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Abstract

NGOs often vary in terms of how radical they are. In this paper, we explore the effectiveness of NGO discourses in bringing about social change. We focus on animal advocacy: welfarist NGOs primarily seek to improve the conditions in which animals are raised and reduce meat consumption, while abolitionist NGOs categorically reject animal use and call for a vegan society. We design an experiment to study the respective impact of welfarist and abolitionist discourses on participants' beliefs regarding pro-meat justifications and their actions, namely their propensity to engage in the short-run in animal welfare (charity donation, petition against intensive farming) and plant-based diets (subscription to a newsletter promoting plant-based diets, petition supporting vegetarian meals). We first show that both welfarist and abolitionist discourses significantly undermine participants' pro-meat justifications. Second, the welfarist discourse does not significantly affect participants' actions, while we detect a potential backlash effect of the abolitionist discourse. We show that the NGOs' positive standard effect on actions through the change in beliefs is outweighed by a negative behavioral response to the discourses (*reactance effect*). Last, greater public-good contributions are associated with greater engagement in animal welfare in the presence of an NGO discourse.

JEL codes: C91, Q18, Q5, D71.

Keywords: moderate, radical, NGO, welfarist, abolitionist, animal-welfare, plant-based diets, behavioral economics, experimental economics, reactance.

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1 Introduction

Non-Governmental Organizations (NGOs) seek to change society by influencing government officials, private companies and individuals. Influence over the former can be very effective, as changes in legal rules are one of the most powerful ways of achieving a rapid shift in behavior. However, political lobbying on its own is likely to be in vain, as NGOs have less financial support than the private interest groups they challenge. Acting on companies, also called *private politics*, has become popular in recent decades, as can be seen in the rise of Corporate Social Responsibility (CSR). Nevertheless, private companies mainly try to maximize profits, and are unlikely to adopt costly behaviors without some associated benefits. Last but not least, NGOs devote considerable resources to influencing citizens (e.g., leafleting, protests, education campaigns and advertising), which benefits them in at least three ways. First, influencing citizens allows them to increase pressure on elected officials to pass the desired legislation. Second, these programs may influence consumers to change their demand for the goods that private companies produce (e.g., via boycotts or delegated philanthropy) and, in turn, affect corporate behavior. Third, targeting citizens is for many NGOs a great way to boost their fund-raising, as awareness campaigns are one of the most salient activities for the general public.

While most NGOs agree on the necessity of acting at all three of these levels, there is a major dividing line concerning the message they convey to their targets: NGOs typically differ in whether they call for moderate or radical change. Moderates argue that small improvements are the most efficient way of achieving long-term goals, as society is more likely to reject radical change. They further claim that promoting radical change may even backfire, as some individuals can feel judged and may react by reinforcing the behavior that has been challenged in order to preserve their self-image. On the contrary, radicals consider that promoting radical change is more effective, as it would take too long to achieve the long-term objective via small improvements. Which of the moderate or radical discourses is the most effective remains an open empirical question. That is what we seek to address

here.

We explore the impact of moderate and radical NGO discourses on citizens' willingness to support social change in the context of animal welfare and plant-based diets. There are mainly three reasons for choosing this specific context. First, the issues raised by meat and farm animals' rearing conditions have received growing attention in public debate recently, and NGOs working in this area have become popular. For instance, the largest American NGO for animal welfare (PETA) had more than 5 million Facebook followers in July 2020, as against 1.3 million for the World Food Programme and 900,000 for Oxfam. The growing visibility of animal protection NGOs is likely explained by the broad range of externalities they address, as the current consumption of animal-based products in developed countries has a sizable negative impact on animal welfare, health and the environment (Tilman and Clark (2014); Springmann et al. (2016, 2018); Treich (2019); Espinosa (2019)). The second reason is that the role of NGOs seems particularly important in this context. Indeed, the animal farming sector is a powerful lobby, leading to under regulation of the production and consumption of meat (Simon (2013); Treich (2019); Tschofen et al. (2019)). Hence, when top down regulation fails, an alternative is to resort to bottom up initiatives, such as those of NGOs. These initiatives often directly target consumers, and can be particularly effective in the food domain (Poore and Nemecek (2018)). The third reason for choosing this context is that animal protection NGOs tend to differ sharply in the message they convey, a difference which is often presented as the abolitionist/welfarist divide (e.g., Bartlett (1991); Jasper and Nelkin (1991); Asher and Fawcett (2005); Espinosa (2020)). Abolitionist NGOs, such as PETA or L214 (the largest French NGO for farm-animal welfare), clearly adopt a radical stand, and ask for an end to all animal use and, thus, an immediate ban on animal-based products (Freeman (2010)). Welfarist NGOs, such as Humane Society (HSUS) or Welfarm, focus on improving the living conditions of farm animals (e.g., HSUS cage-free campaign) and promote a smaller share of animal-based products in diets.[1] The tension between these two

[1]Here are the links to the websites (accessed in July 2020) of the four above-cited animal advocacy NGOs: `https://www.peta.org/`; `https://www.l214.com/`; `https://www.humanesociety.org/`; `https:`

types of activism can be substantial (e.g., Francione (1996); Munro (2001); Singer (2018)).

Economics can be of use in predicting the impact of moderate and radical discourses. At a basic level, standard Bayesian theory predicts that a stronger message has more impact, as it leads to a greater revision in beliefs. Along these lines, the Sentience Institute states, for instance, that "*Asking people to go vegan more strongly communicates the importance of the issue because it requires a more drastic action*".[2] In contrast, a number of psychological theories stress the importance of step-by-step persuasion. For instance, Jon Bockman, the Director of Animal Charity Evaluators, states: "*Some groups advocate for welfare improvements as a way to get their foot in the door with the public or corporations*".[3] In particular, welfarist NGOs frequently advocate the risk of a backlash effect of a too radical message. We hereby propose a simple conceptual and experimental setting that can be useful, as a starting point, to compare the respective strength of the effects.[4]

We design an experiment to determine the effects of welfarist (i.e., moderate) and abolitionist (i.e., radical) discourses on individuals' beliefs and actions with respect to animal welfare and plant-based diets. In the core of the experiment, we expose participants to either a welfarist or an abolitionist discourse, and compare their behaviors to unexposed participants. We neutralize the information in the two types of discourse so that they only differ in their associated recommendations: less animal-based consumption and better living conditions for farmed animals in the welfarist discourse, and the end of all meat consumption

`//welfarm.fr/`. L214 and Welfarm are French NGOs focusing on farm animals and that were involved in our experimental design (see Section 3). On their respective website, L214 says that it *"hopes that our society will recognize that animals are not goods at our disposal, and will not permit anymore that they are used as such"*, while Welfarm says that it *"works to improve the welfare of animals at each stage of their life (farming, transport, slaughter)"* (translated from French by the authors).

[2] `https://www.sentienceinstitute.org/foundational-questions-summaries`.

[3] `https://animalcharityevaluators.org/blog/welfarists-or-abolitionists-division-hurts-animal-advocacy/`.

[4] We note however that our conceptual setting based on cognitive dissonance does not explicitly address the issue of the credibility of the third party (i.e. the NGO) sending the message. In the experiment, we tried, by revealing as little as possible about the NGO and using the same informational content of both discourses certified by scientific experts, to neutralize as far as possible the issue of credibility. Although investigating the possible role of credibility is beyond the scope of the current paper, it need not change the basic predictions, as a stronger message sent by a more "biased" third party can have a greater impact but also be less credible.

and, thus, the use of animals in the abolitionist discourse. To ensure the external validity of our experiment, the two discourses were published online by a welfarist and an abolitionist French NGO. We use an online pre-experimental survey to assess participants' diets and beliefs regarding pro-meat justifications. We elicit the changes in beliefs by asking participants the same questions after the treatment. We assess participants' propensity to engage with animal welfare and plant-based diets in four dimensions: a dictator game with an animal-protection NGO, a petition against intensive farming, a petition in favor of vegetarian food, and subscription to a newsletter promoting a plant-based diet. While most works in agricultural economics related to animal welfare issues investigate consumption choices (e.g., Norwood and Lusk, 2011), we focus here on activism-type behaviors that NGOs seek to induce among citizens (petitions, donations to charity). Intended changes in consumption habits are also considered through the subscription to the newsletter promoting plant-based diets. We then estimate the treatment effect on an aggregation of these four dimensions of social activism, as suggested for pre-registered studies (Olken (2015); Nosek et al. (2018)).

We find the following results. First, welfarist and abolitionist discourses significantly reduce individuals' propensity to justify meat consumption. Second, the welfarist discourse does not significantly affect the propensity to engage in animal welfare or support plant-based diets in the short-run, and we identify a potential backlash effect of the abolitionist discourse. Third, we observe that greater public-good contributions are associated with greater engagement in animal welfare in the presence of an NGO discourse. Last, we estimate a model in which actions are driven by beliefs. We show that the NGOs' positive standard effect on actions through the change in beliefs is outweighed by a negative behavioral response to the discourses (*reactance effect*).

The remainder of the paper is organized as follows. Section 2 discusses some associated work in the literature. Section 3 presents the experimental protocol. Section then 4 analyzes the results of the experiment. Last, Section 5 concludes.

2 Related Literature

Our work relates to at least five strands of the literature. The first is that in political science and economics on the tactics used by NGOs to achieve social change. Apart from standard political lobbying, NGOs devote a great deal of resources to influencing private actors (companies or individuals). The theoretical models in Baron (2001) and Besley and Ghatak (2007) rationalize self-regulation by profit-maximizing firms facing NGO pressure. There are divergent views about the most effective ways to achieve social change. Recent work has considered the effectiveness of NGOs that adopt confrontational or cooperative strategies with private companies that generate negative externalities (Lyon (2010), Baron (2012), Heyes and Oestreich (2018)) or produce public information (Couttenier et al. (2016), Daubanes and Rochet (2019)). This literature usually focuses on the supply side, as it looks at how different NGO tactics ultimately affect private companies. We instead focus exclusively on the demand side, and examine how different NGO discourses affect the public.

Second, our work is related to a long-standing literature on social movements in political science and history. Dillard (2002) underlines that most social movements are composed of moderates (e.g., Martin Luther King) who propose consensual changes in rules, and radicals (e.g., Black Panthers) who adopt confrontational strategies and refuse any concessions. There are similar divisions in the anti-slavery, women's-liberation, pro-environmental and animal-advocacy movements (e.g., Freeman (1975), Haines (1984), Baron (2010), Francione and Garner (2010), Glasser (2011) and Espinosa (2020)). Robnett et al. (2015) discuss how moderate activists can serve as a link between the conservative and radical strands of society. Garner (1993) discusses the heterogeneity of NGOs regarding animal welfare and distinguishes between welfarist (moderate) and abolitionist (radical) NGOs. He labels NGOs as welfarist if they consider that animal use can be justified if the suffering of the animals exploited is necessary. On the contrary, abolitionist NGOs refuse all kinds of animal use. As a complement to this literature, we quantitatively examine the impact of different NGO discourses using an experimental-economics approach.

Third, we contribute to research in behavioral sciences on the impact of information on people's beliefs and behavior. For instance, a large psychological literature has explored the impact of rational vs. emotional discourse (Bail et al. (2017)). In economics, most work has looked at strategic concerns in information-transmission Bayesian games (Crawford and Sobel (1982); Kamenica and Gentzkow (2011)). A recent literature in behavioral economics has examined the incentives to ignore information due to motivated reasoning (Bénabou and Tirole (2002, 2016)). Several contributions have suggested that individuals have imperfect knowledge about the negative externalities of meat consumption on animals, and that this ignorance is related to motivated reasoning (e.g., Loughnan et al. (2010, 2014); Graça et al. (2016); Piazza and Loughnan (2016); Hestermann et al. (2020); Espinosa and Stoop (2020)). We do not focus here on emotional or strategic concerns, but rather build on this recent behavioral-economics literature showing that individuals may have incentives to ignore the most impactful messages (see the theoretical-background subsection).

Fourth, our work is related to a growing literature on the determinants of meat consumption. Many contributions have explored the effectiveness of information that aims to reduce the consumption of animal-based products. Most of these exposed participants to messages about the negative externalities of meat (animal welfare, health and the environment). In a hypothetical survey, Cordts et al. (2014) find that animal-welfare and health arguments are the most effective in reducing meat consumption. Palomo-Vélez et al. (2018) and Perino and Schwirplies (2019) conclude that animal-welfare treatments significantly reduce self-reported meat consumption, and perform better than environmental and health arguments. Klöckner and Ofstad (2017) explore the impact of priming information aimed at reducing meat consumption, and conclude that it is more effective on its own than when diluted in broader informational content. We do not here compare the efficiency of messages across different dimensions (animal welfare, health and the environment), but instead vary the intensity of the message along one single (animal-welfare) dimension.

Fifth, and relatedly, this paper also contributes to a longstanding literature in agricul-

tural economics on the demand for animal welfare. This literature typically focuses on the consumers' willingness-to-pay for farm animal welfare (Lagerkvist and Hess (2011); Norwood et al. (2011); Lusk and Norwood (2012)). In this paper, our focus is different since we study the citizens' response to a NGO discourse in terms of "activism" type behavior such as giving to an animal protection association, or signing a petition in favor of animal welfare and plant-based diets. Interestingly, some studies emphasize a possible gap between consumers' and citizens' attitudes toward animal welfare (Clark et al. (2017); Grethe (2017)). For instance, people may answer that animal welfare is important for them in opinion polls or vote in favor of animal welfare in referenda, but they may not necessarily purchase animal-friendly products in the grocery store (Norwood et al. (2011)). This gap may be due to market failures (Grethe (2017)) or behavioral failures (Hestermann et al. (2020)). Hence, while our paper documents novel results regarding citizens' behavior toward animal welfare in social and political contexts, it may be interesting in future studies to better understand if and how these observed behavioral patterns translate into market contexts.

3 Experimental Design

We explore the impact of two types of NGO discourses on the individual propensity to be pro animal-welfare and plant-based diets. The experimental process is displayed in Figure 1. Ten days before the sessions, participants were asked to fill out a mandatory online questionnaire in the period up to two days before their assigned session. The experiment started with a public-good game, and participants were then exposed to our different treatments. We subsequently elicited participants' beliefs about the justification of the consumption of animal-based products. Finally, we explored participants' propensity to be pro animal welfare and plant-based diets by looking at their decision to undertake four types of actions (a dictator game with an animal-protection NGO, signing a petition against intensive farming, signing a petition in favor of vegetarian food, and subscription to a newsletter regarding

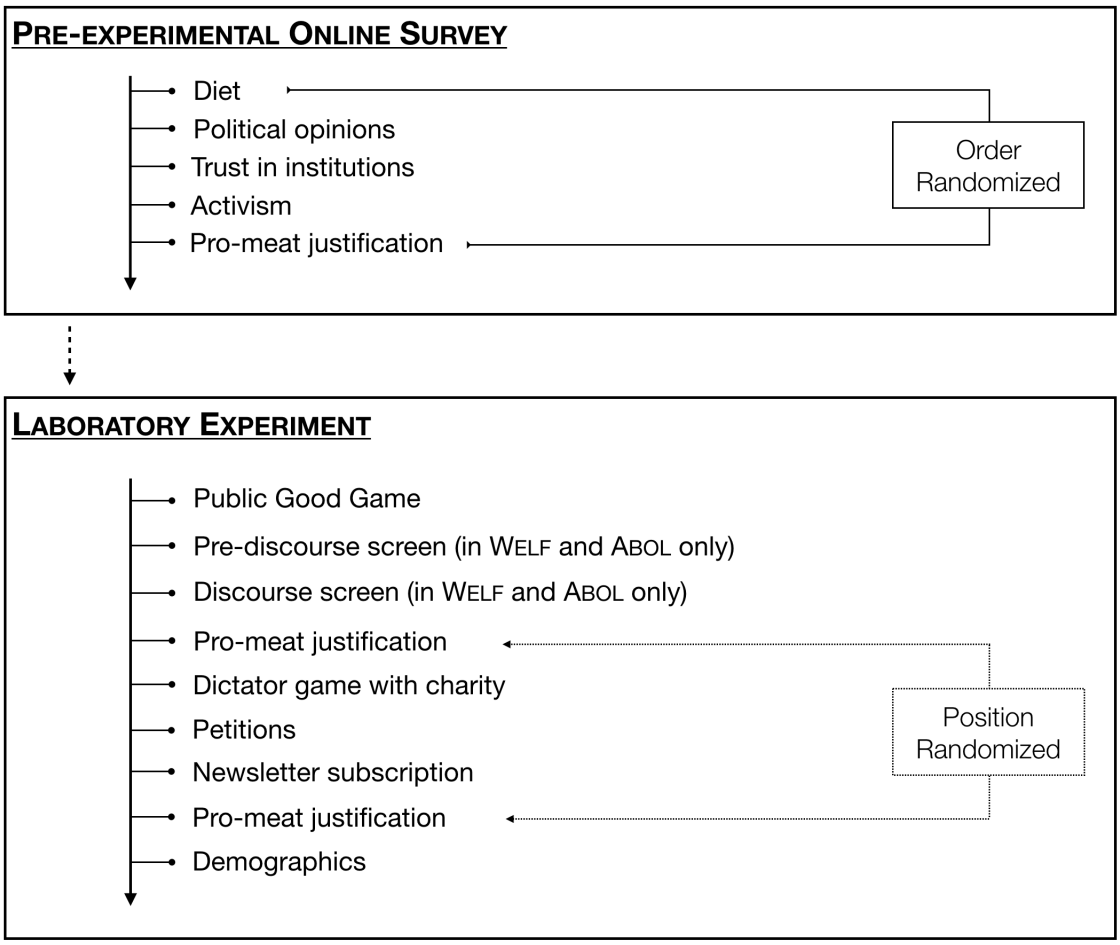
plant-based diets). This protocol was pre-registered online on the American Economic Association's dedicated platform (AEARCTR-0003868).

3.1 Motivation : Theoretical background

The main objective of the experiment is to examine the impact of different messages (or different recommendations) that vary by their degree of radicalism. We assume away any strategic aspect between the message's sender and the receiver. We are interested in the "pure" behavioral effect of a more radical message. Conceptually, a more radical message is expected to induce a larger revision in beliefs, and in turn more radical actions, consistent with standard Bayesian models (Hirshleifer et al. (1992)). However, following the literature in social psychology (Festinger (1962); Freedman and Fraser (1966); Cialdini and Goldstein (2004)), a radical message may be counterproductive. The typical psychological mechanism we have in mind is based on cognitive dissonance: if individuals hold motivated beliefs, they might be more motivated to ignore more radical news.

In the appendix, we introduce a simple behavioral model that can simultaneously accommodate both effects, namely the standard ex-post negative impact of bad news, but also the possibility that ex ante a message that reduces future expected welfare is ignored (at a self-deception cost), consistent with Bénabou and Tirole (2002)'s cognitive dissonance model. The key point is that when a message is more radical, the likelihood to ignore it is greater. In turn, we emphasize the possibility of a backlash effect of a more radical message. Because of the two opposing effects, the "average" impact of a more radical message is thus unclear, and the main object of the experiment is precisely to explore which effect dominates and when.

Figure 1: Summary of the experiment.



3.2 Online questionnaire

When participants registered for the sessions (ORSEE[5], Greiner (2015)) they received an e-mail explaining that they would be required to complete an online questionnaire by at least two days before the experiment. Participants received the link to the questionnaire ten days before the sessions. The questionnaire was computerized using *LimeSurvey*.

The questionnaire contained five series of questions. These appear in the Appendix. The

[5]ORSEE is a web-based Online Recruitment System, specifically designed for organizing economic experiments. The recruitment system in Rennes is open to anyone with a level of French good enough to understand the instructions during the experimental sessions. While most of the participants are students from the University of Rennes 1, some older individuals come and take part to the experiments (4% of the participants in this experiment were aged 30 or above). Whenever a new experiment is programmed, individuals in the database receive an email to register to the experiment. Participants are not told the topic of the experiment and can register as long as the sessions are not filled with full capacity.

first referred to the participants' diet, as this has been shown to be closely related to the perception of animals and beliefs about the living conditions of farmed animals (Piazza et al. (2015); Hestermann et al. (2020)). Participants were asked with which frequency they eat the following products: red meat, white meat, fish, eggs, dairy products, vegetables, pulses, fruit and starchy foods.

Second, we asked participants four questions about political topics. These referred to women's rights and same-sex couples' rights, as it has been shown that speciesism is correlated with these two attitudes (Caviola et al. (2019)). We further asked participants whether people should take action at the individual level to fight climate change. This question was driven by meat consumption being an important contributor to climate change (e.g., Tilman and Clark (2014); Erb et al. (2016); Clark and Tilman (2017)), and that animal welfare is a public good like environmental protection (e.g., Norwood et al. (2018)). The fourth question asked whether the government should intervene to reduce income inequality, as concerns over humans and all types of animals might be correlated.

Third, we included a series of World Values Survey-type questions assessing the degree of trust in a number of institutions: the National Assembly, Justice, the Police, politicians, the UN, industrial companies, farmers, scientific institutions, and associations (for the protection of the environment and the protection of animals).

Participants were also asked a series of political-commitment questions: during the past 12 months had they (i) contacted a politician, (ii) been a member of a political party or a politically-engaged organization, (iii) been a member of another organization or association, (iv) worn a badge or a sticker supporting a cause, (v) signed a petition, (vi) taken part in a legal protest, (vii) boycotted some specific products, or (viii) published or shared online some political statements (e-mail, blog or social networks).

The fifth series of questions explored justifications for meat consumption (e.g., Graça et al. (2015a,b, 2016)). Based on the literature, we assessed the extent to which participants agreed with a series of ten statements that support meat consumption. We first proposed

four statements associated with the 4N theory, according to which people justify their consumption of meat by saying it is *normal, natural, necessary* and *nice* (Joy (2011); Piazza et al. (2015)). Second, we included a hierarchical justification, i.e. eating meat is justified in so far as animals are bred for that purpose. Following the literature on cognitive dissonance regarding meat, we also investigated the tendency to say that eating meat is acceptable as (i) animals do not suffer, (ii) animals have lower cognitive capacities than we have, and (iii) eating meat damages the environment, but so do plant-based diets. These questions are summarized in Table 1.

Table 1: Pro-meat justifications.

Pro-meat justifications.		
(1)	Animal Pain	It is acceptable to eat meat as the animals killed for our consumption do not really suffer.
(2)	Animal Mind	It is acceptable to eat meat as the animals killed for our consumption have lower intellectual capacities than humans.
(3)	Hierarchical Justification	It is acceptable to eat some animals because they are raised for this purpose.
(4)	Religious Justification	God created animals for us to eat.
(5)	Health	Eating meat is healthy.
(6)	Naturality	It's natural to eat meat, it's written in our genes.
(7)	Normality	It's normal to eat meat.
(8)	Niceness	I like meat too much to stop eating it.
(9)	Necessity	Eating meat is necessary for good health.
(10)	Environment	Eating meat may be bad for the environment, but no more so than eating vegetables or cereals.

Notes: Answers take values between 1 (totally disagree) to 7 (totally agree).

To avoid the possibility that asking participants about their diet affects their declared justifications for meat consumption, one series of questions appeared at the beginning of the online questionnaire and the other at the end, so as to reduce the correlation. We also randomized the order in which these two series appeared: half of the participants faced the questionnaire as described above, and the other half an inverted version of the questionnaire in which meat justifications appeared before diet (see Figure 1).

3.3 The public-good game

The experiment started with a three-player public-good game. Each player received €2 at the beginning of the game and was grouped with two unknown participants in the room. For each ten cents that participants invested in the common project, each participant in the group received 5 cents. Participants were asked how much of the €2 they wanted to invest in the public good. The results of this one-shot public-good game were displayed at the end of the experiment.

3.4 Treatments

The second stage of our experiment was the treatment intervention. Our experiment consisted of three treatment variations: Baseline, Welf, and Abol. In the Baseline treatment, nothing happened at this stage. Participants were told that they were about to take a series of decisions on the following screens. Participants in the Welf and Abol treatments were also told that the computer would first display a text for them to read. At this stage, we gave participants two pieces of information about the text: the title of the text and that it had been published online by an NGO.

In the Welf treatment, participants saw the following:

> *The text that you are about to read is entitled: "Let's reduce our meat consumption!". It was published online by an NGO whose objective is to improve the living conditions of farmed animals.*

In the Abol treatment, we had:

> *The text that you are about to read is entitled: "Let's stop eating meat!". It was published online by an NGO whose objective is the abolition of the use of farm animals.*

Participants had to click to proceed to the next screen. In the BASELINE treatment, they proceeded to the next stage of the experiment. In the WELF and ABOL treatments, the next screen displayed a text we had written that compiled standard arguments put forward by welfarist and abolitionist NGOs promoting animal welfare and supporting plant-based diets. These two texts can be found in the Appendix. They put forward health, ethical and environmental arguments regarding meat consumption. The two texts are identical except for two points: the title (see above) and the last paragraph.

In the WELF treatment, the last paragraph reads:

> *The animals bred by the food industry today live in conditions that do not meet their basic needs. For our health, and to limit animal suffering and environmental damage, we should act responsibly by reducing our consumption of animal-based products and refusing to buy those from intensive farming.*

For the ABOL treament, the last paragraph was:

> *Animals bred by the food industry lose their lives prematurely. Whatever the procedure, animals cannot be killed without violence. For our health, and to limit animal suffering and environmental damage, we should act responsibly by stopping the consumption of meat and any animal-based products.*

The two texts were displayed in a similar way. We kept the body of the two texts identical to ensure that they do not differ in the informational content they convey. By providing the same scientific facts to participants, we avoided factual contradictions between the discourses and tried to limit as far as possible any differences in their credibility. In addition, each text ended with a sentence indicating that all of the data mentioned in the texts had been checked by researchers at two of the leading French National Research Institutes (CNRS and INRA). Last, we control below for the participants' view of NGO trustworthiness, based on the answer given in the online questionnaire on non-governmental trust. To ensure the external

validity of our experiment, we proposed that the text be published online by respectively a welfarist (*Welfarm*) and an abolitionist (*L214*) organization in France as part of their communication strategy. The NGOs declared that the two texts matched their communication requirements, and published them online.[6] Note that at no point in the experiment participants knew the identities of the NGOs that published the messages.

3.5 Pro-meat justifications

After the treatment intervention, the standard version of the experiment displayed the same series of questions regarding their justification of meat consumption as appeared in the online questionnaire. Half of the participants were assigned to this version of the experiment. To control for potential order effects, i.e. the possibility that asking participants about their pro-meat justification in the experiment affects their subsequent choices (or vice-versa), we also introduced an alternative version of the experiment. In this alternative version, the pro-meat justifications were asked at the end of the experiment, before the socio-demographic questions (see Figure 1).

3.6 Actions in favor of animal welfare and plant-based diets

Participants were then presented with a series of three screens in which they had to make decisions. In the first screen, participants played a €10 dictator game in which the receiver was an animal-protection NGO.[7] At this stage, participants received €10 and could decide to give some, or all, of this to the NGO. Participants were told that the collected amount would

[6]The published texts can be found using the following links.
For the welfarist text: `http://web.archive.org/web/20181029085314/https://welfarm.fr/pdf/consommation%20viande.pdf`.
For the abolitionist text: `http://web.archive.org/web/20181029122448/https://www.l214.com/arretons-de-consommer-de-la-viande`.

[7]The selected NGO, unknown to the participants, was the *Société Protectrice des Animaux* (SPA), which is neither clearly welfarist nor abolitionist, and mostly focuses on pets. We did not want to explicitly select a welfarist or abolitionist NGO to avoid dissonance between the discourse and the association. In addition, we did not select a different NGO (welfarist or abolitionist) for each group, corresponding to the discourse, as we did not want to introduce a second difference between treatments. All subjects could thus donate to the same NGO.

be donated by the University. To ensure that participants understood the consequences of their choice, they had to report (i) the amount of money they would like to keep for themselves, and (ii) the amount they would like to give to the charity. They could only validate the screen if the two amounts summed up to €10.

In the second screen, participants were presented with two (real) petitions from `Change.org` that they could sign. Participants were informed that their data would effectively be used to register them on the petition platform. As the platform remembers when a person signs a petition, individuals sign publicly with their name and postal code.[8] The first petition requested the introduction of a vegetarian option in French schools every day, and the second the prohibition of intensive farming for chickens. Participants could click on the screen to see the full text of each petition. For each petition, participants had to click to report whether they want to sign or not the petition ("I sign" vs. "I do not sign").

In the third screen, participants were given the opportunity to sign up for a 21-day newsletter that shared information and recipes about plant-based diets. Participants were told that this newsletter had been developed by an association and that the subscription would also give them the opportunity to join an online community to share experience and tips. To validate this screen, participants had to explicitly choose whether they "subscribe to the newsletter" or "do not subscribe to the newsletter". In case they chose to subscribe, participants were asked their first name, last name, and email address.

3.7 Demographics

The last part of the experiment was a questionnaire that collected some demographic information about the participants: age, gender, education, whether they grew up in the countryside, and whether they belong to a religion.

[8] See `https://www.liberation.fr/checknews/2018/03/09/est-il-vrai-que-changeorg-plateforme-de-petitions-en-ligne-revend-les-donnees-personnelles-des-signa_1653311`.

4 Results

The experiment took place in February and April 2019 at the University of Rennes (France). We organized 15 sessions, 5 for each type of treatment. The 28 participants in each session enrolled via ORSEE two weeks before the experiment started. Participants received the link to the online questionnaire ten days before the session, which they could answer at any time up to two days before the actual session. Participants who turned up and who had answered the online questionnaire in time were accepted for the experiment (this figure was just over three-quarters of those who enrolled). We accepted participants who did not fill out the questionnaire or did so only after the deadline to the extent that they allowed us to obtain an appropriate number of participants for the public-good game (i.e. multiples of three). These participants are excluded from the following data analysis, and did not receive the €5 fee for the completion of the online survey. In total, 318 participants took part in the experiment, earning on average €13.38 and giving €3.27 to the charity. Given the above exclusion rules, 307 participants were retained for the empirical analysis.

We first present some descriptive statistics about the sample of participants. Second, we discuss the data from the online questionnaire and then present the impact of the treatment manipulation on the change in pro-meat justification. Last, we investigate the treatment effects on the willingness to engage in animal welfare and plant-based diets.

4.1 Sample

Participants in the experiment are mostly female (59%) and aged on average 22 years-old (Table 2). One half of the participants grew up in the countryside. More than half of the participants declare to eat eggs (64%), dairy (82%) or white meat (62%) several times a week or more, against 30% for fish and 45% for red meat. These consumption patterns are similar to those observed in the general population.[9] The participants show strong levels of trust in

[9]These figures are similar to those obtained for a representative sample of the French population. In 2019, French people declared to eat animal-based products at similar frequencies but with a stronger taste

scientific organisations and NGOs and intermediate levels of trust in farmers, the UN, the justice and the police. The highest levels of distrust are for the political representatives and private companies. These figures are also close to those of the general population.[10]

4.2 Online questionnaire

4.2.1 Participants' diet

We first measure the participants' consumption of animal-based products. To do so, we assign numerical values to the frequencies of food-item consumption as follows (Never=1, A few times a year=2, A few times a month=3, A few times a week=4, Almost every meal=5). We then carry out a Principal Component Analysis, retaining the consumption of animal-based products (red meat, white meat, fish, eggs and milk).

The first dimension of the PCA explains 42.0% of the variation and is positively associated with the consumption of animal-based products (see table 4). The contributions of the meat items are the strongest, but the correlations with eggs and dairy products are also positive. This first dimension captures participant heterogeneity in terms of the consumption of animal-based products: participants with higher scores eat more meat, fish, eggs and and dairy products. We call this score animal-based consumption (ABC).

To explore the reliability of this measure with respect to standard diets, we also regroup participants into four categories: vegans (0.7%), vegetarians (4.2%), pescatarians (4.2%), and omnivores (90.9%). We compare these four categories to our ABC measure that takes on 155 different values. The average ABC scores rise across the above diet classification (vegan=-5.38, vegetarians=-3.75, pescatarians=-2.25 and omnivores=0.32). The ABC scores

for red meat (red meat: 3.4 times a week, white meat: 2.5 times a week, fish: 1.6 times a week, eggs: 2 times a week). Source : Ipsos 2019.

[10]We compare our data with the weighted levels of trust reported in the last wave of the *European Social Survey* (ESS round 9, 2018). We rescale the data of the ESS and compare the trust levels for the five institutions that are in both surveys. Participants in our study have a slightly higher confidence in the legal system (4.42 vs. 4.19), the Parliament (3.72 vs. 3.49) and the United Nations (4.51 vs. 4.0) than the representative population. They also show a slightly lower trust in the police (4.5 vs. 4.91) and the politicians (2.46 vs. 3.12).

Table 2: Summary statistics.

	Mean	St. Deviation	Minimum	Maximum
Female	.59	.49	0	1
Countryside	.5	.5	0	1
Religious	.25	.43	0	1
Age	22.11	5.81	17	68
At least several times a week - Eggs	.64	.48	0	1
At least several times a week - Dairy	.82	.38	0	1
At least several times a week - Fish	.3	.46	0	1
At least several times a week - White Meat	.62	.49	0	1
At least several times a week - Red Meat	.45	.5	0	1
Trust in the National Assembly	3.72	1.36	1	7
Trust in the justice	4.42	1.42	1	7
Trust in the police	4.5	1.42	1	7
Trust in politicians	2.46	1.23	1	7
Trust in the UN	4.51	1.47	1	7
Trust in private firms	2.99	1.36	1	7
Trust in farmers	4.72	1.36	1	7
Trust in scientific organizations	5.44	1.26	1	7
Trust in NGOs	5.28	1.22	1	7
Pro-animal	.5	.26	0	1
Dictator game donation	3.26	2.77	0	10
Petition - Intensive Farming	.65	.48	0	1
Petition - Plant-based Meals	.71	.46	0	1
Newsletter	.41	.49	0	1
Animal-based consumption (ABC)	0	1.45	-5.97	3.2
Pro-Meat Justification online (PMJ)	.5	.18	.14	.94
Leftism	0	1.31	-5.99	1.19
Public Good	.77	.63	0	2
General Trust	0	1.88	-5.78	6.28
Non-governmental trust	0	1.16	-5.13	3.32
Political activism	0	1.58	-1.77	5.35
Non-partisan activism	0	1.11	-3.45	1.57

(1) The pro-animal score corresponds the projections of the first dimension of the Principal Component Analysis run on the four decision variables (charity donation, petitions, subscription to the newsletter). It has been rescaled between 0 and 1.
(2) The Animal-based consumption (ABC) score corresponds to the projections of the first dimension of the Principal Component Analysis run on the reported frequencies of consumption of red meat, white meat, fish, eggs and dairy. See section 4.2.1.
(3) The online Pro-Meat Justification (PMJ) score corresponds to sum of all arguments supporting meat consumption displayed in the online questionnaire. It has been rescaled between 0 and 1. See section 4.2.2.

better represent participant heterogeneity for omnivores (the scores range from -2.64 to 3.20), reflecting very different consumption patterns in this category.

Table 3: Summary statistics by treatment and p-values of ranksum tests.

	Summary statistics			Ranksum p-values		
Variable	Baseline	Welf	Abol	Base=Welf	Base=Abol	Welf=Abol
Pro-animal	.52	.53	.46	.513	.158	.039
Female	.54	.63	.60	.233	.464	.657
Countryside	.54	.52	.42	.76	.09	.156
Religious	.29	.2	.27	.126	.821	.196
PMJ online	.51	.49	.49	.331	.398	.909
Age	21.45	22.49	22.38	.88	.578	.792
Animal-Based Consumption	.15	.08	-.24	.22	.014	.186
Leftism	-.28	.07	.22	.076	.107	.673
Public good	.85	.73	.74	.134	.212	.826
General trust	.08	-.13	.06	.223	.897	.339
Non-governmental trust	.08	.21	-.3	.522	.045	.005
Political activism	.09	.24	-.34	.327	.081	.003
Non-partisan activism	-.12	.04	.07	.386	.525	.713

Notes: (1)The figures here are the means in columns 1 to 3. (2) Columns 4 to 6 report the p-values from the ranksum test

Last, there was variation in our online questionnaire, as for some participants this appeared at the beginning of the questionnaire and for others at the end (to pick up potential order effects resulting from the priming of pro-meat justifications). A two-group mean comparison test and a ranksum test fail to reject the equality of ABC scores across treatments ($p = 0.642$ and $p = 0.938$, respectively).

Table 4: Results of the Principal Component Analysis on diets.

	Animal-based consumption (ABC)
	Eigenvector
White meat	0.600
Red meat	0.557
Fish	0.446
Eggs	0.228
Dairy products	0.282
Explained variation	42.0%
Eigenvalue	2.10

Notes: The ABC score corresponds to the first component of the PCA.

4.2.2 Pro-meat justifications

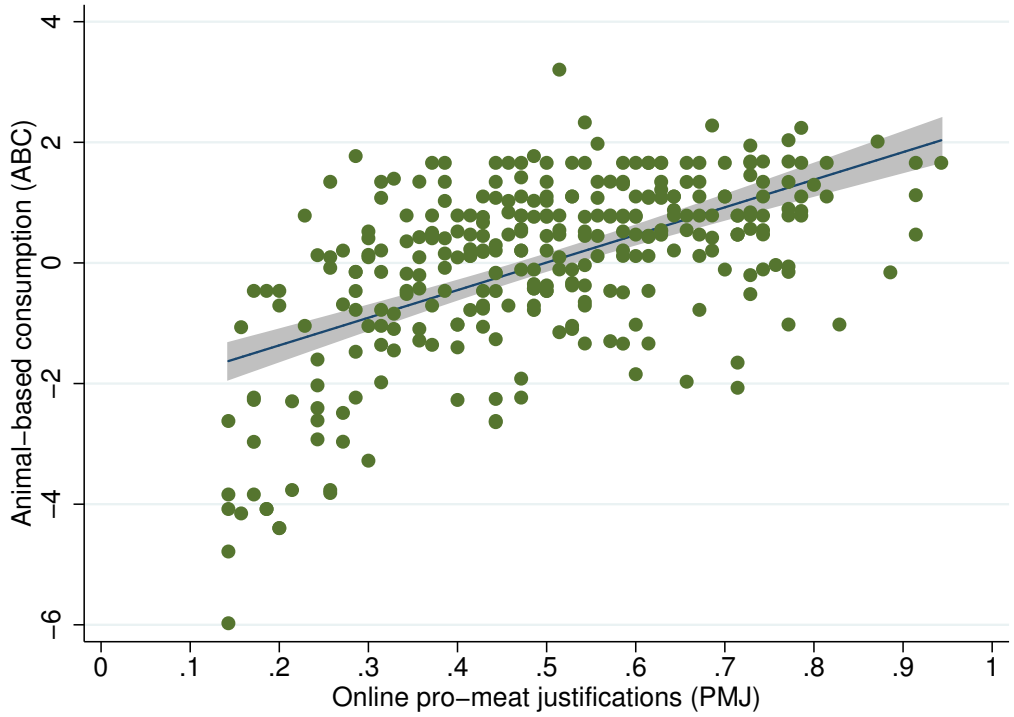
We second establish a measure of pro-meat justifications. To do so, we add up the scores for the ten statements supporting meat consumption to produce a pro-meat justification (PMJ) score, as stated in the pre-registration. This can theoretically take on values between 0 and 70, and we divide it by 70 to obtain values between 0 and 1. The observed PMJ scores in the data range from 0.14 to 0.94, with an average of 0.499. The associated Cronbach's alpha is 0.88, indicating substantial reliability.

We test the robustness of our PMJ index by running a PCA. The first dimension is positively correlated with all items and explains 48.5% of the variation in the sample (see table OA1 in the online appendix). The correlation between the additive and PCA scores is above 0.99 in our sample. We decided to retain the additive PMJ index, where the weights given to the individual items are constant (whereas they will change according to sample composition in the PCA method).

We also investigate the possibility of order effects via a two-group mean-comparison test. We fail to reject the null hypothesis (t-test: $p = 0.301$, ranksum test: $p = 0.253$), so that asking about pro-meat justifications at the end or the beginning of the online questionnaire did not affect the answers.

We now consider the relationship between pro-meat justifications and animal-based consumption (see Figure 2). The two variables are positively and significantly correlated ($\hat{\rho} = 0.566$, $p < 0.001$). A linear regression indicates that a one-point rise in the PMJ score is associated with a ABC score that is 4.58 points higher ($p < 0.001$). In terms of elasticities, a 1% higher PMJ score produces a rise of 0.60% in the PMJ ($p < 0.001$). This positive relationship is in line with previous work looking at the link between diet and pro-meat justifications (e.g., Loughnan et al. (2010); Graça et al. (2015a); Hestermann et al. (2020)).

Figure 2: The relationship between pro-meat justifications in the online questionnaire and animal-based consumption



The blue line displays the predictions from a linear regression (linear fit). The shaded gray area corresponds to the associated 95% confidence interval of the maean.

4.2.3 The control variables from the online questionnaire

We consider five control variables from the three remaining sections of the online questionnaire: political leftism, general trust, trust in non-governmental institutions, political activism, and non-partisan activism. We describe how we construct these variables in Appendix B. Note that we also ran our regressions with the individual scores of trust in each institution instead of the aggregated scores (general trust, trust in non-governmental institutions) and we obtained similar results. Tables are available upon request.

4.3 Change in pro-meat justifications

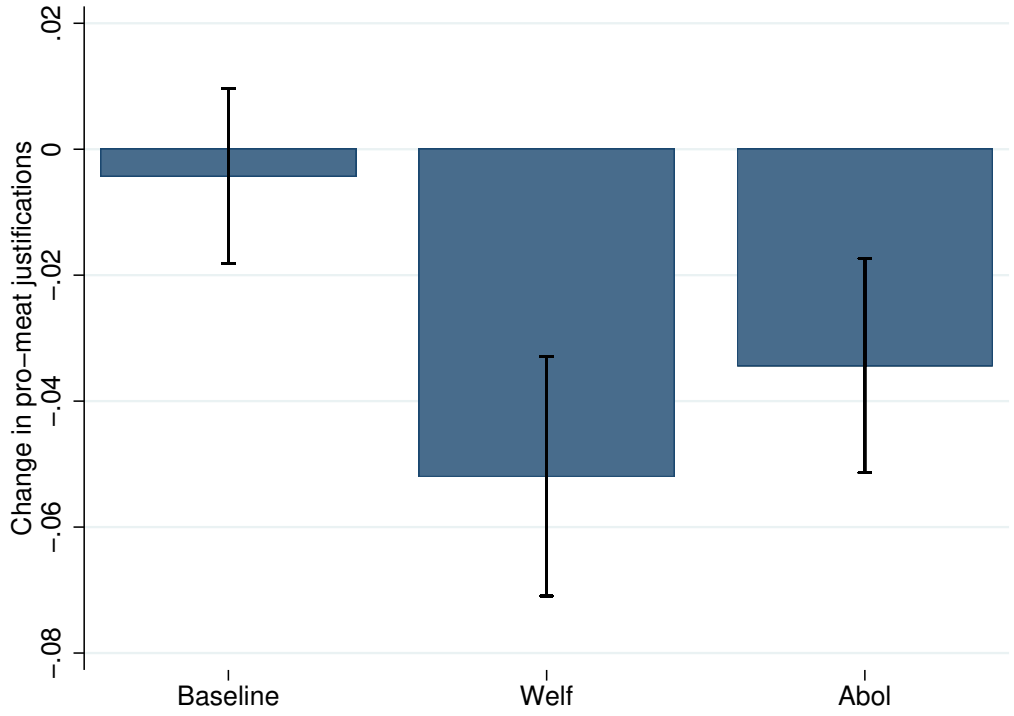
During the sessions, participants were asked the same series of questions about pro-meat justifications as they were online a number of days before the experiment. We investigate how the treatments affected pro-meat justifications. A successful NGO discourse should reduce pro-meat justifications in the short-run; on the contrary, higher PMJ would reflect a backlash effect, as participants would then be more likely to defend meat consumption after the NGO intervention.

Figure 3 displays the average change in pro-meat justifications across treatment conditions. We first see that there is no statistically-significant change in pro-meat justifications between the online and in-lab questionnaires for participants in the BASELINE condition (t-test: $p = 0.546$): when there is no treatment regarding animal-based diet consumption, individuals do not change their pro-meat justifications. Participants here are very consistent in their answers: the correlation coefficient in the BASELINE condition is 0.929 ($p < 0.001$). Second, both NGO treatments significantly affect pro-meat justifications, with a significant fall in both the WELF and ABOL conditions of 5.2 and 3.4 percentage points respectively (t-test: $p < 0.001$ for both conditions). These falls are statistically different from that in the BASELINE condition (t-test: $p < 0.001$ for WELF and $p = 0.007$ for ABOL). However, the changes following the welfarist and abolitionist treatments are not statistically different from each other (t-test: $p = 0.176$, ranksum: $p = 0.266$). Last, the order of the screens does not affect pro-meat justifications in all conditions (ranksum: $p = 0.875$ for BASELINE, $p = 0.261$ for WELF, and $p = 0.554$ for ABOL).

Result 1. The welfarist and abolitionist discourses significantly reduce reported pro-meat justifications.

To understand how participants changed their pro-meat justifications, we further analyze the treatment impact in each question of the PMJ questionnaire. The NGO discourses

Figure 3: The average change in pro-meat justifications by treatment. The lines represent the 95% confidence intervals.



The pikes correspond to the 95% confidence interval.

contained information about three types of externalities associated with meat consumption: animal welfare, health and the environment. Decomposing the effect on PMJ helps us to understand which piece of information most affected participants in each treatment.

Table 5 shows the results of linear regressions of the sub-scores of each PMJ item normalized to lie between 0 and 1. The sharpest falls from treatment are seen in items 5 and 9, which correspond to health arguments: participants are less likely to say that consuming meat is good for their health. The two treatments also significantly affect argument 7: respondents are less likely to say that eating meat is normal after reading an NGO discourse. Last, the WELF treatment also has a significant impact on arguments 1 (animals don't really suffer) and 3 (animals are raised to be killed). The two arguments that are the least sensitive to NGO discourse are 2 (it is justified to eat animals because they have lower cognitive

abilities) and 4 (God created animals for us to eat). This is consistent with the treatment manipulation, given that the discourses did not discuss these aspects.

Table 5: Linear regression of the changes in the sub-scales of pro-meat justifications by argument.

	β_{Welf}	β_{Abol}	Constant	N	R^2
Animal Pain	-0.0655**	-0.0308	-0.0226	307	0.022
	(0.0253)	(0.0258)	(0.0182)		
Animal Mind	0.0103	0.00880	0.00707	307	0.001
	(0.0233)	(0.0237)	(0.0167)		
Hierarchical Justification	-0.0650**	0.00852	-0.00707	307	0.033
	(0.0252)	(0.0257)	(0.0181)		
Religious Justification	-0.0179	-0.00124	0.00990	307	0.002
	(0.0248)	(0.0253)	(0.0178)		
Health	-0.0825***	-0.0535**	-0.00566	307	0.047
	(0.0216)	(0.0220)	(0.0155)		
Naturality	-0.0333	-0.0279	-0.0255	307	0.005
	(0.0275)	(0.0280)	(0.0197)		
Normality	-0.0647***	-0.0431*	0.0113	307	0.024
	(0.0238)	(0.0243)	(0.0171)		
Niceness	-0.0339	-0.0364*	-0.0141	307	0.012
	(0.0209)	(0.0214)	(0.0150)		
Necessity	-0.0860***	-0.0864***	0.00990	307	0.047
	(0.0255)	(0.0260)	(0.0183)		
Environment	-0.0384	-0.0391	-0.00566	307	0.008
	(0.0276)	(0.0281)	(0.0198)		

Notes: (1)The figures here are the OLS estimated coefficients, with standard errors in parentheses. (2) * significant at 10%, ** significant at 5%, *** significant at 1%.

4.4 Treatment effect on the willingness to engage in animal welfare and plant-based diets

Pre-registration commitment. We now turn to the investigation of the decisions taken by the participants in the main part of the experiment. Our experiment elicits participants' propensities to engage in animal welfare in four ways: giving money to an animal-protection charity in the dictator game, signing a petition supporting the introduction of vegetarian options in public schools, signing a petition against intensive farming, and subscription to

a newsletter giving advice about how to adopt a plant-based diet. As we wished to test whether our treatment would have a significant effect at the 5% level, we committed in our pre-registration to reduce dimensionality to one single dimension.[11] To do so, we committed to run a Principal-Component Analysis on the four decisions and retain the first dimension to calculate the treatment effect.

Dimensionality reduction. The results of the PCA are displayed in table 6. The first dimension of the PCA is positively associated with all four of the variables eliciting participants' willingness to engage in animal welfare. The first dimension thus captures, as expected in the pre-registration, a general tendency to engage in favor of animal welfare. We label this first dimension *pro-animal score* as individuals who give to the charity, sign the petitions or to subscribe to the newsletter to become vegan get higher scores. This first dimension explains 39.3% of the variance in the four decisions related to animal welfare. In what follows, we investigate the treatment effect on this single dimension. To facilitate interpretation, we rescale the pro-animal scores to lie between 0 and 1.

Table 6: Results of the Principal Component Analysis on pro-animal actions.

	Pro-animal
	Eigenvector
Donation	0.456
Petition - Intensive Farming	0.451
Petition - Plant-based meals	0.550
Newsletter	0.536
Explained variation	39.3%
Eigenvalue	1.57

Notes: The Pro-animal score corresponds to the first component of the PCA.

[11] Increasing the number of dependent variables on which we regress the treatment increases the probability of finding at least one significant treatment effect. To retain the benefits of statistical theory associated with null-hypothesis significance testing, we committed to the evaluation of the treatment's impact on one single dependent variable (see Olken (2015)). See Nosek et al. (2018) pages 3 and 4 for a discussion.

Treatment effect. We now consider the treatment effect on the pro-animal scores. Table 3 shows that the pro-animal scores averaged 0.52 in BASELINE, 0.53 in WELF and 0.46 in ABOL. At first sight then, the WELF treatment increased the pro-animal score and the ABOL treatment reduced the propensity to engage in animal welfare and plant-based diets. The difference between BASELINE and WELF is not however statistically significant (ranksum: $p = .513$), while the ABOL treatment is associated with a significantly lower pro-animal score than the WELF treatment (ranksum: $p = .039$). The difference between BASELINE and ABOL is not statistically significant in a univariate test (ranksum: $p = .158$), but this likely reflects the pre-existing level of animal-based consumption being significantly higher in BASELINE than in ABOL ($p = .014$, see Table 3).

To control for this composition effect, we ran a multivariate linear regression of the pro-animal scores on the treatment conditions controlling, among other things, for animal-based consumption. The first column of Table 7 shows that the ABOL treatment does not statistically affect the pro-animal score when we do not control for composition. The second column shows that, once we do control for the other variables, the ABOL treatment significantly reduces the pro-animal score ($p = .042$).[12] In the third column, we also control for the the contribution in the public-good game. In this case, the ABOL condition loses some statistical significance ($p = .053$), but remains significant at the 10% level.

Result 2. Overall, the welfarist discourse does not significantly alter the propensity to engage in animal welfare and plant-based diets. The abolitionist discourse produces a backlash effect, (i.e. a significantly lower propensity to engage in animal welfare and plant-based diets).

We then consider the treatment effect conditional on the contribution to the public good. In column 3 of Table 7, more-generous contributors to the public good have higher pro-animal scores. This result is consistent with previous work in economics that has underlined

[12]The full results of the regression are displayed in the online appendix (table OA5). As expected, higher online PMJ is associated with a lower propensity to engage for animal welfare. On the contrary, religiosity, leftism and activism are associated with more pro-animal actions.

Table 7: Linear regression of pro-animal engagement.

	Pro-animal score			
	(1)	(2)	(3)	(4)
WELF	0.0187	-0.00393	0.00433	-0.0118
	(0.0354)	(0.0318)	(0.0314)	(0.0504)
ABOL	-0.0593	-0.0687**	-0.0643*	-0.0848
	(0.0361)	(0.0336)	(0.0331)	(0.0532)
Public-good contribution (PGC)			0.0700***	
			(0.0212)	
PGC $\times$ 1_{BASELINE}				0.0556
				(0.0354)
PGC $\times$ 1_{WELF}				0.0751**
				(0.0354)
PGC $\times$ 1_{ABOL}				0.0809**
				(0.0382)
Controls	No	Yes	Yes	Yes
R^2	0.017	0.264	0.291	0.291
N	307	307	307	307

Notes: (1)The figures here are the estimated coefficients, with standard errors in parentheses.
(2) * significant at 10%, ** significant at 5%, *** significant at 1%.
The controls include all of the variables presented in Table 3.

that plant-based diets can be seen as public goods (Norwood et al. (2018)). We thus explore a potential heterogeneous treatment effect given the propensity to contribute to public goods. To do so, we regress the pro-animal scores on the contribution to public good in each treatment: the results appear in column 4 of Table 7. The contribution to the public good becomes insignificant in the BASELINE condition, but is statistically significant under the WELF and ABOL conditions ($p = .035$). This suggests that the NGO discourses mainly affect public-good contributors. Note that we can say that public-good contributors are significantly more likely to engage in animal-welfare and plant-based diets in the discourse conditions (WELF and ABOL), but cannot conclude that they behave differently from contributors in the BASELINE condition ($p = .626$ and $p = .695$ respectively).

Result 3. Greater contributions to the public good are associated with a stronger engagement in animal welfare and plant-based diets in the presence of an NGO discourse (welfarist

or abolitionist). We find no significant relationship in the absence of a discourse.

Decomposing the effect. As explained in the pre-registration, we now propose to identify the specific variables the most affected by the treatment. To do so, we run the same multivariate analysis as above on each of the four components of the pro-animal scores. The results appear in Table 8. The overall backlash effect of the ABOL condition mainly comes from the two petitions (columns 3, 4 and 5). We also see a negative effect on the two remaining variables of interest (the dictator game with an NGO and the newsletter), but these are not statistically different from zero. Our results with respect to the conditional effect are similar to those above: contributors in the WELF and ABOL treatments are significantly more likely to engage in animal-welfare in the dictator game with an NGO and the petition against intensive farming than low contributors. We find no such statistical relationship in the BASELINE condition.[13]

[13]Note that we obtain similar results to those in Table 8 if we use a Tobit model in columns 1 and 2 and the marginal effects from a probit regression in columns 3, 5 and 7.

Table 8: Linear regression of pro-animal engagement.

	Dictator Game		Petition Intensive Farming		Petition Veg Meals		Veg. Newsletter	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Welf	0.575	0.336	-0.0169	-0.173*	-0.0810	-0.0329	0.0371	0.0831
	(0.364)	(0.586)	(0.0647)	(0.103)	(0.0596)	(0.0955)	(0.0669)	(0.107)
Abol	0.138	-0.239	-0.165**	-0.322***	-0.134**	-0.0243	-0.0177	-0.0374
	(0.385)	(0.618)	(0.0683)	(0.109)	(0.0629)	(0.101)	(0.0706)	(0.113)
Public-good contribution (PGC)	0.888***		0.0888**		0.0310		0.0683	
	(0.246)		(0.0437)		(0.0403)		(0.0452)	
PGC $\times$ 1_{Baseline}		0.649		-0.0353		0.0911		0.0813
		(0.412)		(0.0726)		(0.0671)		(0.0755)
PGC $\times$ 1_{Welf}		0.933**		0.156**		0.0364		0.0198
		(0.411)		(0.0725)		(0.0671)		(0.0754)
PGC $\times$ 1_{Abol}		1.117**		0.157**		-0.0459		0.109
		(0.443)		(0.0782)		(0.0723)		(0.0813)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.180	0.181	0.123	0.137	0.189	0.194	0.127	0.129
N	307	307	307	307	307	307	307	307

Notes: (1)The figures here are the estimated coefficients, with standard errors in parentheses.
(2) * significant at 10%, ** significant at 5%, *** significant at 1%.
The controls include all of the variables presented in Table 3.

4.5 Disentangling the direct and indirect effect of NGO discourses

The above analysis has showed two opposing results. On the one side, *Result 1* showed that both types of NGO discourses successfully influence participants' beliefs in the expected direction (i.e., a decrease in the pro-meat justifications). On the other side, *Result 2* exhibits a non-significant or even negative overall impact of the discourses on the propensity to engage in animal welfare.

The discrepancy between the two results is puzzling insofar as economists would expect beliefs to drive behaviors and would therefore expect concurring results. The cognitive dissonance theory would predict that some people could negatively react to the NGO discourses but would still expect concurring changes in beliefs and actions (see Appendix A). We find some empirical support for these views as we observe a significant relationship between beliefs and actions in the data. In the Baseline condition, lower in-lab PMJ are indeed associated with significantly higher pro-animal scores ($\hat{\rho} = -0.385$, $p < 0.001$).

Given that the NGO discourses significantly reduce PMJ and that lower PMJ are associated with higher pro-animal scores, one should observe a positive effect of the NGO discourses on pro-animal actions. However, Result 2 concludes the contrary. We thus suspect additional forces at play that counter the positive *belief effect*, i.e., the increase in pro-animal actions resulting from the change in beliefs. Negative reactions to discourses promoting specific behaviors have been conceptualized in the psychology literature as *reactance*. Several works showed that whenever people feel restricted in their freedom they may be more likely to engage in the restricted behavior (Steindl et al. (2015)). As a result, participants who are told which dietary choices to make have been observed to choose in the opposite direction (Stok et al. (2014)). Reactance can occur either at the cognitive (e.g., counter-arguments, justifications, narratives) or at the emotional level (e.g., anger, irritation) (Dillard and Shen (2005)). In a different setting, Spelt et al. (2019) find similar results as ours: moderate and more-demanding messages advocating limited meat consumption are associated with higher reactance. Unlike their study, we seek here to distinguish between cognitive and emotional

reactance. We do not suspect any cognitive reactance here given that participants update their beliefs in the direction expected by the discourses. However, the overall negative impact on actions supports the existence of an emotional reactance.

We propose now a strategy to disentangle two treatments effects: a *belief effect* and a *emotional reactance effect*. We estimate beliefs and actions jointly (3SLS), where in-lab PMJ are an explanatory variable for actions. We take advantage of the fact that pre-experimental PMJ (online PMJ) can serve as an exclusion variable. First, we note that there is a strong dependence between online and in-lab PMJ (in BASELINE: $\hat{\rho} = 0.929$, $p < 0.001$), such that online PMJ is a good predictor for in-lab PMJ. Second, in standard economic theory, individual choices are expected to be taken based on current beliefs. So, controlling for in-lab beliefs, actions must be independent of previous beliefs. We find indeed empirical support for this. In the BASELINE treatment, we regress the pro-animal score on the in-lab PMJ: we obtain a significant relationship and compute the associated residuals. We then regress the residuals on the online PMJ and find no statistical relationship ($p = 0.886$). Altogether, we can use online PMJ as an exclusion variable since (i) it is significantly correlated with in-lab PMJ, and (ii) it is not correlated with the pro-animal score conditional on in-lab PMJ.

We estimate the following system of equations:

$$\begin{aligned} \text{inLabPMJ} &= \alpha_0 + \alpha_1 \mathbb{1}_{\text{WELF}} + \alpha_2 \mathbb{1}_{\text{ABOL}} + \alpha_3 X + \alpha_4 \text{onlinePMJ} + u \\ \text{proanimal} &= \beta_0 + \beta_1 \mathbb{1}_{\text{WELF}} + \beta_2 \mathbb{1}_{\text{ABOL}} + \beta_3 X + \beta_4 \text{inLabPMJ} + v \end{aligned} \tag{1}$$

where u and v are random terms that can be correlated, and X are control variables presented in Table 3.

The belief effect of the discourses is given by $\alpha_1 \times \beta_4$ for the WELF treatment, and by $\alpha_2 \times \beta_4$ for the ABOL treatment. The emotional reactance effect corresponds to β_1 and β_2 for the WELF and ABOL treatments respectively.

The 3SLS estimates of the treatment effects are displayed in Table 9. First, we find a positive and significant effect of the discourses on actions through beliefs for both treatments. This result is driven by the fact that actions in the lab are significantly determined by in-lab PMJ which are, in turn, significantly affected by treatment variations (see table OA7 in the online appendix for the detailed results of the estimation). In this respect, it seems that the NGOs successfully affect citizens' actions by affecting their beliefs. However, we find an emotional reactance associated with both discourses. This negative effect is not significant for the WELF discourse, but is sufficiently large to offset the positive belief effect: the estimated total effect is close to zero. For the ABOL discourse, the negative direct effect is larger and outweighs the positive belief effect. On overall, the negative reactance effect dominates in the ABOL discourse, which yields a negative total effect of the NGO discourse.

Result 4. The positive belief effect of NGO discourses is countered by a negative emotional reactance effect. This negative reaction offsets the positive effect on beliefs in the WELF treatment, and even dominates it in the ABOL condition, yielding an overall negative impact on the propensity to engage in animal welfare and plant-based diets.

Table 9: Estimates of the treatment effects (3SLS).

	WELF	ABOL
Belief effect	0.0216***	0.0138**
	(0.0074)	(0.00625)
Emotional reactance effect	-0.0173	-.0781**
	(.0307)	(.0322)
Total effect	0.00433	-.0643**
	(.0305)	(0.0322)

Notes: (1)The figures here are the estimated coefficients, with standard errors in parentheses.
(2) * significant at 10%, ** significant at 5%, *** significant at 1%.
(3) The controls include all of the variables presented in Table 3.

5 Discussion and conclusion

NGOs often disagree about the best way to influence individuals in order to achieve social change. Moderates argue that a step-by-step strategy is the most effective way of reaching the desired objective in the long-run, while radicals claim that only pushing for radical change can lead to significant societal change. In this paper, we propose a first, modest, step to compare the efficiency of different NGO discourses on individuals' propensities to engage in animal welfare. We design an experiment in which participants receive either a moderate or a radical discourse regarding animal welfare and dietary choices, and compare their behaviors to those of a control group that did not receive any discourse. We elicit participants' resulting changes in beliefs via a pro-meat justification questionnaire, and examine the impact of the discourses on four behaviors regarding the willingness to engage in animal welfare and support the switch to plant-based diets: a dictator game with an animal-protection NGO, a petition against intensive farming, a petition in favor of vegetarian meals, and subscription to a newsletter promoting plant-based diets.

We find divergent treatment effects on beliefs and actions. For the former, both the moderate and radical discourses reduce pro-meat justifications. However, NGO discourses do not enhance actions in favor of animal welfare. Our estimates show that the positive impact on actions through beliefs is outweighed by a negative reaction against the injunctive discourses. Obviously, the actions proposed in our experiment are very short-term, and taken immediately after exposure to the discourses in the experiment. A major challenge in assessing the effectiveness of welfarist and abolitionist discourses is to understand which effect dominates in the long-run. Cognitive-dissonance theory suggests that individuals suffer psychologically from the divergence between their beliefs and actions, and will adjust their actions and/or beliefs to reduce this gap. This adjustment will depend on the relative cost of changing actions or beliefs. Actions may be difficult to change due to (e.g.) habits and social norms, but mistaken beliefs may be difficult to maintain with (e.g.) the accumulation of evidence and repeated NGO campaigns.

Furthermore, we find evidence that the abolitionist discourse may produce a backlash effect. In the abolitionist discourse, we find indeed that the emotional reactance outweighs the positive effects on beliefs, undermining participants' willingness to engage in animal welfare. This raises a central and broader question: If the radical discourse was ineffective or even counterproductive, why is radicalism so prevalent in social movements? A number of explanations are possible. First, the abolitionist message may be effective for particular people. We do find in the experiment that the abolitionist discourse triggers a stronger response in some participants. One hypothesis is then that radical and moderate NGO discourses target different people, and essentially employ a rational differentiation strategy. Relatedly, NGOs may select their degree of radicalism to appeal to their respective memberships, which can in turn ensure ongoing donations and greater financial sustainability. Further research may confirm this hypothesis. Future experiments may be able to explore a variant of the current set-up in which subjects can donate to either a well-identified welfarist or abolitionist NGO after being exposed to the respective discourses, or explore other aspects regarding the degree of radicalism, such as the emotional content of the NGOs' discourse or the violence or illegality of their activities.

In addition, we analyze the impact of moderate and radical discourses separately. That is, participants are exposed to only one discourse in the experiment. However, it is possible that the co-existence of the two discourses produce effects of substitution or complementarity. One question raised in the political science and sociology literatures is the radical flank effect, whereby the existence of radical groups can have positive and negative effects on the perception of moderates by third parties such as firms, governments and citizens (Haines (1984, 2013)). Baron et al. (2016) explore this question, but focus on NGO strategies toward firms and not the behavioral response of citizens. We may expect two opposing effects here. On the one hand, moderates might be perceived as more reasonable in the presence of radicals, as they will appear to be more at the center of the political spectrum. Moreover, radicals can obtain wide visibility through spectacular actions that trigger political crises

that can only be resolved through cooperation with moderates. On the other hand, radicals might cast scorn on and generate negative externalities for the overall movement, such as when they resort to violence. Whether there is an overall negative or positive radical flank effect largely remains an open empirical question.

Last, future studies could extend our work in several directions. First, most of the participants who took part in our experiment are young adults. Previous works in psychology showed that adolescents and young adults can be more easily influenced and early adulthood is sometimes considered as the "impressionable years" (Kinder and Sears (1985)). If this is true, our study would focus on the most easily influenced citizens, and NGO discourses would have a more limited impact on a representative sample of the population (i.e., the estimates would be closer to zero). Similarly, some previous works concluded that reactance tends to decrease over age (Hong et al. (1994)). In this case, a representative sample of the adult population would display lower levels of reactance. However, some evidence suggests that veganism is more popular among young people[14], and reactance could thus be stronger for older generations. Whether our results are a lower or an upper bound estimate of the effects of NGO discourses on the entire population of adults remains an open empirical question. Second, our experiment was run in France, and the results should be taken with caution for culturally distant countries. Our findings are likely to be relevant for countries with similar levels of animal-based consumption and animal welfare activism like the United States, but social norms, and thus behavioral changes, could be very different for low or middle income countries where food security is still an important concern for the population. In these countries, animal-based products can be an important source of proteins, and there is little interest to lobby for a reduction of meat consumption when it helps fighting undernourishment. Finally, our decision variables mostly focus on activism-type behaviors. Analyzing these decisions is an important step as NGOs frequently ask citizens to donate and to sign petitions. However, the ultimate goal of these animal protection NGOs is the

[14] https://www.statista.com/statistics/738851/vegan-vegetarian-consumers-us/

effective reduction in animal-based consumption. The subscription to the newsletter promoting plant-based diets is a good indicator of the participants' intentions to decrease the use of animal-based products. However, exploring the impact of the NGO discourses on real consumption choice remains an important empirical question for agricultural economics.

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A Appendix: Theoretical background

In this appendix, we want to compare theoretically the effect of a moderate message to that of a radical message on the adoption of a moral action. The model is adapted from Benabou and Tirole (2002, 2016) and Hestermann et al. (2020). This is a model of cognitive/moral dissonance. Its primitives can be described as follows. An agent can choose an action a that mitigates a moral damage, but this action is costly $c(a)$. Moreover, the moral damage is uncertain. Formally, for given agent's beliefs x about this damage, the agent chooses $a \in [0, 1]$ to maximize:

$$U(a) = -(1 - a)x - c(a)$$

where

$$\begin{aligned} c(a) &: \text{ cost of the moral action } a, \text{ with } c(0) = 0, c'(.) > 0, c''(.) > 0; \\ x &: \text{ beliefs about the uncertain moral damage } (x \in \{0, m\} \text{ with } m > 0). \end{aligned}$$

Let $V(x) \equiv U(a(x)) = \max_a U(a)$ denote the indirect utility as a function of beliefs x. We have $V'(x) = -(1 - a(x)) \leq 0$. That is, if beliefs could be chosen freely, the agent would choose the more optimistic ones: $x = 0$ (no moral damage). Observe that $V(0) = 0$. Note also when the solution is interior, we have $a'(x) = 1/c''(a(x)) > 0$. That is, the moral action is greater when beliefs x increase.

The intrapersonal game and timeline are the following. There are two selves, Self-0 and Self-1. At date 0, Self-0 receives perfect information about the moral damage, namely either a good news $x = 0$ or a bad news $x = m$. Self-0 can transmit the good/bad news to Self-1. Importantly, Self-0 chooses the transmission strategy to maximize Self-1's "perceived utility", namely the utility $V(x)$ computed under Self-1's beliefs x, not true beliefs. The interesting question is: what message does Self-0 transmit under bad news $x = m$?

Self-0 transmits the bad news with probability $t \in [0,1]$ to maximize

$$tV(m) - k(1-t)$$

where parameter k denotes the cost of self-deception. Importantly, note that we assume for simplicity that Self-1 is "naive" in the sense that Self-1 always believes the message received from Self-0. Then, it is easy to show that the equilibrium is such that Self-0 always chooses pure strategies and transmits the bad news if and only if the cost of self-deception is high enough:

$$\text{If } k \geq -V(m) \text{ (resp. } k < -V(m)) \text{ then } t = 1 \text{ (resp. } t = 0)$$

In this model, there is thus a simple trade-off between the moral and the self-deception costs. If Self-0 does not transmit the bad news, then Self-0 faces a cost of self-deception, but no moral damage. If Self-0 transmits the bad news, Self-1 suffers from a moral damage associated with a change in posterior beliefs, but no cost of self-deception.

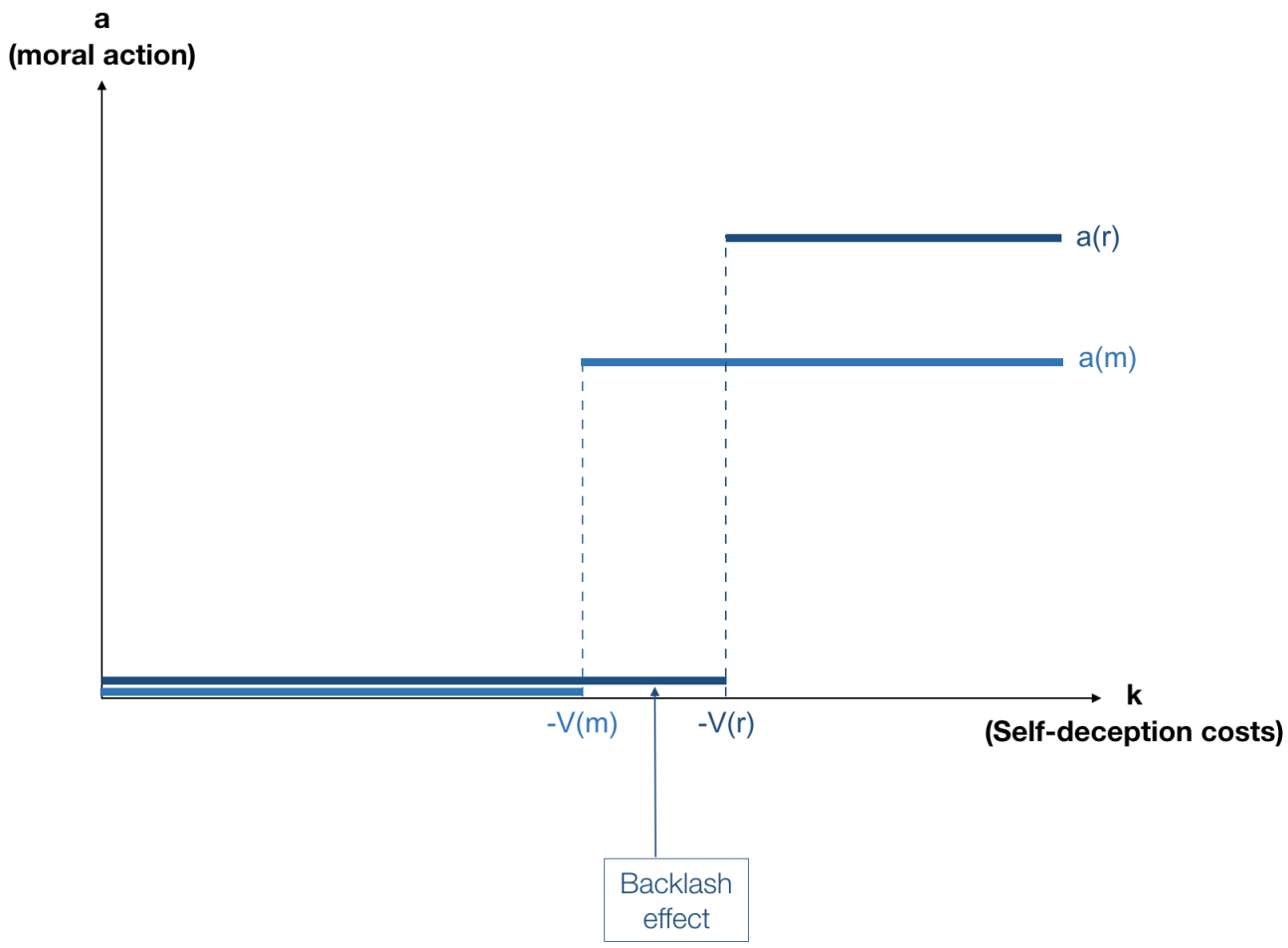
We now examine the effect of a more radical message on this intrapersonal equilibrium. We do so by changing the value of the bad news from m (as "moderate") to $r > m$ (as "radical"). It is easy to see that this change has two opposing effects on beliefs. First, if the bad news is accepted, beliefs under bad news become more pessimistic, i.e. $x = r > x = m$. Second, the bad news is more likely to be ignored for a given self-deception cost since $-V(m) < -V(r)$. The impact on actions is also similar. Indeed, assuming an interior solution, actions under bad news are more radical, i.e. $a(r) > a(m)$, but the more radical action is less often adopted. This last effect can be viewed as a "backlash effect" of a more radical news. The intuition is that it is more costly to accept the bad news when the bad news becomes worse, and has thus a greater negative impact on welfare. These above predictions are illustrated on Figure 4.

We sum up these results in the context of our experiment as follows. Assume that subjects participating in the experiment vary in their self-deception cost. Subjects with a high self-

deception cost always accept the bad news. This implies that a more radical message has always a greater impact on posterior beliefs and in turn leads subjects to adopt a greater moral action, as in standard Bayesian models. Conversely, when the self-deception cost is low, subjects always ignore the bad news, and there is no difference between a radical and a moderate message on beliefs and actions. Finally, there is an interesting intermediate case for an average self-deception cost. In that case, the moderate message is accepted while the radical message is ignored. This "backlash effect" arises because the radical message, if accepted, would have a too strong negative impact on subjective welfare.

An implication of these observations is that some subjects may react more or less to the radical message than to the moderate message depending on their self-deception cost, so that it is not clear a priori to predict which message (moderate or radical) has more impact on average on subjects' beliefs and actions. We conclude that the comparison of the impact of a moderate vs. radical message on expected beliefs and actions is not clear a priori because there are two opposing effects.

Figure 4: Prediction of the treatment effect on actions conditional on self-deception costs.



B Control variables from the online questionnaire

This section describes how we constructed five variables from the online questionnaire: leftism, general trust, non-governmental trust, political activism and non-partisan activism. The associated tables are displayed in the online appendix.

We first explore the opinions of participants regarding (i) the necessity to be individually committed to fight climate change (*climate*), (ii) the need for the government to intervene to reduce income differences (*inequality*), (iii) the need to give jobs to men in priority when jobs are scarce (inverted *feminism*) and (iv) the need for same-sex couples to have similar rights as heterosexual couples (*gay*). The first dimension of a PCA on these four variables explains 43.1% of the variance, and is positively associated with *climate, inequality,* and *gay* and negatively related to *inverted feminism*. We retain this first dimension and label it *leftism*. We see that greater *leftism* is associated with significantly lower levels of pro-meat justifications ($\hat{\rho} = -0.389$, $p < 0.001$) and animal-based consumption ($\hat{\rho} = -0.214$, $p < 0.001$).

Second, we consider the levels of trust in public and private institutions. We run a PCA and retained the first two dimensions. These account for 39.4% and 15% of the variance respectively. The first dimension is positively associated with the level of trust in all institutions: it thus reflects *general trust*. The second dimension is negatively associated with political institutions (National Assembly, politicians) and positively with non-governmental institutions (farmers, scientific organizations, NGOs). This second dimension represents *trust in non-governmental institutions*. We observe higher levels of pro-meat justifications for individuals who have higher levels of general trust ($\hat{\rho} = 0.202$, $p < 0.001$) and lower levels of non-governmental trust ($\hat{\rho} = -0.229$, $p < 0.001$); we observe similar relationships for animal-based consumption (general trust: $\hat{\rho} = 0.165$, $p = 0.004$; non-governmental trust: $\hat{\rho} = -0.150$, $p = 0.009$).

Last, we consider participants' political engagement. We run a PCA on the variables associated with political engagement (the fifth screen of the online questionnaire), and retain

the first two dimensions that explain respectively 31.1% and 15.3% of the total variance. The first dimension is positively correlated with all political-engagement variables: we refer to this as *political activism*. The second dimension is strongly negatively correlated with activism as a voter (contacting an elected politician, campaigning for a party), and is strongly positively associated with activism as a citizen (petitions, boycott). We refer to this second dimension as *non-partisan activism*. Note that, as some participants had the possibility of answering "I don't know" or "I don't want to answer", we can only calculate these scores for 264 participants, while the total sample size is 307. We assign a value of zero to the missing participants, and create a dummy *missing activism* variable for them. Finally, note that political and non-partisan activists declare lower levels of pro-meat justification (political activism: $\hat{\rho} = -0.247$, $p < 0.001$; non-partisan activism: $\hat{\rho} = -0.267$, $p < 0.001$). Political activists also consume significantly fewer animal-based products ($\hat{\rho} = -0.202$, $p = 0.001$).

Online Appendix

Online Appendix 1: Online Questionnaire

The following instructions were originally in French.

First screen

Hello and welcome to the online questionnaire of the LABEX-EM.

As part of the experiment for which you registered, you are asked to complete the following questionnaire. It consists of five series of questions.

Please note that there are no good or bad answers to the questions that will be asked, and you are asked to answer as honestly as possible.

Note that it is not possible to go back once you have validated a screen.

You will be paid €5 for filling out this questionnaire, which you will receive on the day of the experiment.

Second screen

Please indicate how often you consume the following items: Never, a few times a year, a few times a month, a few times a week, almost at each meal.

- Red meat
- White meat

- Fish
- Eggs
- Dairy products
- Vegetables
- Pulses
- Fruit
- Starchy foods

Third screen

Please indicate to which extent you agree with the following statements. Your answers must take values between 1 (totally disagree) and 7 (totally agree).

- We should all be individually committed to fight against climate change.
- The government should intervene to reduce income differences.
- When jobs are scarce, priority should be given to men rather than women to have a job.
- Same-sex couples, male or female, should have the same adoption rights as heterosexual couples.

Fourth screen

Tell us on a scale of 1 to 7, how much confidence you personally have in each of these institutions. (1: no confidence at all, 7: full confidence)

- National Assembly
- Justice
- The Police
- Politicians

- UN (United Nations)
- Industrial companies
- Farmers
- Scientific organizations (the CNRS and INRA)
- Associations (protection of the environment, protection of animals etc.)

Fifth screen

There are different ways to try to improve things in France or prevent things from going wrong. In the past 12 months, did you do any of the following?

- Contact a politician?
- Were a member of a political party or a politically-engaged association?
- Were a member of another organization or association?
- Wear a badge or a sticker supporting a cause?
- Sign a petition?
- Take part in a legal protest?
- Boycott some specific products?
- Publish or share online some political statements (e-mail, blog or social networks)?

Note: For each question, the set of possible answers was: "Yes", "No", "I don't want to answer" and "I don't know".

Sixth screen

Please indicate to which extent you agree with the following statements. Your answers must take values between 1 (totally disagree) and 7 (totally agree).

- It is acceptable to eat meat because the animals killed for our consumption do not really suffer.

- It is acceptable to eat meat because the animals killed for our consumption have lower intellectual capacities than humans.
- It is acceptable to eat some animals because they are raised for this purpose.
- God created animals for us to eat.
- 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.
- Eating meat may be bad for the environment, but no more so than eating vegetables or cereals.

Online Appendix 2: Instructions

OA2.1: Public-Good Game

The first part of the experiment takes place as follows. You will receive €2 and will be put in a group with two other participants who will remain anonymous. The €2 allocated to you is put into a private account, the balance of which you will receive at the end of the experience. Each participant can contribute all or part of his €2 to a joint group project. When a participant puts 10 cents, for example, into the group's joint project, each of the three participants receives 5 cents in his private account. The participant who puts 10 cents into the collective project thus pays 10 cents from their private account and subsequently receives 5 cents from the project, and all other group members also receive 5 cents on their private accounts.

Example: Jordan receives €2 at the beginning of the game. He decides to keep €0.5 on his private account and invests €1.5 in the joint project. He plays with Aurélie and Yann, who decide to keep respectively €2, and €1, and therefore invest €0 and €1 in the joint project. Total investment in the joint project is thus €2.5, so that each member receives €1.25 from the collective project. As a result, at the end of the game Jordan will receive €1.75 (€0.5 from the private account and €1.25 from the collective project).

You receive €2. How much do you want to put into the public account of the group to which the computer will assign you at random?

OA2.2: Welfarist text

The following text was displayed in French to the participants in the Welf *treatment.*

Let's reduce our meat consumption!

About 1 billion livestock are slaughtered each year in France to produce meat. These animals suffer during their rearing and transport to slaughterhouses. The production of

meat, whether organic or industrial, involves practices including mutilation, live castration, slaughter without stunning, the dehorning of calves, the beak conditioning of poultry, the removal of tails from lambs and piglets, artificial insemination etc.

Pigs are currently killed after six months of life, although they can live for up to 10 years in good health. 95% of these pigs are raised in intensive breeding, and about 85% of male piglets are castrated without anesthesia. Milk cows are artificially inseminated and are separated from their calves at birth, which are slaughtered within a few months of being fattened. In the laying-hen industry, about 50 million male chicks are ground alive each year. About 69% of females live in very-crowded cages, with up to 22 laying hens per square meter.

Vegetable proteins, which are present in large quantities in pulses and cereals, are better-processed by the body and are sufficient to ensure good health. The over-consumption of meat increases the chances of health problems such as cardiovascular disease, certain cancers and Type-2 diabetes. In addition, a meal including meat and dairy products pollutes much more than a vegetable meal. For example, recent scientific work has shown that one gram of beef protein is responsible for up to 250 times more greenhouse-gas emissions than one gram of vegetable protein.

The animals bred by the food industry today live in conditions that do not meet their basic needs. For our health, and to limit animal suffering and environmental damage, we should act responsibly by reducing our consumption of animal-based products and refusing to buy those from intensive farming.

Note: All of the information, figures and facts mentioned in this article have been certified by CNRS and INRA researchers.

OA2.3: Abolitionist text

The following text was displayed in French to the participants in the ABOL *treatment..*

Let's stop eating meat!

About 1 billion livestock are slaughtered each year in France to produce meat. These animals suffer during their rearing and transport to slaughterhouses. The production of meat, whether organic or industrial, involves practices including mutilation, live castration, slaughter without stunning, the dehorning of calves, the cutting of poultry, the removal of tails from lambs and piglets, artificial insemination etc.

Pigs are currently killed after six months of life, although they can live for up to 10 years in good health. 95% of these pigs are raised in intensive breeding, and about 85% of male piglets are castrated without anesthesia. Milk cows are artificially inseminated and are separated from their calves at birth, which are slaughtered within a few months of being fattened. In the laying-hen industry, about 50 million male chicks are ground alive each year. About 69% of females live in very-crowded cages, with up to 22 laying hens per square meter.

Vegetable proteins, which are present in large quantities in pulses and cereals, are better-processed by the body and are sufficient to ensure good health. The over-consumption of meat increases the chances of health problems such as cardiovascular disease, certain cancers and Type-2 diabetes. In addition, a meal including meat and dairy products pollutes much more than a vegetable meal. For example, recent scientific work has shown that one gram of beef protein is responsible for up to 250 times more greenhouse-gas emissions than one gram of vegetable protein.

Animals bred by the food industry lose their lives prematurely. Whatever the procedure, animals cannot be killed without violence. For our health, and to limit animal suffering and environmental damage, we should act responsibly by stopping the consumption of meat and any animal-based products.

Note: All of the information, figures and facts mentioned in this article have been certified by CNRS and INRA researchers.

OA2.4: Screen for the dictator game with the NGO

You will now have to make a decision in the situation described below. You receive 10 Euros. You can decide to give some, or all, of this to an animal-protection NGO. The amount collected will be donated by the University to this association in a few days.

How much do you want to give to the association that works for animals?

You keep: ..... Euros
You give to the association: ..... Euros

Please confirm your choice.

OA2.5: Petitions screen

You will find below two petitions aimed at improving the welfare of animals in France. The first calls for government legislation to ban the raising of hens in cages. The second is for public canteens to offer at least one vegetarian option for every meal.

You can view the text associated with each petition by clicking on "See text". To sign one or more petitions, click on the "I sign" box and indicate at the bottom of the page your first name, last name, e-mail, postal code and city of residence. Your personal information will not be kept by the researchers but will only be used to register you as a signatory.

Petition for the prohibition of the intensive breeding of laying hens. [See text]
I sign [] I do not sign []
Petition for vegetarian meals in canteens. [See text]
I sign [] I do not sign []

If at least one of the "I sign" boxes is checked: the following section appears:

First Name:

Name:

E-mail:

Postal code:

City:

Please confirm your choice.

OA2.6: Newsletter screen

For this new stage of the experiment, you can decide to subscribe to a newsletter developed by an association that aims to give practical advice, tips and recipes for the adoption of plant-based diets.

If you subscribe to this newsletter, you will receive a daily e-mail for 21 days with recipe suggestions and information on plant-based nutrition. If you wish, this newsletter will also give you the opportunity to join an online community to share experience and tips.

Subscribe to the newsletter []

Do not subscribe to the newsletter []

If the box "Subscribe to the newsletter" is checked: the following section appears:

First Name:

Name:

E-mail:

Please confirm your choice.

Online Appendix 3: Tables

Table OA1: Results of the Principal Component Analysis on pro-meat arguments.

	First dimension
	Eigenvector
Animal Pain	0.305
Animal Mind	0.266
Religious Justification	0.246
Health	0.363
Naturality	0.336
Normality	0.382
Niceness	0.307
Necessity	0.349
Environment	0.228
Explained variation	48.5%
Eigenvalue	4.85
Correlation with PMJ	>0.99
	(p<0.001)

Notes: The PMJ score corresponds to the additive indicator of pro-meat arguments.

Table OA2: Results of the Principal Component Analysis on political opinions.

	Leftism
	Eigenvector
Climate	0.448
Inequality	0.487
Inverted Feminism	-0.531
Gay	0.530
Explained variation	43%
Eigenvalue	1.73
Correlation with PMJ	-0.389
	(p<0.001)
Correlation with ABC	-0.214
	(p<0.001)

Notes: The Leftism score corresponds to the first component of the PCA.

Table OA3: Results of the Principal Component Analysis on political engagement items.

	Political activism	Non-partisan activism
	Eigenvector	Eigenvector
Contact	0.297	-0.483
Party membership	0.418	-0.305
Association membership	0.462	-0.024
Badge	0.400	-0.138
Petition	0.231	0.546
Protest	0.427	0.121
Boycott	0.160	0.536
Share statement	0.319	0.231
Explained variation	31.1%	15.3%
Eigenvalue	2.49	1.22
Correlation with PMJ	-0.247	-0.267
	(p<0.001)	(p<0.001)
Correlation with ABC	-0.202	-0.097
	(p=0.001)	(p=0.115)

Notes: (1) The Political activism score corresponds to the first component of the PCA.
(2) The Non-partisan activism score corresponds to the second component of the PCA.

Table OA4: Results of the Principal Component Analysis on trust in institutions.

	General trust	Non-governmental trust
	Eigenvector	Eigenvector
National Assembly	0.4119	-0.2381
Justice	0.3834	-0.1690
Police	0.3608	-0.0690
Politicians	0.3920	-0.2860
UN	0.3869	0.0189
Private firms	0.3057	-0.0651
Farmers	0.2653	0.3749
Scientific organizations	0.2652	0.4904
NGOs	0.1246	0.6652
Explained variation	39.4%	15%
Eigenvalue	3.54	1.35
Correlation with PMJ	0.202	-0.229
	(p<0.001)	(p<0.001)
Correlation with ABC	0.165	-0.150
	(p=0.004)	(p=0.009)

Notes: (1) The General trust score corresponds to the first component of the PCA.
(2) The Non-governmental trust score corresponds to the second component of the PCA.

Table OA5: Linear regression of pro-animal engagement (full results).

	Pro-animal score			
	(1)	(2)	(3)	(4)
Welf	0.0187	-0.00393	0.00433	-0.0118
	(0.0354)	(0.0318)	(0.0314)	(0.0504)
Abol	-0.0593	-0.0687**	-0.0643*	-0.0848
	(0.0361)	(0.0336)	(0.0331)	(0.0532)
Public-good contribution (PGC)			0.0700***	
			(0.0212)	
PGC × 1_{Baseline}				0.0556
				(0.0354)
PGC × 1_{Welf}				0.0751**
				(0.0354)
PGC × 1_{Abol}				0.0809**
				(0.0382)
Female		0.0324	0.0466	0.0476*
		(0.0284)	(0.0283)	(0.0285)
Countryside		-0.00394	-0.00164	-0.00161
		(0.0270)	(0.0266)	(0.0266)
PMJ online		-0.363***	-0.363***	-0.361***
		(0.0997)	(0.0980)	(0.0986)
Religious		0.0567*	0.0609**	0.0596*
		(0.0314)	(0.0309)	(0.0311)
Age		-0.000790	-0.00108	-0.00115
		(0.00228)	(0.00224)	(0.00225)
ABC online		0.00377	0.00503	0.00460
		(0.0111)	(0.0109)	(0.0110)
Leftism		0.0226*	0.0230**	0.0232**
		(0.0115)	(0.0113)	(0.0114)
General Trust		0.00331	0.00109	0.000664
		(0.00716)	(0.00707)	(0.00715)
Non-governmental trust		0.0201*	0.0142	0.0147
		(0.0122)	(0.0121)	(0.0122)
Missing Activism Scores Dummy		0.0120	-0.00306	-0.00312
		(0.0380)	(0.0376)	(0.0377)
Political activism		0.0230**	0.0210**	0.0204**
		(0.00937)	(0.00923)	(0.00935)
Non-partisan activism		0.0504***	0.0457***	0.0454***
		(0.0134)	(0.0133)	(0.0133)
Constant	0.516***	0.692***	0.632***	0.644***
	(0.0254)	(0.0825)	(0.0832)	(0.0871)
R^2	0.017	0.264	0.291	0.291
N	307	307	307	307

Notes: (1)The figures here are the estimated coefficients, with standard errors in parentheses.
(2) * significant at 10%, ** significant at 5%, *** significant at 1%.
The controls include all of the variables presented in Table 3.

Table OA6: Linear regression of pro-animal engagement.

	Dictator Game		Petition Intensive Farming		Petition Veg Meals		Veg. Newsletter	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Welf	0.575	0.336	-0.0169	-0.173*	-0.0810	-0.0329	0.0371	0.0831
	(0.364)	(0.586)	(0.0647)	(0.103)	(0.0596)	(0.0955)	(0.0669)	(0.107)
Abol	0.138	-0.239	-0.165**	-0.322***	-0.134**	-0.0243	-0.0177	-0.0374
	(0.385)	(0.618)	(0.0683)	(0.109)	(0.0629)	(0.101)	(0.0706)	(0.113)
Public-good contribution (PGC)	0.888***		0.0888**		0.0310		0.0683	
	(0.246)		(0.0437)		(0.0403)		(0.0452)	
PGC × 1_{Baseline}		0.649		-0.0353		0.0911		0.0813
		(0.412)		(0.0726)		(0.0671)		(0.0755)
PGC × 1_{Welf}		0.933**		0.156**		0.0364		0.0198
		(0.411)		(0.0725)		(0.0671)		(0.0754)
PGC × 1_{Abol}		1.117**		0.157**		-0.0459		0.109
		(0.443)		(0.0782)		(0.0723)		(0.0813)
Female	0.756**	0.776**	0.0115	0.0176	-0.0335	-0.0401	0.122**	0.126**
	(0.328)	(0.331)	(0.0583)	(0.0583)	(0.0537)	(0.0540)	(0.0603)	(0.0607)
Countryside	-0.0698	-0.0689	0.0385	0.0386	-0.0702	-0.0706	0.0476	0.0480
	(0.309)	(0.309)	(0.0548)	(0.0546)	(0.0505)	(0.0505)	(0.0566)	(0.0568)
PMJ online	-2.655**	-2.623**	-0.111	-0.0861	-0.532***	-0.537***	-0.543***	-0.554***
	(1.139)	(1.145)	(0.202)	(0.202)	(0.186)	(0.187)	(0.209)	(0.210)
Religious	0.0672	0.0480	0.101	0.0892	0.105*	0.109*	0.0588	0.0620
	(0.359)	(0.362)	(0.0638)	(0.0638)	(0.0587)	(0.0590)	(0.0659)	(0.0663)
Age	-0.00770	-0.00885	-0.000180	-0.000864	-0.00712*	-0.00686	0.00439	0.00454
	(0.0260)	(0.0262)	(0.00462)	(0.00462)	(0.00426)	(0.00427)	(0.00478)	(0.00480)
ABC online	-0.209	-0.217*	0.000655	-0.00265	0.0129	0.0151	0.0394*	0.0390*
	(0.127)	(0.128)	(0.0225)	(0.0225)	(0.0208)	(0.0208)	(0.0233)	(0.0234)
Leftism	0.0461	0.0483	0.0382	0.0396*	0.0583***	0.0579***	-0.00151	-0.00187
	(0.132)	(0.132)	(0.0234)	(0.0233)	(0.0215)	(0.0216)	(0.0242)	(0.0242)
General Trust	0.0423	0.0343	-0.00797	-0.0111	-0.00382	-0.00141	0.00968	0.00903
	(0.0822)	(0.0831)	(0.0146)	(0.0146)	(0.0134)	(0.0136)	(0.0151)	(0.0152)
Non-governmental Trust	0.0620	0.0703	0.00250	0.00623	0.0135	0.0112	0.0373	0.0375
	(0.141)	(0.142)	(0.0250)	(0.0250)	(0.0230)	(0.0231)	(0.0259)	(0.0260)
Missing Activism Scores Dummy	0.0394	0.0400	-0.0279	-0.0293	0.0740	0.0732	-0.0776	-0.0758
	(0.437)	(0.438)	(0.0776)	(0.0773)	(0.0715)	(0.0715)	(0.0802)	(0.0804)
Political activism	0.166	0.155	0.0149	0.00999	0.0178	0.0212	0.0365*	0.0360*
	(0.107)	(0.109)	(0.0190)	(0.0191)	(0.0175)	(0.0177)	(0.0197)	(0.0199)
Non-partisan activism	-0.0503	-0.0554	0.0975***	0.0947***	0.0860***	0.0872***	0.0327	0.0331
	(0.154)	(0.155)	(0.0274)	(0.0273)	(0.0252)	(0.0253)	(0.0283)	(0.0284)
Constant	3.388***	3.596***	0.657***	0.766***	1.195***	1.143***	0.428**	0.416**
	(0.967)	(1.011)	(0.172)	(0.178)	(0.158)	(0.165)	(0.177)	(0.185)
R^2	0.180	0.181	0.123	0.137	0.189	0.194	0.127	0.129
N	307	307	307	307	307	307	307	307

Notes: (1)The figures here are the estimated coefficients, with standard errors in parentheses.
(2) * significant at 10%, ** significant at 5%, *** significant at 1%.
The controls include all of the variables presented in Table 3.

Table OA7: 3SL3 regression of in-lab pro-meat justifications and pro-animal engagement on treatment variations and controls.

	In-lab PMJ	Pro-animal score
	(1)	(2)
WELF	-0.0508***	-0.01731
	(0.0113)	(0.0307)
ABOL	-0.0324***	-0.0781**
	(0.0120)	(0.0322)
Online PMJ	0.8516***	
	(0.0355)	
In-lab PMJ		-.4264***
		(0.1116)
Female	-0.00749	0.0434
	(0.0102)	(0.0276)
Public-good contribution (PGC)	9.57e-05	0.0700***
	(0.00766)	(0.0205)
Countryside	0.00274	-0.000475
	(0.00961)	(0.0257)
Religious	-0.0197*	0.0525*
	(0.0112)	(0.0298)
Age	0.00195**	-0.000247
	(0.000811)	(0.00217)
ABC online	-0.00108	0.00457
	(0.00395)	(0.0105)
Leftism	-0.00648	0.0203*
	(0.00410)	(0.0112)
General Trust	0.00263	0.00221
	(0.00256)	(0.00690)
Non-governmental Trust	-0.00274	0.0130
	(0.00439)	(0.0118)
Missing Activism Scores Dummy	0.0115	0.00184
	(0.0136)	(0.0365)
Political activism	0.00165	0.0217**
	(0.00334)	(0.00893)
Non-partisan activism	0.00582	0.0482***
	(0.00481)	(0.0128)
Constant	0.0348	0.647***
	(0.0301)	(0.0832)
Controls	Yes	Yes
R^2	0.794	0.297
N	307	307

Notes: (1)The figures here are the estimated coefficients, with standard errors in parentheses.
(2) * significant at 10%, ** significant at 5%, *** significant at 1%.
(3) The controls include all of the variables presented in Table 3.

Online Appendix 4: Figures

Figure OA1: Average of each argument included in the PMJ index.