enables both an Instrumental Variables (IV) approach, using invitation status as an instrument for actual pledge acceptance, and an intention-to-treat (ITT) analysis, which compares invited and non-invited participants (for the full ITT analysis, see Appendix 2.C).

Table 2.2.1: Study timeline according to groups

Veganuary	Pre-treatment Survey S0	“Meat-free” January	Post-treatment Survey (short run) S1	Post-treatment Survey (long run) S2
Control	Pre-treatment Survey S0	“Normal” January	Post-treatment Survey (short run) S1	Post-treatment Survey (long run) S2

Table 2.2.1 and Figure 2.2.1 provide a visual representation of the study timeline, illustrating the sequence of surveys and the intervention period.

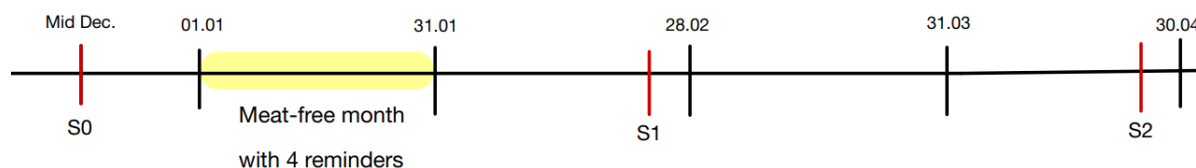


Figure 2.2.1: Study timeline

Table 2.2.2 presents the general structure of the three surveys (S0, S1 and S2) for both groups. In each, participants complete a 15-minute questionnaire covering meat and meat substitute consumption, as well as attitudes related to eating behavior (e.g., meat justification). The initial pre-treatment survey (S0) also includes sociodemographic information at the beginning of the questionnaire.⁶

Table 2.2.2: General structure of the three surveys

Veganuary/Control	Last Week's Consumption	Attitudes	Pro-environmental Behavior	Disgust
--------------------------	----------------------------	-----------	-------------------------------	---------

2.2.2 Treatment

The treatment in this experiment consists of a pledge to reduce meat intake during one month (accompanied by supporting materials such as tips, recipes, and reminders). Those invited see the screen shown in Figure 2.2.2 and are then asked on the next page whether they agree to participate. They are also reminded that they would still take part in the next two surveys regardless of their decision and that the challenge only requires reducing the consumption of meat, fish, and poultry – not eliminating milk and eggs (see Appendix Figure 2.F.15). Participants who are not invited do not see this screen and are instead directed to the common final page, which provides details on the next steps of the study, including the date of the upcoming survey and payment information.

⁶To assess compliance, the short-run post-treatment survey (S1) includes additional questions for participants in the *Veganuary* group who replied “yes” to the question “Did you reduce your meat consumption in January?” (see Appendix Figure 2.F.16). These questions, presented at the end of the questionnaire, measure the extent to which participants reduced their meat consumption or increased their intake of meat substitutes, the perceived difficulty of reducing meat, and whether they used any provided recipes (see Appendix Figure 2.F.17). In the long-run post-treatment survey (S2), both treatment and control groups answer manipulation check questions to evaluate prior exposure and familiarity with the intervention. These include whether participants have previously heard of *Veganuary*, have ever attempted *Veganuary* or a similar diet, and whether they fasted for Lent in that year (see Appendix Figure 2.F.18).

You might have heard of the "Veganuary". During the month of January the participants of this event follow a vegan diet and avoid animal products such as meat, fish, poultry, milk, eggs, etc. The effects of the "Veganuary" are potentially large and summarised in the picture below (source: <https://veganuary.com>). Please read carefully.

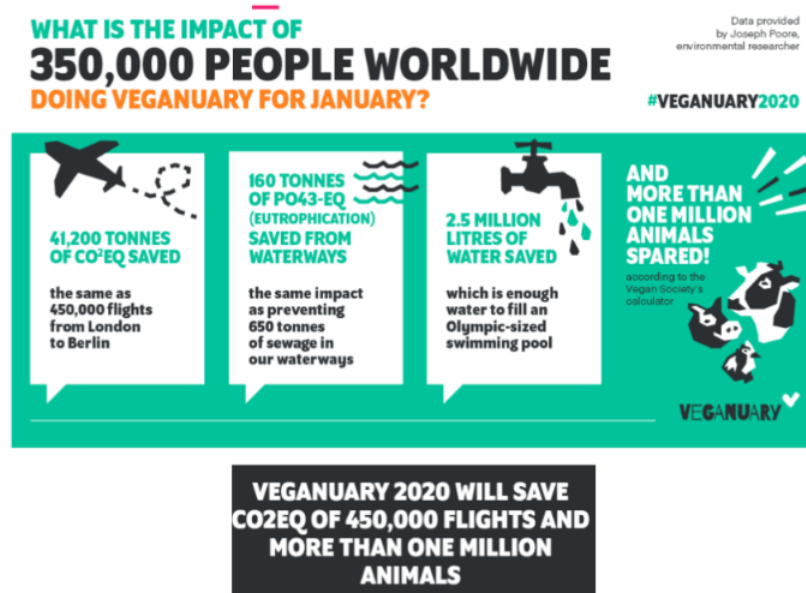


Figure 2.2.2: Treatment

If participants accept the challenge, they receive a weekly reminder throughout January containing recipes and useful information (see Appendix Figures 2.G.1, 2.G.2, and 2.G.3 for examples). Those who do not accept the challenge receive no reminder e-mails in January and "join" the control group for the two post-treatment surveys.

2.2.3 Eliciting consumption of meat and meat substitutes

To elicit the consumption of meat, participants are asked to answer the following three questions:

- *How many times have you had meat (beef, pork, chicken, fish,...) for breakfast in the past week?*
- *How many times have you had meat (beef, pork, chicken, fish,...) for lunch in the past week?*
- *How many times have you had meat (beef, pork, chicken, fish,...) for dinner in the past week?*

To elicit the consumption of meat substitutes, participants are asked to answer the following three questions:

- *How many times have you had meat substitutes for breakfast in the past week (think of food items made of tofu, quorn, seitan, peas or lentils such as veggie sausage or veggie salami)?*
- *How many times have you had meat substitutes for lunch in the past week (think of food items made of tofu, quorn, seitan, peas or lentils such as veggie burgers)?*
- *How many times have you had meat substitutes for dinner in the past week (think of food items made of tofu, quorn, seitan, peas or lentils such as veggie burgers)?*

These questions are rated on a discrete scale from 0 to 7, allowing participants to select any whole number within this range. The questions specifically refer to the week preceding the survey to minimize potential recall bias (for the exact screens, see Appendix Figures 2.F.7 and 2.F.8).

2.2.4 Eliciting attitudes

I constructed a *Meat Justification Score* based on 18 statements (e.g., “It is acceptable to eat some animals because they are raised for this purpose” or “God created animals for us to eat”) in which participants rated their agreement on a scale from 1 (strongly disagree) to 7 (strongly agree). Most of these questions are based on the work of Espinosa and Treich (2021). I incorporated the “four Ns” framework (eating meat is natural, normal, necessary, and nice) as described in Piazza et al. (2015). The exact 18 questions can be found in Appendix Figures 2.F.9 and 2.F.10.

2.2.5 Implementation

Recruitment, ethics approval and funding

I recruited 102 participants through the FriLab recruitment system. Two participants had to drop out after revealing they followed a vegetarian diet, resulting in a sample of 100 participants. Additionally, 8 participants did not complete the short-run post-treatment survey (S1), and one participant did not complete the long-run post-treatment survey (S2), conducted three months post-treatment. I received the approval of the Internal Review Board of the University of Fribourg (application No. 2023-11-03, 8th of December 2023) and the experiment was funded through a grant from the Swiss National Bank Fund to the Department of Economics of the University of Fribourg.

Payoffs

Participants received a total of CHF 25 for completing all three surveys. They were paid CHF 5 for completing the pre-treatment survey (S0), another CHF 5 for the short-run post-treatment survey (S1), and the remaining CHF 15 for completing the long-run

post-treatment survey (S2). If participants dropped out after the first two surveys, they hence received CHF 10. This payment structure incentivized participants to complete each survey, helping to minimize attrition.

2.2.6 Hypotheses

The main hypotheses are the following:

Hypothesis 1 (Meat consumption). *Veganuary lowers meat consumption.*

Hypothesis 2 (Meat substitute consumption). *Veganuary increases the consumption of meat substitutes.*

Hypothesis 3 (Meat justification). *Veganuary reduces justification for meat consumption.*

Additional hypotheses concern pro-environmental behavior – measured by the pro-environmental behavior score described in Appendix 2.B.2 – and participants’ feelings of disgust toward meat and meat substitutes (both detailed in Appendices 2.B.3 and 2.B.4). Specifically, the temporary meat-free month is expected to increase pro-environmental behavior, increase disgust toward meat and decrease disgust toward meat substitutes.

2.3 Results

2.3.1 Descriptive statistics

As shown in Table 2.3.1, of the 100 participants, 50 were invited to commit to the challenge in the pre-treatment survey. Among those invited, 68% (34 participants) chose to participate. The sample was 82% women, with an average age of 22.41 years, and consisted predominantly of students. Table 2.3.2 presents the descriptive statistics for the main outcome variables: meat consumption, meat substitute consumption, and meat justification, measured both in the short and long term.

Table 2.3.1: Descriptive statistics of the independent and control variables

Variable	Mean	SD	Min	Max
Invited	0.50	0.50	0	1
Veganuary	0.34	0.48	0	1
Female	0.82	0.39	0	1
Age	22.41	3.88	18	46
Observations	100			

Table 2.3.2: Descriptive statistics of the main outcome variables

Variable	Mean	SD	Min	Max	N
Meat at breakfast S1	0.50	1.27	0	6	92
Meat at lunch S1	2.18	1.87	0	7	92
Meat at dinner S1	2.03	1.79	0	7	92
Weekly meat consu S1	4.72	3.89	0	16	92
Meat at breakfast S2	0.43	1.23	0	6	91
Meat at lunch S2	2.51	2.03	0	7	91
Meat at dinner S2	2.51	2.13	0	7	91
Weekly meat consu S2	5.44	4.35	0	19	91
Meat sub. at breakfast S1	0.22	0.86	0	6	92
Meat sub. at lunch S1	1.30	1.50	0	6	92
Meat sub. at dinner S1	1.35	1.62	0	6	92
Weekly meat sub. consu S1	2.87	3.34	0	18	92
Meat sub. at breakfast S2	0.25	0.93	0	6	91
Meat sub. at lunch S2	1.36	1.50	0	5	91
Meat sub. at dinner S2	1.36	1.47	0	5	91
Weekly meat sub. consu S2	2.98	3.15	0	16	91
Meat justification score S1	3.29	1.03	1.28	6.44	92
Meat justification score S2	3.38	1.01	1.22	6.50	91

2.3.2 Instrumental variable approach

In the following section, I apply an instrumental variable approach, with the invitation to participate in the challenge as the instrument. I run a 2SLS regression, using the dummy variable *Veganuary* as the independent variable. This dummy takes the value of 1 if the participant received the invitation, committed to the pledge, and hence received the full package of reminder e-mails, vegetarian recipes, etc. It takes the value of 0 if the participant either did not receive the invitation or received it but declined the challenge.

Three key assumptions must be met to use this instrumental variable approach and establish the nonparametric identification of the local average treatment effect (LATE), also known as the compliers' average causal effect (CACE): (1) the unconfounded assignment of the instrument, (2) the exclusion restriction, and (3) the (weak) monotonicity of the treatment with respect to the instrument.

While the first assumption is typically satisfied in a randomized trial, it is important to assess the potential violations of the other two.⁷ The exclusion restriction requires that

⁷I still examined the balance between the two groups by looking at the distributions of key covariates and found that the two groups were similar in terms of age, gender, origin and religion. While I observe a slight difference in faculty composition – with one group having a somewhat higher proportion of science and medical students and the other a greater share of law students – I do not believe this small (randomly occurring) imbalance is likely to have a significant impact on the results, especially given that

the instrument (the invitation to the pledge) has no causal effect on the outcome variable except through its impact on treatment participation. That is, all effects of the instrument on the outcome must operate exclusively through the treatment, with no alternative channels or mechanisms, whether direct or indirect. I argue that the invitation itself, which consists of two short pages in the initial survey, should not have any causal effect on the outcome variables in either the short-term or long-term post-treatment surveys conducted months later – except through its effect on treatment participation. Monotonicity is also likely to hold, as it is improbable that individuals who received the invitation but declined the challenge would have chosen to participate in *Veganuary* if they had not received the invitation. Before proceeding with further analyses, I verify the validity of the first stage in Table 2.3.3, which shows that receiving the invitation positively and significantly influences the decision to accept the challenge.

Table 2.3.3: First stage – IV regression

	(1)	(2)
	Veganuary	Veganuary
being_invited	0.680*** (0.0660)	0.738*** (0.0693)
Controls	No	Yes
Observations	100	100

Robust standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Notes: Controls are Female, Faculty, Origin, Religion and Age. The dummy variable *being_invited* is coded as 1 if the person was invited to take on the challenge and 0 if not.

2.3.3 Treatment effects on meat consumption

After confirming the validity of the first stage, I proceed to the second stage of the IV regression, presented in Table 2.3.4 (short run) and Table 2.3.5 (long run), which examines the weekly (self-reported) consumption of meat. Consistent with Hypothesis 1, the results indicate that *Veganuary* significantly reduces weekly meat consumption – by 1.35 items one month post-treatment and by 1.83 items three months post-treatment. Given that the average participant consumes 4.72 meat items per week one month after the intervention, the reduction of 1.35 items corresponds to 28.60% of the mean. Similarly, three months post-treatment, the reduction of 1.83 items represents 33.64% of the average weekly consumption (5.44 meat items).⁸

all participants were students.

⁸On average, participants consumed 5.78 meat items per week prior to the treatment (survey S0).

Table 2.3.4: Weekly meat consumption – one month post-treatment (S1)

	(1)	(2)
	Weekly meat consumption S1	Weekly meat consumption S1
Veganuary	-1.054 (0.709)	-1.348** (0.611)
Weekly meat consumption S0	0.698*** (0.0533)	0.669*** (0.0544)
Constant	1.104*** (0.381)	1.039 (1.846)
Controls	No	Yes
Observations	92	92

Robust standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Notes: Controls include Female, Faculty, Origin, Religion, and Age.

Result 1. *Veganuary reduces meat consumption one month post-treatment.*

Table 2.3.5: Weekly meat consumption – three months post-treatment (S2)

	(1)	(2)
	Weekly meat consumption S2	Weekly meat consumption S2
Veganuary	-1.664** (0.736)	-1.834** (0.734)
Weekly meat consumption S0	0.794*** (0.0549)	0.779*** (0.0648)
Constant	1.452*** (0.452)	0.327 (2.248)
Controls	No	Yes
Observations	91	91

Robust standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Notes: Controls include Female, Faculty, Origin, Religion, and Age.

Result 2. *Veganuary reduces meat consumption three months post-treatment.*

2.3.4 Treatment effects on meat substitute consumption

Consistent with Hypothesis 2, Table 2.3.6 shows that *Veganuary* increases weekly consumption of meat substitutes by 2.75 items one month post-treatment. Given that the average participant consumes 2.87 meat substitutes per week one month after the intervention, the increase of 2.75 items corresponds to 95.82% of the mean. However, as

shown in Table 2.3.7, this effect diminishes over time: *Veganuary* does not appear to have a significant impact on the weekly consumption of meat substitutes three months post-treatment (although the coefficient remains positive).⁹

Table 2.3.6: Weekly meat substitute consu – one month post-treatment (S1)

	(1)	(2)
	Weekly meat substitute cons. S1	Weekly meat substitute cons. S1
Veganuary	3.122*** (0.780)	2.752*** (0.811)
Weekly meat sub. cons. S0	0.682*** (0.146)	0.682*** (0.148)
Constant	0.216 (0.305)	-2.771 (1.796)
Controls	No	Yes
Observations	92	92

Robust standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Notes: Controls are Female, Faculty, Origin, Religion, and Age.

Table 2.3.7: Weekly meat substitute consu – three months post-treatment (S2)

	(1)	(2)
	Weekly meat substitute cons. S2	Weekly meat substitute cons. S2
Veganuary	0.956 (0.747)	0.924 (0.764)
Weekly meat sub. cons. S0	0.715*** (0.131)	0.708*** (0.139)
Constant	1.028** (0.404)	-0.101 (1.962)
Controls	No	Yes
Observations	91	91

Robust standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Notes: Controls include Female, Faculty, Origin, Religion, and Age.

Result 3. *Veganuary increases the consumption of meat substitutes one month post-treatment but this effect has faded away three months post-treatment.*

⁹On average, participants consumed 2.36 meat substitute items per week prior to the treatment (survey S0).

2.3.5 Treatment effects on attitudes

Consistent with Hypothesis 3, Table 2.3.8 shows that *Veganuary* significantly decreases the meat justification score in the short term. Given that the average participant has a meat justification score of 3.29 one month after the intervention, the decrease of 0.368 corresponds to 11.19% of the mean. However, in the long run, Table 2.3.9 reveals that this effect has faded three months post-treatment (although the coefficient remains negative).¹⁰ This pattern mirrors the trend observed in meat substitute consumption, where an initial shift diminishes over time.

Table 2.3.8: Meat justification score – one month post-treatment (S1)

	(1)	(2)
	Meat justification score S1	Meat justification score S1
Veganuary	-0.266* (0.144)	-0.368*** (0.142)
Meat justification score S0	0.888*** (0.0466)	0.906*** (0.0560)
Constant	0.381** (0.166)	-0.429 (0.526)
Controls	No	Yes
Observations	92	92

Robust standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Notes: Controls are Female, Faculty, Origin, Religion and Age.

¹⁰On average, participants have a meat justification score of 3.42 prior to the treatment (survey S0).

Table 2.3.9: Meat justification score – three months post-treatment (S2)

	(1)	(2)
	Meat justification score S2	Meat justification score S2
Veganuary	-0.0654 (0.139)	-0.112 (0.140)
Meat justification score S0	0.892*** (0.0470)	0.879*** (0.0572)
Constant	0.366** (0.166)	0.159 (0.585)
Controls	No	Yes
Observations	91	91

Robust standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Notes: Controls are Female, Faculty, Origin, Religion and Age.

Result 4. *Veganuary decreases meat justification one month post-treatment but this effect has faded away three months post-treatment.*

When comparing the results from the ITT analysis (available in Appendix 2.C) with the IV regression results above, I observe very similar findings. As expected, the ITT coefficients are smaller, reflecting the dilution effect caused by noncompliance. Specifically, ITT estimates the effect of being invited to participate in *Veganuary*, regardless of whether participants actually took part. Some invited individuals may not follow through, leading to dilution – the estimated effect is averaged across both compliers and noncompliers, making it smaller than the effect of actual participation. Additionally, self-selection may also contribute to the smaller ITT estimates, as individuals who choose to participate may have different characteristics and motivations compared to those who do not, further influencing the estimated effect. In contrast, the 2SLS approach estimates the local average treatment effect (LATE), isolating the causal impact of participating in *Veganuary* among those who complied. The similarity between the 2SLS and ITT estimates suggests that noncompliance did not introduce significant bias and that the invitation served as a strong and valid instrument.¹¹

Figure 2.3.1 displays group means and confidence intervals for meat consumption, meat substitute consumption, and meat justification at both follow-up waves (S1 and S2) under the ITT framework (i.e., comparing invited to non-invited individuals).

¹¹Importantly, the ITT estimate reflects real-world effectiveness of the program, accounting for the fact that not all individuals comply. This makes ITT particularly valuable for cost-benefit analysis, as costs are partially incurred for everyone (the invited participants), not just those who effectively comply (the *Veganuary* pledgers). When ITT and IV estimates are close, it also implies that the outcomes for compliers are broadly representative of the average (invited) group, and that the treatment effect is not concentrated in a narrow subgroup (e.g., the compliers). As a result, noncompliance is unlikely to meaningfully distort the overall policy impact.

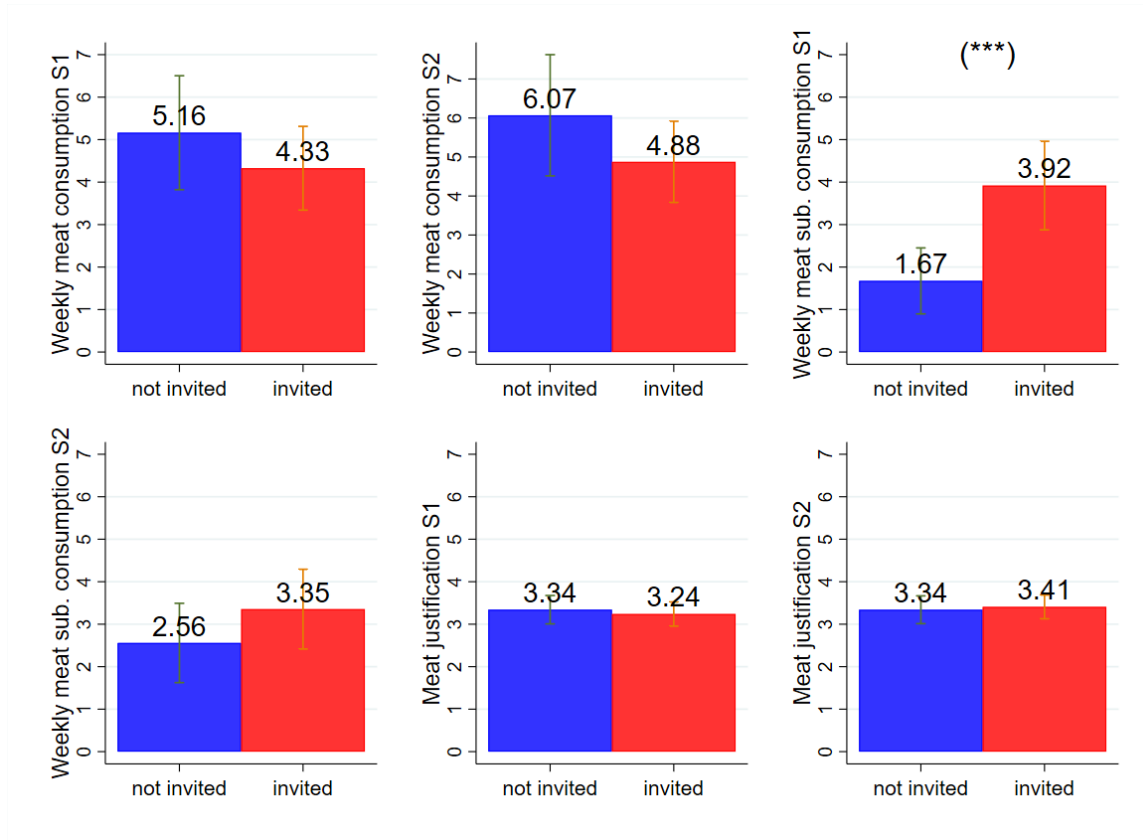


Figure 2.3.1: Meat consumption, meat substitute consumption and meat justification

Notes: *Weekly meat consumption S1 (S2)* represents the addition of meat at breakfast, lunch and dinner (from 0 to 21) one month post-treatment (three months post-treatment). *Weekly meat sub. consumption S1 (S2)* represents the addition of meat substitutes at breakfast, lunch and dinner (from 0 to 21) one month post-treatment (three months post-treatment). *Meat justification S1 (S2)* represents the meat justification score one month post-treatment (three months post-treatment). The stars come from the t-test performed and express * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

2.3.6 Further results

As an exploratory analysis, I also examined the differences between S2 and S1 for the three main outcome variables (meat consumption, consumption of meat substitutes and meat justification) to better understand the dynamics between the different survey waves and explain how the effect diminishes over time for two of the outcome variables (meat substitute consumption and meat justification). These analyses reveal some rebound effect: Although participants initially increased their consumption of meat substitutes (as shown in Table 2.3.6 and Appendix Table 2.D.3), this increase was followed by a significant reduction between S1 and S2. This explains why the effect on meat substitute consumption is no longer significant in the long run. A similar pattern is observed for meat justification: Participants reduce their justifications in the short term (as shown in Table 2.3.8 and Appendix Table 2.D.5), but this reduction was followed by a significant

increase in their meat justification between S1 and S2, which explains the lack of a significant difference in the long run. These findings reveal a clear rebound effect between the short and long run, where participants initially alter their behaviors (e.g., increase their meat substitute consumption or reduce their justifications), but over time, these changes diminish and are no longer statistically significant. In contrast, meat consumption does not exhibit a rebound effect. The difference between S2 and S1 is not statistically significant, aligning with the consistent reduction observed in both the short term (Table 2.3.4 and Appendix Table 2.D.1) and long term (Table 2.3.5 and Appendix Table 2.D.2). This stability suggests that *Veganuary* leads to a sustained decrease in meat consumption. Further details on these dynamics can be found in Appendix 2.B.1.

I also conducted analyses on the pro-environmental behavior score and the disgust scores toward meat-based and vegetarian meals. While these analyses reveal no statistically significant differences in either the short or long run, as detailed in Appendices 2.B.2, 2.B.3 and 2.B.4, the direction of the effects in the ITT analysis (invited vs. not invited) aligns with the hypotheses, suggesting potential effects that may be too small to detect given the sample size. Specifically, invited individuals tend to exhibit higher pro-environmental behavior scores – indicating more environmentally friendly behavior – in both short- and long-term, as hypothesized. Disgust toward meat increases more in the long run for invited participants, while disgust toward meat substitutes tends to decrease more among invited participants in both the short and long run, as hypothesized.

2.3.7 Robustness checks

As a first robustness check, I examine short-run and long-run changes by calculating the differences between S1 and S0 (short run) and S2 and S0 (long run) for the three main outcomes: meat consumption, meat substitute consumption, and meat justification. The results from these dynamic analyses are highly consistent with those from the main regressions, which use levels rather than changes, further reinforcing the robustness of the findings. Detailed results can be found in Appendix 2.D.

As a second robustness check, I replicate the t-test comparisons from Figure 2.3.1 using the nonparametric Mann-Whitney U test. The results from both tests are highly similar, further confirming the robustness of my findings. Detailed results can be found in Appendix 2.E.

2.4 Discussion and conclusion

This study explores the short- and longer-term effects of a one-month meat reduction pledge on meat and meat substitute consumption, as well as on attitudes. The findings highlight both short-term and long-term effects of the pledge, contributing to a growing body of literature on commitment-based interventions aimed at reducing meat consumption. The results of this randomized experiment reveal that full program participation – comprising the commitment to the pledge, the reduction of meat intake, and receiving

ongoing support – leads to a significant reduction in (self-reported) meat consumption in both the short and long term. Interestingly, while the (self-reported) consumption of meat substitutes increases in the short run, this effect fades over time. Similarly, a reduction in meat consumption justification is observed in the short run, but this change does not persist.

The findings suggest that a pledge-based intervention may be effective in reducing meat intake, as participants who committed to *Veganuary* show a significant reduction in weekly meat consumption – by 1.35 items one month post-treatment and 1.83 items three months post-treatment. This sustained decline implies that behavioral change extends beyond the immediate intervention period, possibly due to habit formation, increased awareness, or shifts in attitudes toward meat consumption. Targeted interventions, when coupled with ongoing support such as reminders and recipes, can produce meaningful reductions in meat consumption. On the other hand, the increase in meat substitute consumption by 2.75 items – nearly doubling the average weekly intake – one month post-treatment indicates an initial substitution effect, with participants likely replacing meat with plant-based alternatives. The fact that this effect fades by three months suggests that these substitutes may serve as transitional aids rather than long-term replacements. Interestingly, a similar temporal trend is observed in meat consumption justification: an initial reduction in justification also diminishes over time. This pattern points to a dual-process response: while the reduction in meat consumption seems sustained – perhaps due to internalized motivation or newly adopted habits – the uptake of meat substitutes and the shift in justification seem more fragile and may require ongoing and additional reinforcement to persist.

These findings are consistent with previous research on pledges and commitment-based interventions, such as *Meatless Mondays*, which aim to encourage (short-term) reductions in meat consumption. The results align with studies that show the potential of such campaigns to produce initial behavioral changes, but also underline the challenge of maintaining these changes in the long term (Piazza et al., 2022). Similarly to other commitment-based campaigns, such as *Dry January* or smoke-free pledges, the present study suggests that while short-term behavioral changes are achievable, sustaining these changes over time requires, however, continued motivation and support.

The study also provides insights into the potential mechanisms driving these changes. The short-term decrease in meat justification suggests that participants may have become more aware of the ethical, environmental, and health concerns associated with meat consumption during the pledge and one-month post-treatment. This awareness could have increased moral tension, encouraging a shift toward more sustainable eating habits (e.g., through greater consumption of meat-free alternatives and reduced meat intake). However, this effect appears to fade away three months post-treatment, pointing to the need for longer-term strategies to sustain these changes in beliefs and attitudes. Interestingly, although justification for meat consumption “reemerges” after three months, participants continue to maintain reduced levels of meat consumption.

Despite the valuable insights provided by this study, there are some limitations that should be considered. One potential issue is the possibility of an experimental demand ef-

fect, which could particularly affect participants who accepted the pledge. These pledgers may alter their behavior or self-reporting in ways they believe align with the expectations of the experimenter(s). This could lead to socially desirable answers or biases, as pledgers might feel compelled to report higher reductions in meat consumption or stronger changes in their justifications to match the perceived goal of the intervention. To address this limitation, I implemented several best practices recommended by Haaland et al. (2023) to mitigate these effects in my study, including ensuring respondent anonymity, using neutral framing in the instructions, and employing factual, behavior-based questions. Future research could incorporate more objective measures of behavior, such as tracking actual food purchases or consumption using digital tools or real-time monitoring systems. These approaches would help reduce reliance on self-reported data and minimize associated biases. Additionally, incorporating measures of revealed preferences could offer deeper insights into participants' true motivations. For instance, researchers could observe choices between a vegetarian or meat-based canteen voucher, or between donating to a charity that supports the farming industry versus one that advocates for improved animal welfare.

In conclusion, the findings suggest that targeted interventions can effectively prompt meaningful behavioral changes, such as reduced meat consumption and increased consumption of meat alternatives. However, achieving lasting impact requires sustained support and more structured, long-term strategies (particularly to sustain changes in meat substitute consumption and reductions in meat justification). To design effective campaigns or policies, it is essential to better understand the mechanisms that promote durable change and to explore how commitment-based interventions can change habits over time.

Declaration about generative AI

During the preparation of this work, the author used GPT-4 to improve the language. Following this, the author carefully reviewed and edited the content as necessary and assumes full responsibility for the final output.

Appendices

2.A Additional analyses of primary outcomes

2.A.1 Meat consumption

The following figures present the mean difference in meat consumption across three daily meals – breakfast, lunch, and dinner – between participants who were invited to take the pledge and those who were not, in both the short run (Figure 2.A.1) and long run (Figure 2.A.2). Additionally, Figure 2.A.3 shows the changes in weekly meat consumption over time, comparing the invited and non-invited groups across different survey waves. These analyses are conducted within the intention-to-treat (ITT) framework.

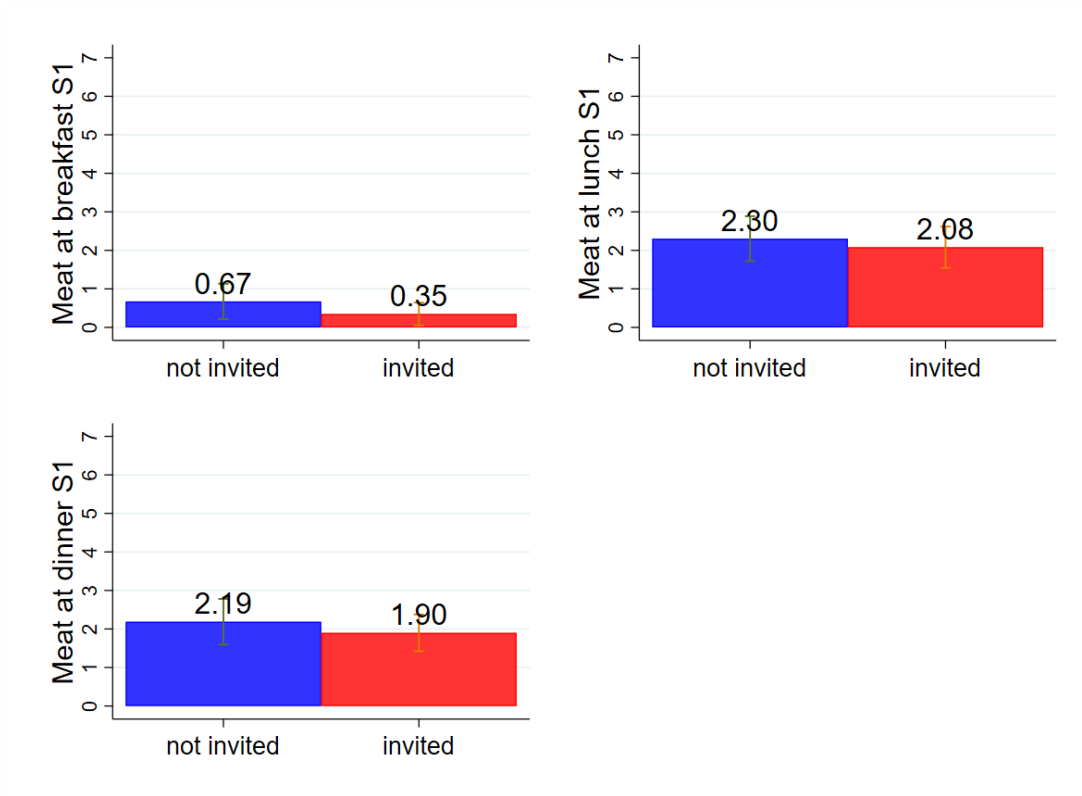


Figure 2.A.1: Meat consumption – one month post-treatment (S1)

Notes: *Meat at breakfast/lunch/dinner S1* measures the weekly consumption of meat one month post-treatment (from 0 to 7). The stars come from the t-test performed and express * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. $n=92$.

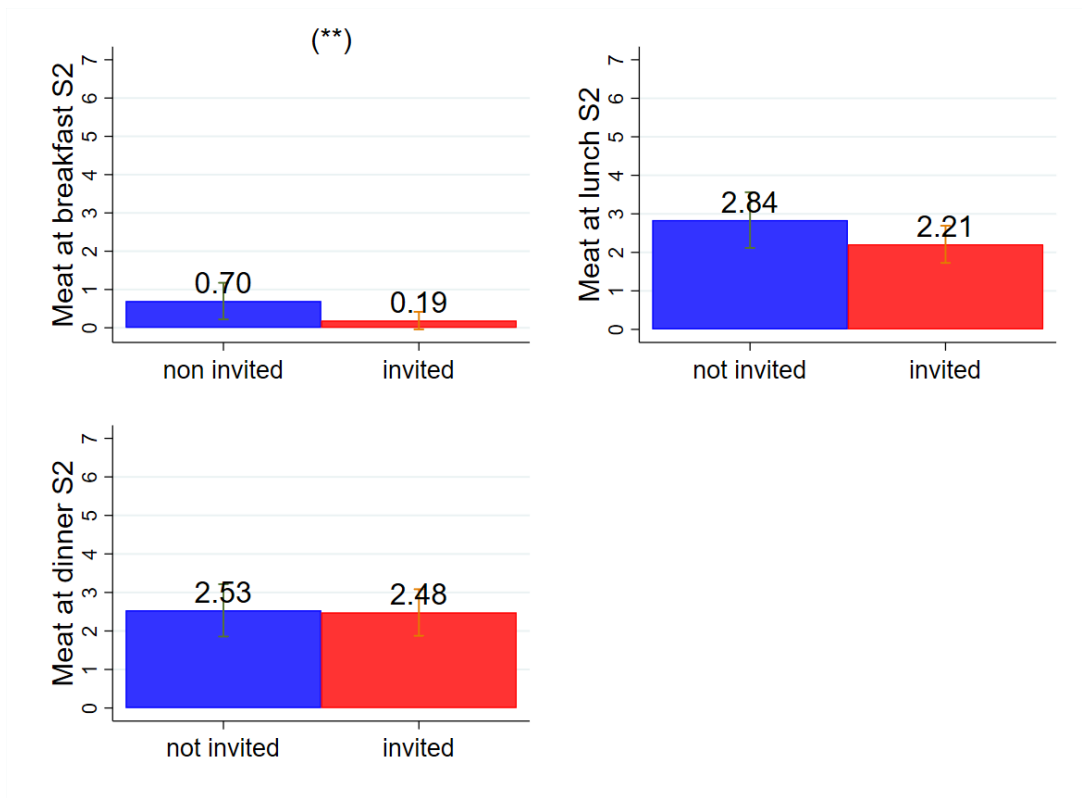


Figure 2.A.2: Meat consumption – three months post-treatment (S2)

Notes: *Meat at breakfast/lunch/dinner S2* measures the weekly consumption of meat three month post-treatment (from 0 to 7). The stars come from the t-test performed and express * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. n=91.

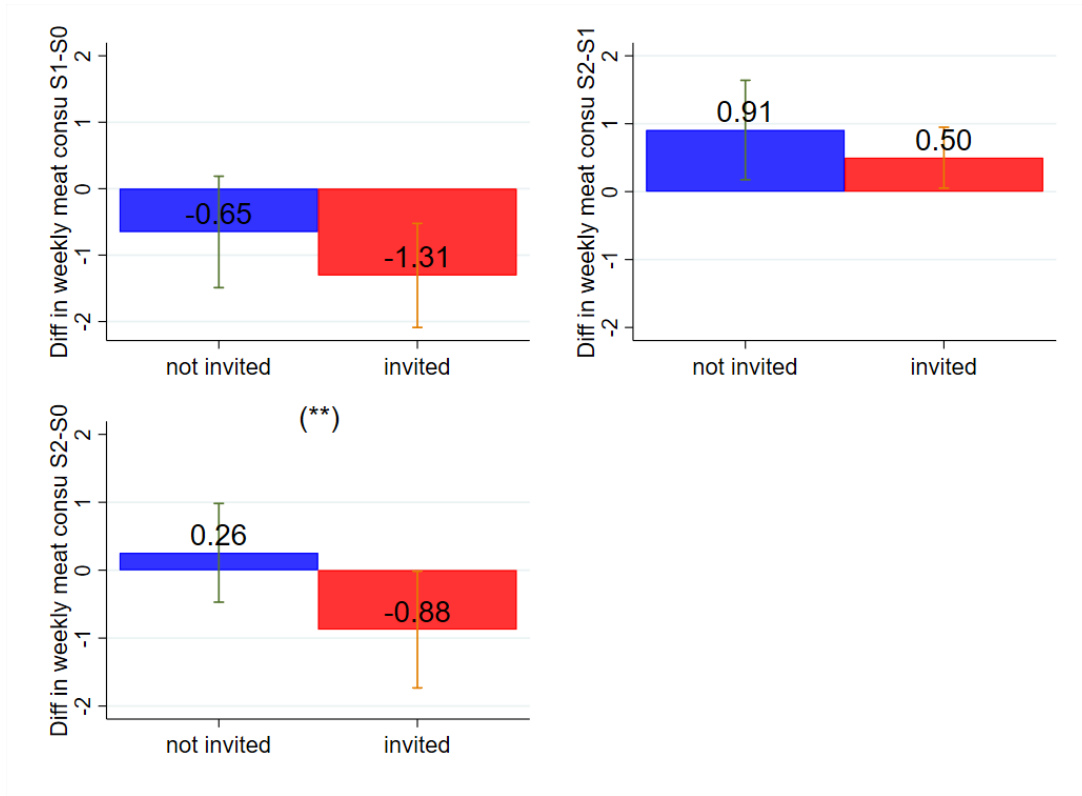


Figure 2.A.3: Differences in meat consumption

Notes: *Diff in weekly meat consu S1-S0* measures the difference in weekly meat consumption between survey S1 and survey S0. *Diff in weekly meat consu S2-S1* represents the difference in weekly meat consumption between survey S2 and survey S1. *Diff in weekly meat consu S2-S0* measures the difference in weekly meat consumption between survey S2 and survey S0. The stars come from the t-test performed and express * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

2.A.2 Meat substitute consumption

The following figures illustrate the mean difference in meat substitute consumption across three daily meals – breakfast, lunch, and dinner – between participants who were invited to take the pledge and those who were not, both in the short run (Figure 2.A.4) and long run (Figure 2.A.5). Additionally, Figure 2.A.6 depicts changes in weekly meat substitute consumption over time across different survey waves, comparing the invited and non-invited groups. These analyses follow the ITT framework.

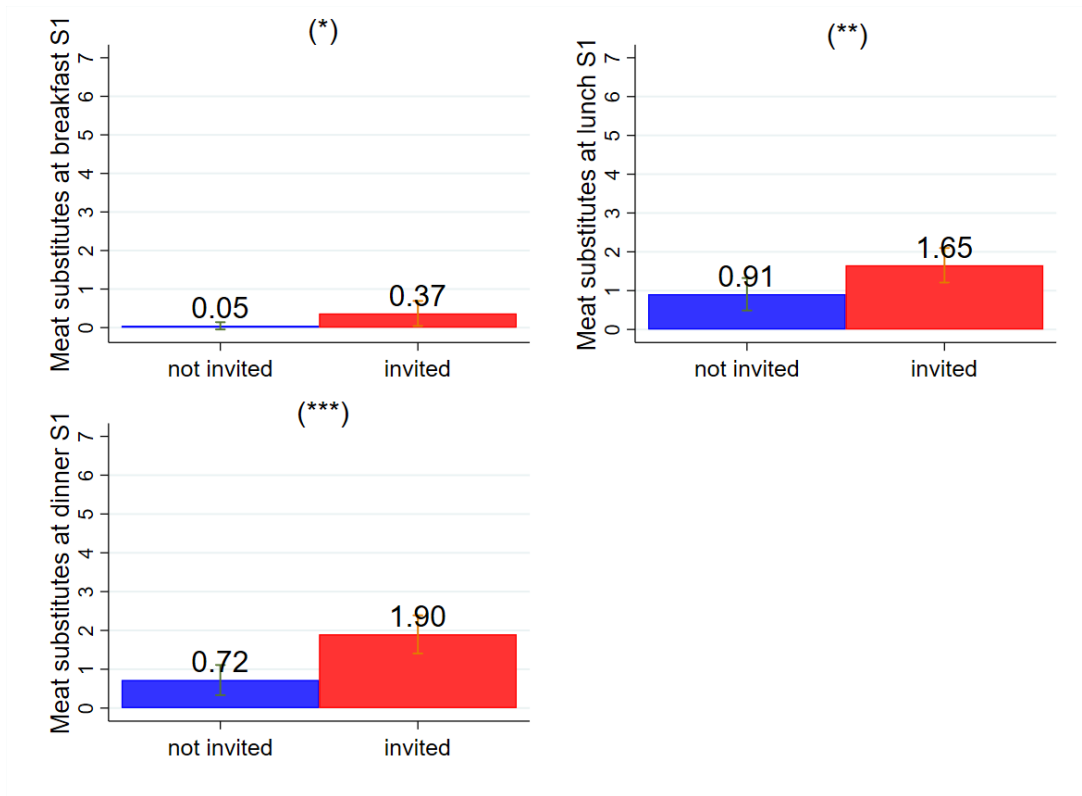


Figure 2.A.4: Meat substitute consumption – one month post-treatment (S1)

Notes: *Meat substitutes at breakfast/lunch/dinner S1* measures the weekly consumption of meat substitutes one month post-treatment (from 0 to 7). The stars come from the t-test performed and express * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. $n=92$.

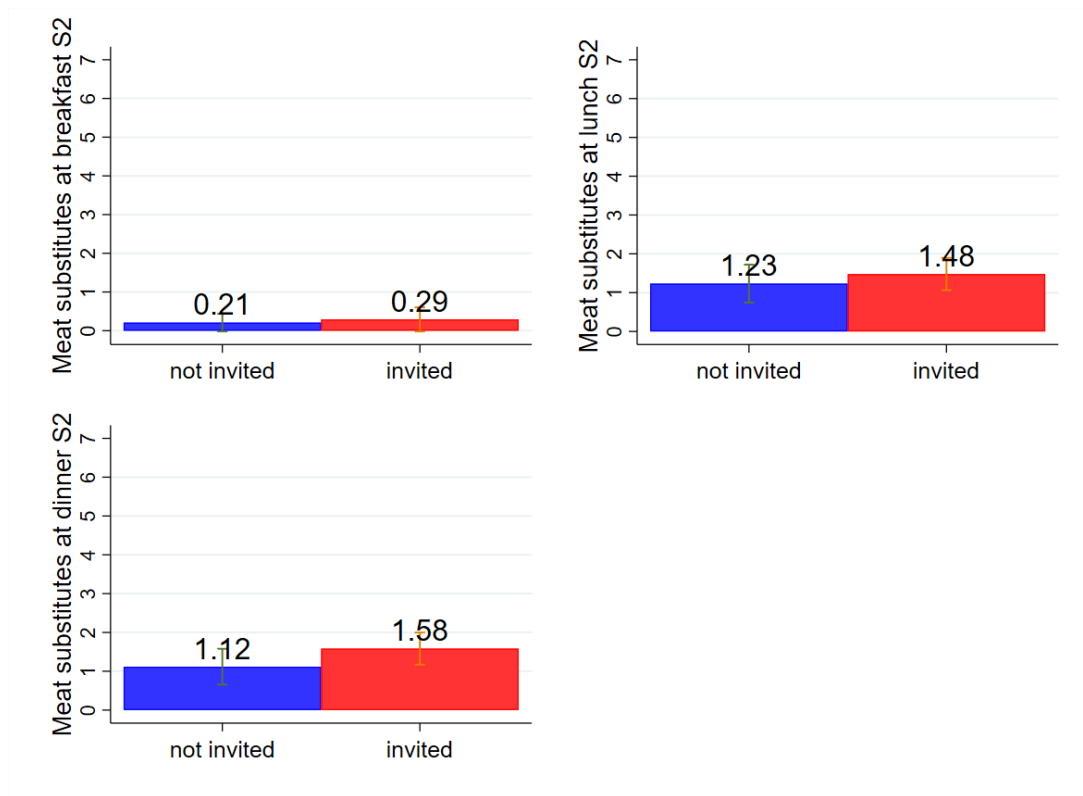


Figure 2.A.5: Meat substitute consumption – three months post-treatment (S2)

Notes: *Meat substitutes at breakfast/lunch/dinner S2* measures the weekly consumption of meat substitutes three months post-treatment (from 0 to 7). The stars come from the t-test performed and express * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. n=91.

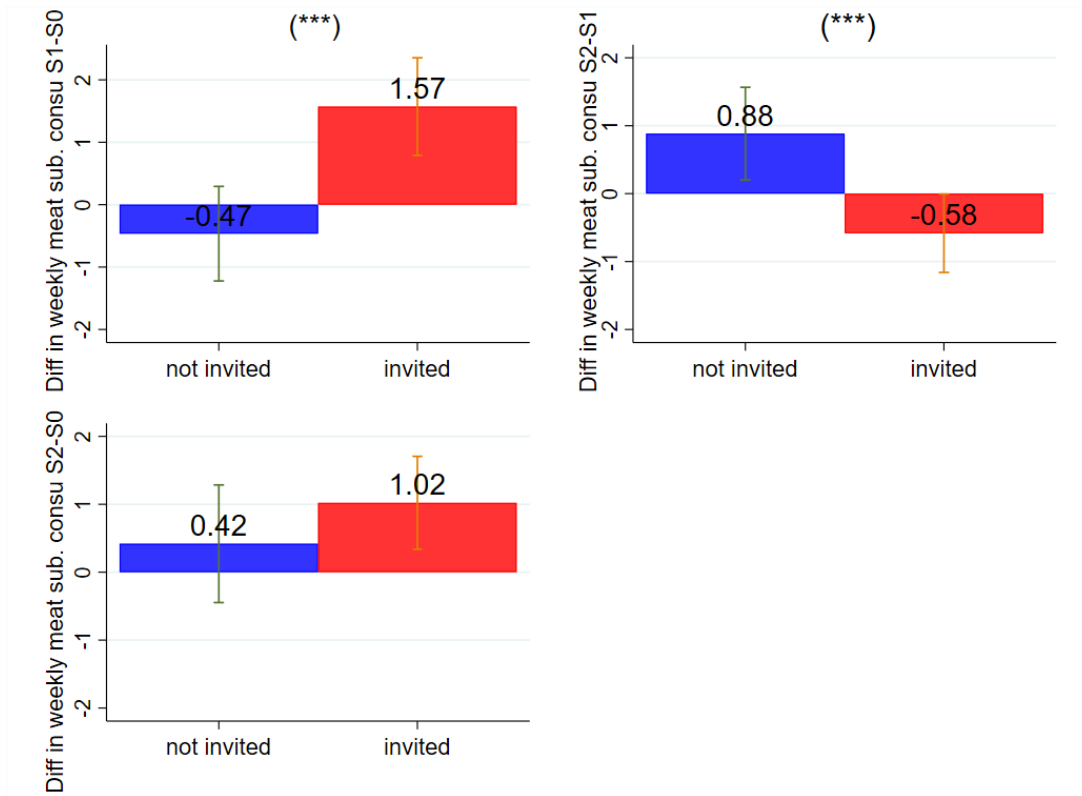


Figure 2.A.6: Differences in meat substitute consumption

Notes: *Diff in weekly meat sub. consu S1-S0* measures the difference in weekly meat substitute consumption between survey S1 and survey S0. *Diff in weekly meat sub. consu S2-S1* represents the difference in weekly meat substitute consumption between survey S2 and survey S1. *Diff in weekly meat sub. consu S2-S0* measures the difference in weekly meat substitute consumption between survey S2 and survey S0. The stars come from the t-test performed and express * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

2.A.3 Meat justification

The *Meat Justification Score* is calculated as the average of responses to 18 items (with reverse coding applied where necessary to ensure consistency in direction):

- It is acceptable to eat meat because the animals killed for our consumption do not really suffer.
- It is acceptable to eat meat as the animals killed for our consumption have lower intellectual capacities than humans.
- God created animals for us to eat.
- It is acceptable to eat some animals because they are raised for this purpose.
- Eating meat is healthy.

- It's natural to eat meat, it's written in our genes.
- It's normal to eat meat.
- I like meat too much to stop eating it.
- Eating meat is necessary for good health.
- I would be willing to sign a petition against intensive farming if the opportunity came to me.
- It is important for me to vote for politicians who care about the environment and animal welfare.
- I want to reduce my consumption of meat in the (near) future.
- I prioritise tasty food over healthy food.
- Eating healthy food gives me satisfaction.
- Eating meat may be bad for the environment, but no more so than eating vegetables or cereals.
- Animals are mostly treated well in farms in Switzerland.
- It is immoral to harm animals for the production of food.
- The way meat is produced in Switzerland is morally wrong.

Notes: Response scale where 1 = strongly disagree, 4 = neutral and 7 = strongly agree.

Figure 2.3.1 displays the mean difference in meat justification scores between participants who were invited to take the pledge and those who were not, shown for both the short and long term. Additionally, Figure 2.A.7 tracks changes in meat justification scores over time across the different survey waves, comparing participants who were invited to take the pledge with those who were not. These analyses are conducted within the ITT framework.

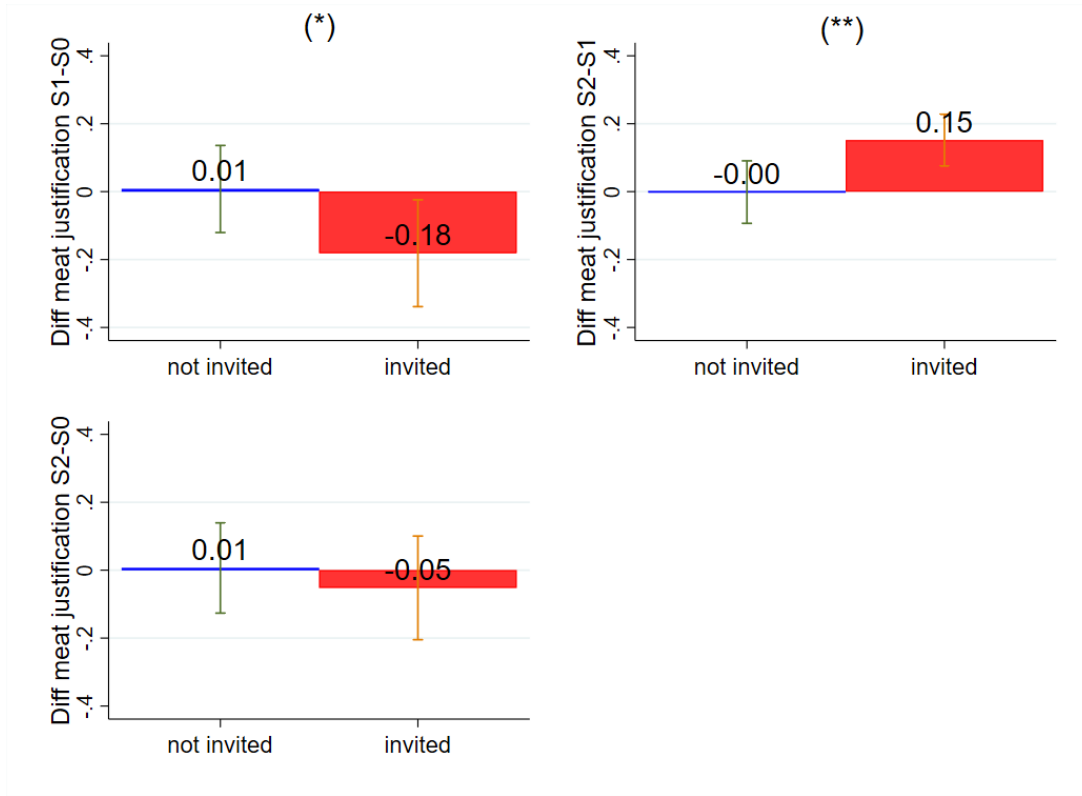


Figure 2.A.7: Differences in meat justification scores

Notes: *Diff meat justification S1-S0* measures the difference in the meat justification scores between survey S1 and survey S0. *Diff meat justification S2-S1* represents the difference in the meat justification scores between survey S2 and survey S1. *Diff meat justification S2-S0* measures the difference in the meat justification scores between survey S2 and survey S0. The stars come from the t-test performed and express * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

2.B Further results

2.B.1 Rebound effects – differences S2-S1

In the following section, I examine the differences between S2 and S1 for the three main outcome variables (meat consumption, consumption of meat substitutes and meat justification) to better understand the dynamics between the different survey waves, with a particular focus on the transition from short- to long-term effects.

The results for the consumption of meat substitutes reveal that although participants initially increased their consumption of meat substitutes (as shown in Table 2.3.6 and Appendix Table 2.D.3), this increase was followed by a significant reduction, suggesting a rebound effect. This explains why the effect on meat substitute consumption is no longer significant in the long run. Table 2.B.1 below indeed shows this subsequent decline in consumption, ultimately resulting in no significant long-term difference in the overall

consumption of meat substitutes.

Table 2.B.1: Difference in meat substitute consu S2-S1

	(1)	(2)
	Diff in meat substitute consu S2-S1	Diff in meat substitute consu S2-S1
Veganuary	-2.134*** (0.671)	-1.804*** (0.622)
Constant	0.884*** (0.334)	3.235 (2.395)
Controls	No	Yes
Observations	91	91

Robust standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Notes: Controls are Female, Faculty, Origin, Religion and Age.

A similar pattern is observed for meat justification: Participants justify their meat consumption less in the short term (as shown in Table 2.3.8 and Appendix Table 2.D.5), but this reduction was followed by a significant increase in their meat justification (rebound effect), which explains the lack of a significant difference in the long run. Indeed, Table 2.B.2 below shows this subsequent increase in justifications, leading to no significant long-term difference.

These findings reveal a clear rebound effect for the consumption of meat substitutes and meat justification between the short and long run, where participants initially alter their behaviors (e.g., increased meat substitute consumption or reduced justifications), but over time, these changes diminish and are no longer statistically significant.

Table 2.B.2: Difference in meat justification score S2-S1

	(1)	(2)
	Diff in meat justification score S2-S1	Diff in meat justification score S2-S1
Veganuary	0.222** (0.0918)	0.249*** (0.104)
Constant	-0.00129 (0.0451)	0.348 (0.266)
Controls	No	Yes
Observations	91	91

Robust standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Notes: Controls are Female, Faculty, Origin, Religion and Age.

In contrast, meat consumption does not exhibit a rebound effect. The difference be-

tween S2 and S1 is not statistically significant as shown in Table 2.B.3 below, aligning with the consistent reduction observed in both the short term (Table 2.3.4 and Appendix Table 2.D.1) and long term (Table 2.3.5 and Appendix Table 2.D.2). This stability suggests that *Veganuary* leads to a sustained decrease in meat consumption, without any apparent rebound effect.

Table 2.B.3: Difference in meat consu S2-S1

	(1)	(2)
	Difference in meat consu S2-S1	Difference in meat consu S2-S1
Veganuary	-0.592 (0.614)	-0.518 (0.591)
Constant	0.907** (0.358)	0.246 (1.312)
Controls	No	Yes
Observations	91	91

Robust standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Notes: Controls are Female, Faculty, Origin, Religion and Age.

2.B.2 Pro-environmental behavior

The *Pro-Environmental Behavior Score* is calculated as the average of responses to these 12 questions:

- At home, I recycle used paper and use a compost bin.
- I take short showers (1-5 minutes).
- I rarely take the plane (once a year or less).
- Whenever possible, I buy organic food.
- I regularly support initiatives in favor of the environment by petitioning or volunteering in my free time.
- When I vote, I pay much attention to the party's climate protection policies.
- I would find it acceptable to pay more for electricity due to a transition to renewable energy sources.
- I contribute financially to environmental organizations.
- I intend to use as few products as possible that are associated with deforestation and other negative environmental consequences.

- I intend to reduce my consumption of non local or non seasonal food.
- I intend to buy more second-hand clothes.
- I intend to reduce my shower time.

Notes: Response scale where 1 = strongly disagree, 4 = neutral and 7 = strongly agree.

Figure 2.B.1 illustrates the mean difference in pro-environmental behavior scores between participants who were invited to take the pledge and those who were not, in both the short and long run. Additionally, Figure 2.B.2 tracks changes in this score over time across the different survey waves, comparing the invited and non-invited groups. These analyses are conducted within the ITT framework.

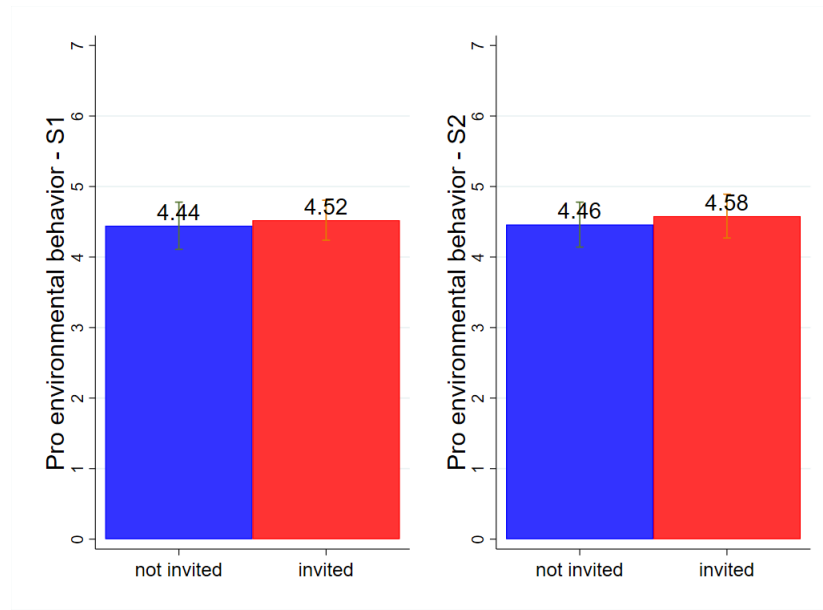


Figure 2.B.1: Pro-environmental behavior – one month post-treatment (S1) and three months post-treatment (S2)

Notes: *Pro-environmental behavior – S1* measures the pro-environmental behavior mean score one month post-treatment (i.e., the average level of agreement with the 12 statements above, rated on a scale from 1 (strongly disagree) to 7 (strongly agree)). The higher the score the more the person acts “pro-environmentally”. The variable *Pro-environmental behavior – S2* measures in the same way the pro-environmental behavior mean score three months post-treatment. The stars come from the t-test performed and express * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

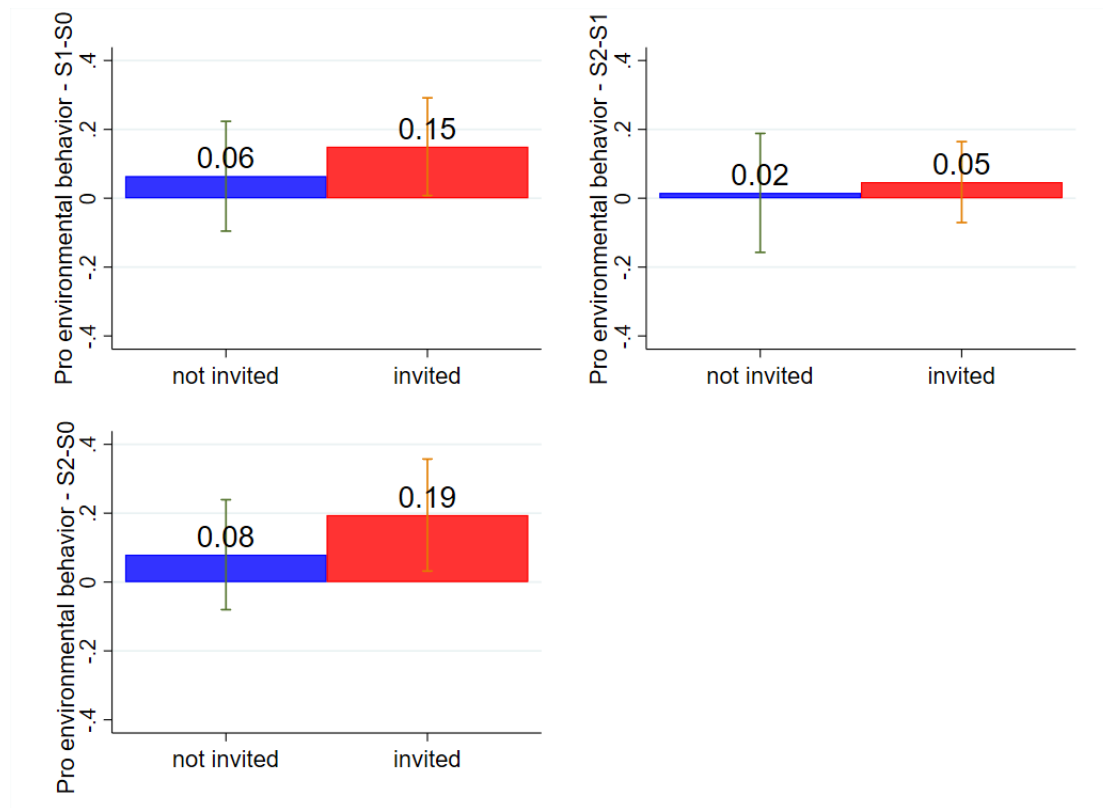


Figure 2.B.2: Differences in pro-environmental behavior

Notes: *Pro-environmental behavior - S1-S0* measures the difference in the pro-environmental behavior scores between survey S1 and survey S0. *Pro-environmental behavior - S2-S1* represents the difference in the pro-environmental behavior scores between survey S2 and survey S1. *Pro-environmental behavior - S2-S0* measures the difference in the pro-environmental behavior scores between survey S2 and survey S0. The stars come from the t-test performed and express * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

I also performed OLS regressions as part of the ITT analysis. They revealed no significant difference in pro-environmental behavior scores between invited and non-invited individuals. The same holds when running standard IV regressions (2SLS, same as in the main text): I did not find any statistically significant differences between the pledgers and the control group in either the short run or the long run.

2.B.3 Disgust toward meat

Figure 2.B.3 illustrates the mean difference in disgust toward meat between participants who were invited to take the pledge and those who were not, both in the short and long run. Additionally, Figure 2.B.4 tracks changes in this score over time across the different survey waves, comparing the invited and non-invited groups. These analyses follow the ITT framework. For further details, including the specific images and questions used to assess participants' disgust and appetite, please refer to Appendix Figure 2.F.13.

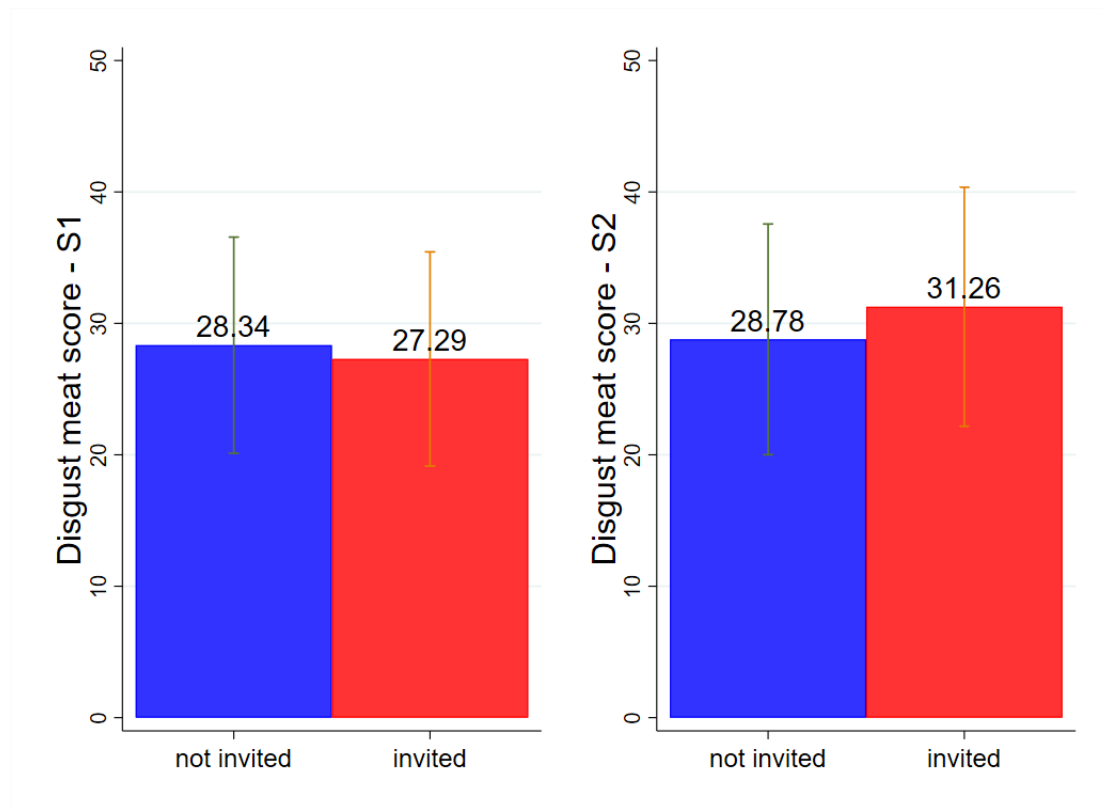


Figure 2.B.3: Disgust toward meat – one month post-treatment (S1) and three months post-treatment (S2)

Notes: *Disgust meat score – S1* is calculated as the average score across three questions one month post-treatment: “How would you rate the taste of these types of food?”, “How likely are you to eat these types of food?”, and “To what extent do you find this food disgusting?”. For each question, participants responded on a scale from 0 to 100. The score is constructed so that the higher the score the more the person is disgusted by meat or less likely to eat meat. The variable *Disgust meat score – S2* is constructed in the same way three months post-treatment. The stars come from the t-test performed and express * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

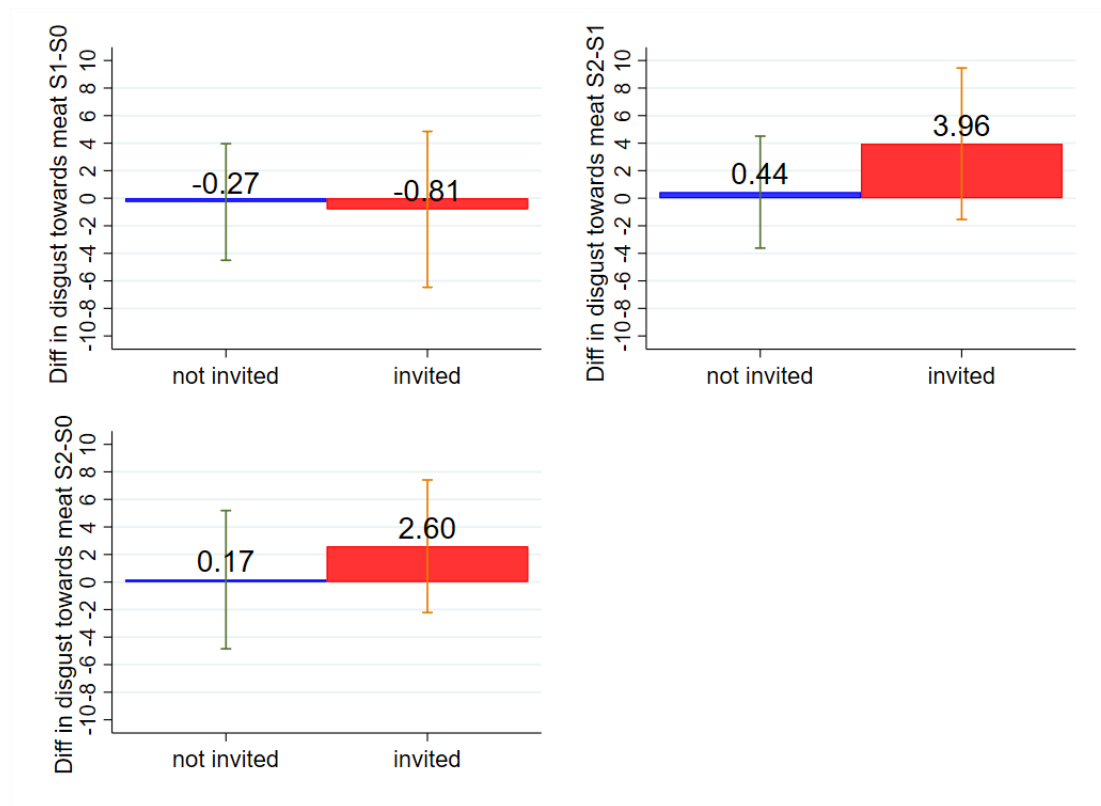


Figure 2.B.4: Differences in disgust toward meat

Notes: *Diff in disgust toward meat S1-S0* measures the difference in the disgust meat scores between survey S1 and survey S0. *Diff in disgust toward meat S2-S1* represents the difference in the disgust meat scores between survey S2 and survey S1. *Diff in disgust toward meat S2-S0* measures the difference in the disgust meat scores between survey S2 and survey S0. The stars come from the t-test performed and express * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

There appears to be no significant difference in disgust toward meat between invited and non-invited participants either in the short run or in the long run.

I also ran OLS regressions as part of the ITT analysis and they revealed no significant difference in disgust toward meat between invited and non-invited individuals. The same holds when running standard IV regressions (2SLS, as in the main text): I did not find any statistically significant differences between the pledgers and the control group in either the short run or the long run.

2.B.4 Disgust toward meat substitutes

Figure 2.B.5 illustrates the mean difference in disgust toward meat substitutes between participants who were invited to take the pledge and those who were not, in both the short and long run. Additionally, Figure 2.B.6 tracks changes in this score over time across the different survey waves, comparing the invited and non-invited groups. These analyses follow the ITT framework. For further details, including the specific images

and questions used to assess participants' disgust and appetite, please refer to Appendix Figure 2.F.12.

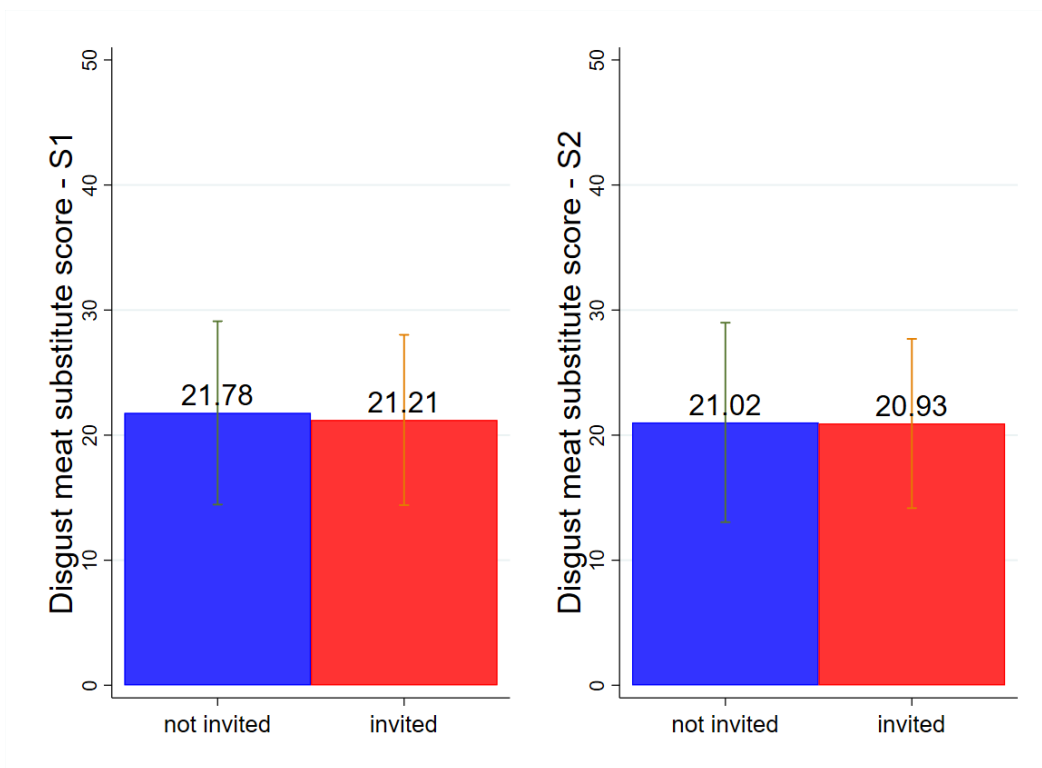


Figure 2.B.5: Disgust toward meat substitutes – one month post-treatment (S1) and three months post-treatment (S2)

Notes: *Disgust meat substitute score - S1* is calculated as the average score across three questions one month post-treatment: “How would you rate the taste of these types of food?”, “How likely are you to eat these types of food?”, and “To what extent do you find this food disgusting?”. For each question, participants responded on a scale from 0 to 100. The score is constructed so that the higher the score the more the person is disgusted by meat substitutes or less likely to eat meat substitutes. The variable *Disgust meat substitute score - S2* is constructed in the same way three months post-treatment. The stars come from the t-test performed and express * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

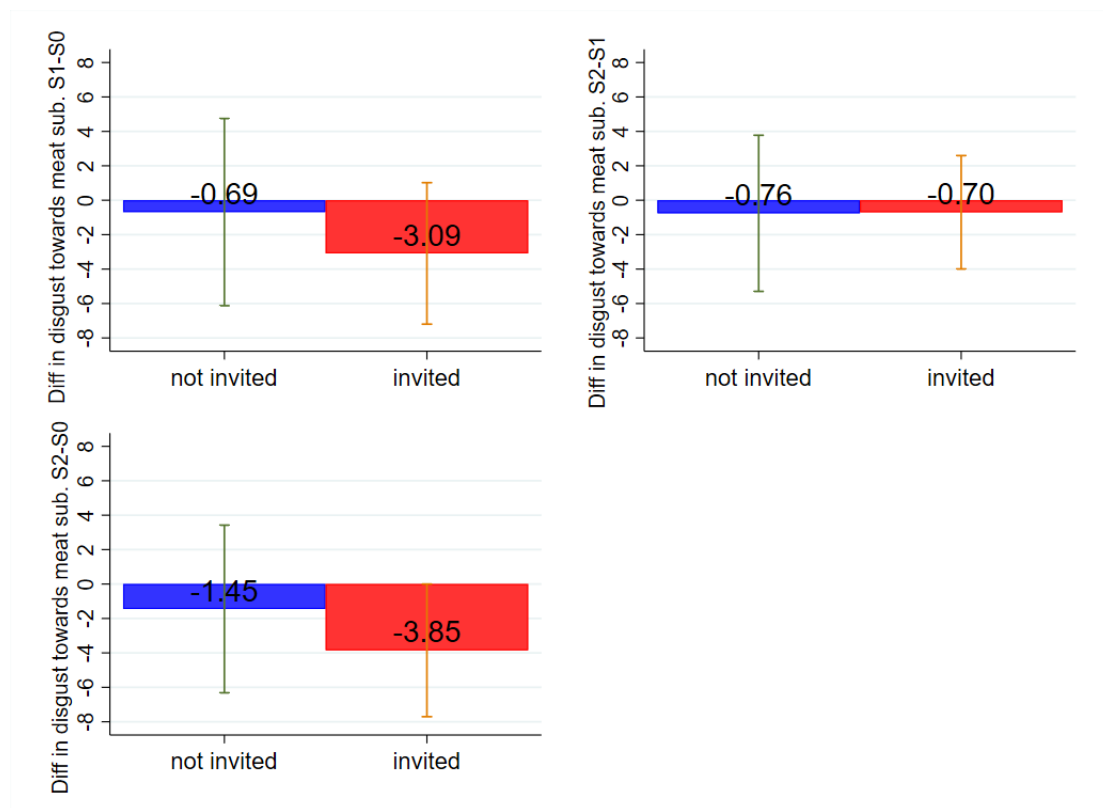


Figure 2.B.6: Differences in disgust toward meat substitutes

Notes: *Diff in disgust toward meat sub. S1-S0* measures the difference in the disgust meat substitute scores between survey S1 and survey S0. *Diff in disgust toward meat sub. S2-S1* represents the difference in the disgust meat substitute scores between survey S2 and survey S1. *Diff in disgust toward meat sub. S2-S0* measures the difference in the disgust meat substitute scores between survey S2 and survey S0. The stars come from the t-test performed and express * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

There appears to be no significant difference in the disgust toward meat substitutes between invited and non-invited individuals (ITT analysis) either in the short run or in the long run.

I also ran OLS regressions as part of the ITT analysis and they revealed no significant difference in disgust toward meat substitutes between invited and non-invited individuals. The same holds when running standard IV regressions (2SLS, as in the main text): I did not find any statistically significant differences between the pledgers and the control group in either the short run or the long run.

2.C Intention-to-treat

In this section, I replicate the main analysis using the ITT framework to estimate treatment effects. Unlike the IV approach, the ITT assesses the impact of being invited, regardless of whether the individual actually accepted the invitation. This provides a more

conservative estimate, accounting for noncompliance. The ITT analysis below shows results similar to the IV approach but with smaller coefficients due to the dilution effect of noncompliance. The ITT estimates the effect of being invited, while the 2SLS approach isolates the causal impact of actual participation. The similarity between the two suggests that noncompliance did not introduce significant bias and that the invitation was an effective instrument.

2.C.1 Meat consumption

Table 2.C.1: Weekly meat consumption – one month post-treatment (S1)

	(1)	(2)
	Weekly meat consumption S1	Weekly meat consumption S1
Invited	-0.708 (0.505)	-0.990** (0.485)
Weekly meat consu S0	0.707*** (0.0582)	0.671*** (0.0601)
Constant	1.050*** (0.379)	0.733 (2.108)
Controls	No	Yes
Observations	92	92

Robust standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Notes: Controls are Female, Faculty, Origin, Religion and Age.

Table 2.C.2: Weekly meat consumption – three months post-treatment (S2)

	(1)	(2)
	Weekly meat consumption S2	Weekly meat consumption S2
Invited	-1.143** (0.538)	-1.337** (0.570)
Weekly meat consu S0	0.813*** (0.0584)	0.786*** (0.0698)
Constant	1.341*** (0.440)	0.273 (2.686)
Controls	No	Yes
Observations	91	91

Robust standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Notes: Controls are Female, Faculty, Origin, Religion and Age.

2.C.2 Meat substitute consumption

Table 2.C.3: Weekly meat substitute consu – one month post-treatment (S1)

	(1)	(2)
	Weekly meat sub. consu S1	Weekly meat sub. consu S1
Invited	2.091*** (0.522)	2.017*** (0.628)
Weekly meat sub. consu S0	0.736*** (0.146)	0.705*** (0.153)
Constant	0.101 (0.317)	-2.203 (2.128)
Controls	No	Yes
Observations	92	92

Robust standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Notes: Controls are Female, Faculty, Origin, Religion and Age.

Table 2.C.4: Weekly meat substitute consu – three months post-treatment (S2)

	(1)	(2)
	Weekly meat sub. consu S2	Weekly meat sub. consu S2
Invited	0.654 (0.526)	0.672 (0.591)
Weekly meat sub. consu S0	0.732*** (0.134)	0.716*** (0.147)
Constant	0.992** (0.432)	-0.109 (2.065)
Controls	No	Yes
Observations	91	91

Robust standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Notes: Controls are Female, Faculty, Origin, Religion and Age.

2.C.3 Meat justification

Table 2.C.5: Meat justification score – one month post-treatment (S1)

	(1)	(2)
	Meat justification score S1	Meat justification score S1
Invited	-0.181* (0.0999)	-0.272** (0.108)
Meat justification score S0	0.906*** (0.0505)	0.918*** (0.0596)
Constant	0.323* (0.171)	-0.567 (0.556)
Controls	No	Yes
Observations	92	92

Robust standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Notes: Controls are Female, Faculty, Origin, Religion and Age.

Table 2.C.6: Meat justification score – three months post-treatment (S2)

	(1)	(2)
	Meat justification score S2	Meat justification score S2
Invited	-0.0456 (0.0995)	-0.0826 (0.109)
Meat justification score S0	0.898*** (0.0486)	0.884*** (0.0617)
Constant	0.348** (0.161)	0.137 (0.629)
Controls	No	Yes
Observations	91	91

Robust standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Notes: Controls are Female, Faculty, Origin, Religion and Age.

2.D First robustness check: analyses of dynamics (S2-S0 and S1-S0)

The following regression tables estimate the impact of the pledge on changes in weekly meat consumption over time. Tables 2.D.1 and 2.D.2 indicate that participants who committed to the pledge exhibited a greater reduction (or a smaller increase) in meat consumption both in the short run and long run.

Table 2.D.1: Difference in meat consu S1-S0 (short term)

	(1)	(2)
	Difference in meat consu S1-S0	Difference in meat consu S1-S0
Veganuary	-0.973 (0.816)	-1.274* (0.757)
Constant	-0.651 (0.411)	-2.648 (1.959)
Controls	No	Yes
Observations	92	92

Robust standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Notes: Controls are Female, Faculty, Origin, Religion and Age.

Table 2.D.2: Difference in meat consu S2-S0 (long term)

	(1)	(2)
	Difference in meat consu S2-S0	Difference in meat consu S2-S0
Veganuary	-1.645** (0.777)	-1.770** (0.801)
Constant	0.256 (0.356)	-1.685 (2.431)
Controls	No	Yes
Observations	91	91

Robust standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Notes: Controls are Female, Faculty, Origin, Religion and Age.

The following regression tables estimate the impact of the pledge on changes in weekly meat substitute consumption over time. Table 2.D.3 shows that participants who accepted the challenge initially increased their consumption of meat substitutes more (or reduced it less) one month post-treatment. However, Table 2.D.4 reveals that this initial shift fades away in the long run.

Table 2.D.3: Difference in meat substitute consu S1-S0 (short term)

	(1)	(2)
	Diff in meat substitute consu S1-S0	Diff in meat substitute consu S1-S0
Veganuary	3.024*** (0.815)	2.652*** (0.812)
Constant	-0.465 (0.371)	-2.900 (2.025)
Controls	No	Yes
Observations	92	92

Robust standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Notes: Controls are Female, Faculty, Origin, Religion and Age.

Table 2.D.4: Difference in meat substitute consu S2-S0 (long term)

	(1)	(2)
	Diff in meat substitute consu S2-S0	Diff in meat substitute consu S2-S0
Veganuary	0.876 (0.783)	0.830 (0.775)
Constant	0.419 (0.424)	-0.259 (2.008)
Controls	No	Yes
Observations	91	91

Robust standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Notes: Controls are Female, Faculty, Origin, Religion and Age.

The following regression tables estimate the impact of the pledge on changes in meat justification scores over time. Table 2.D.5 shows that participants who accepted the challenge initially offered fewer justifications for their meat consumption (or showed a smaller increase) one month post-treatment. However, three months post-treatment the initial shift fades away as confirmed by Table 2.D.6. This pattern closely mirrors the trend observed in meat substitute consumption, where an initial shift disappears over time.

Table 2.D.5: Difference in meat justification score S1-S0 (short term)

	(1)	(2)
	Diff in meat justification score S1-S0	Diff in meat justification score S1-S0
Veganuary	-0.281* (0.148)	-0.382*** (0.141)
Constant	0.00775 (0.0628)	-0.915** (0.388)
Controls	No	Yes
Observations	92	92

Robust standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Notes: Controls are Female, Faculty, Origin, Religion and Age.

Table 2.D.6: Difference in meat justification score S2-S0 (long term)

	(1)	(2)
	Diff in meat justification score S2-S0	Diff in meat justification score S2-S0
Veganuary	-0.0852 (0.143)	-0.128 (0.138)
Constant	0.00646 (0.0651)	-0.410 (0.422)
Controls	No	Yes
Observations	91	91

Robust standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Notes: Controls are Female, Faculty, Origin, Religion and Age.

The results of these dynamics are consistent with those reported in the main text.

2.E Second robustness check: medians and Mann-Whitney U test

If the assumptions for the t-test are not met (e.g., homogeneity of variances or normality), which is often the case in experimental economics, an alternative is to use the Mann-Whitney U test. This nonparametric test evaluates whether the difference between the invited and uninvited participants in terms of the outcome variable is statistically significant. The Mann-Whitney U test is a rank-sum test, where the null hypothesis states that the rank sums do not differ significantly, while the alternative hypothesis suggests that the rank sums do differ significantly. Essentially, it tests whether the medians of the two groups are significantly different. In this analysis, I perform the same comparisons as with the t-test but using the Mann-Whitney U test. The results from both tests are very similar, confirming the robustness of my findings.

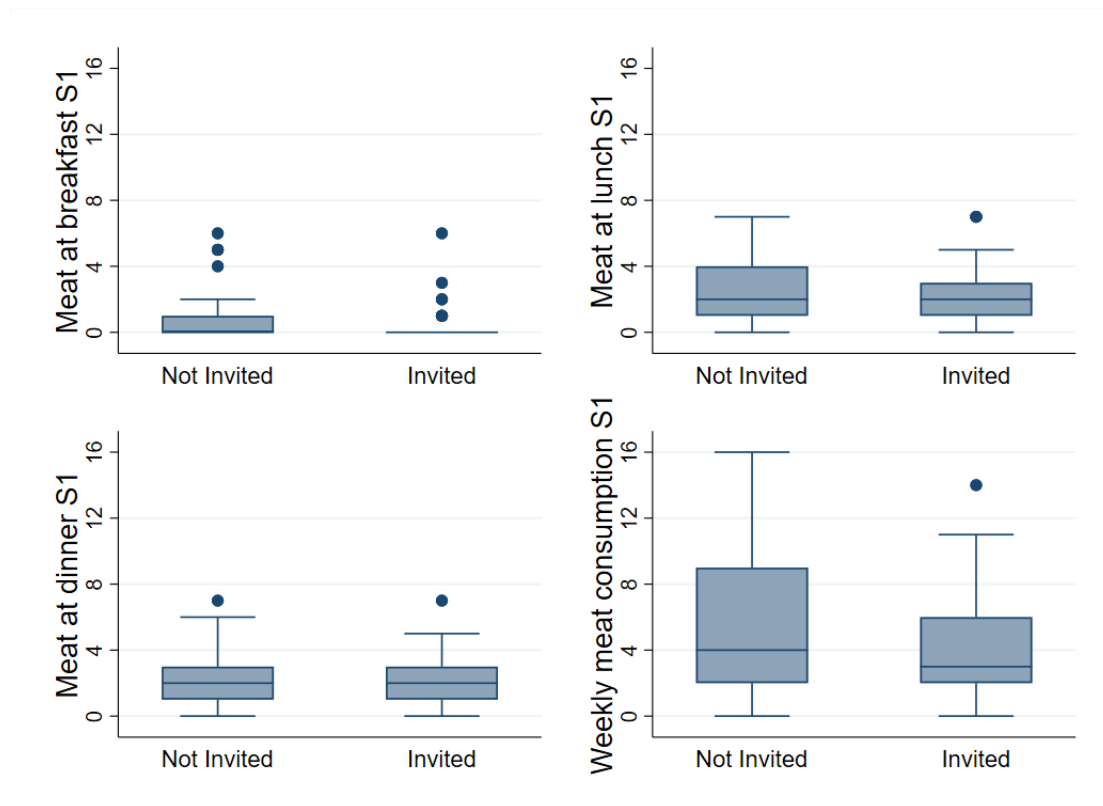


Figure 2.E.1: Meat consumption – one month post-treatment (S1)

Notes: *Meat at breakfast/lunch/dinner S1* measures the weekly consumption of meat one month post-treatment (from 0 to 7). *Weekly meat consumption S1* represents the addition of meat at breakfast, lunch and dinner (from 0 to 21) one month post-treatment. Stars indicate significance levels from the Mann-Whitney U test: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. $n=92$.

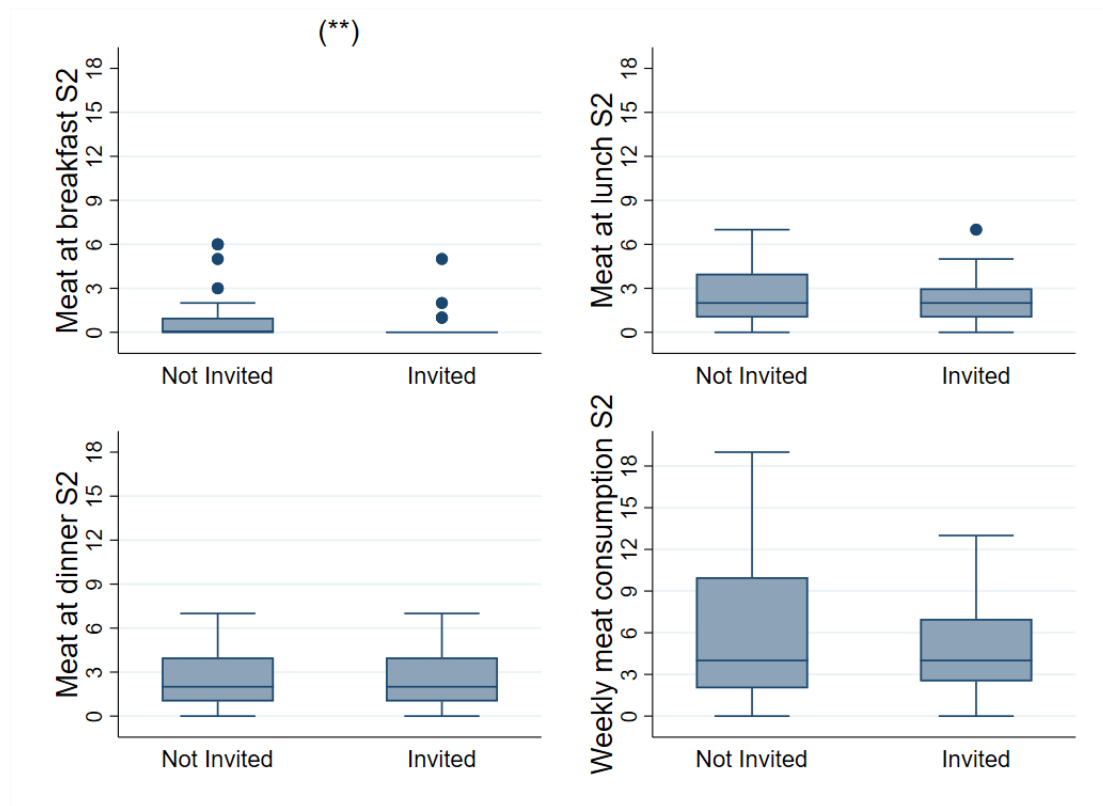


Figure 2.E.2: Meat consumption – three months post-treatment (S2)

Notes: *Meat at breakfast/lunch/dinner S2* measures the weekly consumption of meat three months post-treatment (from 0 to 7). *Weekly meat consumption S2* represents the addition of meat at breakfast, lunch and dinner (from 0 to 21) three months post-treatment. Stars indicate significance levels from the Mann-Whitney U test: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. $n=91$.

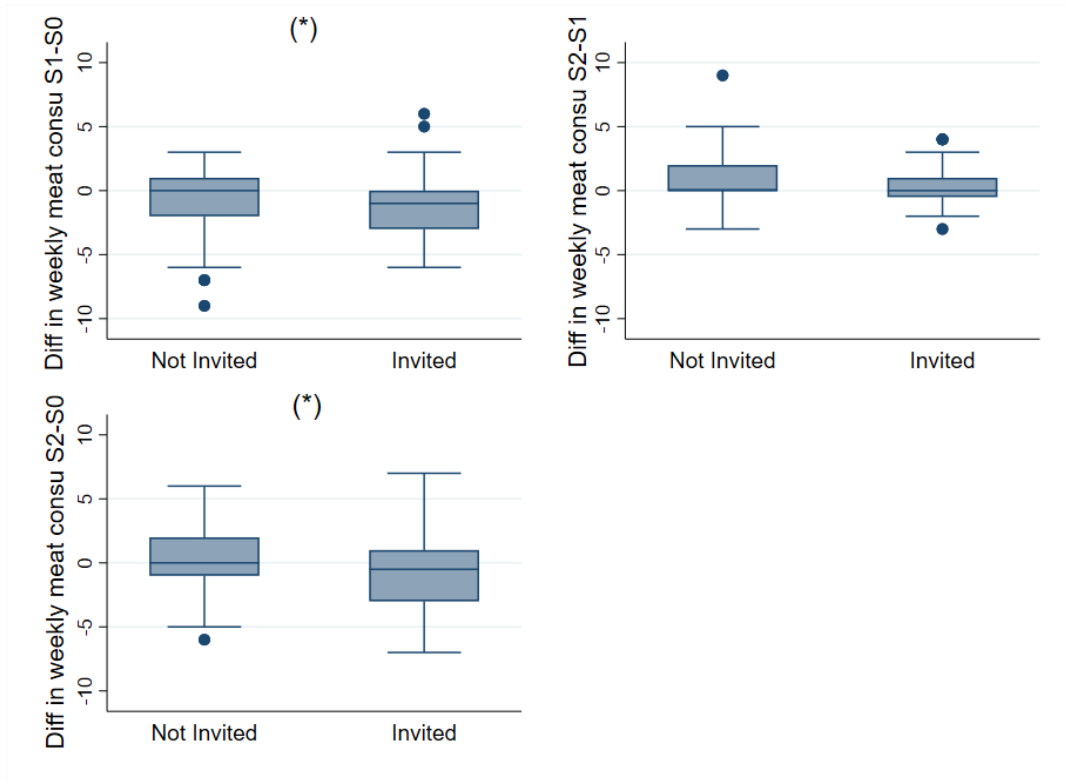


Figure 2.E.3: Differences in meat consumption

Notes: *Diff in weekly meat consu S1-S0* measures the difference in weekly meat consumption between survey S1 and survey S0. *Diff in weekly meat consu S2-S1* represents the difference in weekly meat consumption between survey S2 and survey S1. *Diff in weekly meat consu S2-S0* measures the difference in weekly meat consumption between survey S2 and survey S0. Stars indicate significance levels from the Mann-Whitney U test: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

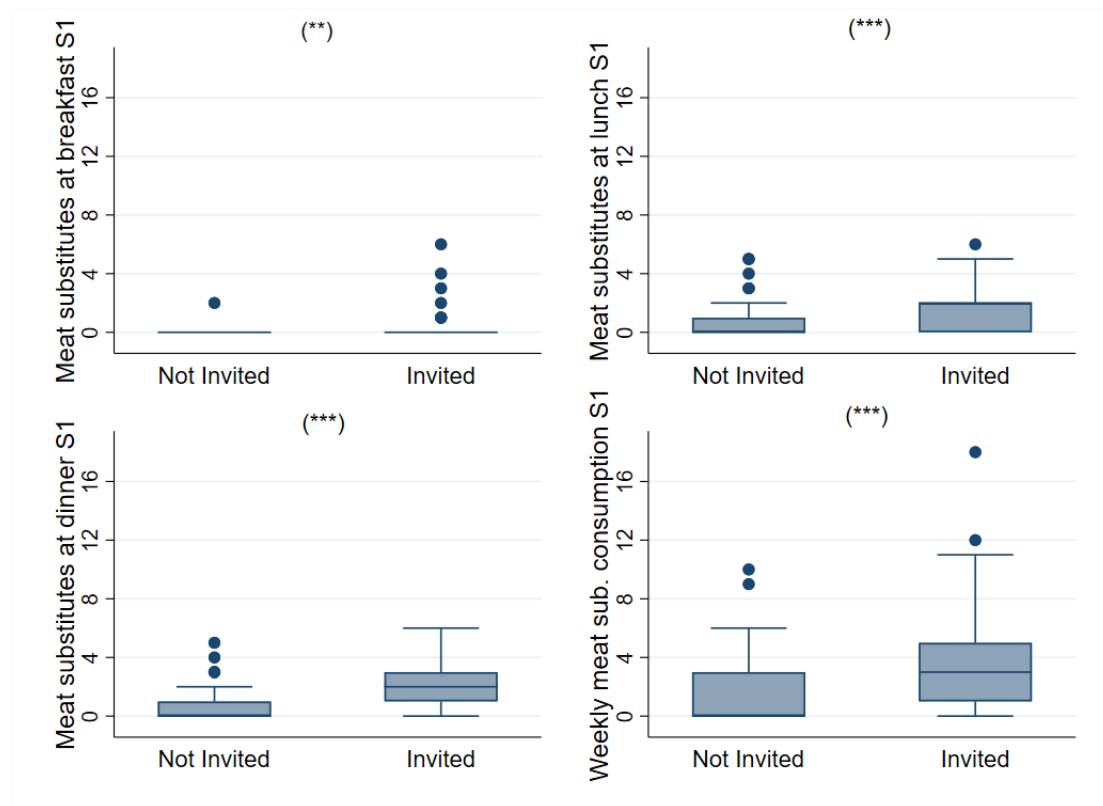


Figure 2.E.4: Meat substitute consumption – one month post-treatment (S1)

Notes: *Meat substitutes at breakfast/lunch/dinner S1* measures the weekly consumption of meat substitutes one month post-treatment (from 0 to 7). *Weekly meat sub. consumption S1* represents the addition of meat substitutes at breakfast, lunch and dinner (from 0 to 21) one month post-treatment. Stars indicate significance levels from the Mann-Whitney U test: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. $n=92$.

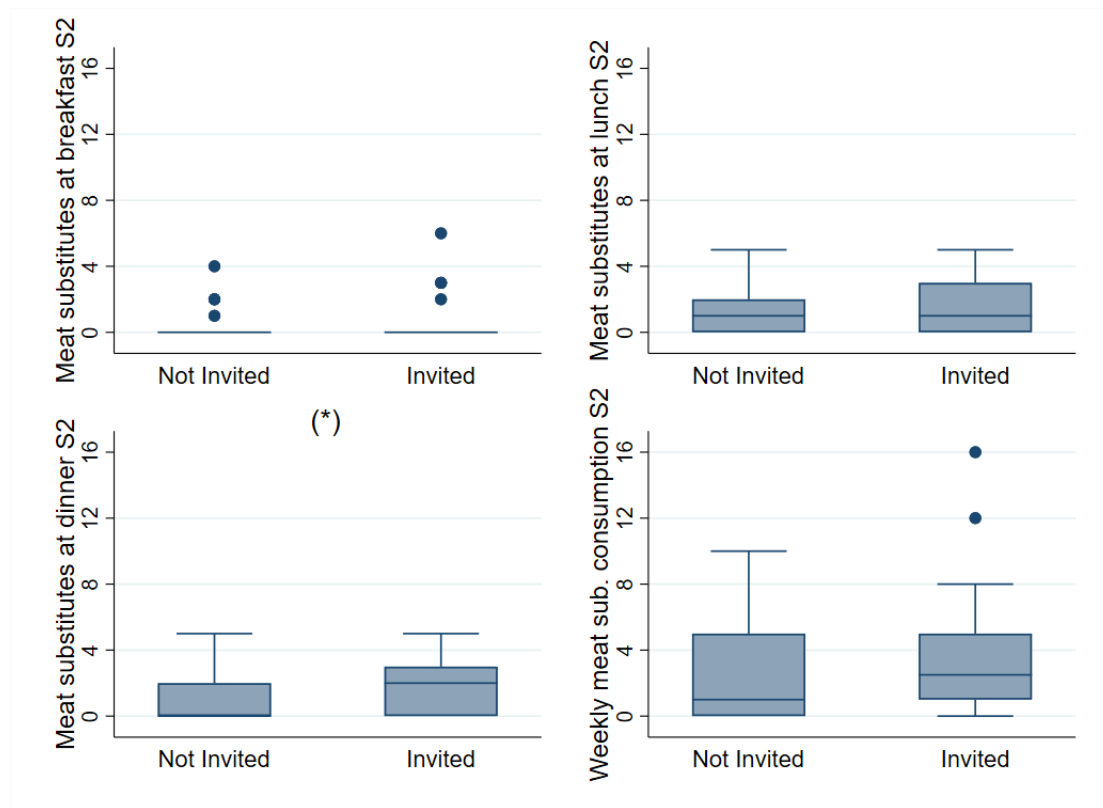


Figure 2.E.5: Meat substitute consumption – three months post-treatment (S2)

Notes: *Meat substitutes at breakfast/lunch/dinner S2* measures the weekly consumption of meat substitutes three months post-treatment (from 0 to 7). *Weekly meat sub. consumption S2* represents the addition of meat substitutes at breakfast, lunch and dinner (from 0 to 21) three months post-treatment. Stars indicate significance levels from the Mann-Whitney U test: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Note that *Weekly meat sub. consumption S2* is on the verge of being significant ($p = 0.10$). $n=91$.

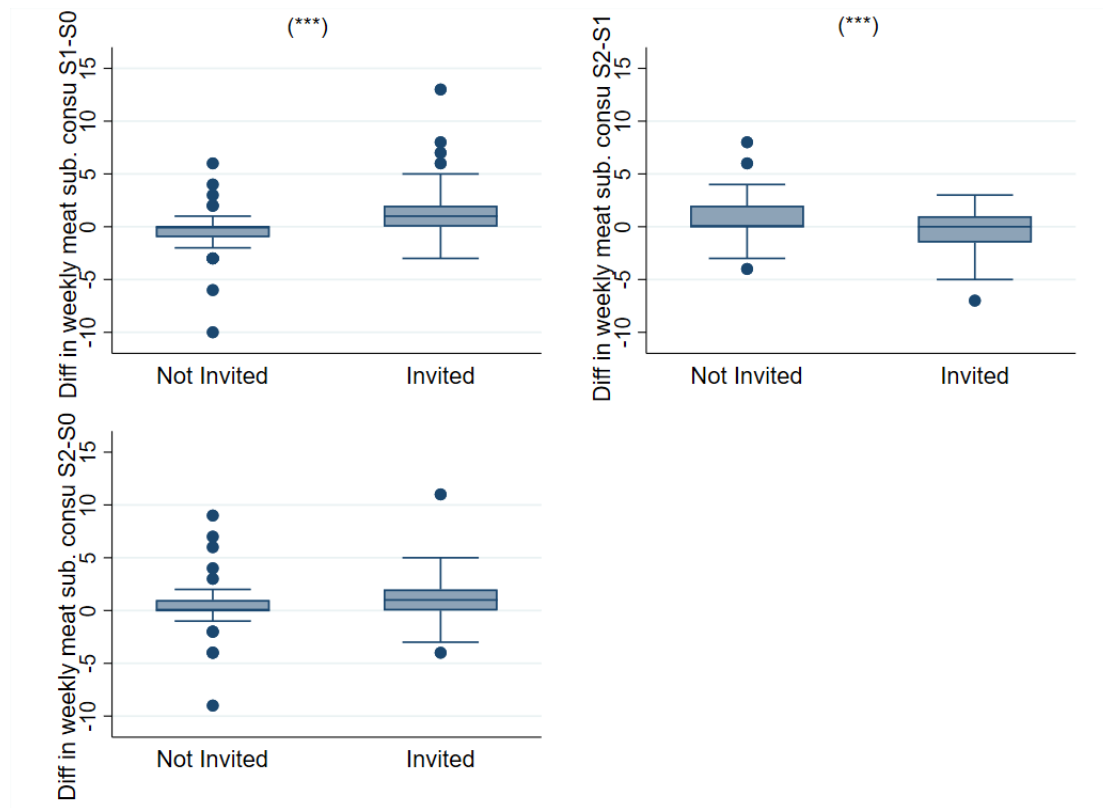


Figure 2.E.6: Differences in meat substitute consumption

Notes: *Diff in weekly meat sub. consu S1-S0* measures the difference in weekly meat substitute consumption between survey S1 and survey S0. *Diff in weekly meat sub. consu S2-S1* represents the difference in weekly meat substitute consumption between survey S2 and survey S1. *Diff in weekly meat sub. consu S2-S0* measures the difference in weekly meat substitute consumption between survey S2 and survey S0. Stars indicate significance levels from the Mann-Whitney U test: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

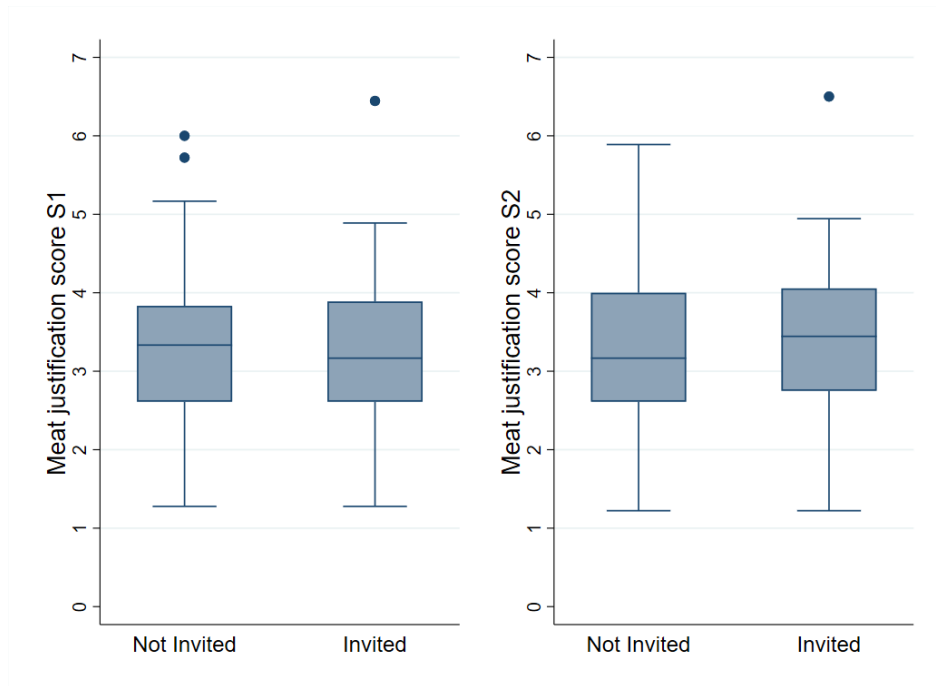


Figure 2.E.7: Meat justification scores – one month post-treatment (S1) and three months post-treatment (S2)

Notes: *Meat justification S1* represents the meat justification score one month post-treatment whereas *Meat justification S2* measures the meat justification score three months post-treatment. Stars indicate significance levels from the Mann-Whitney U test: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

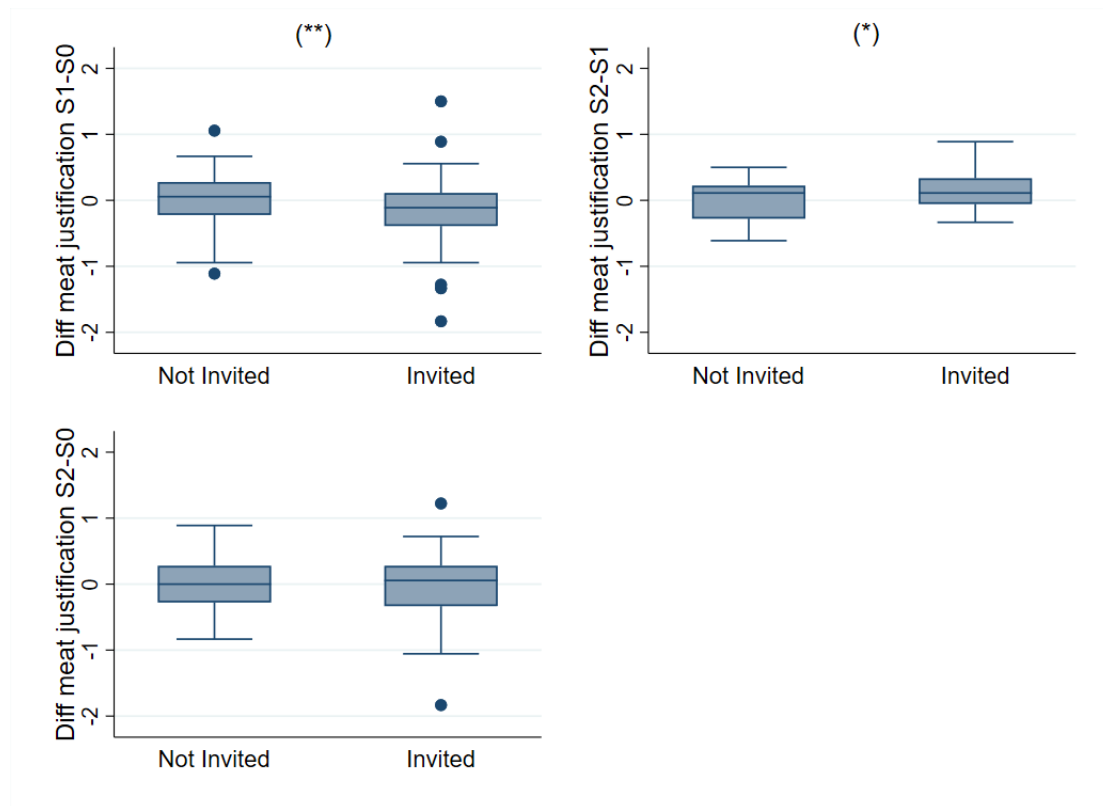


Figure 2.E.8: Differences in meat justification scores

Notes: *Diff meat justification S1-S0* measures the difference in the meat justification scores between survey S1 and survey S0. *Diff meat justification S2-S1* represents the difference in the meat justification scores between survey S2 and survey S1. *Diff meat justification S2-S0* measures the difference in the meat justification scores between survey S2 and survey S0. Stars indicate significance levels from the Mann-Whitney U test: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

2.F Questionnaires

2.F.1 Pre-treatment survey S0

Welcome to the study!

This study consists of **three online surveys** on your nutrition habits and behavior. This first survey will take you approximately 15 minutes to complete and the next two surveys 10 minutes each.

Confidentiality

You will be asked to give your email address in each survey, this is to match your answers from the three surveys and invite you to the subsequent survey. You will only be invited to the second and third survey if you have completed the previous one. Your email address will not be used for any other purpose and will be deleted immediately after this study.

You will have the option to be paid via TWINT or to get the compensation in cash directly from the secretary's office G402 of the economics department located on the fourth floor of the main building PER 21 (Bd de Pérolles 90) until End of May 2024. If you decide to receive the compensation via TWINT you will be asked to give your phone number. Your phone number will not be used for any other purpose and will be deleted immediately after the payment.

Voluntary participation

Data obtained will be used for research purpose only. Your participation in this study is completely voluntary and you can withdraw at any time. You may be asked to participate in some activity but participation is voluntary. If you decide to withdraw, your data will be deleted. Please note that it is impossible to delete your data once the study is finished, because then the data is anonymized and can no longer be linked to you.

If you have questions about this study, you may contact Bénédicte Droz from the University of Fribourg, benedicte.droz@unifr.ch.

By clicking "I agree" below you are indicating that you are at least 18 years old, have read and understood this consent form and agree to participate in this research study.

I agree

Figure 2.F.1: Welcome and consent – S0

Instructions

You are now taking part in a scientific study. Please read the following instructions carefully. Everything that you need to know in order to participate in this study is explained below.

In this study you will be asked about nutrition habits and behaviour. Participants who have dietary restrictions are not suited for this study and should not go further. To participate, you must also be able to understand English. If you are not confident with English, please do not go further. If you have already participated in this study, please do not go further.

This study is split in three parts. Each part consists in answering an online questionnaire for about 10-15 minutes. **We ask you to complete the three surveys.**

Please note that there will be **attention checks** in each survey.

The next two questionnaires will be sent to you by e-mail **in February 2024 and April 2024**. Please do not participate if you have no time to participate again in February 2024 and April 2024.

For completing **the three surveys** you will receive **25 CHF**: after completing the first survey you already receive 5 CHF, then 5 CHF for completing survey 2 and the remaining 15 CHF for completing survey 3.

To receive the compensation you will have the choice between **TWINT** or **CASH**. The cash payment can be collected from the secretary's office **G402** of the economics department located on the fourth floor of the main building PER 21 (Bd de Pérolles 90) on a **Tuesday, Wednesday or Thursday from 8.15 to 17.00 from the 9th of January 2024 until the 30th of May 2024**. We will remind you of the location and the opening hours at the end of each survey.

Please complete the survey personally.

Next

Figure 2.F.2: Instructions – S0

1. What gender do you identify with?

- ☐ female
- ☐ male
- ☐ other

2. How old are you?

I am years old

3. What is your nationality?

Country: ☐ No answer

4. If you have studied or are studying, what faculty do your studies belong to?

- ☐ Theology
- ☐ Management, Economics and social sciences
- ☐ Law
- ☐ Humanities
- ☐ Science and Medicine

☐ Not applicable

Next

Figure 2.F.3: Sociodemographics 1 – S0

5. What religion do you associate with?

☐ Christianity

☐ Islam

☐ Judaism

☐ Buddhism

☐ Hinduism

☐ Not religious

☐ I would rather not say

6. Where do you view yourself on the political spectrum?

☐ Far left ☐ Left ☐ Center left ☐ Center ☐ Center right ☐ Right ☐ Far right | ☐ I don't know ☐ Prefer not to say

7. Which party would best align with your current political beliefs?

Next

Figure 2.F.4: Sociodemographics 2 – S0

8. Please provide your e-mail address. It will only be used to send you the e-mail invitation to the next questionnaires. Please make sure you use the SAME e-mail address in the three online questionnaires.

E-mail

9. Please provide your phone number only if you wish to be paid via Twint at the end of this survey.

Payoffs: 5CHF for the first survey, 5CHF for the second survey and 15CHF for the third survey.

If you do not give your phone number here, we will keep your payoff at the secretary's office G402 of the economics department located on the fourth floor of the main building PER 21 until the 30th of May 2024. The opening hours to get your compensation are the following: Tuesday, Wednesday or Thursday from 8.15-17.00.

Phone number

Next

Figure 2.F.5: E-mail and phone number – S0

Please select "strongly agree" in order to show that you are paying attention to the questions.

☐ strongly disagree ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ strongly agree

Next

Figure 2.F.6: Attention check – S0

2.F.2 Main outcome variables – S0, S1 and S2

1. How many times have you had meat (beef, pork, chicken, fish,...) for breakfast in the past week?

☐ 0 ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7

2. How many times have you had meat (beef, pork, chicken, fish,...) for lunch in the past week?

☐ 0 ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7

3. How many times have you had meat (beef, pork, chicken, fish,...) for dinner in the past week?

☐ 0 ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7

Next

Figure 2.F.7: Weekly meat consumption

1. How many times have you had meat substitutes for breakfast in the past week (think of food items made of tofu, quorn, seitan, peas or lentils such as veggie sausage or veggie salami) ?

☐	☐	☐	☐	☐	☐	☐	☐
0	1	2	3	4	5	6	7

2. How many times have you had meat substitutes for lunch in the past week (think of food items made of tofu, quorn, seitan, peas or lentils such as veggie burgers) ?

☐	☐	☐	☐	☐	☐	☐	☐
0	1	2	3	4	5	6	7

3. How many times have you had meat substitutes for dinner in the past week (think of food items made of tofu, quorn, seitan, peas or lentils such as veggie burgers) ?

☐	☐	☐	☐	☐	☐	☐	☐
0	1	2	3	4	5	6	7

Next

Figure 2.F.8: Weekly meat substitute consumption

You will now face a series of statements. Please indicate to which extent you agree or disagree with these statements. There are no right or wrong answers. Use the below scale where **1 = strongly disagree**, **4 = neutral** and **7 = strongly agree**.

10. Attitudes

	1 strongly disagree	2	3	4	5	6	7 strongly agree
It is acceptable to eat meat because the animals killed for our consumption do not really suffer.	☐	☐	☐	☐	☐	☐	☐
It is acceptable to eat meat as the animals killed for our consumption have lower intellectual capacities than humans.	☐	☐	☐	☐	☐	☐	☐
God created animals for us to eat.	☐	☐	☐	☐	☐	☐	☐
It is acceptable to eat some animals because they are raised for this purpose.	☐	☐	☐	☐	☐	☐	☐
Eating meat is healthy.	☐	☐	☐	☐	☐	☐	☐
It's natural to eat meat, it's written in our genes.	☐	☐	☐	☐	☐	☐	☐
It's normal to eat meat.	☐	☐	☐	☐	☐	☐	☐
I like meat too much to stop eating it.	☐	☐	☐	☐	☐	☐	☐
Eating meat is necessary for good health.	☐	☐	☐	☐	☐	☐	☐

Next

Figure 2.F.9: Meat justification 1

You will now face a series of statements. Please indicate to which extent you agree or disagree with these statements. There are no right or wrong answers. Use the below scale where **1 = strongly disagree**, **4 = neutral** and **7 = strongly agree**.

	1 strongly disagree	2	3	4	5	6	7 strongly agree
I would be willing to sign a petition against intensive farming if the opportunity came to me.	☐	☐	☐	☐	☐	☐	☐
It is important for me to vote for politicians who care about the environment and animal welfare.	☐	☐	☐	☐	☐	☐	☐
I want to reduce my consumption of meat in the (near) future.	☐	☐	☐	☐	☐	☐	☐
I prioritise tasty food over healthy food.	☐	☐	☐	☐	☐	☐	☐
Eating healthy food gives me satisfaction.	☐	☐	☐	☐	☐	☐	☐
Eating meat may be bad for the environment, but no more so than eating vegetables or cereals.	☐	☐	☐	☐	☐	☐	☐
Animals are mostly treated well in farms in Switzerland.	☐	☐	☐	☐	☐	☐	☐
It is immoral to harm animals for the production of food.	☐	☐	☐	☐	☐	☐	☐
The way meat is produced in Switzerland is morally wrong.	☐	☐	☐	☐	☐	☐	☐

Figure 2.F.10: Meat justification 2

You will now face a series of statements. Please indicate to which extent you agree or disagree with these statements. There are no right or wrong answers. Use the below scale where **1 = strongly disagree**, **4 = neutral** and **7 = strongly agree**.

11. Actual behavior

	1 strongly disagree	2	3	4	5	6	7 strongly agree
At home, I recycle used paper and use a compost bin.	☐	☐	☐	☐	☐	☐	☐
I take short showers (1-5 minutes).	☐	☐	☐	☐	☐	☐	☐
I rarely take the plane (once a year or less).	☐	☐	☐	☐	☐	☐	☐
Whenever possible, I buy organic food.	☐	☐	☐	☐	☐	☐	☐

12. Policy support

	1 strongly disagree	2	3	4	5	6	7 strongly agree
I regularly support initiatives in favor of the environment by petitioning or volunteering in my free time.	☐	☐	☐	☐	☐	☐	☐
When I vote, I pay much attention to the party's climate protection policies.	☐	☐	☐	☐	☐	☐	☐
I would find it acceptable to pay more for electricity due to a transition to renewable energy sources.	☐	☐	☐	☐	☐	☐	☐
I contribute financially to environmental organizations.	☐	☐	☐	☐	☐	☐	☐

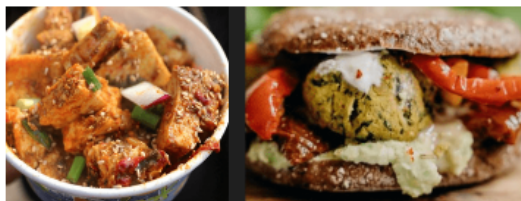
13. Intentions

	1 strongly disagree	2	3	4	5	6	7 strongly agree
I intend to use as few products as possible that are associated with deforestation and other negative environmental consequences.	☐	☐	☐	☐	☐	☐	☐
I intend to reduce my consumption of non local or non seasonal food.	☐	☐	☐	☐	☐	☐	☐
I intend to buy more second-hand clothes.	☐	☐	☐	☐	☐	☐	☐
I intend to reduce my shower time.	☐	☐	☐	☐	☐	☐	☐

Next

Figure 2.F.11: Pro-environmental behavior

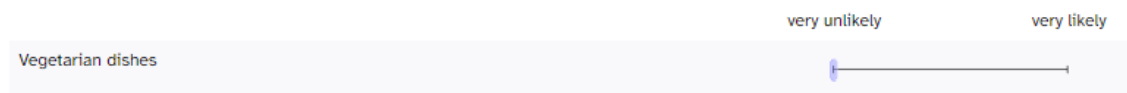
Please look carefully at the next two pictures.



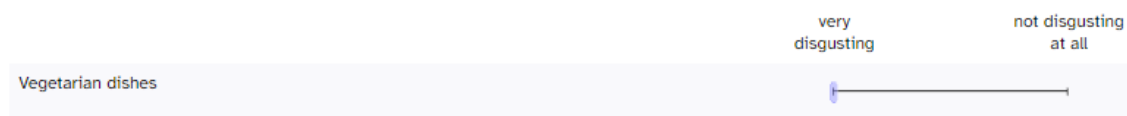
14. How would you rate the taste of these types of food?



15. How likely are you to eat these types of food?



16. Is this food disgusting to you and if so, how much?



Next

Figure 2.F.12: Disgust toward meat substitutes

Please look carefully at the next two pictures.



17. How would you rate the taste of these types of food?

very unpleasant

very pleasant

Meat and Fish

18. How likely are you to eat these types of food?

very unlikely

very likely

Meat and Fish

19. Is this food disgusting to you and if so, how much?

very disgusting

not disgusting at all

Meat and Fish

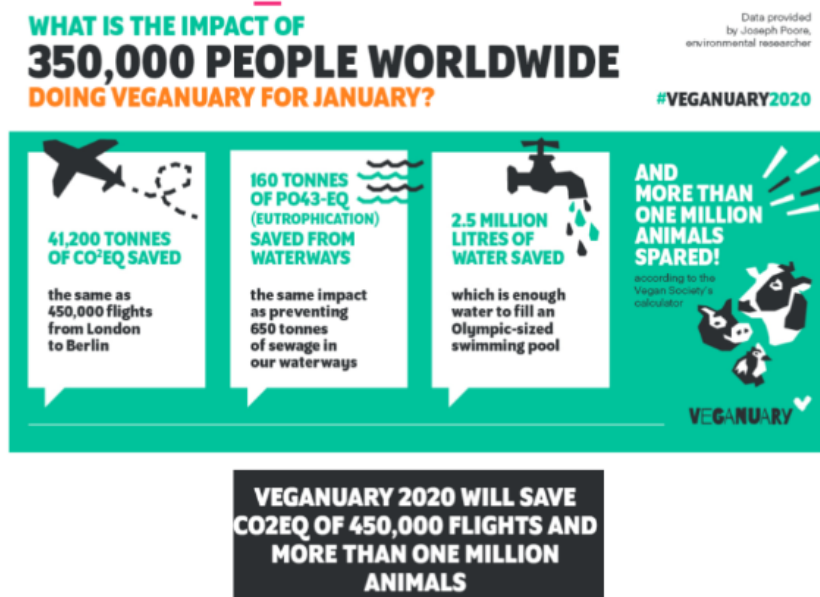
Next

Figure 2.F.13: Disgust toward meat

2.F.3 Treatment – S0

The following pages appear at the end of the pre-treatment survey (S0) for the invited group only. The invited participants are randomly selected.

You might have heard of the "Veganuary". During the month of January the participants of this event follow a vegan diet and avoid animal products such as meat, fish, poultry, milk, eggs, etc. The effects of the "Veganuary" are potentially large and summarised in the picture below (source: <https://veganuary.com>). Please read carefully.



Next

Figure 2.F.14: Treatment – S0

We would like you to try a similar challenge: **to reduce your meat consumption as much as possible during January 2024**. We ask you to avoid meat - if possible completely - during January 2024. Other participants have been invited to take up this challenge as well.

Note again that taking up the challenge is voluntary and that you can still participate in the next two survey independent of your choice.

If you take up this challenge, we ask you to reduce as much as possible your consumption of meat, fish and poultry only. We do not ask you to reduce your consumption of milk products and eggs. To help you with this task we will send you one reminder a week during the month of January with veggie recipes and useful information.

20. Do you accept to take up the challenge and try to reduce your meat consumption as much as possible during the month of January?

☐ I accept the challenge and will try to reduce my meat consumption as much as possible.

☐ I DO NOT accept the challenge.

Next

Figure 2.F.15: Treatment – Do you accept the challenge? – S0

2.F.4 Manipulation checks

13. Did you reduce your meat consumption in January?

☐ yes

☐ no

Next

Figure 2.F.16: Manipulation check – both groups – S1

You reduced or tried to reduce as much meat (beef, pork, chicken, fish,...) as possible during the month of January. We would like to know more about your experience during this period of time.

1. I reduced my consumption of...

	Not at all	A little (0-24% of reduction)	Moderately (25%-49%)	Significantly (50%-74% of reduction)	A lot (75%-99% of reduction)	Completely
fish	☐	☐	☐	☐	☐	☐
meat (pork, beef, ...)	☐	☐	☐	☐	☐	☐

2. Did you use the vegetarian recipe(s) sent per mail during the month of January?

☐ Yes, several times.

☐ Yes, once.

☐ No, never.

3. Avoiding meat during January was particularly difficult when I was...

	1 strongly disagree	2	3	4	5	6	7 strongly agree
with family	☐	☐	☐	☐	☐	☐	☐
with friends	☐	☐	☐	☐	☐	☐	☐
with colleagues from work	☐	☐	☐	☐	☐	☐	☐
at restaurant / eating out	☐	☐	☐	☐	☐	☐	☐
at home	☐	☐	☐	☐	☐	☐	☐

4. Due to my reduction of meat consumption in January, I suffered from...

	1 strongly disagree	2	3	4	5	6	7 strongly agree
social/peer pressure	☐	☐	☐	☐	☐	☐	☐
negative comments/remarks from others concerning my diet	☐	☐	☐	☐	☐	☐	☐
missing the taste of meat/fish/poultry	☐	☐	☐	☐	☐	☐	☐
nothing in particular	☐	☐	☐	☐	☐	☐	☐

5. How hard/easy was it to commit to the challenge and reduce or avoid meat consumption in January?

☐ very hard
 ☐ hard
 ☐ neutral
 ☐ easy
 ☐ very easy

6. I increased my consumption of...

	Not at all	A little (from 1% 49% increase)	Moderately (from 50% to 99% increase)	Significantly (from 100% to 200% increase)	Drastically (more than 200% increase)
legumes (lentils, chickpeas,...)	☐	☐	☐	☐	☐
veggie substitutes such as veggie burger or veggie nuggets	☐	☐	☐	☐	☐

Next

Figure 2.F.17: Manipulation checks – Veganuary group – S1

1. Have you already heard of the Veganuary campaign?

☐ yes

☐ no

2. Have you ever tried Veganuary or some similar diet (for example avoiding meat for a month)?

☐ yes, this year

☐ yes, last year

☐ yes, more than a year ago

☐ no, never

☐ I do not know Veganuary.

3. Did you fast this year for Lent? (six-week season that leads up to Easter)

☐ yes, I stopped...

☐ no

Figure 2.F.18: Manipulation checks – both groups – S2

2.G Motivational content

PDF Vegetarian bolognese recipe.pdf 342 KB

PDF Chocolate and Hazelnut Swiss Roll.pdf 1 MB

Hello,

You started **your challenge last week**. We would like to ask you to continue to avoid meat, fish and poultry as much as possible until the 31st of January 2024.

We also attached some nice recipe to make your own vegetarian Bolognese (preparation time: 10 minutes) as well as another recipe to make delicious chocolate and hazelnut rolls (preparation time: 60 minutes).

A new study by the Oxford University shows that vegan and vegetarian diets have a lower impact on the environment than diets including meat (link to the study [here](#)). Indeed, a meat diet has a larger impact on land, water use and greenhouse gas emissions than a vegan diet as displayed in the next three figures.

HOW MUCH LAND IS NEEDED TO SUPPORT A PERSON ON DIFFERENT TYPES OF DIET* EACH DAY?

HIGH MEAT	16.78sq m
LOW MEAT	8.31sq m
FISH	6.31sq m
VEGETARIAN	6.01sq m
VEGAN	4.37sq m

HOW MUCH WATER IS USED TO PRODUCE FOOD FOR DIFFERENT TYPES OF DIET PER PERSON* EACH DAY?

HIGH MEAT	890 litres
LOW MEAT	710 litres
FISH	710 litres
VEGETARIAN	530 litres
VEGAN	410 litres

HOW MUCH CARBON DIOXIDE DO DIFFERENT TYPES OF DIET PRODUCE PER PERSON* EACH DAY?

HIGH MEAT	10.24kg
LOW MEAT	5.37kg
FISH	4.74kg
VEGETARIAN	4.16kg
VEGAN	2.47kg

Source: [Reducing meat intake study \(Veganuary website\)](#)

We will send you the second online questionnaire **End of February 2024** and the last questionnaire in **End of April 2024**.

Thank you for your participation!

Best regards,

Bénédicte

Figure 2.G.1: Example of reminder e-mail

BEANS



BERRIES



OTHER FRUITS



CRUCIFEROUS VEGETABLES



GREENS



OTHER VEGETABLES



NUTS & SEEDS



FLAXSEEDS



HOW TO USE THIS CHECKLIST

- ☐ = number of servings
- ☒ tick 'em off what you've eaten 'em done 'em or drunk

○



SPICES



WHOLE GRAINS



DRINKS



EXERCISE



VITAMIN B12



179

PUMPKIN BERRY Acai BOWL

BY TULIKA VENUGOPAL



COMPLIANCE LEVEL
KICKSTART, LIFESTYLE, PERFORMANCE

TOTAL TIME
10 MINUTES

SERVINGS
2

BASE INGREDIENTS

- 1/2 cup frozen mixed berries
- 1/2 frozen banana
- 1/4 cup almond milk
- 2 Sambazon Pure Acai Berry unsweetened packets
- 1 Tbsp chia seeds
- 1/4 cup pumpkin puree
- 1/2 tsp ground cinnamon

TOPPINGS INGREDIENTS

- 1 sliced banana
- 6 sliced strawberries
- 2 Tbsp sliced almonds
- 1 Tbsp hemp seeds
- 4 Tbsp of your preferred combo of oats, nuts, and seeds (optional)
- 1 tsp unsweetened shredded coconut
- 2 tsp coconut nectar (optional)

DIRECTIONS

1. Place all of the base ingredients in a blender and blend until smooth.
2. Pour into two bowls.
3. Top each bowl with the topping ingredients: banana, strawberries, almonds, hemp seeds, and (optional) oat/nut/seed combo.
4. Sprinkle the shredded coconut on top and, if desired, drizzle the optional coconut nectar over the finished bowl.

NOTES

When it comes a combination of oats, nuts, and seeds, this is one of my favorites: oats, almonds, walnuts, and chia seeds.

For this to be compliant for Performance players, leave out the optional items.

WWW.WHOLELIFECHALLENGE.COM

4

Figure 2.G.3: Example of veggie recipe sent through the reminder e-mail

Chapter 3

What Can Sexual Orientation Reveal About the Gender Gap in Confidence?¹

3.1 Introduction

Understanding the gender gap in various economic outcomes, such as wages, insurance coverage, and representation, is critical to promoting equity, economic efficiency, and social well-being. Consequently, these disparities have gained significant scholarly attention over the past several decades (Blau and Kahn, 2017; Goldin, 2014). Recent research has tried to identify the underlying causes of these disparities. On the one hand, men and women might be treated differently due to discrimination. On the other hand, they may differ in their economic behavior, exhibiting different levels of confidence, competitiveness, or risk preferences, for example. These behavioral differences have been extensively studied through various experiments (Exley and Kessler, 2022; Niederle and Vesterlund, 2007; Croson and Gneezy, 2009; Hernandez-Arenaz and Iriberri, 2018). However, potential behavioral gaps across both gender *and* sexual orientation remain largely unexplored. Including sexual orientation acknowledges that behavior can vary within gender groups due to the distinct social and economic challenges faced by LGBTQ+ individuals, as well as potential differences in their preferences. This paper is the first to investigate confidence differences based on sexual orientation in addition to gender.

Research indicates that the LGBTQ+ individuals – estimated at eight percent of the world population, i.e., representing 640 million people or twice the US population size (World Population Review, 2025b)² – are more likely to face economic challenges such

¹I thank Billur Aksoy, Berno Buechel, Robert Dur, Steve Heinke, Holger Herz, Nagore Iriberri, Tom Rodriguez, Christian Zehnder, Christian Zihlmann as well as the participants of the AEA Economics of LGBTQ+ Individuals Virtual Seminar Series for their very helpful comments. I would also like to thank the Foundation SES of the University of Fribourg and Stonewall Foundation which made the experiment possible.

²These figures are evolving: in a poll in 2012 “only” 3.5 percent identified as non-heterosexual while

as being uninsured or earning lower salaries compared to their non-LGBTQ+ counterparts – with the exception of lesbian women, who experience different economic outcomes (Badgett et al., 2021). A meta-analysis found that, on average, homosexual and bisexual men earn 11 percent less than their equally-qualified peers, while lesbian women tend to earn more than their heterosexual counterparts (Klawitter, 2015).³ Few experiments have investigated whether there exist potential differences in economic behavior between LGBTQ+ individuals, which could explain variations in economic outcomes such as differences in wages; Aksoy and Chadd (2025) and Buser et al. (2018) have examined the sexual orientation gap in competitiveness and shown that while gay men compete less than heterosexual men, lesbian women compete (less or) as much as heterosexual women. Furthermore, Aksoy et al. (2024) found that gender diverse people (who do not identify as either male or female) are on average less confident and exhibit more pessimistic self-evaluations than equally-performing men on a math and science test.

However, to the best of my knowledge, there are no studies that examine the sexual orientation gaps in confidence. Confidence plays a crucial role in many real-world contexts, such as job interviews or scholarship applications, where individuals are required to evaluate their own performance and skills. Motivated by Aksoy et al. (2024) and Exley and Kessler (2022) and their experimental design, I conduct an online experiment to investigate potential differences in confidence across gender *and* sexual orientation. Specifically, I examine whether sexual orientation gaps in confidence exist and whether the gender gap in confidence varies across sexual orientations. I find that while the gender gap in confidence is reproduced, sexual orientation affects women’s outcomes, but seems to have no effect on men. Lesbian women show indeed a much smaller gender gap in confidence compared to the typical gap observed between men and women, with lesbian women’s confidence levels approaching those of heterosexual men.

This paper contributes to three key streams of literature. First, it builds on the (labor market) discrimination literature, beginning with Becker (1957)’s model of taste-based discrimination towards minorities and extending to the theory of statistical discrimination advanced by Phelps (1972) and Arrow (1973). It examines behavioral mechanisms – specifically, confidence gaps – that may (at least partially) account for gaps in economic outcomes. Second, it extends the existing literature on gender gaps in confidence by highlighting that this gap may be smaller for a specific subgroup. Third, it contributes to the flourishing stream of “the LGBTQ+ Economics” (Badgett et al., 2021) and documents novel sexual orientation gaps in confidence.

The remainder of this paper is organized as follows: Section 3.2 describes the design and Section 3.3 presents the key results. I finally discuss these results and conclude in Section 3.4.

this number doubled and reached 7.6 percent in 2023. Furthermore, if we only look at generation Z (born between 1997 and 2012) around one in five considers themselves as non-heterosexual (Jones, 2024).

³While the wage premium for lesbian women appears to have declined over the last years, the wage penalty for gay men seems stable (Keynes, 2024).

3.2 Design

3.2.1 Overview

I run an online experiment on Prolific where participants have to go through 5 different parts. First, participants complete a math and science quiz containing 10 questions (Part 1). Second, I elicit their belief on their absolute performance by asking them how many questions they think they answered correctly out of the 10 (*Belief*). Third, I elicit their *Uninformed self-evaluations* by asking them six different questions, which are detailed below (Part 2). Fourth, their true own score from the quiz is revealed. Fifth, they are asked again the exact same six questions representing their *Informed self-evaluations* (Part 3).

3.2.2 Eliciting confidence: belief and self-evaluations

Figure 3.2.1 illustrates how confidence is defined in this study, based on the six self-evaluation questions detailed below and the *Belief* question.⁴

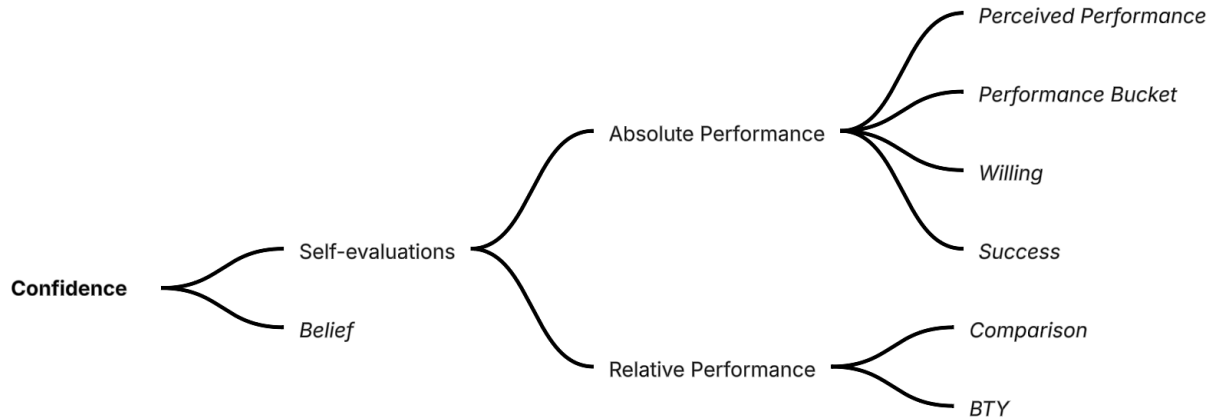


Figure 3.2.1: Overview of confidence

By responding to the question “Out of the 10 questions in part 1, how many questions do you think you have answered correctly?” I measure the participants’ beliefs about their absolute performance which I further name *Belief*. After the 10 quiz questions and this *Belief* question, participants are asked six different questions related to their own assessment of their performance in the test (*Uninformed self-evaluations*). The first

⁴This *Belief* question is sometimes referred to as *Confidence* in the literature; see Exley and Kessler (2022) for a discussion on whether self-evaluations measure a subjective form of confidence. For clarity, I define and measure overall confidence using the *Belief* question and the six *Self-Evaluation* questions, as illustrated in Figure 3.2.1. This approach slightly deviates from the pre-registration, where I originally referred to the *Belief* question as *Confidence*.

question, referred to as the *Performance Bucket* asks them how well they think they performed on the test from Part 1 (from *terrible* to *exceptional*) whereas the next three questions are statements to which participants can (dis)agree on a scale from 0 (*entirely disagree*) to 100 (*entirely agree*).⁵ These three questions are the following:

- I performed well on the test I took in part 1. (*Perceived performance*)
- I would apply for a job that required me to perform well on the test I took in part 1. (*Willing*)
- I would succeed in a job that required me to perform well on the test I took in part 1. (*Success*)

Finally, the last two questions concern their relative performance. I first assess participants’ perceptions of their performance compared to others by asking how well they think they performed compared to the average score of all participants, ranging from “much worse” to “much better” (*Comparison*), and second, by asking them to estimate the percentage of participants who performed strictly better than them, from 0% to 100% (*BTY* which stands for Better-Than-You).

I then reveal their actual test score.⁶ Following this disclosure, the participants are again asked the exact same six questions (*Informed self-evaluations*). This design captures participants’ perceptions of their performance before *and* after learning their actual performance. Uninformed self-evaluations reveal whether initial confidence levels vary across equally-performing individuals, particularly by gender or sexual orientation, with research showing that men often exhibit higher initial confidence than equally-performing women (Exley and Kessler, 2022). By informing participants of their true score, I mechanically eliminate any discrepancies in their beliefs about their absolute performance. This allows me to determine whether the gap in self-evaluations persists.

3.2.3 Data collection and payoffs

The experiment was conducted in June 2024 on Prolific, with data collected from 719 participants (following a pilot in March 2024 involving 157 participants).⁷ The Prolific

⁵The key distinction between *Belief* and *Perf bucket* (or *Perceived Perf*) is that *Belief* asks for a specific estimate of correct answers, which reflects a precise assessment of their knowledge score while *Perf bucket* and *Perceived Perf* are broader, more subjective evaluations of performance, influenced by factors like self-esteem, making it more likely to reveal differences between groups, even with the same (believed) performance. For example, lesbian women may exhibit more optimistic perceptions of their own performance, which *Perf bucket* and *Perceived Perf* capture more clearly than *Belief*, even if their specific estimates of correct answers are similar to those of equally-performing heterosexual women.

⁶My study makes two adaptations to Exley and Kessler (2022): the inclusion of two additional questions related to relative performance, *Comparison* and *BTY*, and providing participants with feedback solely on their absolute scores, without any information about their relative performance.

⁷I received ethics approval from the Institutional Review Board from the University of Fribourg in June 2024 (Application No. 2024-06-03). The study was pre-registered (#180628) in June 2024 using AsPredicted. Since this is the first experiment investigating the sexual orientation gaps in confidence,

platform allows researchers to pre-screen participants and target specific demographics, such as heterosexual women in the UK. Upon enrolling on the platform, participants answer several demographic questions that enable researchers to filter and select individuals that align with their study criteria. This functionality allowed me to create equally-sized groups of heterosexual men, heterosexual women, gay men, and lesbian women (all UK residents and whose approval rating was of 98% or higher, ensuring that they have a track record of completing studies reliably and accurately). The filters I used, typically collected during enrollment with the consent of the participants, focused on sexual orientation and gender. For sexual orientation, I included participants who identified as either *heterosexual* or *homosexual*, while for gender, I retained those who identified as *Woman (including Trans Female/Trans Woman)* or *Man (including Trans Male/Trans Man)*. For the main analysis, I created the two dummies *Female* (which takes the value of 1 if the person is prescreened as a woman (including trans female/trans woman) and 0 if prescreened as man (including trans male/trans man)) and *Homosexual* (which takes the value of 1 if the person is prescreened as homosexual and 0 if prescreened as heterosexual).⁸

I implemented the payment structure modeled after the approach used by Aksoy et al. (2024). Participants received a fixed payment of £3 and had the opportunity to earn additional payoffs based on their answers and a randomization process. If Part 1 (math and science quiz) was selected, they earned 10 pence for each correct answer on the test. If Part 2 (Uninformed self-evaluations) or Part 3 (Informed self-evaluations) was selected, they earned a guaranteed 50 pence.

3.3 Main results

The average participant is 37.65 years old, achieves a (knowledge) score of 3.63 out of 10 on the math and science test, but estimates their own score to be 3 (for a complete overview of the descriptive statistics, refer to Appendix 3.A).⁹ In my sample, heterosexual women perform worse on average than heterosexual men, with a coefficient of -0.383 ($p < 0.05$) and believe that they performed worse than equally-performing heterosexual

I did not pre-register specific hypotheses or the expected direction of the findings. However, all other aspects of the study, including the methodology and main questions, were pre-registered as displayed in Appendix 3.L, following a similar approach to Aksoy et al. (2024). The experiment was funded by the SES Foundation of the University of Fribourg and the Stonewall Foundation.

⁸To assess the reliability of Prolific’s gender filter, I created an alternative dummy variable, *Women*, which takes the value of 1 if the respondent *self-identified* as a woman in my online survey, 0 if they *self-identified* as a man, and 2 if they selected “other” in response to the question: “What gender do you identify with?”. Overall, over 99.5% of participants matched the gender information provided by Prolific. The results of the robustness check using this *Women* dummy therefore align very closely with the main findings.

⁹Participants are, on average, underconfident, with variations across gender and sexual orientation (see Appendices 3.C and 3.D for details). This underconfidence can affect how participants react to feedback. Indeed, Baumann et al. (2024) show causal evidence between confidence and belief updating; they find that individuals with underconfidence react less to positive feedback, which leads to pessimistic updating.

men, with a coefficient of -0.617 ($p < 0.01$) as displayed in Appendix 3.E. While the coefficients for *Homosexual* and the interaction term between *Female* and *Homosexual* (further *Female_Hom.*, which examines whether differences exist at the intersection of gender and sexual orientation) are not statistically significant for *Knowledge score*, the coefficient for *Female_Hom.* for *Belief* is close to being significant ($p = 0.10$).

The results presented in Table 3.3.1 reveal that heterosexual women have a significantly lower perceived performance compared to equally-performing heterosexual men, as indicated by the *Female* coefficient of -6.589 ($p < 0.01$). A similar trend is evident across all other outcomes, where heterosexual women consistently exhibit more pessimistic self-evaluations compared to equally-performing heterosexual men (when uninformed of their true score). It is important to note that the baseline group for this table is heterosexual men. Consequently, the *Female* coefficient reflects the gender gap between heterosexual women and heterosexual men. While this is not the “true” gender gap observed in the general population, it provides a closer approximation to reality compared to the gender gap in my sample, which overrepresents lesbian women and gay men.¹⁰ The coefficient for *Homosexual* is never statistically significant in Table 3.3.1, suggesting that gay men do not differ significantly from equally-performing heterosexual men in their self-evaluations of performance.

The combined effect of the three coefficients (i.e., the addition of the three coefficients *Female*, *Homosexual* and *Female_Hom.*) reveals the gap between lesbian women and heterosexual men. This total effect (called Combined Gap in the table) can be compared to the gender gap captured by the *Female* coefficient alone, which reflects the difference between heterosexual women and heterosexual men. For instance, in the case of *Perceived Performance*, the Combined Gap for lesbian women is -1.05, a statistically significant reduction from the original gender gap of -6.589 (the difference between the two gaps is significant with $p = 0.011$). Similarly, for *Performance Bucket*, the gender gap narrows from -0.548 to -0.225 ($p = 0.007$), and for *Willing*, from -8.448 to -1.768 ($p = 0.011$). This pattern holds across other outcomes, such as *Success* and *Comparison*. These results demonstrate that the gender gap in self-evaluations diminishes substantially and significantly for lesbian women and that lesbian women’s self-evaluations are more similar to those of men. Consistent with these findings, there is no statistically significant difference between equally-performing men and lesbian women regarding both uninformed and informed self-evaluations (with the exception of *BTY (uninformed)*, $p = 0.089$) as displayed in Appendix 3.K.

¹⁰The analysis of the gender gap in confidence (and self-evaluations) in the entire sample (all men vs. all women) is to be found in Appendix 3.H. The results confirm the findings of Exley and Kessler (2022): Women provide more pessimistic self-evaluations of their performance on a math and science quiz than equally-performing men, in both uninformed and informed cases.

Table 3.3.1: Uninformed self-evaluations

	(1)	(2)	(3)	(4)	(5)	(6)
	Perceived Perf.	Perf. Bucket	Willing	Success	Comparison	BTY
Female	-6.589*** (2.226)	-0.548*** (0.120)	-8.448*** (2.477)	-7.261*** (2.689)	-0.602*** (0.123)	5.169** (2.418)
Homosexual	-0.924 (2.238)	-0.132 (0.125)	-0.857 (2.797)	-1.508 (2.697)	-0.129 (0.129)	1.297 (2.387)
Female_Hom.	6.463** (2.985)	0.455*** (0.164)	7.537** (3.640)	7.887** (3.722)	0.417** (0.174)	-1.206 (3.416)
Hetero Male Average	26.49	2.89	24.09	26.46	3.17	52.94
Female - Combined Gap (=Gap Hetero W vs Hetero M - Gap Lesbian W vs Hetero M)						
Difference	-5.539	-0.323	-6.680	-6.380	-0.288	-0.092
P-value	0.011	0.007	0.011	0.021	0.023	0.972
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Observations	719	719	719	719	719	719

Robust standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Notes: Results are based on OLS regressions (which include a constant term), with the dependent variable for each model indicated in the corresponding column. Controls include Knowledge score, Right-wing, Ethnicity, Education, Employment status, Age, and Rural. The baseline group is heterosexual men. *Hetero Male Average* is the unadjusted mean for heterosexual men, before controlling for covariates. *Difference* represents the difference between the gender gap, as indicated by the coefficient for *Female* (comparing heterosexual men and heterosexual women), and the Combined Gap, which is the sum of the coefficients for *Female*, *Homosexual*, and *Female_Hom.* (capturing the gap between lesbian women and heterosexual men). The P-value corresponds to the two-sided t-test for the difference between these two gap estimates.

After revealing the participants' true scores, I proceed to the analysis of the informed self-evaluations in Table 3.3.2. I find again, across all outcomes, that heterosexual women evaluate their performance more pessimistically than equally-performing heterosexual men (although most coefficients are of a smaller size) and that gay men do not show any significant difference in self-evaluations of their performance compared to equally-performing heterosexual men. Comparing the combined effect of the three coefficients *Female*, *Homosexual* and *Female_Hom.* (which represents the gap between lesbian women and heterosexual men) with the gender gap between heterosexual men and women (*Female*), Table 3.3.2 shows similar results to those observed in the uninformed condition: the gender gap in self-evaluations is substantially and significantly smaller for lesbian women. The similarity in results between the uninformed and informed self-evaluations suggests that differences in self-evaluations are not primarily driven by any (potential) gap in beliefs about one's absolute score. For the plot of the coefficients, please refer to Appendix 3.B.

In contrast to Exley and Kessler (2022), who also include information about relative performance in their feedback, here participants receive feedback only on their own scores, not in relation to others. This allows me to additionally investigate whether on average,

heterosexual women more strongly believe that they performed worse than others compared to equally-performing heterosexual men. The coefficient of the dummy variable *Female* is statistically significant for the two models *Comparison* and *BTY*, both before and after feedback. This suggests that heterosexual women indeed compare themselves, on average, more negatively to others than equally-performing heterosexual men both before and after feedback.

Table 3.3.2: Informed self-evaluations

	(1)	(2)	(3)	(4)	(5)	(6)
	Perceived Perf.	Perf. Bucket	Willing	Success	Comparison	BTY
Female	-5.969*** (1.616)	-0.394*** (0.0987)	-4.785** (2.353)	-8.386*** (2.252)	-0.381*** (0.115)	5.122** (2.401)
Homosexual	-0.334 (1.801)	-0.0615 (0.0989)	-0.165 (2.511)	-0.175 (2.531)	-0.0588 (0.119)	0.298 (2.500)
Female_Hom.	6.625*** (2.368)	0.481*** (0.135)	4.334 (3.356)	7.648** (3.352)	0.312** (0.158)	-1.758 (3.466)
Hetero Male Average	28.42	3.16	25.32	27.36	3.18	51.78
Female - Combined Gap (=Gap Hetero W vs Hetero M - Gap Lesbian W vs Hetero M)						
Difference	-6.291	-0.419	-4.17	-7.473	-0.253	1.460
P-value	0.000	0.000	0.089	0.002	0.028	0.579
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Observations	719	719	719	719	719	719

Robust standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Notes: Same as for the *Uninformed self-evaluations* in Table 3.3.1.

Result (Female-Hom.). *The gender gap in self-evaluations is significantly smaller for lesbian women.*

I additionally conducted separate analyses for women (comparing heterosexual women to lesbian women) and men (comparing heterosexual men to gay men). These analyses reveal that in both informed and uninformed cases lesbian women provide more optimistic self-evaluations of their performance than equally-performing heterosexual women and that gay men do not show any significant difference in self-evaluations of their performance compared to equally-performing heterosexual men (see Appendix 3.G for details). I also compare men to women across my entire sample and, consistent with the literature, find that women provide worse self-evaluations of their performance than equally-performing men in both informed and uninformed cases (see Appendix 3.H for details).

Finally, as part of the exploratory analysis, I also test whether different groups (e.g., lesbian women, gay men, men, women, etc.) adjust differently to the feedback they receive. Overall, I observe minimal differences between groups, with a few notable exceptions in the men vs. women comparison (see Appendix 3.I for details). To test the robustness of my findings, I conduct two robustness checks: in the first, I exclude the observations who

have incorrectly stated their absolute score even though their actual score was displayed in red on the same screen. Hence, I only include those who effectively are aware (not only informed) of their true absolute score. In the second robustness check, I additionally exclude participants who failed to answer two easy attention checks consecutively (an example of attention check is displayed in Figure 3.F.16 in Appendix 3.F).¹¹ The two robustness checks align with the main findings, supporting the reliability of my findings and demonstrating the robustness of the study (see Appendix 3.J for details).

3.4 Discussion and conclusion

In this experiment I investigate whether sexual orientation gaps in confidence exist and how the gender gap in confidence varies across sexual orientations. I base my experiment on Aksoy et al. (2024) and Exley and Kessler (2022)’s work which found gender differences in confidence (and self-evaluations) – specifically, that women, on average, report more pessimistic beliefs about their absolute performance and evaluate their performance more negatively compared to equally-performing men. While my findings confirm these previous results, they also reveal significant differences within the group of women. In particular, lesbian women provide more optimistic self-evaluations of their performance than equally-performing heterosexual women and exhibit a significantly smaller gender gap in self-evaluations compared to the typical gap observed between men and women, with lesbian women’s confidence levels approaching those of (heterosexual) men. This discrepancy persists even after participants are informed about their actual scores, suggesting that lesbian women may inherently have more positive self-views, shaped by social or psychological factors, such as coping mechanisms or resilience. Alternatively, lesbian women may develop greater self-assurance and pride in their abilities due to facing challenges or discrimination. This experiment highlights that lesbian women appear to have a different perception of their performance and evaluate themselves differently compared to heterosexual women, which suggests a nuanced understanding of how sexual orientation intersects with gender in shaping self-evaluations of performance. On the other hand, gay men seem to show no significant difference in self-evaluations (informed and uninformed) compared to equally-performing heterosexual men. This suggests that sexual orientation may not be a strong predictor of confidence for men, or that any difference, if it exists, is too small to be detected with our sample.¹²

Building on these findings, future research should explore the origins of confidence and

¹¹Among participants, 12.4% failed to report their own displayed absolute score, while 2.5% failed both attention checks consecutively and 9.9% at least one main attention check.

¹²Remember that my sample consists of UK residents. The UK ranks highly on the Global Acceptance Index (GAI), which measures overall LGBTQ+ acceptance. In contrast, for example, the US ranks lower (World Population Review, 2025a). Additionally, the “gay penalty” varies significantly across countries – ranging from 4-5% in the UK and France, to 12-16% in Canada and the US (Drydakis, 2014). This suggests that, in the UK, gay rights are well-established, and the general social climate may be more accepting of sexual diversity, which could help explain the lack of significant differences in confidence between gay men and heterosexual men.

the mechanisms that sustain it. Understanding potential triggers, such as social norms, early life experiences, and peer influences, may shed light on how confidence develops. This could help explain why gay men show no significant differences in confidence compared to equally-performing heterosexual men, while lesbian women do differ from their heterosexual counterparts.

One could also explore potential differences in other economic behaviors between heterosexual and homosexual individuals, such as gaps in risk preferences, altruism, or optimism, and examine whether accounting for sexual orientation reveals variations within genders. Documenting these behavioral differences between heterosexual and homosexual individuals, in addition to the traditional focus on gender differences between men and women, and further examining the extent to which these differences in economic behavior influence gender and sexual orientation gaps in economic outcomes, could offer valuable insight for designing targeted interventions aimed at reducing discriminatory economic outcomes and improving the lives of individuals of sexual orientation minorities. It seems that this new field is still in its early stages with many intriguing questions remaining to be explored and answered.

Declaration about generative AI

During the preparation of this work, the author used GPT-4 to improve the language. Following this, the author carefully reviewed and edited the content as necessary and assumes full responsibility for the final output.

Appendices

3.A Descriptive statistics

Table 3.A.1: Descriptive statistics of the independent and control variables

Variable	Mean	SD	Min	Max
Female	0.50	0.50	0	1
Homosexual	0.50	0.50	0	1
Rightwing	21.53	26.20	0	100
Ethnic	1.29	0.80	1	6
Educ	4.66	1.19	1	8
Employment	2.33	1.81	1	8
Rural	0.30	0.46	0	1
Age	37.65	12.59	18	80
Observations	719			

Notes: *Rightwing* is measured with a slider from entirely disagree to entirely agree to the following statement: “I feel favorably about conservative parties (like the Republican party in the USA).” *Ethnicity* is measured with the following question “Which of the following best describes your ethnic background?” and 6 possible categories. *Education* is measured with the following question “Please select the option that best represents your highest level of education completed” and 8 possible categories. *Employment Status* is measured with the following question “What is your current employment status?” and 8 possible categories. Finally, *Rural* is measured with the following question “Do you currently live in a rural area or an urban area?” with rural area or urban area as the two options.

Table 3.A.2: Descriptive statistics of the outcome variables

Variable	Mean	SD	Min	Max
Knowledge score	3.63	1.80	0	9
Belief	3.00	1.82	0	10
Perceived performance (uninformed)	22.23	22.27	0	100
Performance bucket (uninformed)	2.58	1.22	1	7
Willing (uninformed)	19.45	26.18	0	100
Success (uninformed)	22.05	27.13	0	100
Comparison (uninformed)	2.85	1.31	1	7
BTY (uninformed)	56.03	23.20	0	100
Perceived performance (informed)	24.76	23.66	0	100
Performance bucket (informed)	2.94	1.39	1	7
Willing (informed)	21.56	26.49	0	100
Success (informed)	23.04	26.65	0	100
Comparison (informed)	2.95	1.45	1	7
BTY (informed)	54.81	24.98	1	100
Observations	719			

3.B Coefficient plots

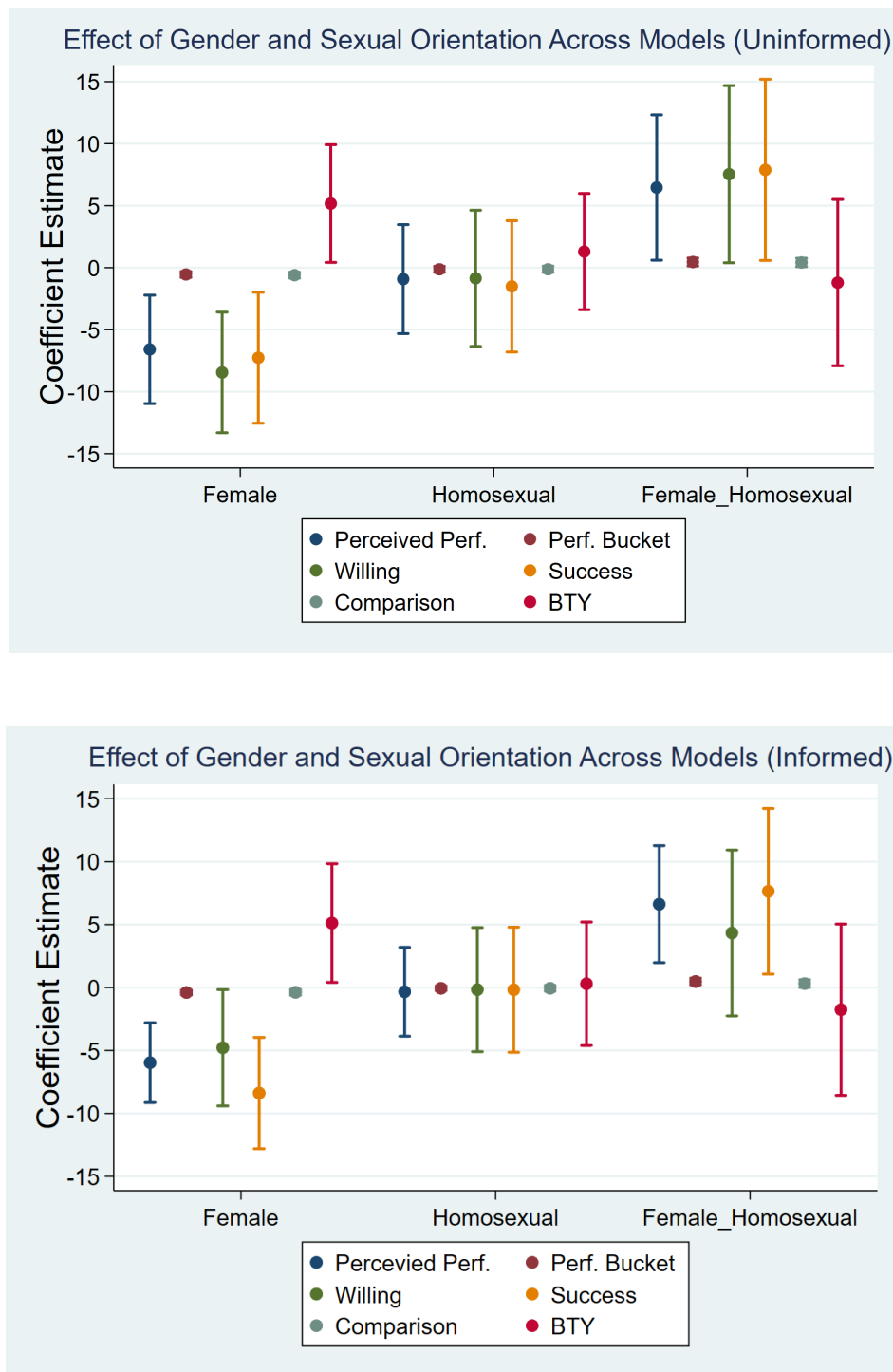


Figure 3.B.1: Coefficient plots

3.C Underconfidence among women

On average, both heterosexual and lesbian women underestimate their own scores. Lesbian women show slightly *less* underconfidence than heterosexual women, though this difference is not statistically significant (see Figure 3.C.1). When controlling for relevant variables (such as age, education, rural/urban setting, political orientation, ethnicity and employment status) and performing a linear regression on the entire sample of women (see Table 3.C.1), the coefficient for *lesbian woman* is not statistically significant ($p = 0.135$). Looking at the distributions, the histograms displayed in Figure 3.C.2 show that there seem to be more heterosexual women underestimating their actual score than lesbian women.

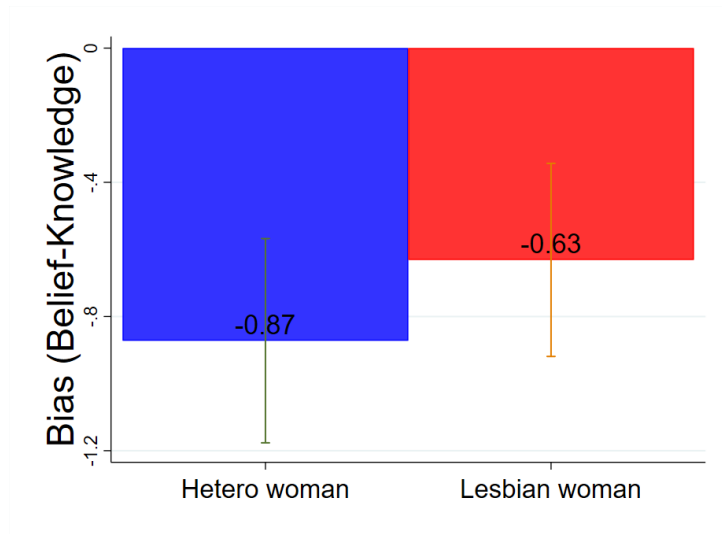


Figure 3.C.1: Bias (Belief-Knowledge score) among women

Notes: *Bias (Belief-Knowledge)* represents the difference between the participant's perceived score (*Belief*) and their actual score, defined as the number of correct answers out of the 10 questions (*Knowledge score*). The error bars displayed represent the confidence intervals at 95%. The stars come from the t-test performed and express * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. $n=359$.

Table 3.C.1: Bias among women

	(1)
	Bias
lesbian woman	0.356 (0.238)
Hetero Female Average	-0.87
Controls	Yes
Observations	359

Robust standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Notes: Results are based on OLS regressions (which include a constant term), with the dependent variable indicated in the corresponding column. Controls are Rightwing, Ethnicity, Education, Employment Status, Age and Rural. *Hetero Female Average* is the unadjusted mean for heterosexual women, before controlling for covariates.

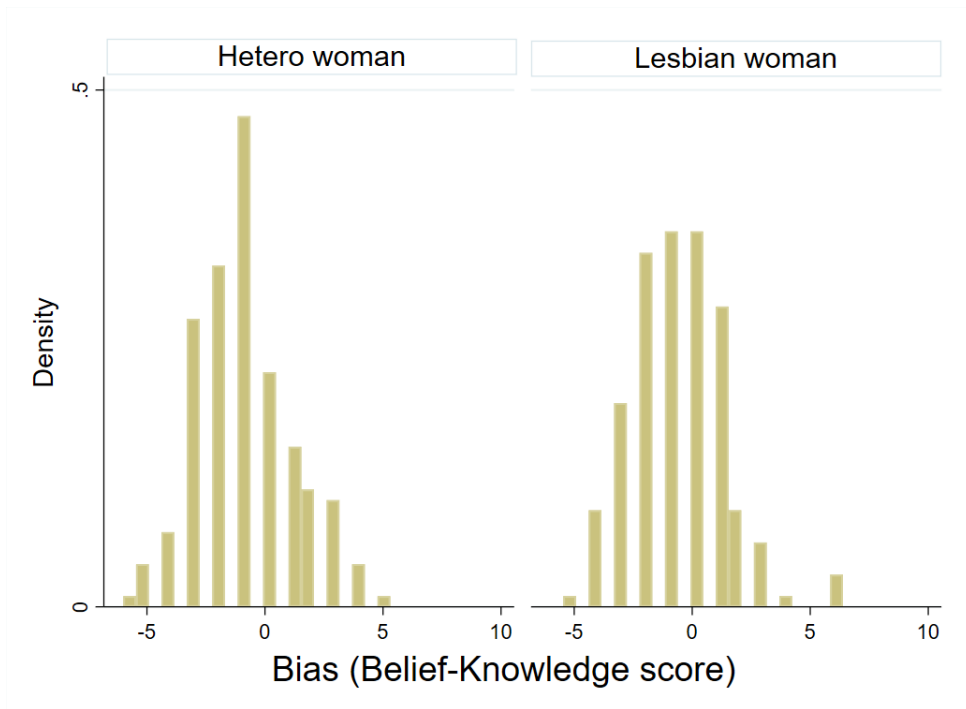


Figure 3.C.2: Bias (Belief-Knowledge score) among women – histogram

Notes: *Bias (Belief-Knowledge score)* represents the difference between the participant's perceived score (*Belief*) and their actual score, defined as the number of correct answers out of the 10 questions (*Knowledge score*).

3.D Underconfidence among men

On average, both heterosexual and gay men underestimate their own scores. Gay men show slightly *more* underconfidence than heterosexual men, though this difference is not statistically significant (see Figure 3.D.1). When controlling for relevant variables (such as age, education, rural/urban setting, political orientation, ethnicity and employment status) and performing a linear regression on the entire sample of men, there seems to be no difference between gay men and heterosexual men in terms of bias as shown in Table 3.D.1. Looking at the distributions, the histograms displayed in Figure 3.D.2 show that there seem to be more gay men underestimating their actual score than heterosexual men.

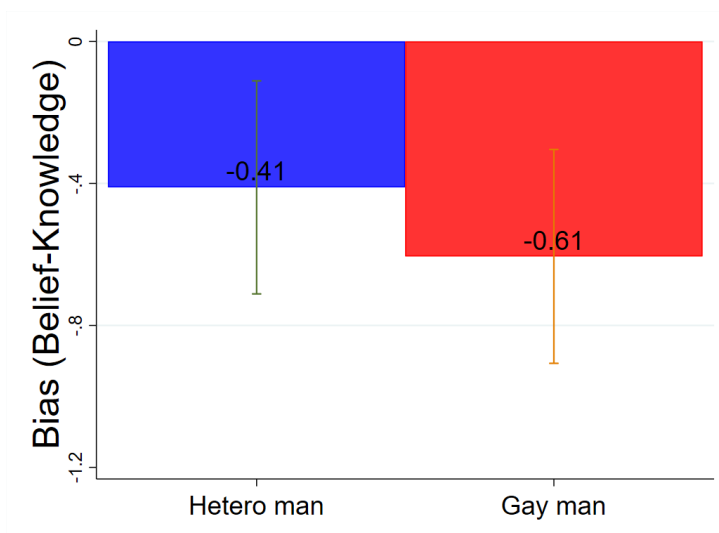


Figure 3.D.1: Bias (Belief-Knowledge score) among men

Notes: *Bias (Belief-Knowledge)* represents the difference between the participant's perceived score (*Belief*) and their actual score, defined as the number of correct answers out of the 10 questions (*Knowledge score*). The error bars displayed represent the confidence intervals at 95%. The stars come from the t-test performed and express * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. $n=360$.

Table 3.D.1: Bias among men

	(1)
	Bias
gay man	-0.000645 (0.223)
Hetero Male Average	-0.41
Controls	Yes
Observations	360

Robust standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Notes: Results are based on OLS regressions (which include a constant term), with the dependent variable indicated in the corresponding column. Controls are Rightwing, Ethnicity, Education, Employment Status, Age and Rural. *Hetero Male Average* is the unadjusted mean for heterosexual men, before controlling for covariates.

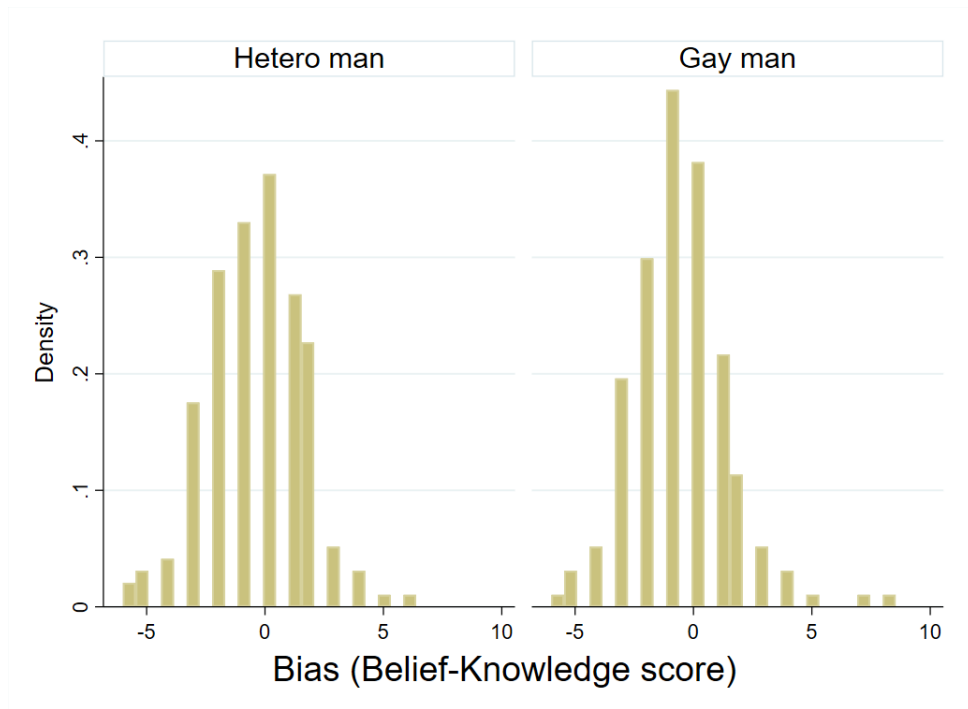


Figure 3.D.2: Bias (Belief-Knowledge score) among men – histogram

Notes: *Bias (Belief-Knowledge score)* represents the difference between the participant's perceived score (*Belief*) and their actual score, defined as the number of correct answers out of the 10 questions (*Knowledge score*).

3.E Knowledge score and belief

Table 3.E.1 indicates that heterosexual women not only score lower on the math and science test than heterosexual men but also tend to underestimate their absolute performance relative to equally-performing heterosexual men. Note that the interaction term *Female_Hom.* is on the verge of being significant ($p = 0.10$) in Model 2 (*Belief*). The difference between the two gaps (*Female* and Combined Gap) is statistically significant ($p = 0.045$) for Model 2 (*Belief*): the gender gap in the belief of own absolute performance is significantly smaller for lesbian women.

Table 3.E.1: Knowledge score and belief

	(1) Knowledge score	(2) Belief
Female	-0.383** (0.180)	-0.617*** (0.179)
Homosexual	0.0329 (0.202)	-0.0302 (0.178)
Female_Hom.	-0.0964 (0.263)	0.399 (0.242)
Hetero Male Average	3.73	3.32
Female - Combined Gap (=Gap Hetero W vs Hetero M - Gap Lesbian W vs Hetero M)		
Difference	0.063	-0.369
P-value	0.734	0.045
Controls	Yes	Yes
Observations	719	719

Robust standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Notes: Results are based on OLS regressions (which include a constant term), with the dependent variable for each model indicated in the corresponding column. Controls for the Model 1 are Rightwing, Ethnicity, Education, Employment status, Age and Rural as well as Knowledge score for Model 2. The baseline group is heterosexual men. *Hetero Male Average* is the unadjusted mean for heterosexual men, before controlling for covariates. *Difference* represents the difference between the gender gap, as indicated by the coefficient for *Female* (comparing heterosexual men and heterosexual women), and the Combined Gap, which is the sum of the coefficients for *Female*, *Homosexual*, and *Female_Hom.* (capturing the gap between lesbian women and heterosexual men). The P-value corresponds to the two-sided t-test for the difference between these two gap estimates.

3.F Questionnaire

Welcome to this study!

In this study, you will be asked to complete 3 short parts.

The study takes about **15 minutes**. The participation fee is **3 pounds and some potential additional payoffs** that depend on your answers and random mechanisms. You will be informed when and how you can earn additional payoffs.

There will be control questions to check your understanding of the study as well as attention checks.

Confidentiality

Data obtained will be used for research purpose only. Your prolific-ID number will be deleted immediately upon completion of the study. The researchers will at no point receive any personally identifying information about you. The data is therefore anonymous and cannot be linked to personal data. The anonymous data will later be stored in open access repositories.

Voluntary participation

Your participation in this study is completely voluntary. You can choose to withdraw your participation without stating any reason at any time. If you decide to withdraw, your data will be deleted. Please note that it is impossible to delete your data once the study is finished, because then the data is anonymized and can no longer be linked to you.

We ask you to answer these questions honestly and carefully. You are not allowed to use any tools (e.g., ChatGPT, calculator, etc.).

By clicking "I agree" below you confirm that you agree to NOT use any tools (e.g., ChatGPT, calculator, etc.), to have read and understood the instructions above and to be willing to participate.

I agree

Figure 3.F.1: Welcome and consent

1. What is your unique Prolific ID?

In order to get paid for this study we need a valid Prolific ID. Therefore, please check that you have correctly given your Prolific ID.

Next

Figure 3.F.2: Prolific ID

PART 1

In part 1, you will complete a test consisting of 10 questions. Each question tests your science and math skills. Academic researchers often use such tests.

You will be given 45 seconds per question. However, you may click the button "Next" at the bottom of the page before the time is up.

If part 1 is randomly selected as the part that counts, your additional payment will equal 10 pence for each question you answer correctly in this part.

Please answer these questions personally.

Remember: you are not allowed to use any external help such as a calculator or ChatGPT.

Next

Figure 3.F.3: Part 1 – instructions

You will now face a series of 10 factual questions.

Each of these questions has one and **only one right answer**. Please tick the correct answer. If you are not sure, you can take a guess. There are no negative points for wrong answers. Please try to answer each question as best as you can.

If part 1 is randomly selected as the part that counts, each correct answer will add 10 pence to your earnings.

Here is an **example** of a question you might be asked on the next pages (now without the 45 second countdown):

Example question

If $-100 < x < 0$

Column A

$$x^{-4}$$

Column B

$$x^{-3}$$

Which statement is correct?

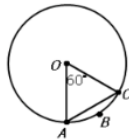
- ☐ The quantity in Column B is greater
- ☐ The relationship cannot be determined from the information given
- ☐ The two quantities are equal
- ☐ The quantity in Column A is greater

Correct answer: The quantity in Column A is greater.

Explanation: When you have an even exponent, positive or negative, that exponent will always yield a positive number whereas odd exponents give you a negative output if the base (the number below the exponent) is negative as it is here ($-100 < x < 0$).

Next

Figure 3.F.4: Example question



O is the center of the circle with radius 6.

Column A	Column B
Length of arc ABC	6

Question 1

Which statement is correct?

- ☐ The two quantities are equal
- ☐ The quantity in Column A is greater
- ☐ The relationship cannot be determined from the information given
- ☐ The quantity in Column B is greater

Remaining time: 0:39

Next

The revenue generated by Firm X is divided between Mary and Peter in a 6 to 5 ratio respectively.

Column A	Column B
Mary's share when the revenue generated by Firm X is 15'700 \$	7'900 \$

Question 2

Which statement is correct?

- ☐ The two quantities are equal
- ☐ The relationship cannot be determined from the information given
- ☐ The quantity in Column A is greater
- ☐ The quantity in Column B is greater

Remaining time: 0:42

Next

Question 3

In how many different ways can 3 identical green shirts and 3 identical red shirts be distributed among 6 children such that each child receives a shirt?

- ☐ 40
- ☐ 20
- ☐ 216
- ☐ 720

Remaining time: 0:16

Next

Question 4

The price of a pair of sneakers was \$80 for the last six months of last year. On January first, the price increased 20%. After the price increase, an employee bought these sneakers with a 10% employee discount. What price did the employee pay?

- ☐ 86.40
- ☐ 88
- ☐ 83.33
- ☐ 82.00

Remaining time: 0:45

Next

The greatest prime factor of 144 is x

The greatest prime factor of 96 is y

Column A

Column B

x

y

Question 5

Which statement is correct?

- ☐ The quantity in Column B is greater
- ☐ The relationship cannot be determined from the information given
- ☐ The two quantities are equal
- ☐ The quantity in Column A is greater

Remaining time: 0:42

Next

ANIMAL DISTRIBUTION IN THE ZOO

Animal	Percent
Lions	32%
Leopards	16%
Ocelots	20%
Tigers	8%
Bobcats	24%

Question 6

If there are 44 leopards at the zoo, what is the zoo's total animal population?

- ☐ 225
☐ 350
☐ 325
☐ 275

Remaining time: 0:41

Next

STUDENT ENROLLMENT AT A SMALL COLLEGE

Distribution of Enrollment by Class and Gender
Total Enrollment: 1,400

Class	Males	Females
Freshmen	303	259
Sophomores	215	109
Juniors	182	88
Seniors	160	84
Total	860	540

Percent of Total Enrollment Majoring
in Selected Academic Areas

Area	Percent
Humanities	33%
Social sciences	30%
Physical sciences	24%

Note: No student is majoring in more than one area.

Question 7

The ratio of the number of male freshmen to the number of female sophomores is approximately...

- ☐ 2 to 1
☐ 3 to 1
☐ 4 to 1
☐ 3 to 2

Remaining time: 0:34

Next

STUDENT ENROLLMENT AT A SMALL COLLEGE

Distribution of Enrollment by Class and Gender
Total Enrollment: 1,400

Class	Males	Females
Freshmen	303	259
Sophomores	215	109
Juniors	182	88
Seniors	160	84
Total	860	540

Percent of Total Enrollment Majoring
in Selected Academic Areas

Area	Percent
Humanities	33%
Social sciences	30%
Physical sciences	24%

Note: No student is majoring in more than one area.

Question 8

How many students are either juniors or males or both?

- ☐ 1130
- ☐ 948
- ☐ 766
- ☐ 678

Remaining time: 0:38

Next

Question 9

Tony is four years younger than his brother Josh, and two years older than his sister Cindy. Tony also has a twin brother, Evan. All the ages of the children totaled together is 66. How old is Tony?

- ☐ 22
- ☐ 16
- ☐ 20
- ☐ 14

Remaining time: 0:41

Next

Question 10

The relationship between temperature C , in degrees Celsius, and temperature F , in degrees Fahrenheit, is given by the formula $F = \frac{9}{5} \times C + 32$. If a recipe calls for an oven temperature of 210 degrees Celsius, what is the oven temperature in degrees Fahrenheit? (x means "times" or "multiplied by")

- ☐ 320
- ☐ 350
- ☐ 410
- ☐ 420

Remaining time: 0:39

Next

Figure 3.F.5: Math and science quiz – 10 questions

Notes: Quiz questions taken from the GRE practice questions (magoosh.com, prepscholar.com, manhattanreview.com and the Book “Official GRE Quantitative Reasoning Practice Questions”, Volume 1, Second Edition).

Congratulations! You have now completed part 1 out of 3. Please answer the following question before pushing the arrow to go to part 2.

2. Out of the 10 questions in part 1, how many questions do you think you have answered correctly?

[Please choose] ▼

Next

Figure 3.F.6: Belief

PART 2

In part 2, you will be asked several questions related to your performance in part 1.

If part 2 is randomly selected as the part that counts, your additional payment will equal 50 pence regardless of how you answer these questions. Therefore, we ask you to answer these questions honestly and carefully please.

3. Understanding question

If this part is randomly selected as the part that counts, your additional payment will...

- ☐ depend on how you answer the following questions.
- ☐ equal 50 pence for sure.
- ☐ equal 10 pence times the number of questions you answered correctly in part 1.

Next

Figure 3.F.7: Part 2 – instructions

4. Please indicate how well you think you performed on the test you took in part 1.

☐ Terrible ☐ Very poor ☐ Poor ☐ Neutral ☐ Good ☐ Very good ☐ Exceptional

5. Please indicate to which extent you agree with the following statement:

entirely disagree entirely agree

I performed well on the test I took in part 1.

I would apply for a job that required me to perform well on the test I took in part 1.

I would succeed in a job that required me to perform well on the test I took in part 1.

6. Please indicate how well you think you performed on the test you took in part 1 compared to the average score of all participants. Compared to the average score of all participants, I performed...

☐ Much worse ☐ Worse ☐ Slightly worse ☐ Same ☐ Slightly better ☐ Better ☐ Much Better

7. What share of the other participants performed strictly better than you?

0% 100%

Next

Figure 3.F.8: Uninformed self-evaluations

Congratulations! You have now completed part 2 out of 3. Please look carefully at your results below before pushing the arrow to go to part 3.

You have scored 0 points.

Understanding question: Out of the 10 questions in part 1, how many questions did you answer correctly?

[Please choose] ▼

Next

Figure 3.F.9: Own performance revealed

PART 3

In part 3, you will be asked several questions related to your performance in part 1. If part 3 is randomly selected as the part that counts, your additional payment will equal 50 pence regardless of how you answer these questions. Therefore, we ask you to answer these questions honestly and carefully please.

8. If this part is randomly selected as the part that counts, your additional payment will...

- ☐ depend on how you answer the following questions.
- ☐ equal 50 pence for sure.
- ☐ equal 10 pence times the number of questions you answered correctly in part 1.

Next

Figure 3.F.10: Part 3 – instructions

Now that you have seen your performance on the test, please answer the following questions again. Your answers may be the same or different than your previous answers.

10. Please indicate how well you think you performed on the test you took in part 1.

- ☐ Terrible
- ☐ Very poor
- ☐ Poor
- ☐ Neutral
- ☐ Good
- ☐ Very good
- ☐ Exceptional

11. Please indicate to which extent you agree with the following statement:

entirely disagree entirely agree

I performed well on the test I took in part 1.

I would apply for a job that required me to perform well on the test I took in part 1.

I would succeed in a job that required me to perform well on the test I took in part 1.

12. Please indicate how well you think you performed on the test you took in part 1 compared to the average score of all participants. Compared to the average score of all participants, I performed...

- ☐ Much worse
- ☐ Worse
- ☐ Slightly worse
- ☐ Same
- ☐ Slightly better
- ☐ Better
- ☐ Much Better

13. What share of the other participants performed strictly better than you?

0% 100%

Next

Figure 3.F.11: Informed self-evaluations

We will now ask you some (socio)demographic questions.

14. How old are you?

I am years old

15. What gender do you identify with?

- ☐ female
- ☐ male
- ☐ other

16. Which of the following best describes your ethnic background?

[Please choose] ▼

17. Please select the option that best represents your highest level of education completed.

[Please choose] ▼

18. What is your current employment status?

[Please choose] ▼

19. Please indicate to which extent you agree with the following statement:

I feel favorably about conservative parties (like the Republican party in the USA).

entirely disagree entirely agree

Which is the country, you're currently living in?

Country:

20. Do you currently live in a rural area or an urban area?

[Next](#)

Figure 3.F.12: Sociodemographics

Part 1 has been selected. In addition to your fixed fee (£3), you will receive 10 cents per correct answer from part 1. Since you have answered 0 question(s) correctly, your final payoff is £3.

Next

Figure 3.F.13: Payoffs – option 1

Part 2 has been selected. In addition to your fixed fee (£3), you will receive an additional 50 pence. Your final payoff is therefore £3.50.

Next

Figure 3.F.14: Payoffs – option 2

Part 3 has been selected. In addition to your fixed fee (£3), you will receive an additional 50 pence. Your final payoff is therefore £3.50.

Next

Figure 3.F.15: Payoffs – option 3

PART 3

In part 3, you will be asked several questions related to your performance in part 1. If part 3 is randomly selected as the part that counts, your additional payment will equal 50 pence regardless of how you answer these questions. Therefore, we ask you to answer these questions honestly and carefully please.

8. If this part is randomly selected as the part that counts, your additional payment will...

- ☐ depend on how you answer the following questions.
- ☐ equal 50 pence for sure.
- ☐ equal 10 pence times the number of questions you answered correctly in part 1.

Next

Figure 3.F.16: Attention check 2

Please retry.

Remember: if the following part is randomly selected as the part that counts, your additional will equal 50 pence **for sure** and not depend on your answers. Thus, we ask you to answer the following questions carefully and honestly.

9. Understanding question

If this part is randomly selected as the part that counts, your additional payment will...

- ☐ depend on how you answer the following questions.
- ☐ equal 50 pence for sure.
- ☐ equal 10 pence times the number of questions you answered correctly in part 1.

Next

Figure 3.F.17: Follow-up attention check 2

Please read carefully the information about the payment in part 3:

If part 3 is randomly selected as the part that counts, your additional will equal 50 pence **for sure** and not depend on your answers. Thus, we ask you to answer the following questions carefully and honestly.

Next

Figure 3.F.18: Conclusion attention check 2

Notes: *Attention check 1*, *Follow-up attention check 1* and *Conclusion attention check 1* are exactly the same but for Part 2 (instead of Part 3).

Thank you for your participation!

In order to transmit your answers please go back to Prolific website by clicking on this link:

[Prolific](#)

If you have any inquiry concerning the study question please contact the author of this study through the Prolific platform.

Figure 3.F.19: Thanks

3.G Homosexual vs. heterosexual

To conduct separate analyses for women (comparing heterosexual women to lesbian women) and men (comparing heterosexual men to gay men), I created the dummy *lesbian woman* (*gay man*) which takes the value of 1 if the person was pre-screened as a lesbian woman (gay man) from the online platform and 0 if the person was pre-screened as heterosexual woman (heterosexual man). Model 1 (*Knowledge Score*) in Table 3.G.1 shows that there is no statistically significant difference in knowledge scores between lesbian women and heterosexual women (Panel A); both groups perform similarly on the 10-question quiz. Same holds for the comparison between gay men and heterosexual men in Panel B. Model 2 (*Belief*) shows that equally-performing lesbian women and heterosexual women assess their exact number of correct answers similarly ($p = 0.186$). Same holds for the comparison between gay men and heterosexual men in Panel B.¹³

Table 3.G.1: Knowledge score and belief: lesbian women (gay men) vs. hetero women (men)

	(1)	(2)
	Knowledge Score	Belief
Panel A: Lesbian Women vs. Hetero Women		
lesbian woman	-0.143	0.260
	(0.199)	(0.196)
Hetero Female Average	3.37	2.50
Observations	359	359
Panel B: Gay Men vs. Hetero Men		
gay man	0.0334	0.0205
	(0.208)	(0.183)
Hetero Male Average	3.73	3.32
Observations	360	360
Controls	Yes	Yes

Robust standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Notes: Results are based on OLS regressions (which include a constant term), with the dependent variable for each model indicated in the corresponding column. Controls are Rightwing, Ethnicity, Education, Employment Status, Age, and Rural as well as Knowledge Score for Model 2. *Hetero Female Average* and *Hetero Male Average* are the unadjusted means for heterosexual women (men), before controlling for covariates.

¹³Appendix 3.C shows that both lesbian women and heterosexual women are on average underconfident in their assessment, lesbian women being on average *less* underconfident but this difference is not statistically significant. Furthermore, Appendix 3.D shows that both gay men and heterosexual men are on average underconfident in their assessment, gay men being on average *more* underconfident but this difference is not statistically significant.

However, as Panel A in Table 3.G.2 shows, equally-performing lesbian women and heterosexual women perceive their overall *performance* differently. Indeed, lesbian women provide answers which are 4.54 points higher than equally-performing heterosexual women when asked to agree on a scale from 0 to 100 to the following statement “I performed well on the test I took in part 1”. Since the average female participant answers 18.91 out of 100 for this perceived performance question (see Table 3.H.4 for the women’s descriptive statistics), these 4.54 points represent 24% of the mean. Lesbian women further provide answers which are 5.908 points higher than equally-performing heterosexual women when asked to agree on a scale from 0 to 100 to the following statement “I would apply for a job that required me to perform well on the test I took in part 1”. Since the average female participant answers 15.59 out of 100 for this question, these 5.908 points represent 37.9% of the mean. Similarly, for the statement, “I would succeed in a job that required me to perform well on the test I took in part 1”, lesbian women score 6.112 points higher, which represents 32.65% of the mean score of 18.72. Although of a smaller size, I find similar results concerning *Performance bucket* (the coefficients for *Comparison* and *BTY* are not statistically significant). Interestingly, lesbian women do not tend to perceive their performance as superior to others more strongly compared to equally-performing heterosexual women (see *BTY* and *Comparison*); however, they do evaluate their performance more optimistically than equally-performing heterosexual women.

For the comparison among men, I do not find any statistically significant difference between gay men and heterosexual men in terms of uninformed self-evaluations as Panel B in Table 3.G.2 shows.

Table 3.G.2: Uninformed self-evaluations: lesbian women (gay men) vs. hetero women (men)

	(1)	(2)	(3)	(4)	(5)	(6)
	Perceived Perf.	Perf. Bucket	Willing	Success	Comparison	BTY
Panel A: Lesbian Women vs. Hetero Women						
lesbian woman	4.540** (2.254)	0.218* (0.129)	5.908** (2.899)	6.112** (2.959)	0.166 (0.133)	1.607 (2.850)
Hetero Female Average	17.26	2.20	13.38	17.09	2.43	58.79
Observations	359	359	359	359	359	359
Panel B: Gay Men vs. Hetero Men						
gay man	-0.671 (2.292)	-0.0842 (0.128)	-0.398 (2.880)	-1.104 (2.737)	-0.0751 (0.132)	0.623 (2.451)
Hetero Male Average	26.49	2.89	24.09	26.46	3.17	52.94
Observations	360	360	360	360	360	360
Controls	Yes	Yes	Yes	Yes	Yes	Yes

Robust standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Notes: Results are based on OLS regressions (which include a constant term), with the dependent variable for each model indicated in the corresponding column. Controls include Knowledge score, Right-wing, Ethnicity, Education, Employment status, Age, and Rural. *Hetero Female Average* and *Hetero Male Average* represent unadjusted means for heterosexual women and men before controlling for covariates.

Result 1 (Self-evaluations (uninformed)). *There is a sexual orientation gap in self-evaluations.*

- Lesbian women provide more optimistic self-evaluations of their (absolute) performance on a math and science quiz than equally-performing heterosexual women (when being uninformed of their true performance).*
- Gay men show no significant difference in self-evaluations of their performance on a math and science quiz compared to equally-performing heterosexual men (when being uninformed of their true performance).*

One might argue that this result only holds when lesbian women are uninformed of their true performance. Upon learning their actual score, the difference in self-evaluations between equally-performing lesbian women and heterosexual women should disappear, as their self-evaluations should be based more on objective feedback rather than subjective beliefs.¹⁴ Indeed, by informing participants of their true score, I mechanically eliminate

¹⁴Recall that participants receive feedback only on their own scores, not in relation to others. On average, lesbian participants might more strongly believe that they performed better than others or better than the average compared to equally-performing heterosexual women. Interestingly, the two variables capturing this comparison dimension (*Comparison* and *BTY*) remain not statistically significant after feedback. This suggests that lesbian women still do not compare themselves more positively to others and to the average than equally-performing heterosexual women after receiving feedback on their personal score. Yet, they remain more optimistic about their own performance.

any discrepancies in their beliefs about their absolute performance. However, Panel A in Table 3.G.3 shows significant and substantial differences in self-evaluations even after their performance is revealed, suggesting that lesbian women maintain more optimistic self-evaluations than equally-performing heterosexual women. The gap in self-evaluations persists and is not primarily driven by any (potential) gap in beliefs about one's absolute score.

After receiving their absolute test scores, lesbian women rate themselves 6.044 points higher than equally-performing heterosexual women on the statement, "I performed well on the test I took in part 1". Since the average female participant answers 21.04 out of 100 for this perceived performance question, these 6.044 points represent 28.73% of the mean. Similarly, for the statement, "I would succeed in a job that required me to perform well on the test I took in part 1", lesbian women score 6.299 points higher, which represents 33.74% of the mean score of 18.67. I find similar results for *Performance bucket* (the coefficients for *Willing*, *Comparison* and *BTY* are not statistically significant). Again, lesbian women do not tend to perceive their performance as superior to others more strongly compared to equally-performing heterosexual women after feedback (see *BTY* and *Comparison*) but they evaluate themselves more optimistically than equally-performing heterosexual women even when their own absolute performance is revealed.

For the comparison among men, I do not find any statistically significant difference between gay men and heterosexual men in terms of informed self-evaluations as Panel B in Table 3.G.3 shows.

Table 3.G.3: Informed self-evaluations: lesbian women (gay men) vs. hetero women (men)

	(1)	(2)	(3)	(4)	(5)	(6)
	Perceived Perf.	Perf. Bucket	Willing	Success	Comparison	BTY
Panel A: Lesbian Women vs. Hetero Women						
lesbian woman	6.044***	0.371***	4.272	6.299**	0.181	-1.509
	(1.935)	(0.111)	(2.653)	(2.562)	(0.124)	(2.867)
Hetero Female Average	18.31	2.52	16.92	15.68	2.58	59.07
Observations	359	359	359	359	359	359
Panel B: Gay Men vs. Hetero Men						
gay man	-0.232	-0.0363	0.210	0.245	-0.0168	0.0182
	(1.824)	(0.0983)	(2.580)	(2.571)	(0.121)	(2.586)
Hetero Male Average	28.42	3.16	25.32	27.36	3.18	51.78
Observations	360	360	360	360	360	360
Controls	Yes	Yes	Yes	Yes	Yes	Yes

Robust standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Notes: Results are based on OLS regressions (which include a constant term), with the dependent variable for each model indicated in the corresponding column. Controls include Knowledge score, Right-wing, Ethnicity, Education, Employment status, Age, and Rural. *Hetero Female Average* and *Hetero Male Average* represent unadjusted means for heterosexual women and men before controlling for covariates.

Result 2 (Self-evaluations (informed)). *The sexual orientation gap in self-evaluations persists even when informed of their own performance.*

- a. Lesbian women still provide more optimistic self-evaluations of their (absolute) performance on a math and science quiz than equally-performing heterosexual women.*
- b. Gay men further show no significant difference in self-evaluations of their performance on a math and science quiz compared to equally-performing heterosexual men.*

3.H Women vs. men

In addition to comparing lesbian women (gay men) with heterosexual women (heterosexual men), I also compare men to women. The results of this comparison – which replicates Exley and Kessler (2022)¹⁵ – are displayed in this section. The results confirm the gender gap in confidence (and self-evaluations). Women report more pessimistic beliefs about their absolute performance than equally-performing men. Furthermore, women provide worse self-evaluations of their performance on a math and science quiz than equally-performing men (when being uninformed of their true performance). This gender gap in self-evaluations persists even when informed of their own performance. Women still provide worse self-evaluations of their performance on a math and science quiz than equally-performing men. However, it is important to note that my sample is evenly split between homosexual and heterosexual individuals, which is not representative of the real-world distribution. As a result, the gender gap in the general population is likely to be larger, given that the proportion of lesbian women among women is smaller in the broader population. Closer to reality, the first row (*Female*) in Table 3.3.1 and Table 3.3.2 shows the gender gap between heterosexual women and heterosexual men.

When comparing men and women, Table 3.H.1 shows that the gender gap in performance is clear and aligned with what the literature has shown in the past (Exley and Kessler, 2022); Women on average perform worse than men. Women’s scores are on average 0.43 points lower than those of men. Since the average score is 3.63 out of 10, these 0.43 points represent 11.85% of the mean. Women also hold more pessimistic beliefs about their absolute performance than equally-performing men. Indeed, to the question “Out of the 10 questions in part 1, how many questions do you think you have answered correctly?” women provide an answer which is 0.426 points lower than equally-performing men. Since the average belief answer is 3, these 0.426 points represent 14.2% of mean. These results are statistically significant at the 1% level, with appropriate controls applied.

¹⁵My study makes two adaptations: the inclusion of two additional questions related to relative performance, *Comparison* and *BTY*, and providing participants with feedback on their absolute score only, unlike Exley and Kessler (2022), who also include information about relative performance.

Table 3.H.1: Knowledge score and belief: women vs. men

	(1)	(2)
	Knowledge Score	Belief
Female	-0.430*** (0.133)	-0.426*** (0.124)
Male Average	3.83	3.32
Controls	Yes	Yes
Observations	719	719

Robust standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Notes: Results are based on OLS regressions (which include a constant term), with the dependent variable for each model indicated in the corresponding column. Controls are Rightwing, Ethnicity, Education, Employment Status, Age and Rural as well as Knowledge Score for Model 2. *Male Average* is the unadjusted mean for all men, before controlling for covariates.

Result 3 (Beliefs about Absolute Performance). *There is a gender gap in beliefs about one's absolute performance. Women report more pessimistic beliefs about their absolute performance than equally-performing men.*

Table 3.H.2 shows that women provide answers which are 3.468 points lower than equally-performing men when asked to agree on a scale from 0 to 100 to the following statement “I performed well on the test I took in part 1”. Since the average participant answers 22.23 out of 100 for this perceived performance question, these 3.468 points represent 15.6% of the mean. Women further provide answers which are 4.817 points lower than equally-performing men when asked to agree on a scale from 0 to 100 to the following statement “I would apply for a job that required me to perform well on the test I took in part 1”. Since the average participant answers 19.45 out of 100 for this question, these 4.817 points represent 24.77% of the mean. Women further provide answers which are 3.437 points lower than equally-performing men when asked to agree on a scale from 0 to 100 to the following statement “I would succeed in a job that required me to perform well on the test I took in part 1”. Since the average participant answers 22.05 out of 100 for this question, these 3.437 points represent over 15.59% of the mean. I find similar results concerning the remaining self-evaluations; *Performance bucket*, *Comparison* and *BTY*. Women evaluate their performance more pessimistically than equally-performing men.

Table 3.H.2: Uninformed self-evaluations: women vs. men

	(1)	(2)	(3)	(4)	(5)	(6)
	Perceived Perf.	Perf. bucket	Willing	Success	Comparison	BTY
Female	-3.468** (1.537)	-0.325*** (0.0854)	-4.817*** (1.823)	-3.437* (1.932)	-0.398*** (0.0902)	4.542*** (1.733)
Male Average	25.54	2.82	23.30	25.37	3.13	53.14
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Observations	719	719	719	719	719	719

Robust standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Notes: Results are based on OLS regressions (which include a constant term), with the dependent variable for each model indicated in the corresponding column. Controls are Knowledge score, Rightwing, Ethnicity, Education, Employment status, Age and Rural. *Male Average* is the unadjusted mean for all men, before controlling for covariates.

Result 4 (Self-evaluations (uninformed)). *There is a gender gap in self-evaluations. Women provide worse self-evaluations of their performance on a math and science quiz than equally-performing men (when being uninformed of their true performance).*

One could first argue that the result above only holds when women do not know their true performance and that when informed of their true score, the difference in self-evaluations between equally-performing women and men disappears because their self-evaluations should be based more on objective feedback rather than subjective beliefs. Indeed, by informing participants of their true score, I mechanically eliminate any discrepancies in their beliefs about their absolute performance. However, Table 3.H.3 shows substantial and statistically significant differences in self-evaluations even after their performance is revealed which suggests that women still hold more pessimistic self-evaluations on their performance than equally-performing men and that the differences in self-evaluations are not primarily driven by any (potential) gap in beliefs about one's absolute score. The size of the differences is yet smaller for all informed self-evaluations except *Success*.

Women provide answers which are 2.794 points lower than equally-performing men when asked to agree on a scale from 0 to 100 to the following statement "I performed well on the test I took in part 1". Since the average participant answers 24.76 out of 100 for this perceived performance question, these 2.794 points represent 11.28% of the mean.

Women further provide answers which are 4.728 points lower than equally-performing men when asked to agree on a scale from 0 to 100 to the following statement "I would succeed in a job that required me to perform well on the test I took in part 1". Since the average participant answers 23.04 out of 100 for this question, these 4.728 points represent over 20.52% of the mean. I find similar results concerning the remaining self-evaluations; *Performance bucket*, *Comparison* and *BTY* (the coefficient for *Willing* is not statistically significant anymore in the informed case). Women evaluate their performance more pessimistically than equally-performing men even after having received their own absolute score.

Table 3.H.3: Informed self-evaluations: women vs. men

	(1)	(2)	(3)	(4)	(5)	(6)
	Perceived Perf.	Perf. bucket	Willing	Success	Comparison	BTY
Female	-2.794** (1.206)	-0.162** (0.0717)	-2.710 (1.701)	-4.728*** (1.695)	-0.230*** (0.0820)	4.271** (1.748)
Male Average	28.48	3.16	25.08	27.40	3.19	51.38
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Observations	719	719	719	719	719	719

Robust standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Notes: Results are based on OLS regressions (which include a constant term), with the dependent variable for each model indicated in the corresponding column. Controls are Knowledge score, Rightwing, Ethnicity, Education, Employment status, Age and Rural. *Male Average* is the unadjusted mean for all men, before controlling for covariates.

Result 5 (Self-evaluations (informed)). *The gender gap in self-evaluations persists even when informed of their own performance. Women still provide worse self-evaluations of their performance on a math and science quiz than equally-performing men.*

Table 3.H.4: Descriptive statistics – women only

Variable	Mean	SD	Min	Max
Knowledge score	3.42	1.66	0	8
Belief	2.67	1.78	0	10
Perceived performance (uninformed)	18.91	20.97	0	100
Performance bucket (uninformed)	2.34	1.17	1	6
Willing (uninformed)	15.59	23.63	0	100
Success (uninformed)	18.72	26.35	0	100
Comparison (uninformed)	2.57	1.22	1	6
BTY (uninformed)	58.93	23.80	1	100
Perceived performance (informed)	21.04	21.67	0	89
Performance bucket (informed)	2.72	1.34	1	6
Willing (informed)	18.02	24.84	0	100
Success (informed)	18.67	24.04	0	100
Comparison (informed)	2.71	1.35	1	7
BTY (informed)	58.26	25.08	1	100
Observations	359			

3.I Exploratory analysis: difference between informed and uninformed self-evaluations

This section examines how individuals adjust their self-evaluations after receiving feedback. The outcome variables are calculated as the difference between the informed and uninformed measures (e.g., *informed Success* - *uninformed Success*). A positive coefficient indicates that self-evaluations, on average, increased after receiving feedback (what I would expect given the average underconfidence of the participants). Overall, I observe minimal differences between groups (men vs. women or gay men/lesbian women vs. heterosexual men/women), with a few notable exceptions in the men vs. women comparison. For instance, women increase their comparison scores more following feedback than equally-performing men. Heterosexual women also seem to increase their *Willingness* (to apply to a job that requires such skills) more after feedback than equally-performing heterosexual men.

Table 3.I.1: Self-evaluations differences (informed-uninformed)

	(1) Perceived Perf. Difference	(2) Perf. Bucket Difference	(3) Willing Difference	(4) Success Difference	(5) Comparison Difference	(6) BTY Difference
Female	0.621 (2.171)	0.154 (0.122)	3.663* (1.969)	-1.124 (1.954)	0.221** (0.112)	-0.0471 (1.750)
Homosexual	0.589 (1.936)	0.0703 (0.117)	0.692 (1.773)	1.332 (1.574)	0.0705 (0.112)	-0.999 (1.714)
Female_Hom.	0.162 (2.825)	0.0256 (0.163)	-3.203 (2.661)	-0.239 (2.668)	-0.105 (0.151)	-0.553 (2.452)
Hetero Male Average	1.92	0.27	1.23	0.91	0.02	-1.16
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Observations	719	719	719	719	719	719

Robust standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Notes: Results are based on OLS regressions (which include a constant term), with the dependent variable for each model indicated in the corresponding column. Controls are Knowledge score, Rightwing, Ethnicity, Education, Employment status, Age and Rural. *Hetero Male Average* is the unadjusted mean for heterosexual men, before controlling for covariates. *Perceived Perf. Difference* is the difference between the informed *Perceived Perf.* and the uninformed *Perceived Perf.*. Same holds for the other variables.

Table 3.I.2: Self-evaluations differences (informed-uninformed) – women vs. men

	Perceived Perf. Difference	Perf. Bucket Difference	Willing Difference	Success Difference	Comparison Difference	BTY Difference
Female	0.674 (1.436)	0.163* (0.0850)	2.106 (1.388)	-1.291 (1.359)	0.168** (0.0786)	-0.271 (1.256)
Male Average	2.94	0.34	1.78	2.03	0.07	-1.76
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Observations	719	719	719	719	719	719

Robust standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Notes: Results are based on OLS regressions (which include a constant term), with the dependent variable for each model indicated in the corresponding column. Controls are Knowledge score, Rightwing, Ethnicity, Education, Employment status, Age, and Rural. *Male Average* is the unadjusted mean for all men, before controlling for covariates. *Perceived Perf. Difference* is the difference between the informed *Perceived Perf.* and the uninformed *Perceived Perf.*. The same holds for the other variables.

Table 3.I.3: Self-evaluations differences (informed-uninformed) – lesbian women vs. hetero women

	Perceived Perf. Difference	Perf. Bucket Difference	Willing Difference	Success Difference	Comparison Difference	BTY Difference
lesbian woman	1.505 (2.202)	0.153 (0.128)	-1.636 (2.110)	0.188 (2.099)	0.0145 (0.111)	-3.116 (1.941)
Hetero Fem. Avg.	1.04	0.32	3.53	-1.41	0.14	0.28
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Observations	359	359	359	359	359	359

Robust standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Notes: Results are based on OLS regressions (which include a constant term), with the dependent variable for each model indicated in the corresponding column. Controls are Knowledge score, Rightwing, Ethnicity, Education, Employment status, Age, and Rural. *Hetero Fem. Avg.* is the unadjusted mean for heterosexual women, before controlling for covariates. *Perceived Perf. Difference* is the difference between the informed *Perceived Perf.* and the uninformed *Perceived Perf.*. The same holds for the other variables.

Table 3.I.4: Self-evaluations differences (informed-uninformed) – gay men vs. hetero men

	Perceived Perf. Difference	Perf. Bucket Difference	Willing Difference	Success Difference	Comparison Difference	BTY Difference
gay man	0.440 (1.973)	0.0479 (0.120)	0.608 (1.786)	1.349 (1.519)	0.0583 (0.115)	-0.605 (1.728)
Hetero Male Avg.	1.92	0.27	1.23	0.91	0.02	-1.16
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Observations	360	360	360	360	360	360

Robust standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Notes: Results are based on OLS regressions (which include a constant term), with the dependent variable for each model indicated in the corresponding column. Controls are Knowledge score, Rightwing, Ethnicity, Education, Employment status, Age, and Rural. *Hetero Male Avg.* is the unadjusted mean for heterosexual men, before controlling for covariates. *Perceived Perf. Difference* is the difference between the informed *Perceived Perf.* and the uninformed *Perceived Perf.*. The same holds for the other variables.

3.J Robustness checks

3.J.1 First robustness check

89 participants (12.4% of the whole sample) did not answer correctly the question “Out of the 10 questions in part 1, how many questions do you think you have answered correctly?” even though the answer was displayed on the same screen in red (see Figure 3.F.9). In the next regression tables, these “inattentive” participants are withdrawn from the sample.

Compared to the main analysis involving all 719 participants in Table 3.3.1 (uninformed self-evaluations), Table 3.J.1 shows that *Female* and *Female_Hom.* remain statistically significant across the 6 models (at least weakly) – except for model *BTY*, where *Female_Hom.* was already not statistically significant in the main analysis. The difference between the two gaps (*Female* and the Combined Gap) is statistically significant in all models except for model *BTY*, where the gap was already not statistically significant in the main analysis.

Compared to the main analysis involving all 719 participants in Table 3.3.2 (informed self-evaluations), Table 3.J.2 shows that *Female* remains statistically significant across all models except for *Willing*. Concerning the interaction term *Female_Hom.*, it remains statistically significant for *Perceived Perf.*, *Perf. Bucket* and *Comparison* as in the main analysis but loses its significance for model *Success*. Finally, the difference between the two gaps is statistically significant in all models except for model *BTY*, where the gap was already not statistically significant in the main analysis and *Willing*, where it loses significance.

All in all, women exhibit more pessimistic self-evaluations than equally-performing men and the gender gap in self-evaluations is narrower for lesbian women. In contrast, no significant difference in self-evaluations is observed between gay and heterosexual men. This pattern holds true for both uninformed and informed scenarios and aligns with the results of the main analysis.

Table 3.J.1: Uninformed self-evaluations

	Perceived Perf.	Perf. Bucket	Willing	Success	Comparison	BTY
Female	-6.257*** (2.396)	-0.555*** (0.129)	-7.691*** (2.696)	-6.260** (2.980)	-0.654*** (0.132)	5.230** (2.638)
Homosexual	-1.892 (2.289)	-0.169 (0.126)	-1.279 (2.947)	-1.289 (2.842)	-0.169 (0.137)	0.994 (2.478)
Female_Hom.	7.238** (3.143)	0.535*** (0.173)	7.827** (3.901)	7.888* (4.049)	0.537*** (0.184)	-1.926 (3.650)
Hetero Male Average	26.66	2.90	23.65	25.94	3.21	52.45
Female - Combined Gap (=Gap Hetero W vs Hetero M - Gap Lesbian W vs Hetero M)						
Difference	-5.346	-0.367	-6.548	-6.599	-0.367	0.932
P-value	0.022	0.005	0.024	0.033	0.007	0.746
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Observations	630	630	630	630	630	630

Robust standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Notes: Results are based on OLS regressions (which include a constant term), with the dependent variable for each model indicated in the corresponding column. Controls are Knowledge score, Rightwing, Ethnicity, Education, Employment status, Age, and Rural. The baseline group is heterosexual men. *Hetero Male Average* is the unadjusted mean for heterosexual men, before controlling for covariates. *Difference* represents the difference between the gender gap, as indicated by the coefficient for *Female* (comparing heterosexual men and heterosexual women), and the Combined Gap, which is the sum of the coefficients for *Female*, *Homosexual*, and *Female_Hom.* (capturing the gap between lesbian women and heterosexual men). The P-value corresponds to the two-sided t-test for the difference between these two gap estimates.

Table 3.J.2: Informed self-evaluations

	Perceived Perf.	Perf. Bucket	Willing	Success	Comparison	BTY
Female	-3.895** (1.511)	-0.288*** (0.0879)	-3.954 (2.504)	-6.477*** (2.382)	-0.335*** (0.113)	5.471** (2.535)
Homosexual	0.212 (1.654)	-0.0152 (0.0871)	0.126 (2.563)	0.942 (2.592)	-0.0459 (0.115)	0.397 (2.476)
Female_Hom.	5.075** (2.284)	0.436*** (0.127)	3.749 (3.528)	4.944 (3.418)	0.340** (0.158)	-2.515 (3.592)
Hetero Male Average	28.81	3.20	25.28	27.12	3.25	50.21
Female - Combined Gap (=Gap Hetero W vs Hetero M - Gap Lesbian W vs Hetero M)						
Difference	-5.287	-0.421	-3.876	-5.886	-0.294	2.118
P-value	0.004	0.000	0.152	0.017	0.014	0.451
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Observations	630	630	630	630	630	630

Robust standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Notes: Results are based on OLS regressions (which include a constant term), with the dependent variable for each model indicated in the corresponding column. Controls are Knowledge score, Rightwing, Ethnicity, Education, Employment status, Age, and Rural. The baseline group is heterosexual men. *Hetero Male Average* is the unadjusted mean for heterosexual men, before controlling for covariates. *Difference* represents the difference between the gender gap, as indicated by the coefficient for *Female* (comparing heterosexual men and heterosexual women), and the Combined Gap, which is the sum of the coefficients for *Female*, *Homosexual*, and *Female_Hom.* (capturing the gap between lesbian women and heterosexual men). The P-value corresponds to the two-sided t-test for the difference between these two gap estimates.

Compared to the analysis among women only in Appendix 3.G, Panel A in Table 3.J.3 (uninformed self-evaluations) shows that *lesbian woman* in model *Comparison* is here significant at a 10% level (was not significant in Appendix 3.G). In all other models, *lesbian woman* remains positive and statistically significant (in model *BTY*, *lesbian woman* was already not significant in Appendix 3.G).

Looking at Panel A in Table 3.J.4 (informed self-evaluations), we see that in model *Comparison*, *lesbian woman* is here significant at 10% level (was not significant in Appendix 3.G). In all other models, significance level and coefficient sign for *lesbian woman* do not change from Appendix 3.G. All in all, consistent with the analysis in Appendix 3.G, lesbian women provide more optimistic views of their performance compared to equally-performing heterosexual women.

Consistent with the analysis among men only in Appendix 3.G, Panel B in both Tables 3.J.3 and 3.J.4 show no difference between gay men and heterosexual men in terms of (un)informed self-evaluations.

Table 3.J.3: Uninformed self-evaluations: lesbian women (gay men) vs. hetero women (men)

	(1)	(2)	(3)	(4)	(5)	(6)
	Perceived Perf.	Perf. Bucket	Willing	Success	Comparison	BTY
Panel A: Lesbian Women vs. Hetero Women						
lesbian woman	5.319** (2.421)	0.295** (0.139)	6.474** (3.254)	6.876** (3.331)	0.266* (0.143)	0.745 (3.110)
Hetero Female Average	17.08	2.17	13.27	17.06	2.40	58.76
Observations	312	312	312	312	312	312
Panel B: Gay Men vs. Hetero Men						
gay man	-2.136 (2.325)	-0.140 (0.129)	-1.355 (3.079)	-1.163 (2.880)	-0.123 (0.141)	0.0681 (2.533)
Hetero Male Average	26.66	2.90	23.65	25.94	3.21	52.45
Observations	318	318	318	318	318	318
Controls	Yes	Yes	Yes	Yes	Yes	Yes

Robust standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Notes: Results are based on OLS regressions (which include a constant term), with the dependent variable for each model indicated in the corresponding column. Controls are Knowledge Score, Rightwing, Ethnicity, Education, Employment Status, Age, and Rural. *Hetero Female Average* and *Hetero Male Average* are the unadjusted means for heterosexual women (men), before controlling for covariates.

Table 3.J.4: Informed self-evaluations: lesbian women (gay men) vs. hetero women (men)

	(1)	(2)	(3)	(4)	(5)	(6)
	Perceived Perf.	Perf. Bucket	Willing	Success	Comparison	BTY
Panel A: Lesbian Women vs. Hetero Women						
lesbian woman	6.073*** (2.080)	0.400*** (0.119)	4.037 (2.964)	5.710** (2.640)	0.246* (0.131)	-1.990 (3.103)
Hetero Female Average	18.75	2.53	16.46	15.61	2.57	59.01
Observations	312	312	312	312	312	312
Panel B: Gay Men vs. Hetero Men						
gay man	-0.330 (1.644)	-0.0100 (0.0873)	0.114 (2.630)	0.926 (2.615)	-0.0137 (0.117)	0.0404 (2.563)
Hetero Male Average	28.81	3.20	25.28	27.12	3.25	50.21
Observations	318	318	318	318	318	318
Controls	Yes	Yes	Yes	Yes	Yes	Yes

Robust standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Notes: Results are based on OLS regressions (which include a constant term), with the dependent variable for each model indicated in the corresponding column. Controls are Knowledge Score, Rightwing, Ethnicity, Education, Employment Status, Age, and Rural. *Hetero Female Average* and *Hetero Male Average* are the unadjusted means for heterosexual women (men), before controlling for covariates.

Compared to the analysis involving all 719 participants, which examines the differences between men and women in Appendix 3.H, *Female* in model *Perceived Perf.* and *Success* is not statistically significant anymore in Table 3.J.5 (uninformed self-evaluations). In all other models, *Female* remains statistically significant (at least weakly) and retains the same sign. Finally, Table 3.J.6 (informed self-evaluations) shows that *Female* in model *Perceived Perf.* and *Perf. bucket* is not statistically significant anymore. In all other models, *Female* remains statistically significant and retains the same sign as in Appendix 3.H (in model *Willing* it was already not statistically significant).

Table 3.J.5: Uninformed self-evaluations: women vs. men

	(1)	(2)	(3)	(4)	(5)	(6)
	Perceived Perf.	Perf. bucket	Willing	Success	Comparison	BTY
Female	-2.621 (1.620)	-0.285*** (0.0897)	-3.789* (1.959)	-2.328 (2.090)	-0.383*** (0.0964)	4.243** (1.850)
Male Average	25.18	2.80	22.72	25.00	3.15	52.72
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Observations	630	630	630	630	630	630

Robust standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Notes: Results are based on OLS regressions (which include a constant term), with the dependent variable for each model indicated in the corresponding column. Controls are Knowledge score, Rightwing, Ethnicity, Education, Employment status, Age, and Rural. *Male Average* is the unadjusted mean for all men, before controlling for covariates.

Table 3.J.6: Informed self-evaluations: women vs. men

	(1)	(2)	(3)	(4)	(5)	(6)
	Perceived Perf.	Perf. bucket	Willing	Success	Comparison	BTY
Female	-1.407 (1.158)	-0.0722 (0.0659)	-2.115 (1.794)	-4.082** (1.752)	-0.166** (0.0798)	4.218** (1.802)
Male Average	29.03	3.20	25.16	27.56	3.25	50.16
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Observations	630	630	630	630	630	630

Robust standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Notes: Results are based on OLS regressions (which include a constant term), with the dependent variable for each model indicated in the corresponding column. Controls are Knowledge score, Rightwing, Ethnicity, Education, Employment status, Age, and Rural. *Male Average* is the unadjusted mean for all men, before controlling for covariates.

3.J.2 Second robustness check

In the following section, I further exclude participants who failed to answer correctly the attention check twice in a row (see Figure 3.F.16 for the attention check). Compared to the main analysis involving all 719 participants in Table 3.3.1 (uninformed self-evaluations), Table 3.J.7 shows that *Female* and *Female_Hom.* remain statistically significant (and retain the same sign) across the 6 models (at least weakly) – except for model *BTY*, where *Female_Hom.* was already not statistically significant in the main analysis. The difference between the two gaps (*Female* and the Combined Gap) is statistically significant in all models, except for model *BTY*, where the gap was already not statistically significant in the main analysis.

Compared to the main analysis involving all 719 participants in Table 3.3.2 (informed self-evaluations), Table 3.J.8 shows that *Female* remains statistically significant across all models (at least weakly) and retains the same sign. Concerning the interaction term *Female_Hom.*, it remains statistically significant (and retains the same sign) for *Perceived Perf.*, *Perf. Bucket* and *Comparison* as in the main analysis but loses its significance for model *Success*. The difference between the two gaps is statistically significant in all models, except for model *BTY*, where the gap was already not statistically significant in the main analysis, and *Willing*, where it loses significance.

All in all, women exhibit more pessimistic self-evaluations than equally-performing men and the gender gap in self-evaluations is narrower for lesbian women. In contrast, no significant difference in self-evaluations is observed between gay and heterosexual men. This pattern holds true for both uninformed and informed scenarios and aligns with the results of the main analysis.

Table 3.J.7: Uninformed self-evaluations

	Perceived Perf.	Perf. Bucket	Willing	Success	Comparison	BTY
Female	-6.275*** (2.424)	-0.559*** (0.131)	-7.358*** (2.722)	-6.643** (2.973)	-0.649*** (0.134)	4.942* (2.665)
Homosexual	-1.873 (2.305)	-0.178 (0.127)	-1.235 (2.961)	-1.522 (2.865)	-0.187 (0.137)	0.741 (2.496)
Female_Hom.	7.116** (3.169)	0.522*** (0.174)	7.194* (3.909)	7.840* (4.036)	0.520*** (0.185)	-2.094 (3.680)
Hetero Male Average	26.54	2.89	23.30	25.94	3.23	52.55
Female - Combined Gap (=Gap Hetero W vs Hetero M - Gap Lesbian W vs Hetero M)						
Difference	-5.243	-0.344	-5.960	-6.318	-0.333	1.354
P-value	0.027	0.008	0.040	0.036	0.014	0.641
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Observations	620	620	620	620	620	620

Robust standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Notes: Results are based on OLS regressions (which include a constant term), with the dependent variable for each model indicated in the corresponding column. Controls are Knowledge score, Rightwing, Ethnicity, Education, Employment status, Age, and Rural. The baseline group is heterosexual men. *Hetero Male Average* is the unadjusted mean for heterosexual men, before controlling for covariates. *Difference* represents the difference between the gender gap, as indicated by the coefficient for *Female* (comparing heterosexual men and heterosexual women), and the Combined Gap, which is the sum of the coefficients for *Female*, *Homosexual*, and *Female_Hom.* (capturing the gap between lesbian women and heterosexual men). The P-value corresponds to the two-sided t-test for the difference between these two gap estimates.

Table 3.J.8: Informed self-evaluations

	Perceived Perf.	Perf. Bucket	Willing	Success	Comparison	BTY
Female	-3.974*** (1.526)	-0.289*** (0.0885)	-4.253* (2.524)	-6.646*** (2.418)	-0.342*** (0.113)	5.029** (2.553)
Homosexual	0.0719 (1.621)	-0.0213 (0.0863)	0.00869 (2.569)	0.728 (2.596)	-0.0554 (0.115)	0.0276 (2.496)
Female_Hom.	4.559** (2.216)	0.409*** (0.125)	3.477 (3.510)	4.484 (3.405)	0.331** (0.158)	-2.665 (3.615)
Hetero Male Average	28.85	3.21	25.25	27.16	3.26	50.38
Female - Combined Gap (=Gap Hetero W vs Hetero M - Gap Lesbian W vs Hetero M)						
Difference	-4.631	-0.388	-3.486	-5.212	-0.275	2.637
P-value	0.005	0.000	0.182	0.026	0.017	0.354
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Observations	620	620	620	620	620	620

Robust standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Notes: Results are based on OLS regressions (which include a constant term), with the dependent variable for each model indicated in the corresponding column. Controls are Knowledge score, Rightwing, Ethnicity, Education, Employment status, Age, and Rural. The baseline group is heterosexual men. *Hetero Male Average* is the unadjusted mean for heterosexual men, before controlling for covariates. *Difference* represents the difference between the gender gap, as indicated by the coefficient for *Female* (comparing heterosexual men and heterosexual women), and the Combined Gap, which is the sum of the coefficients for *Female*, *Homosexual*, and *Female_Hom* (capturing the gap between lesbian women and heterosexual men). The P-value corresponds to the two-sided t-test for the difference between these two gap estimates.

Consistent with the analysis between lesbian women and heterosexual women (359 women) in Appendix 3.G, Panel A in Table 3.J.9 on the uninformed self-evaluations shows that *lesbian woman* remains statistically significant (at least weakly) and retains its sign across all models – except for model *Comparison* and model *BTY*, where it was already not statistically significant in Appendix 3.G. Panel A in Table 3.J.10 on the informed self-evaluations shows again that for all models where *lesbian woman* was significant in Appendix 3.G, it remains significant (and retains its sign) and even becomes weakly significant for model *Comparison* (same as first robustness check). All in all, consistent with Appendix 3.G and the first robustness check, lesbian women provide more optimistic views of their (absolute) performance compared to equally-performing heterosexual women.

Consistent with the analysis between gay men and heterosexual men (360 men) in Appendix 3.G, Panel B in Table 3.J.9 and Panel B in Table 3.J.10 show no difference (same as the first robustness check). In my sample, there seems to be no difference between gay men and heterosexual men in terms of (un)informed self-evaluations.

Table 3.J.9: Uninformed self-evaluations: lesbian women (gay men) vs. hetero women (men)

	(1)	(2)	(3)	(4)	(5)	(6)
	Perceived Perf.	Perf. Bucket	Willing	Success	Comparison	BTY
Panel A: Lesbian Women vs. Hetero Women						
lesbian woman	5.204** (2.477)	0.258* (0.136)	5.669* (3.230)	6.229* (3.198)	0.219 (0.141)	0.257 (3.170)
Hetero Female Average	16.81	2.16	13.15	16.66	2.40	58.75
Observations	305	305	305	305	305	305
Panel B: Gay Men vs. Hetero Men						
gay man	-2.052 (2.340)	-0.142 (0.130)	-1.185 (3.101)	-1.137 (2.912)	-0.135 (0.141)	-0.0368 (2.555)
Hetero Male Average	26.54	2.89	23.30	25.94	3.23	52.55
Observations	315	315	315	315	315	315
Controls	Yes	Yes	Yes	Yes	Yes	Yes

Robust standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Notes: Results are based on OLS regressions (which include a constant term), with the dependent variable for each model indicated in the corresponding column. Controls are Knowledge Score, Rightwing, Ethnicity, Education, Employment Status, Age, and Rural. *Hetero Female Average* and *Hetero Male Average* are the unadjusted means for heterosexual women (men), before controlling for covariates.

Table 3.J.10: Informed self-evaluations: lesbian women (gay men) vs. hetero women (men)

	(1)	(2)	(3)	(4)	(5)	(6)
	Perceived Perf.	Perf. Bucket	Willing	Success	Comparison	BTY
Panel A: Lesbian Women vs. Hetero Women						
lesbian woman	5.017*** (1.748)	0.341*** (0.103)	3.239 (2.806)	4.624* (2.435)	0.205* (0.123)	-2.713 (3.163)
Hetero Female Average	18.49	2.52	15.97	15.28	2.56	58.93
Observations	305	305	305	305	305	305
Panel B: Gay Men vs. Hetero Men						
gay man	-0.173 (1.649)	-0.003 (0.088)	0.274 (2.657)	1.003 (2.637)	-0.012 (0.118)	-0.202 (2.580)
Hetero Male Average	28.85	3.21	25.25	27.16	3.26	50.38
Observations	315	315	315	315	315	315
Controls	Yes	Yes	Yes	Yes	Yes	Yes

Robust standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Notes: Results are based on OLS regressions (which include a constant term), with the dependent variable for each model indicated in the corresponding column. Controls are Knowledge Score, Rightwing, Ethnicity, Education, Employment Status, Age, and Rural. *Hetero Female Average* and *Hetero Male Average* are the unadjusted means for heterosexual women (men), before controlling for covariates.

Compared to the analysis involving all 719 participants, which examines the differences between men and women in Appendix 3.H, Table 3.J.11 on the uninformed self-evaluations shows that *Female* retains its sign and remains statistically significant (at least weakly) across all models except for *Success* and *Perceived Perf.* as in the first robustness check. Table 3.J.12 on the informed self-evaluations shows that in models *Perceived Perf.* and *Perf. bucket*, *Female* is not statistically significant anymore while in all other models it remains significant (and with the same sign), exactly as in the first robustness check (in model *Willing* the coefficient for *Female* was already not statistically significant in Appendix 3.H).

Table 3.J.11: Uninformed self-evaluations: women vs. men

	(1)	(2)	(3)	(4)	(5)	(6)
	Perceived Perf.	Perf. bucket	Willing	Success	Comparison	BTY
Female	-2.678 (1.628)	-0.294*** (0.0899)	-3.751* (1.958)	-2.704 (2.076)	-0.385*** (0.0966)	3.875** (1.858)
Male Average	25.10	2.80	22.55	24.99	3.15	52.77
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Observations	620	620	620	620	620	620

Robust standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Notes: Results are based on OLS regressions (which include a constant term), with the dependent variable for each model indicated in the corresponding column. Controls are Knowledge score, Rightwing, Ethnicity, Education, Employment status, Age and Rural. *Male Average* is the unadjusted mean for all men, before controlling for covariates.

Table 3.J.12: Informed self-evaluations: women vs. men

	(1)	(2)	(3)	(4)	(5)	(6)
	Perceived Perf.	Perf. bucket	Willing	Success	Comparison	BTY
Female	-1.726 (1.108)	-0.0858 (0.0639)	-2.536 (1.779)	-4.464** (1.737)	-0.177** (0.0787)	3.712** (1.808)
Male Average	29.05	3.21	25.14	27.58	3.25	50.24
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Observations	620	620	620	620	620	620

Robust standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Notes: Results are based on OLS regressions (which include a constant term), with the dependent variable for each model indicated in the corresponding column. Controls are Knowledge score, Rightwing, Ethnicity, Education, Employment status, Age and Rural. *Male Average* is the unadjusted mean for all men, before controlling for covariates.

3.K Comparing lesbian women to men

I created a dummy *Lesbian* which takes the value of 1 if the participant was pre-screened as a lesbian woman and 0 if the participant was pre-screened as a gay man or heterosexual man. Consequently, the sample size decreases from 719 to 539, as heterosexual women are excluded from the following regressions. Table 3.K.1 shows that lesbian women tend to perform worse on average compared to men.

Overall, this section shows that there is no statistically significant difference between equally-performing men and lesbian women regarding both uninformed and informed self-evaluations (with the exception of *BTY (uninformed)*, $p = 0.089$).

Table 3.K.1: Knowledge score and belief: lesbian women vs. men

	(1)	(2)
	Knowledge score	Belief
Lesbian	-0.356**	-0.165
	(0.161)	(0.149)
Male Average	3.83	3.32
Controls	Yes	Yes
Observations	539	539

Robust standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Notes: Results are based on OLS regressions (which include a constant term), with the dependent variable for each model indicated in the corresponding column. Controls are Rightwing, Ethnicity, Education, Employment Status, Age and Rural as well as Knowledge Score for Model 2. *Male Average* is the unadjusted mean for all men, before controlling for covariates.

Table 3.K.2: Uninformed self-evaluations: lesbian women vs. men

	(1)	(2)	(3)	(4)	(5)	(6)
	Perceived Perf.	Perf. bucket	Willing	Success	Comparison	BTY
Lesbian	0.325	-0.0789	-0.424	0.259	-0.165	3.773*
	(1.846)	(0.102)	(2.457)	(2.491)	(0.112)	(2.214)
Male Average	25.54	2.82	23.20	25.37	3.13	53.14
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Observations	539	539	539	539	539	539

Robust standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Notes: Results are based on OLS regressions (which include a constant term), with the dependent variable for each model indicated in the corresponding column. Controls are Knowledge score, Rightwing, Ethnicity, Education, Employment status, Age and Rural. *Male Average* is the unadjusted mean for all men, before controlling for covariates.

Table 3.K.3: Informed self-evaluations: lesbian women vs. men

	(1)	(2)	(3)	(4)	(5)	(6)
	Perceived Perf.	Perf. bucket	Willing	Success	Comparison	BTY
Lesbian	1.266 (1.609)	0.109 (0.0912)	-0.388 (2.249)	0.0596 (2.295)	-0.0248 (0.102)	3.113 (2.236)
Male Average	28.48	3.16	25.08	27.40	3.19	51.38
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Observations	539	539	539	539	539	539

Robust standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Notes: Results are based on OLS regressions (which include a constant term), with the dependent variable for each model indicated in the corresponding column. Controls are Knowledge score, Rightwing, Ethnicity, Education, Employment status, Age and Rural. *Male Average* is the unadjusted mean for all men, before controlling for covariates.

3.L Pre-registration document



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The sexual orientation minority gaps in confidence and self-evaluations (#180628)

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1) Have any data been collected for this study already?

It's complicated. We have already collected some data but explain in Question 8 why readers may consider this a valid pre-registration nevertheless.

2) What's the main question being asked or hypothesis being tested in this study?

We investigate whether there exist sexual orientation minority gaps in confidence and self-evaluation, i.e. if homosexual individuals differ from heterosexual in terms of confidence and self-evaluation when being informed of their personal score and when being uninformed of their personal score. We also investigate the gender gap in confidence and self-evaluation, i.e. if women differ from men in terms of confidence and self-evaluation when being informed of their personal score and when being uninformed of their personal score.

3) Describe the key dependent variable(s) specifying how they will be measured.

Key variables: in part 1 participants answer a 10 questions quiz from which we can create a score. Then we collect the following key dependent variables: first, we elicit the participants' beliefs about their absolute performance (how many questions they believe to have answered correctly) which is our confidence measure. Then we ask them 6 self-evaluation questions: performance bucket (how well they think they performed on the test in part 1 from terrible, very poor, poor, neutral, good, very good, to exceptional), perceived performance ("I performed well on the test I took in part 1" from entirely disagree 0 to entirely agree 100), willing to apply ("I would apply for a job that required me to perform well on the test I took in part 1" from entirely disagree 0 to entirely agree 100), success ("I would succeed in a job that required me to perform well on the test I took in part 1" from entirely disagree 0 to entirely agree 100), comparison bucket ("Please indicate how well you think you performed on the test you took in part 1 compared to the average score of all participants" from Much worse, Worse, Slightly worse, Same, Slightly better, Better to Much Better) and better-than-you ("What share of the other participants performed strictly better than you?" from 0% to 100%). We ask the participants these 6 items twice: first when being uninformed of their own score (part 2) and second being informed of their own score (part 3).

4) How many and which conditions will participants be assigned to?

We will investigate potential behavioral differences between sexual orientations (homosexual vs heterosexual, sexual orientation minority gap) and also behavioral differences between men and women (gender gap). We will also be able to compare those two gaps. We will aim to recruit in equal numbers from the four groups: heterosexual men, heterosexual women, homosexual men, homosexual women.

There are four groups (heterosexual men, heterosexual women, homosexual men and homosexual women) which allow us to look at the gender gap between men and women as well as the sexual orientation minority gap (our main focus) between heterosexual people and homosexual people in the confidence question, and in these 6 items (self-evaluation questions) before being informed and also after being informed of their own score.

5) Specify exactly which analyses you will conduct to examine the main question/hypothesis.

We will compare our participants' confidence and self-evaluations answers between the 2 sexual orientation groups: homosexual and heterosexual as well as between the two groups: men and women.

6) Describe exactly how outliers will be defined and handled, and your precise rule(s) for excluding observations.

We will exclude participants who answered two times incorrectly our two attention checks or who have given two answers that strictly contradict each other.

7) How many observations will be collected or what will determine sample size? No need to justify decision, but be precise about exactly how the number will be determined.

Our plan is to collect the questionnaires from 135 participants per group. Since we have 4 groups this means a total of 540 participants.

8) Anything else you would like to pre-register? (e.g., secondary analyses, variables collected for exploratory purposes, unusual analyses planned?)

We conducted a pilot in March 2024 with only a few participants per group (45) to test the Prolific platform and also to test our questionnaires and questions as it is usually done in pilots. We will not use this data for our main experiment.

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