**Comparing the effectiveness of COVID-19, animal welfare, personal health, and environmental framing on intentions to choose plant-based alternatives (Phase 1)**

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**Goals:**

1. Examine whether messages that use the COVID-19 pandemic to highlight the risk of disease transmission from factory farms or use the COVID-19 pandemic to highlight the threat to worker’s health created by factory farms are more effective at changing attitudes and behavioral intentions towards plant-based eating, as compared to more traditional messages that highlight the environmental, health, or animal welfare implications of factory farmed meat consumption (Phase 1).

IV= “condition”

Primary DVs= Beh\_intentions1, Beh\_intentions2, Beh\_intentions3

Secondary exploratory DVs= messenger trust, animal adv eval\_1, animal adv eval\_2, animal adv eval\_3, animal adv eval\_4, animal adv eval\_6, animal adv eval\_7, planteating\_beliefs\_1, planteating\_beliefs\_2, planteating\_beliefs\_3, planteating\_beliefs\_4, planteating\_beliefs\_5, planteating\_beliefs\_7, planteating\_beliefs\_8, planteating\_beliefs\_9, planteating\_beliefs\_10, planteating\_beliefs\_11, coalition support

1. Examine what sub-groups various messages may be most effective for (Phase 1).

Hypothesized Moderators:

1. Average of COVID attitudes\_1, COVID attitudes\_2, COVID attitudes\_3
2. pre plant attitudes

**Methods:**

Phase 1:

-Survey experiment with 1,500 representatives of the US population recruited through Prolific survey company; 300 randomly assigned participants in each of the 5 primary message conditions (COVID and worker health, COVID/pandemic framing, environment, human health, animal welfare)

-Two attention checks will be included asking participants to select a particular response to a question; those failing both will be removed from the analysis and not paid.

Attention check 1: animal adv eval\_5= 5; Attention check 2: planteating\_beliefs\_6=3

-Survey items will examine participants’ general attitudes towards COVID-19 and meat and dairy consumption before being exposed to the message. After being exposed to one of the randomly assigned messages, the survey will examine participants’ reaction to the message, trust in the messenger, attitudes towards animal activists, perceived connection between animal farming and various societal outcomes, attitudes and beliefs towards and likelihood of trying plant-based alternatives, as well as their support of a factory farming ban and a coalition working to develop a food system that relies more on plant-based sources.

-We will use linear regressions (and ordinal logistic, as a sensitivity analysis) to examine the impact of message condition on the outcomes described above, both adjusted and unadjusted for demographic and pre-message attitudinal covariates below.

IV= “condition”

Primary DVs= Beh\_intentions1, Beh\_intentions2, Beh\_intentions3

We will consider all pre-message attitudes towards COVID-19 and meat consumption and demographics summarized below as potential covariates. Each potential covariate will be pre-screened using a bivariate likelihood ratio test with the outcome. If the p-value is less than 0.20 the covariate will be included in the model. We will report the results of both unadjusted and adjusted analyses.

Potential adjustment co-variates: Average of (COVID attitudes\_1, COVID attitudes\_2, COVID attitudes\_3), pre plant attitudes, Pre behavioral int, Age, Gender, Race, Education, income, urbanrural, political affiliatio, pets

-The three behavioral intentions items related to choosing plant-based alternatives reported below will be our primary outcomes of interest. The other perceptual outcomes (support of a coalition, factory farming ban, attitudes towards plant-based alternatives, etc) will be exploratory, secondary outcomes. We will adjust for multiple comparisons when interpreting primary outcomes results by dividing the p-value by the number of primary outcomes (3). We will report both unadjusted and adjusted p-values. We will report the unstandardized Beta coefficient of the message condition as the effect size.

Secondary exploratory DVs= messenger trust, animal adv eval\_1, animal adv eval\_2, animal adv eval\_3, animal adv eval\_4, animal adv eval\_6, animal adv eval\_7, planteating\_beliefs\_1, planteating\_beliefs\_2, planteating\_beliefs\_3, planteating\_beliefs\_4, planteating\_beliefs\_5, planteating\_beliefs\_7, planteating\_beliefs\_8, planteating\_beliefs\_9, planteating\_beliefs\_10, planteating\_beliefs\_11, coalition support

-As an exploratory analysis, we will also look at qualitative responses to questions eliciting beliefs about plant-based alternatives and meat consumption by message condition.

Beh\_intention\_reason and Beh\_intentio\_reason2 by condition

Also message reaction by condition

To explore additional barriers and motivations not addressed in messages, could also examine Pre behav expl (why they are/are not limiting animal products before receiving message)

-Participants’ attitudes towards COVID-19 and prior attitudes towards meat/dairy consumption and plant-based alternatives will be examined as a potential moderators of message effects. Prior attitudes towards meat/dairy will be measured with one item (Would you consider your attitudes towards plant-based alternatives to animal products to be positive, negative, or neutral?), while participants’ responses to the attitudes towards COVID-19 scale will be combined into a single metric to be used as a moderator. To determine moderation, we will add an interaction term between the moderators and the message condition to the regression analyses. We will conduct a likelihood ratio test to examine whether adding the interaction terms between these binary attitude variables and message condition significantly improved the model fit.

Hypothesized Moderators:

1. Average of COVID attitudes\_1, COVID attitudes\_2, COVID attitudes\_3
2. pre plant attitudes

-Participants’ trust in the messenger and post-message attitudes/beliefs related to activists, animal agriculture, and plant-based alternatives will be examined as potential mediators of message effects. To examine mediation, we will use the Barron and Kenney (1986) method. Specifically, we will test whether each mediator is correlated with the message condition and any outcomes that were significantly influenced by the message. We will then test whether including these mediators in models reduces the effect of the message condition on the outcome.

Potential mediators/Secondary exploratory DVs= messenger trust, animal adv eval\_1, animal adv eval\_2, animal adv eval\_3, animal adv eval\_4, animal adv eval\_6, animal adv eval\_7, planteating\_beliefs\_1, planteating\_beliefs\_2, planteating\_beliefs\_3, planteating\_beliefs\_4, planteating\_beliefs\_5, planteating\_beliefs\_7, planteating\_beliefs\_8, planteating\_beliefs\_9, planteating\_beliefs\_10, planteating\_beliefs\_11

**Survey:**

Prolific ID Please provide your unique Prolific ID:

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Pre diet How would you describe your diet most of the time?

* Omnivore (eat animal and plant-based products) (1)
* Vegetarian (eat eggs/dairy and plant-based products but no meat) (2)
* Vegan (only eat plant-based products) (3)

Pre behavioral int In the past 5 years, have you tried to reduce your consumption of animal products (i.e., meat, dairy, eggs)?

* Yes (6)
* No (7)

Pre behav expl In a few words, describe why you have or have not tried to reduce your consumption of animal products.

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pre plant attitudes Would you consider your attitudes towards plant-based alternatives to animal products to be positive, negative, or neutral?

* Very negative (1)
* Moderately negative (2)
* Somewhat negative (3)
* Neither negative nor positive (4)
* Somewhat positive (5)
* Moderately positive (6)
* Very positive (7)

**End of Block: Pre Message Veg Attitudes**

**Start of Block: COVID attitudes**

COVID attitudes In the next few questions, we would like to learn a bit more about your perspectives towards the novel coronavirus disease (COVID-19), which is a virus (more specifically, a coronavirus) identified in 2019 as the cause of an outbreak of respiratory illness.   
How acceptable do you think the following public health measures are to slow the spread of COVID-19?

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | Highly unacceptable (1) | Moderately unacceptable (2) | Somewhat unacceptable (3) | Neither (4) | Somewhat acceptable (5) | Moderately acceptable (6) | Highly acceptable (7) |
| Governments not allowing groups of 10 or more people to gather (1) |  |  |  |  |  |  |  |
| Governments requiring face masks in indoor, public locations (2) |  |  |  |  |  |  |  |
| Government-mandated stay-at-home orders and nonessential business closures when cases rise in a certain area (3) |  |  |  |  |  |  |  |

**End of Block: COVID attitudes**

**Start of Block: Messages**

Worker health condition=1: In the next few questions, we would like to understand your response to a message about food systems in the United States.    Please read the following message, which was crafted from recent news articles and scientific papers:     "Slaughterhouse workers suffer from some of the highest rates of injury and dismemberment of any profession. Data from the Occupational Safety and Health Administration (OSHA) from 2014 showed that repetitive motion injuries among slaughterhouse workers were almost seven times that of other private industries. And these health and safety risks are amplified by the COVID-19 pandemic. Some of the largest COVID-19 outbreaks in North America have occurred in meatpacking plants, because physical distancing is difficult on animal disassembly lines. According to the U.S. Center for Disease Control and Prevention, over 3 percent of workers at meat and poultry processing facilities have tested positive for the coronavirus. Workers continue to complain that safety concerns are being ignored, and in Georgia, workers at a slaughterhouse walked off the job due to safety concerns. **Choosing more plant-based alternatives to meat and dairy is one way to demonstrate your opposition to unsafe and unjust working conditions in slaughterhouses and meat-packing plants**."

Pandemic condition=2: In the next few questions, we would like to understand your response to a message about food systems in the United States.    Please read the following message, which was crafted from recent news articles and scientific papers:   "COVID-19 is widely suspected to have originated in a Wuhan wet market, which is a type of informal slaughterhouse. These informal slaughterhouses, along with their more formal counterparts in the factory farming industry, are the perfect place to spread disease. Animals are confined tightly together in unsanitary conditions, and the stress weakens their immune systems. These conditions facilitate disease spread between animals and between animals and people. According to a recent scientific study, many strains of novel influenza viruses currently identified by the Center for Disease Control and Prevention as “of special concern,” can be traced back to commercial poultry production systems. Additionally, studies find that recent influenza viruses such as H1N1 (swine flu) or H5N1 (bird flu) evolved on chicken and pig factory farms. Furthermore, farmers often use antibiotics to try to prevent disease outbreaks and increase animal growth. This contributes to the growing crisis of “antibiotic resistant” bacterial infections, which affect 2.8 million Americans each year. **Choosing more plant-based alternatives to meat and dairy is one way to do your part in preventing future pandemics.**"

Animal welfare condition =3: In the next few questions, we would like to understand your response to a message about food systems in the United States.    Please read the following message, which was crafted from recent news articles and scientific papers:   "Americans spend more than $72 billion a year on their dogs, cats, and other pets to ensure they live happy and healthy lives. At the same time, more than 32 million cattle, 8.5 billion chickens, and 112 million pigs are slaughtered each year for people to consume. Why do we treat these animals so differently? Studies have found that this cannot be explained by differences in animal intelligence; for example, a recent scientific review paper on animal cognition finds that pigs are highly cognitively complex, experience fear, happiness, and pain, and have strong emotional connections to other pigs. Yet, animal farming results in millions of pigs and other farmed animals suffering in unimaginable conditions. Pigs are repeatedly impregnated, for example, and confined in barren metal cages so small the animals are unable to turn around, while piglets who are not growing fast enough are often brutality killed. In fact, not a single federal law protects pigs during their lives at factory farm. **Choosing more plant-based alternatives to meat and dairy is one way to demonstrate your commitment to treating all animals with the same compassion and respect that we give to our own pets.**"

Environment condition=4: In the next few questions, we would like to understand your response to a message about food systems in the United States.    Please read the following message, which was crafted from recent news articles and scientific papers:   "The meat and dairy industry contributes to climate change and environmental degradation. According to a recent scientific study, meat, aquaculture, eggs, and dairy use more than 80% of the world’s farmland and contribute to more than 55% of carbon emissions from food, despite providing only 37% of our protein and 18% of our calories. While some meat production strategies have less environmental impacts than others, a recent scientific paper found that the environmental impacts of the lowest-impact animal products typically exceed those of vegetable substitutes. According to the 2019 Intergovernmental Panel on Climate Change (IPCC), by 2050, shifting the public towards plant-based diets could free up several million square kilometres of land and reduce global CO2 emissions by up to eight billion tonnes per year. **Choosing more plant-based alternatives to meat and dairy is one way to demonstrate your commitment to stopping climate change and improving our environment**."

health condition=5: In the next few questions, we would like to understand your response to a message about food systems in the United States.    Please read the following message, which was crafted from recent news articles and scientific papers:   "A growing body of medical research has suggested that reducing meat consumption and eating a whole food, plant-based diet can improve health. Scientific studies have found that increased long-term consumption of red meat is associated with an increased risk of mortality, cardiovascular disease, colorectal cancer and type 2 diabetes. Further, studies find robust evidence for beneficial effects of plant-based diets versus conventional diets on weight, energy metabolism and systemic inflammation. For these reasons, Mayo Clinic calls a plant-based diet a “win-win-win” for your health. **Choosing more plant-based alternatives to meat and dairy is one way to demonstrate your commitment to improving your health.**"

message reaction What is something that surprised you, interested you, or concerned you about the message above?

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messenger trust To what extent do you think the people who crafted the message above are trustworthy?

* Not at all trustworthy (4)
* Somewhat trustworthy (5)
* Moderately trustworthy (6)
* Very trustworthy (7)
* Extremely trustworthy (8)

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animal adv eval   Please indicate your level of agreement of disagreement with the following statements:  
  
  
Activists against the factory farming of animals are:

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | Strongly disagree (1) | Moderately disagree (2) | Slightly disagree (3) | Neither agree nor disagree (4) | Slightly agree (5) | Moderately agree (6) | Strongly agree (7) |
| Honest (1) |  |  |  |  |  |  |  |
| Annoying (2) |  |  |  |  |  |  |  |
| Truthful (3) |  |  |  |  |  |  |  |
| Misleading (4) |  |  |  |  |  |  |  |
| Select "slightly agree" for this question (5) |  |  |  |  |  |  |  |
| Accurate in their arguments (6) |  |  |  |  |  |  |  |
| Similar to me in their values (7) |  |  |  |  |  |  |  |

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**End of Block: Messages**

**Start of Block: Post beliefs and intentions**

Beh\_intentions1 How likely are you to try replacing animal products with plant-based alternatives (e.g. “impossible burger,” “vegan cheese”) in some of your meals in the next month?

* Not at all likely (1)
* Somewhat likely (2)
* Moderately likely (3)
* Very likely (4)
* Extremely likely (5)

Beh\_intentions2 How likely are you to try to reduce your overall meat consumption in the next month?

* Not at all likely (1)
* Somewhat likely (2)
* Moderately likely (3)
* Very likely (4)
* Extremely likely (5)

Beh\_intentions3 How likely are you to encourage your friends or family to try plant-based alternatives to animal products in the next month?

* Not at all likely (1)
* Somewhat likely (2)
* Moderately likely (3)
* Very likely (4)
* Extremely likely (5)

Beh\_intention\_reason What are some reasons why you would or would not want to try plant-based alternatives to animal products in the future?

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Beh\_intentio\_reason2 What are some reasons why you would or would not want to encourage your friends and family to try plant-based alternatives to animal products in the future?

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planteating\_beliefs Indicate how strongly you agree or disagree with the following statements:

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | Strongly disagree (1) | Moderately disagree (2) | Slightly disagree (3) | Neither agree nor disagree (4) | Slightly agree (5) | Moderately agree (6) | Strongly agree (7) |
| There is a direct connection between raising animals for food and the novel coronavirus. (1) |  |  |  |  |  |  |  |
| There is a link between raising animals for food and climate change. (2) |  |  |  |  |  |  |  |
| There is a link between raising animals for food and the risk of global pandemics. (3) |  |  |  |  |  |  |  |
| There is a link between raising animals for food and antibiotic resistance. (4) |  |  |  |  |  |  |  |
| Plant-based diets are NOT associated with better health outcomes. (5) |  |  |  |  |  |  |  |
| Select "slighty disagree" for this question (6) |  |  |  |  |  |  |  |
| Conditions in factory farms and slaughterhouses can threaten worker safety and health. (7) |  |  |  |  |  |  |  |
| We should ban factory farming. (8) |  |  |  |  |  |  |  |
| Reducing public meat consumption should NOT be a societal goal (9) |  |  |  |  |  |  |  |
| I feel a personal responsibility to choose plant-based alternatives to meat more often. (10) |  |  |  |  |  |  |  |
| People I know would react negatively if I were to choose plant-based alternatives to meat more often. (11) |  |  |  |  |  |  |  |

coalition support Overall, how supportive would you be of a global coalition working to develop a food system that is more focused on plant-based sources, with the intention of mitigating climate change and preventing new pandemics and antibiotic resistance?

* Not at all supportive (1)
* Somewhat supportive (2)
* Moderately supportive (3)
* Very supportive (4)
* Extremely supportive (5)

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**End of Block: Post beliefs and intentions**

**Start of Block: Demographics**

Age Now, we would like to know a bit more about you.  
  
  
What is your age?

* Under 18 (4)
* 18 - 24 (5)
* 25 - 34 (6)
* 35 - 44 (7)
* 45 - 54 (8)
* 55 - 64 (9)
* 65 - 74 (10)
* 75 - 84 (11)
* 85 or older (12)

Gender What is your gender?

* Male (1)
* Female (2)
* Non-binary/third gender (3)
* Prefer not to answer (4)
* Prefer to self-describe (5) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Race Are you... ? (please select one or more categories)

* Black or African American (2)
* White (3)
* Hispanic or Latino (4)
* American Indian or Alaska Native (5)
* Asian (6)
* Native Hawaiian or Other Pacific Islander (7)
* Other (8) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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Education What is the highest degree or level of school you have completed?

* Less than a high school degree (1)
* High school degree or equivalent (2)
* Some college (3)
* 2-year associate's degree or technical school (4)
* 4 –year college degree (5)
* Advanced degree beyond 4-year college degree (6)

income What is your annual household income before taxes?

* Less than 10,000 (1)
* 10,000 to less than 25,000 (2)
* 25,000 to less than 50,000 (3)
* 50,000 to less than 100,000 (4)
* 100,000 to less than 200,000 (5)
* 200,000 or more (6)

urbanrural How would you describe your current residence or community?

* Rural (1)
* Semi-rural (2)
* Suburban (3)
* Urban (4)
* Large city (5)

political affiliatio Do you think of yourself as a Democrat, Republican, or Independent?

* Democrat (1)
* Republican (2)
* Independent (3)

independent polit Do you think of yourself as closer to the Republican party or to the Democratic Party?

* Closer to the Republican party (1)
* Neither (2)
* Closer to the Democratic party (3)

pets Do you have any pets in your household?

* Yes, dog(s) (1)
* Yes, cat(s) (2)
* Yes, other types of pet (3)
* No (4)