

University of British Columbia

Social Ecological Economic Development Studies (SEEDS) Sustainability Program

Student Research Report

The Effects of Gain Frame on Intentions Regarding Meat Consumption

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The Effects of Gain Frame on Intentions Regarding Meat Consumption

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Theme: Developing Strategies to Promote Student Participation in Climate Action Plan 2030,
Sustainability, Diet

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Executive Summary

Ecotopia, in collaboration with the Social Ecological Economic Development Studies (SEEDS) Program, decided to work on developing strategies to promote student participation in the Climate Action Plan 2030. To narrow the scope, we decided to focus on meat consumption. To examine if it is possible to reduce meat consumption and impact behavioural intentions using pro-environmental messaging, we conducted a between-subjects study at UBC Vancouver campus. We were interested in determining whether exposure to a gain frame message would be an effective nudge to reduce meat consumption.

Participants were randomly assigned to one of three different conditions: a gain frame condition (exposure to positive and empowering messaging), a loss frame condition (exposure to an almost identical passage using negative and discouraging messaging), or a control condition (no exposure). We examined differences between responses of these groups regarding environmental concerns, perceived environmental impacts of meat consumption, and interest in environmental issues. Our analysis shows partial statistically significant differences between the three groups, which may be due to a fairly small sample size. However, the trends of the results revealed possible differences if there was a larger varied sample size or if we used different types of media, such as videos or posters.

Key words: gain frame, loss frame, climate change, meat consumption, impact of climate change, climate education, environmental messaging, sustainable behavioral intentions, diet

Introduction

Background Literature:

As a pressing challenge for our society, climate change is scientifically complex, politically charged and has profound implications for ecosystems and societies across all parts of the globe (Kirk et al, 2014). Considering the widespread access to climate science data and the increasing coverage of climate change in the news to expect an increase in the general public's awareness about climate change seems natural. However, many local and regional planners are not aware of the causes of climate change and variability or where to find information about the climate that may be integrated into their operations (Shafer et al, 2009).

The work of Van Valkengoed and Steg (2019) on the other hand reveals that descriptive norms - the perception of peers' engagement in adaptive and sustainable actions, negative affect - a displeasing mental state that people feel encouraged to eliminate, perceived self-efficacy and outcome efficacy of adaptive actions have a significant impact on behavioral changes. O'Neill and Nicholson-Cole (2009) in "Fear Won't Do It" argue that it is not worth scaring people into taking action, particularly if they do not know that their actions can make a difference. If fear appeals are to be used, the viewers must have feasible coping responses (e.g., high self-efficacy and the ability to respond behaviorally) ensure that barriers to engagement are not encountered.

Ros et al. (2020) further discuss the importance of self-efficacy in altering people's behaviors. They point out that climate change represents an urgent public health problem which is growing in scope globally. Despite recent political challenges related to addressing climate change, the public health community is galvanized to engage in safeguarding the health of the world's people and alleviating the suffering related to the deleterious climate-related health consequences that are emerging. According to the authors among the most important climate action challenges is engaging in communication within our families, communities, and populations.

Since animal agriculture is implicated as a major cause of greenhouse gas emissions, animal suffering and public health problems (Bryant, 2019) we, as students in Environmental Psychology, attempted to encourage an easily implementable intervention for reducing meat consumption.

Psychological Insight:

The general approach to self-regulation in which this operationalization of optimism rests assumes that much of life concerns the approach of goals. Expectancies become important primarily when impediments appear. If the person is confident about eventual success, effort continues. If the person is doubtful, there is a tendency to disengage effort. Sometimes, disengagement of effort accompanies continued psychological engagement with the goal, yielding distress. Sometimes, the disengagement is from the goal itself, resulting in failure to attain it. Optimism versus pessimism reflects such expectancies on a broad scale. Given the origin of the optimism construct in a broad view of motivation, it is natural that research has investigated its role in motivation-relevant outcomes in various life situations. (Carver & Scheier, 2014). Lack of knowledge, unwillingness to change current lifestyles, giving up current pleasures, and positive illusions are some of other barriers that cause less engagement with sustainable actions. To promote more engagement in UBC students we can educate them, by using tangible examples to demonstrate how serious and urgent the issue of climate change is and to ease the process of intervention by showing practical solutions such as 'Meatless

Mondays.’ The use of nudges like personalized messages, and education using posters, messages, short clips and statistics to show that every action counts and signs to present critical information can also be really effective.

Research Question and Hypothesis:

Our research question is “Do students feel more inclined to reduce meat consumption when presented with a gain-frame condition compared to a loss-frame condition?”. We hypothesized that the Gain-frame condition will increase students' intentions to reduce meat consumption versus a loss-frame condition.

Methods

Participants:

In order to maintain relevance to UBC’s aim of increasing student engagement in the CAP 2030 our data collection focused only on UBC students. Based on the findings of Van Valkengoed et al (2019) and Ros Viamonte et al. (2020) we anticipated an effective size of 0.4. Through a power analysis we established that in order to achieve a power of 0.8 with an effect size of 0.4, we would need a target of at least 113 UBC participants. Through our data collection we received a total of 137 responses for the online survey. The data analysis was conducted on 137 UBC students, out of which 6 responses were missing. A total of 131 responses were then used for the analysis of the results. This sample population was randomly chosen by sharing the survey on social media groups such as ‘UBC Class of 2021’. A majority of the students were female (N= 101), did not take any courses on environmental or sustainability studies (N = 79), lived off-campus (N=114), and ate meat as a part of their diet either always, often, sometimes, or rarely (N= 115) [See Figure 1, Appendix B]

Conditions:

This study used a between-subjects design where UBC students who took the online survey (Appendix A) were randomly assigned into one of three conditions. The two experimental conditions were the gain frame condition (N= 45), which involved reading a gain passage (positive media message) regarding the benefits e.g. carbon “saving” aspect of eating a plant-based diet; and, the loss frame condition (N= 45) presented a more pessimistic message about the “costs” e.g. “carbon loss” aspect of eating a meat-based diet. Participants who were randomly assigned to the control condition (N= 46) did not read any passage and only answered the online survey.

Measures:

A 5-point Likert Scale was used for 8 multiple-choice questions which were designed to measure the dependent variables, which were the intentions towards a more sustainable diet. The two types of questions asked were on the frequency of a specific behaviour e.g. *how often would you encourage your friends and family to eat less meat?*, and also on how challenging a change in diet would be e.g. *how challenging would it be for you to adopt a plant based diet?* In the scale, 1 measured intentions that were considered less sustainable intentions e.g. “never” encouraging friends and family to eat less meat, and finding it “impossible” to adopt a more plant-based diet. The fifth point on the scale measured more sustainable intentions e.g. “always” encouraging friends and family to eat less meat, and finding it “not at all challenging” to adopt a plant-based diet.

Procedure:

The online survey was conducted using UBC Qualtrics. The survey was published online on UBC student groups such as “UBC Class of 2021” and private UBC class groups such as “PSYCH 319” group. Questions pertained to intentions towards a more sustainable diet with reduced meat-consumption. No incentive was used to encourage participation in our study. After signing the consent form participants in the gain condition read a prosocial message on carbon savings and other benefits e.g. health benefits of consuming a plant-based diet, the loss condition read a more negative message on the carbon costs of consuming a meat-based diet. Conversely, the participants in the control condition did not read any passage at all. After reading the passage, with the control condition reading no passage, the participants answered a short, less than 3 minute long, survey on Qualtrics. Survey questions included 8 total questions pertaining to intentions on moving towards a more plant based diet and 5 demographic questions on the age, diet i.e. how often participants consumed meat, place of residence and on if participants took any environmental sciences or sustainability courses. The survey remained online for a total period of upto 2 weeks, during which time 90 responses were collected under the experimental condition, and a total of 46 responses were collected under the control condition. Overall, the sample size was small but we received a high response rate for the survey with only a total of 6 missing results and the same number of results for our two experimental conditions.

Results

A one-way ANOVA between-subjects statistical analysis was conducted on the survey results. All three conditions were compared to obtain the following results. A *post-hoc* analysis using a Tukey test was done on any significant results with a *p*-value less than $p=.05$. The *post-hoc* analysis was done in order to reveal which of the independent variables i.e. control versus gain versus loss, had the most significant results.

Of our eight dependent variables, three yielded significant results. These three variables had a *p*-value of less than 0.05 (Table A). We then performed a post-hoc in the form of a Tukey Test to determine the conditions where there was significant difference. The other five of our dependent variables yielded insignificant results with *p*-values of more than 0.05 (Table B).

The first significant result, how challenging participants perceived it was to adopt a plant-based diet, found that the gain frame condition ($M=3.46$, $SD=1.00$), only in comparison to the loss frame condition ($M=2.91$, $SD=1.03$), is significantly more effective in increasing intentions for reducing meat intake, $p_{\text{tukey}} 0.021$, $p = 0.026$. This finding supports our hypothesis. Figure 1 indicates that the loss frame condition leads to the idea of adopting a plant based diet as being more challenging, and a gain frame resulting in the switch seemingly being less challenging. Notably, only loss frame participants indicated that it was impossible for them to switch to a plant-based diet. There was no significant result between the control condition ($M=3.11$, $SD=0.78$) and/or the loss and gain frame conditions. This means that loss frame decreases intentions when compared to gain frame, as there is no significant difference between the response averages of gain frame and control. From this, we can conclude that gain frame is preferable to loss frame when there is a goal to increase intentions, but there are no significant benefits to using no exposure compared to gain frame.

The ANOVA test of our next significant result (seen in figures 3 & 4), regarding consideration of climate change and sustainability in one's diet, indicated a very low p-value of .003. The post hoc analysis shows a significant difference between the response averages in both the Gain Frame ($M=3.409$, $SD=1.106$) v. Loss Frame conditions ($M=2.667$, $SD=1.097$) (which has a p-tukey value of .044) and the Control ($M=3.200$, $SD=0.869$) v. Loss Frame conditions (which has a very low p-tukey value of .003). This means that Loss Frame decreases intentions, because there is a significant difference between both the response averages of Gain Frame v. Loss Frame and Control v. Loss Frame, but there is no significant difference between the response averages of Gain Frame v. Control. This allows us to conclude that Gain Frame and no exposure (such as in the Control group) are preferable to Loss Frame when there is a goal to increase intentions, but there are no significant benefits to using no exposure compared to Gain Frame.

The ANOVA test of our final significant result (seen in figures 5 & 6), involving the encouragement of friends and family to engage in meat consumption less frequently, determined a fairly low p-value of .015. The post hoc analysis indicates that there is only a significant difference between the response averages in the Gain Frame ($M=3.023$, $SD=1.210$) v. Loss Frame ($M=2.286$, $SD=1.111$) conditions, which has a low p-tukey value of .011. This means that Loss Frame decreases intentions when compared to Gain Frame, because there is no significant difference between the response averages of Gain Frame v. Control ($M=2.644$, $SD=1.151$). From this we can conclude that Gain Frame is preferable to Loss Frame when there is a goal to increase intentions, but there are no significant benefits to using no exposure compared to Gain Frame.

Conclusion

Participants who received the gain frame increased their consideration for sustainability and climate change as a factor in their diet. They were more likely to adopt a plant-based diet and would further encourage their friends and family to eat less meat when compared with participants who received the loss frame. Participants in the loss frame decreased their consideration for sustainability and climate change as a factor in their diet. Therefore, participants who received the gain frame condition had increased intentions to reduce meat consumption opposed to the participants in the loss frame condition. The hypothesis is partially supported by questions 3, 6 and 7. The interpretation of these results show that the gain frame is preferable to the loss frame when the goal is to increase intentions.

Climate change initiatives that highlight climate change from a loss perspective should be avoided because participants are shown to decrease their consideration for sustainability. Presenting the gain frame led to increased consideration for sustainability and climate change as a factor in their diet. Presenting the loss perspective should be avoided because participants in our study were shown to decrease their consideration for diet sustainability and found it more challenging to adopt a plant-based diet. We recommend that our client incorporate the gain frame in order to increase participant considerations for sustainability and climate change as a factor in their diet and avoid using a loss frame because it has been shown to decrease participant consideration for sustainability and climate change. Climate change is a long-term environmental problem. Therefore, reducing carbon emissions will require adaptation and mitigation solutions that are focused on reinforcing pro-environmental behaviour. Highlighting what participants can

gain from reducing their carbon emissions is a mitigation solution that has been shown to lead to pro-environmental behavior. We recommend that our client implement the gain perspective when advocating for diet sustainability. Showing people the benefits of preventing climate change led to positive changes in that they were more likely to adopt a plant-based diet and would further encourage their friends and family to eat less meat.

Appendix A - References

1. Bryant CJ. We Can't Keep Meating Like This: Attitudes towards Vegetarian and Vegan Diets in the United Kingdom. *Sustainability*. 2019; 11(23):6844. <https://doi.org/10.3390/su11236844>
2. C. S., Carver, C. S., & Scheier, M. F. (2014). *Dispositional optimism* Elsevier. doi:10.1016/j.tics.2014.02.003
3. Ros, A. V., LaRocque, R., Fortinsky, R., & Nicholas, P. (2020). Addressing Climate Change Communication: Effective Engagement of Populations for Climate Action in the US and Globally. *Annals of Global Health*, 86(1), 54. DOI: <http://doi.org/10.5334/aogh.2900>
4. Karin B. Kirk et al. Undergraduate Climate Education: Motivations, Strategies, Successes, and Support, *Journal of Geoscience Education*. 2014, 62:4, 538-549, DOI: [10.5408/13-054](https://doi.org/10.5408/13-054)
5. O'Neill, S., & Nicholson-Cole, S. (2009). "Fear Won't Do It": Promoting Positive Engagement With Climate Change Through Visual and Iconic Representations. *Science Communication*, 30(3), 355–379. <https://doi.org/10.1177/1075547008329201>
6. Shafer, M. A et al. Enhancing climate literacy. In 18th Symposium on Education, American Meteorological Society, Phoenix AZ , 2009, retrieved from https://ams.confex.com/ams/89annual/techprogram/paper_150334.htm
7. UBC Climate action plan 2030 https://planning.ubc.ca/sites/default/files/2019-11/PLAN_UBC_ClimateActionPlan.pdf
8. van Valkengoed, A.M., Steg, L. Meta-analyses of factors motivating climate change adaptation behaviour. *Nature Clim Change* 9, 158–163 (2019). <https://doi-org.ezproxy.library.ubc.ca/10.1038/s41558-018-0371-y>
9. Wolde, B., Lal, P., Harclerode, M., & Rossi, A. (2019). Comparative optimism: Relative risk perception and behavioral response to lead exposure. *Environmental Management*, 63(5), 691-701. doi:<http://dx.doi.org.ezproxy.library.ubc.ca/10.1007/s00267-019-01148-9>
10. Wynes, S., Zhao, J. & Donner, S.D. How well do people understand the climate impact of individual actions? *Climatic Change* 162, 1521–1534 (2020). <https://doi.org/10.1007/s10584-020-02811-5>

Appendix B - Table and Graphs

Table A. One-way Anova Test Results with Tukey post-hoc test.

Dependent Variable	Conditions of Statistical Significance	<i>p</i>	<i>ptukey</i>
How challenging is it for you to adopt a plant-based diet?	Gain Frame and Loss Frame	0.026	0.021
How often will you consider sustainability and climate change as a factor in your diet?	Gain Frame and Loss Frame	0.003	0.003
	Control and Loss Frame		0.044
How often will you encourage your friends and family to eat meat less frequently?	Gain Frame and Loss Frame	0.015	0.011

Table B. One-way Anova Test for Insignificant Results.

Dependent Variable	<i>p</i>
In the future, how often will you consume plant-based protein instead of meat-based protein?	0.409
How often would you like to eat a plant-based meal?	0.957
When eating at a restaurant, how often will you choose plant-based meals?	0.145
When eating at home, how often will you choose plant-based meals?	0.835

When hosting future social gatherings (provided the conditions are safe), how often would you prepare plant-based/meat-free meals for others?

0.322

Figure 1. Bar graph of survey question three - how challenging is it for you to adopt a plant-based diet?

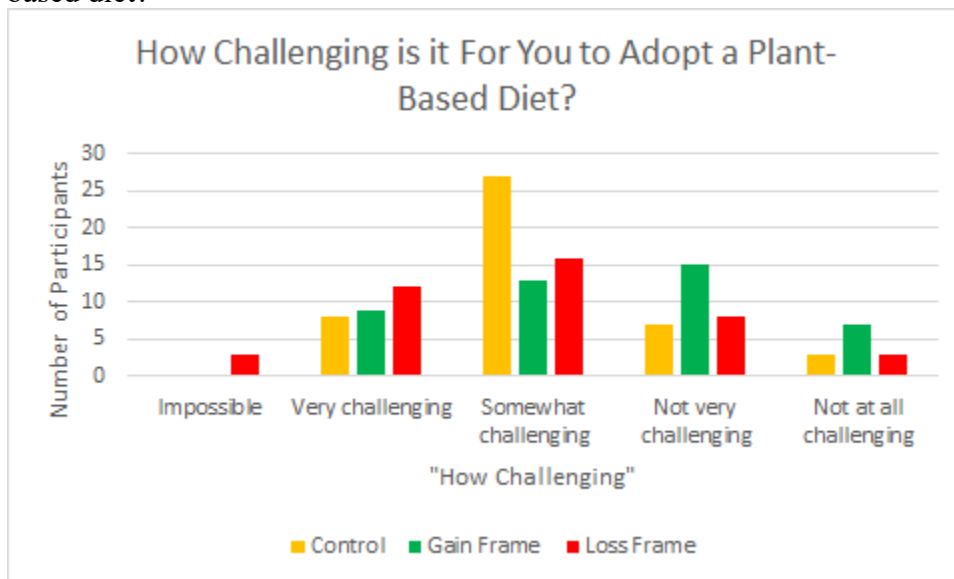


Figure 2. Descriptive plot of survey question three - how challenging is it for you to adopt a plant-based diet?

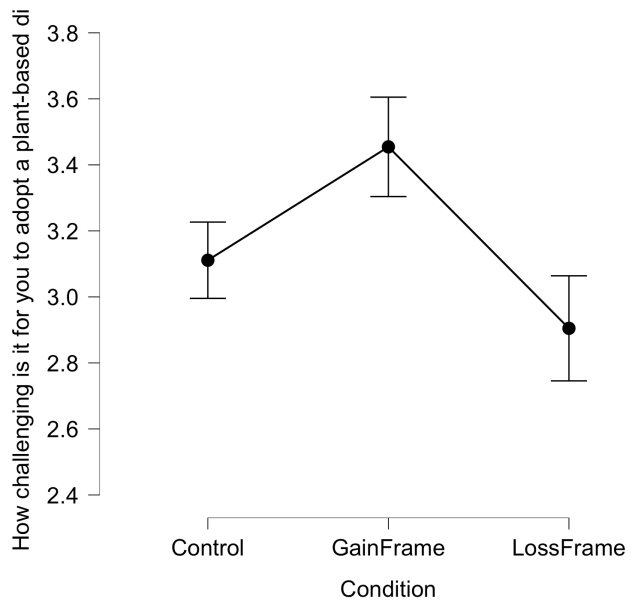


Figure 3. Bar graph of survey question six - how often will you consider sustainability and climate change as a factor in your diet?

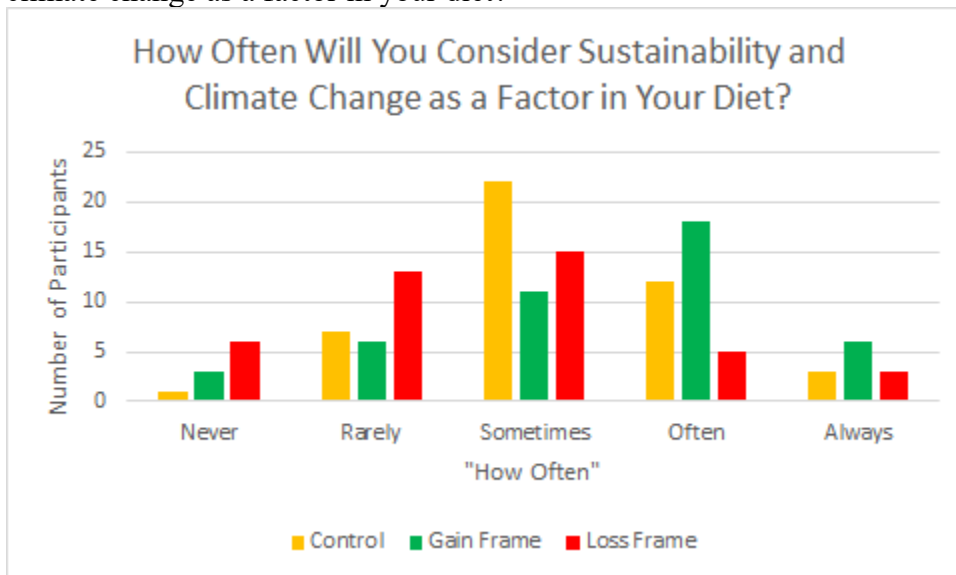


Figure 4. Descriptive plot of survey question six - how often will you consider sustainability and climate change as a factor in your diet?

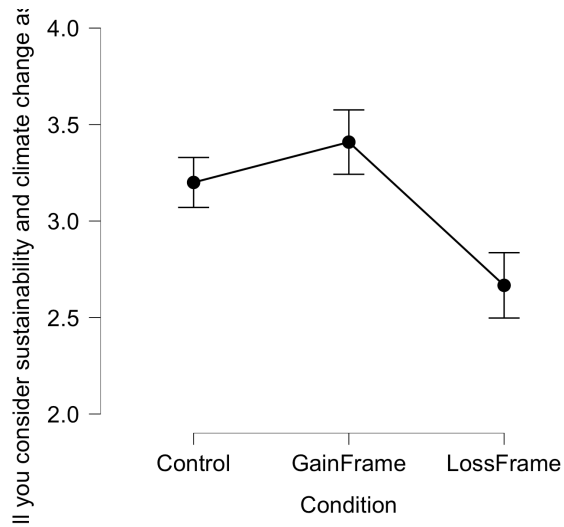


Figure 5. Bar graph of survey question seven - how often will you encourage your friends and family to eat meat less frequently?

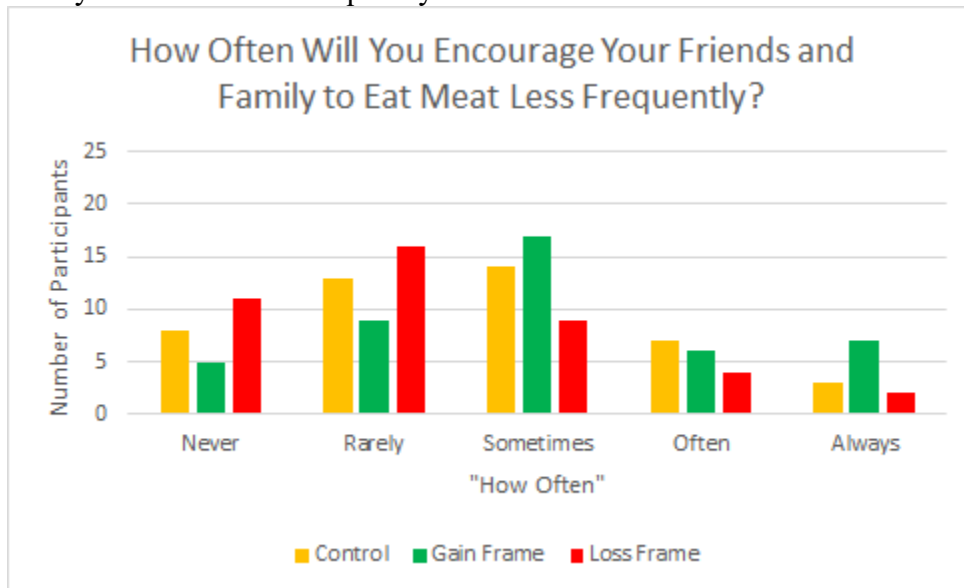
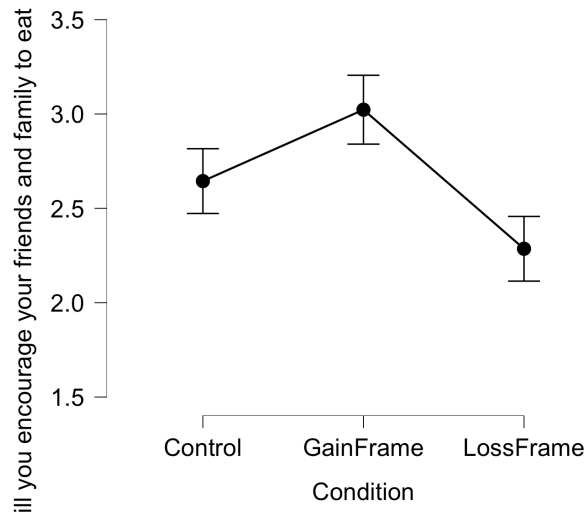


Figure 6. Descriptive plot of survey question seven - how often will you encourage your friends and family to eat meat less frequently?



Appendix C - Survey

Gain Frame Passage

“A plant-based diet has a large carbon saving: it prevents 1800 kg of greenhouse gas emissions per person per year, when compared to a meat-based diet. It increases biodiversity by reducing agriculture land use. Overall, a plant-based diet is the most effective way to save the planet. In addition, a plant-based diet has a wide range of health benefits including a lower risk of heart disease and mortality.”

Reference:

<https://interactive.carbonbrief.org/what-is-the-climate-impact-of-eating-meat-and-dairy/>

Loss Frame Passage

“A meat-based diet has a large carbon cost: it emits an additional 1800 kg of greenhouse gas emissions per person per year, compared to a plant-based diet. It also causes biodiversity loss by increasing agriculture land use. Overall, a meat-based diet is the most effective way to destroy the planet. In addition, a meat-based diet has a wide range of health costs including a higher risk of heart disease and mortality.”

Reference:

<https://interactive.carbonbrief.org/what-is-the-climate-impact-of-eating-meat-and-dairy/>

Survey Questions:

Q1 In the future, how often will you consume plant-based protein instead of meat-based protein?

- Never (1)
- Rarely (2)
- Sometimes (3)
- Often (4)
- Always (5)

Q2 How often would you like to eat a plant-based meal?

- Never (1)
- Rarely (2)
- Sometimes (3)
- Often (4)
- Always (5)

Q3 How challenging is it for you to adopt a plant-based diet?

- Impossible (1)
- Very challenging (2)
- Somewhat challenging (3)
- Not very challenging (4)
- Not at all challenging (5)

Q4 When eating at a restaurant, how often will you choose plant-based meals?

- Never (1)
- Rarely (2)
- Sometimes (3)
- Often (4)
- Always (5)

Q5 When eating at home, how often will you choose plant-based meals?

- Never (1)
- Rarely (2)
- Sometimes (3)
- Often (4)
- Always (5)

Q6 How often will you consider sustainability and climate change as a factor in your diet?

- Never (1)
- Rarely (2)
- Sometimes (3)
- Often (4)
- Always (5)

Q7 How often will you encourage your friends and family to eat meat less frequently?

- Never (1)
- Rarely (2)
- Sometimes (3)
- Often (4)
- Always (5)

Q8 When hosting future social gatherings (provided the conditions are safe), how often would you prepare plant-based/meat-free meals for others?

- Never (1)
- Rarely (2)
- Sometimes (3)

- Often (4)
- Always (5)

Demographics Questions

Q1 What is your age (in years?)

Q2 Which gender do you most identify with?

- Female (1)
- Male (2)
- Transgender Female (3)
- Transgender Male (4)
- Gender Variant/Non-conforming (5)
- Not listed (fill in blank) (6) _____

Q3 Have you taken a course/ courses in environmental sciences or on sustainability?

- Yes (1)
- No (2)

Q4 Do you live on or off-campus?

- On campus (1)
- Off campus (2)

Q5 What diet do you currently subscribe to?

- Eat meat all or most of the time (1)
- Eat meat frequently, but not always (2)

- o Eat meat sometimes (about half the time) (3)
- o Rarely eat meat (4)
- o Never eat meat (5)

Contributions

Anna Johnson: I formulated the topic of research, wrote the entire completed first draft of the project proposal to be edited by the rest of the group, created the usable survey questions and wrote/formatted the full Qualtrics survey, came up with the Likert Scale formatting for the answers to the survey questions, recruited participants through the use of course group chats, and worked on the Results section (script and written portions) of both the project presentation and the final report with Ben. Engaged in discourse/meetings through the use of Zoom, Facebook Messenger, Google Docs, and Canva, and provided guidance to questions regarding the research topic and data analysis throughout the project.

Ben Calvard: Engaged in continuous discourse to help refine and specify aspects of our project throughout all steps. Conducted literature analysis to gather previous research that would help guide our project and the rationale for our hypothesis. Assisted in the survey by working on the gain frame and loss frame passages. Worked on the Results section (with Anna), including creating a table and graphs.

Sanduni Ariyawansa: I contributed to the project by engaging in discussions with my group for all sections of our required course for this semester. We conducted Zoom calls for most of our discussions and others were done collaboratively on platforms like Google Docs and Canva. First I assisted in the writing up of our research proposal, after which we collaborated on designing the survey questions. For the presentation I helped design the presentation which included creating graphs for our three main significant findings, and also by including infographics for our demographics data for relaying our background research and research questions. I was in charge of presenting the methods and design of the study and for completing this section on our final report as well.

Gavin Nijjar: I worked with the group on literature analysis when we were researching for previous research that would help with our project. Continued involvement throughout each step of the research project. Cooperated and assisted group members with the creation of questions for our 1st draft of survey questions. Collaborated on the creation of the Qualtrics survey. Engaged in progress approval and check-in meetings. Worked on the implications of our study and the recommendations we have for our client during the presentation. For the research report, I worked on the discussion section highlighting what our results suggested and its application to

the general population. In addition, I worked on the recommendations for the UBC client section by suggesting actions that our client can take based on our findings.

Mehri Rostami: After the research proposal that was done with the help of Anna, Ben and Sanduni (by reading the articles and getting the ideas and collaborating Background Literature, Psychological Insight, etc of the proposal), me and Sanduni prepared the first draft of the survey questions. I collaborated with the other members to recruit UBC students by sharing the Qualtrics link among my classmates and teammates from other courses. Sanduni and I performed the data analysis including Descriptive Analysis for all the collected data, prepared the interpretation of the data and worked on the PowerPoint presentation, by dividing it into two parts (I worked on the first half and Sanduni worked on the second half). Then for the Final report I wrote the Executive Summary and Introduction sections of the report as the introduction was the part that was presented by me. Besides participating in all Zoom meetings with the other group members, I also had several meetings with the instructor and TAs to discuss the issues and questions that we had and (when I was alone in those meetings) tried to transfer what was told during the meeting (like how to use JASP to run the data analysis) to the absent members of the team.