UBC Social Ecological Economic Development Studies (SEEDS) Sustainability Program

Student Research Report

Plant Based Diets: Effects of Framing on Willingness to Adopt Plant-Based Diets

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Abstract

This paper examines the effects of framing on willingness to adopt a plant-based diet. Framing involves the presentation of either a gain frame or a loss frame of the definition of a plant-based diet. The hypothesis is that a gain frame will increase the number of days per week a participant is willing to adopt the diet when compared to a loss frame. To test the hypothesis, an online survey was distributed through social media and UBC course website channels. Participants (N=152) were randomly assigned to one of three of the conditions. Additional survey items investigated participants' perceptions of the composition of a plant-based diet and their top barriers in adopting a plant-based diet. A one-way between subjects ANOVA was conducted. There was a significant effect of framing on willingness to adopt a plant-based diet at the $p<0.1$ level for the three conditions [$F(2)=2.550$, $p=0.081$]. A post-hoc Tukey test showed the difference between control-loss and loss-gain is significant (Ptukey=0.143 and 0.114 respectively) and the difference between control-gain is not significant (Ptukey=0.996). A weighted sum model determined routine as the top-rated barrier in adopting a plant-based diet. The implications of these findings have practical applications relevant to UBC Food Services.

Research has long supported the benefits of eating fruits and vegetables. The pursuit of a vegetarian diet for health reasons has been documented since the 18th century (Slavin & Lloyd, 2012). Vegetarian diets have been associated with decreased risk of cardiovascular disease, cancer, obesity, hypertension, dementia, diabetes, and other chronic diseases while being positively associated with increased immune functioning among other benefits (Key, Davey, & Appleby, 2007; American Dietetic Association 2009). Beyond personal health, widespread adoption of low meat/vegetarian diets could play a significant role in climate change mitigation (Stehfest et al., 2009). Despite the clear benefits, many adults in Canada fail to meet the minimum recommended fruit and vegetable consumption recommendations, with only approximately 50% of females and 40% of males consuming at least five servings per a day (Statistics Canada, 2016). Several studies have examined how to promote the adoption of a plant-based diet by highlighting the health or environmental benefits (de Boer & Aiking, 2012). However, the literature review revealed no studies have yet explored the use of a loss or gain frame to describe the components of a plant-based diet. Tversky and Kahneman (1981) were the first to explore the framing effect in which they found that the decision to pick one of two identical outcomes was influenced by whether the outcomes were phrased as a loss or gain. Levin (1987) expanded on framing within the context of consumer behavior and found that positive framing led to more positive evaluations of a product. Within the context of plant-based diets, defined as a diet consisting of fruits, vegetables, grains, legumes, nuts, and seeds (Lea, Crawford, & Worsley, 2006), a gain frame emphasizes the contents of the diet while a loss frame emphasizes the exclusion of animal products such as meat, dairy, fish, and eggs. Based on this, we seek to explore: how does framing of a plant-based diet impact the willingness to adopt a plant-based diet? We hypothesize that a gain frame of the definition of a plant-based diet will increase the number of days per week a participant is willing to adopt the diet when compared to a loss frame.

Methods

Participants

The participant sample consisted of 152 participants, of which 93 females, 56 males, two who identified as ‘other’, and one who preferred not to say. The mean age was 24 years old, with a standard deviation of 8.181 years. 110 of the 152 participants were university students (see Appendix B, Table 15).

Materials and Procedure

The study consisted of an online survey with 16 questions (see Appendix A) which was distributed via a link on social media and UBC Psychology course blogs over the span of two weeks. The survey contained five main sections:

Framing. Participants were randomly assigned to one of three conditions for the initial question, which asked about the number of days per a week they were willing to adopt a plant-based diet under one of three frames.

Conditions. The three frames were gain frame, loss frame, and control. The gain frame emphasized the contents of the diet “... consisting solely of vegetables, fruits, seeds, nuts, legumes and grain”, whereas the loss frame emphasized that the diet “... does not contain animal products such as meat, fish, dairy, or eggs”. The term “plant-based diet” was used as the control (see Appendix A).

Current diet. Participants were asked about the contents of their current diet and the frequency and amount of animal product consumption on a weekly basis.

Perception of, and obstacles to, a plant-based diet. Participants were assessed on their perception of the composition of a plant-based diet by asking them what percentage of a plant-based diet was comprised of animal products. They were also asked to rank personal obstacles to adopting a plant-based diet. Some of the obstacles included price, taste, availability, protein content, other, etc. (see Appendix A).

Activity level. Participants were asked to provide the number of hours that they engaged in vigorous activity (AHA, 2014) during their average week.

Demographics. Age, gender, income, and university student status were assessed.

Results

Descriptive statistics

The mean number of hours of vigorous activity was 3.717 hours per week, with a standard deviation of 2.683 hours. Of the barriers mentioned in 'other', most were related to medical reasons or similar reasons as the ones the participants could have selected. For the control condition, the willingness to adopt a plant-based diet was 3.020 days a week (SD=2.287). For the gain frame, the mean number of days willing to adopt a plant-based diet is 3.058 days a week (SD= 2.516) and for the loss frame 2.157 days (SD= 1.994) (see Appendix B, Table 15). Perception of a plant-based diet was studied by asking the participants what percentage of a plant-based diet they thought consists of plants. For all conditions, the mode was 100, indicating most participants thought 100% of a plant-based diet consisted of fruits, vegetables, grains, legumes, nuts, and seed and 0% of animal-based products like meat, dairy, fish and eggs (see Appendix B, Table 8, Table 11, and Table 14).

Main effect

Framing has a marginally significant effect on willingness to adopt a plant-based diet. A one-way between subjects ANOVA was conducted to compare the effect of framing on willingness to adopt a plant-based diet in control, gain frame and loss frame conditions. There was a significant effect of framing on willingness to adopt a plant-based diet at the $p<0.1$ level for the three conditions [$F(2)=2.550$, $p=0.081$] (see Appendix B, Table 1 and Figure 1). When studying significance of the differences between the conditions using post hoc comparisons, it can be seen that the difference between control-loss and loss-gain is significant (Ptukey=0.143 and 0.114 respectively). The difference between control-gain is not significant (Ptukey=0.996). The effect size of control-loss is Cohen's d=0.403, for loss-gain Cohen's d=-0.396, which can be classified as small to medium effects (see Appendix B, Table 2). Most likely, these effects are small due to the relatively small number of subjects in the sample. Framing does not have a significant effect on current consumption or on the perception of a plant-based diet ($p=0.300$ and $p=0.739$ respectively) (see Appendix B, Table 3).

Willingness and perception. For the gain frame, a significant correlation was found between willingness to adopt the diet and perception ($p=0.007$, Pearson's $r=-0.368$) (see Appendix

B, Table 10). There was no significant correlation for the control condition and the loss frame condition ($p=0.692$ and $p=0.981$ respectively) (see Appendix B, Table 7 and Table 13).

Barriers to adopting a plant-based diet. The barriers were analyzed across all conditions collectively since the survey provided a common definition of a plant-based diet prior to the barriers question. By providing the definition, the participants were removed from their respective conditions for the remainder of the survey. Using a weighted sum model, the major barrier to adopting a plant-based diet was that participants did not want to change their eating habits or routine. Willpower was the second highest barrier and price the third (see Appendix B, Table 4). A Pearson's correlation was run to assess the relationship between the barriers to adopting a plant-based diet, namely willpower, nutrients/protein, taste, routine, lack of information, family, availability, and expense, as well as vigorous activity within all of the participants. The significant correlations at $p<0.05$ are between willpower and expense ($r=-0.166$), willpower and vigorous activity ($r=0.170$), willpower and availability ($r=-0.168$), nutrients and vigorous activity ($r=-0.176$), expense and routine($r=-0.192$), and family and availability ($r=-0.176$). The significant correlations at $p<0.01$ are between lack of information and willpower ($r=-0.234$), and taste and nutrients ($r=-0.220$). The significant correlations at $p<0.001$ are between family and taste ($r=-0.304$), lack of information and routine ($r=-0.397$), and availability and routine ($r=-0.297$) (see Appendix B, Table 5).

Discussion

The hypothesis that a gain frame will increase the willingness to adopt the diet when compared to a loss frame was supported because the gain frame was marginally different than the loss frame. There was no difference between the control and gain frame results. The implications of our findings are substantial. If, by using a gain frame instead of a loss frame, people would be willing to adopt a plant-based diet for three days a week instead of two, this would have an enormous positive impact on the environment. Non-vegetarian diets require 2.9 times more water, 2.5 times more primary energy, 13 times more fertilizer, and 1.4 times more pesticides than a vegetarian diet (Marlow et al., 2009). The livestock sector accounts for 18% of global greenhouse gas emissions and 80% of anthropogenic land use (Stefhest et al., 2009). These numbers are for a vegetarian diet – a full plant-based diet would have an even bigger impact.

The results indicated the main barriers were changing routines, lack of willpower, and price. This is consistent with literature: attachment towards meat is the main barrier to a shift towards a more plant-based diet (Graça, Calheiros & Oliveira, 2015). Meat attachment consists of four dimensions: hedonism, affinity, entitlement, and dependence. Consumers who are high in meat attachment are less likely to substitute meat. For future research, it would be interesting to discover what makes consumers score higher in meat attachment. Significant correlations were found between some of the barriers. Participants who indicated the attitude of their friends and family was a major barrier, stated taste was not a big barrier. Individuals who did not state taste as a barrier were perhaps under normative social influence as it was peer pressure that prevented them from changing their diet choices. For participants who thought changing routines was not a barrier for adopting the diet, information was a major problem. These participants could be provided with more information about the benefits of adopting plant-based diets, as they stated changing their routines is not the problem. Availability and routine were negatively correlated, indicating that for people who did not want to change their routines, the availability of plant-based products was not

a major challenge. This means even if availability increases, people who do not want to change their habits will not be affected.

Recommendations

When analyzing the results and implications of this study, there are several recommendations to improve sustainability at UBC. First, when advocating or advertising a plant-based diet to students and staff, the UBC Botanical Garden ought to avoid loss framed messages and use gain frames or simply plant-based diets instead. For example, instead of "say no to meat" replace it with "say yes to falafel (or vegetables, etc.)". When advertising food options on campus, signs saying "cheese burger with no meat, no cheese, no eggs, no dairy" will leave people asking, "What's left?" Instead, when offering a plant-based burger, consider using "cheeze burger with cashew cheeze, 32g protein, 10g fiber" to promote the contents of the food product.

Moreover, when assessing the perceived barriers to adopting a plant-based diet, the UBC Botanical Garden can work in partnership with UBC student-led groups such as the UBC Vegan, Sprouts, and other veg-friendly food services to host educational workshops, campaigns, or other outreach opportunities. These opportunities can educate on how to start and structure a healthy plant-based diet and address the common barriers or misconceptions such as: "plant-based food tastes gross", "it's too expensive to be vegan", "I don't have the time to change my eating habits", "finding plant-based options is too hard", "I need meat for my protein" and many more. UBC President, Santa Ono, may be able to help raise awareness for the cause as can be seen with his supportive tweet for the UBC Vegan Club (see Appendix C). Lastly, in an effort to raise awareness and combat the number six barrier, taste, to adopting the plant-based diet, the UBC Botanical Garden may want to promote pop-up taste tests in collaboration with UBC Food Services as a marketing tactic. Providing blind taste testing of high quality plant-based meat alternatives can introduce people to tasty, high-quality plant-based alternatives.

Overall, the recommendations stem from a root of avoiding negativity. That is, framing the diet in terms of gains rather than losses, what benefits stem from the switch, rather than what is lost by giving up meat.

Limitations and Future Studies

The study was limited by use of a convenience sample and small sample size. Additionally, the study measures an individual's self-reported willingness to adopt a plant-based diet as a condition of framing, however, it does not measure the real up-take of the diet. Although individuals report an intention to change their diet, this does not guarantee a change in their behaviour. According to existing literature, this intention-behaviour gap can best be bridged by raising involvement, perceived consumer effectiveness, certainty, social norms, and perceived availability (Vermeir & Verbeke, 2006). Other effective measures are planning, perceived self-efficacy, and action control (Sniehotta, Scholz & Schwarzer, 2005). Future studies may benefit from longitudinal study design and may be able to study the conversion of willingness to behavioural change. Alternatively, studies could observe how framing on food item labeling effect sales.

Another issue lies in the phrasing of the gain frame, "How many days a week are you willing to adopt a diet consisting *solely* of vegetables, fruits, seeds, nuts, legumes and grain?" the usage of the word "solely" could have negatively impacted the strength of the gain frame in relation to both the control and loss frames (see Appendix A). Future studies should look to analyze the impacts of having limiting words such as only and solely in the gain frame. There is a possibility

that the effect between gain-loss could have been larger by omitting these limiting words. Further research into phrasing should also be looked into, such as whether utilizing a more negatively associated word like vegan instead of plant-based further affect the results.

As this report is written to help the UBC Botanical Garden, the participant sample consists mainly of university students. To apply the implications of this report to a more general public, a broader and more representative participant sample is required to ensure generalizability.

References

American Heart Association [AHA]. (2014, March). Moderate to Vigorous - What is your level of intensity? Retrieved from http://www.heart.org/HEARTORG/HealthyLiving/PhysicalActivity/FitnessBasics/Moderate-to-Vigorous---What-is-your-level-of-intensity_UCM_463775_Article.jsp#.WsQOaIgbM2x

Craig, W. J., & Mangels, A. R. (2009). Position of the American Dietetic Association: vegetarian diets. *Journal of the American dietetic association*, *109*(7), 1266-1282.

de Boer, J., & Aiking, H. (2017). Pursuing a low meat diet to improve both health and sustainability: How can we use the frames that shape our meals? *Ecological Economics*, *142*, 238-248.

Graça, J., Calheiros, M. M., & Oliveira, A. (2015). Attached to meat? (Un) Willingness and intentions to adopt a more plant-based diet. *Appetite*, *95*, 113-125.

Key, T. J., Davey, G. K., & Appleby, P. N. (1999). Health benefits of a vegetarian diet. *Proceedings of the Nutrition Society*, *58*(02), 271-275. doi:10.1017/s0029665199000373

Levin, I. P., & Gaeth, G. J. (1988). How consumers are affected by the framing of attribute information before and after consuming the product. *Journal of Consumer Research*, *15*(3), 374. doi:10.1086/209174

Marlow, H. J., Hayes, W. K., Soret, S., Carter, R. L., Schwab, E. R., & Sabate, J. (2009). Diet and the environment: does what you eat matter?–. *The American journal of clinical nutrition*, *89*(5), 1699S-1703S.

Slavin, J. L., & Lloyd, B. (2012). Health benefits of fruits and vegetables. *Advances in nutrition*, *3*(4), 506-516.

Statistics Canada. (2016, September 28). Fruit and vegetable consumption. Retrieved from http://www.statcan.gc.ca/pub/82-229-x/2009001/deter/fvc-eng.htm

Stehfest, E., Bouwman, L., Van Vuuren, D. P., Den Elzen, M. G., Eickhout, B., & Kabat, P. (2009). Climate benefits of changing diet. *Climatic Change*, *95*(1-2), 83-102. doi:10.1007/s10584-008-9534-6

Sniehotta, F. F., Scholz, U., & Schwarzer, R. (2005). Bridging the intention–behaviour gap: Planning, self-efficacy, and action control in the adoption and maintenance of physical exercise. *Psychology & Health*, *20*(2), 143-160.

Tversky, A., & Kahneman, D. (1981). The framing of decisions and the psychology of choice. *Science, 211*(4481), 453-458. doi:10.1126/science.7455683

Vermeir, I., & Verbeke, W. (2006). Sustainable food consumption: Exploring the consumer "attitude–behavioral intention" gap. *Journal of Agricultural and Environmental ethics*, *19*(2), 169-194.

Appendix

APPENDIX A: Survey on wellness

Start of Block: Default Question Block
Q1
Consent Form Class Research Projects in PSYC 321 - Environmental Psychology
Principal Investigator:
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Department of Psychology Institute for Resources, Environment and Sustainability Email: jiayingz@psych.ubc.ca
Introduction and Purpose Students in the PSYC 321 – Environment Psychology class are required to complete a research project on the UBC campus as part of their course credit. In this class, students are required to write up a research proposal, conduct a research project, analyze data, present their findings in class, and submit a final report. Their projects can include surveys, observations, and simple experiments on waste sorting on campus, student health and wellbeing, food consumption and diet, biodiversity perception, and exercise habits. The goal of the project is to train students to learn research techniques, how to work in teams and work with UBC clients selected by the UBC SEEDS (Social Ecological Economic Development Studies) program.
Study Procedures If you agree to participate, the study will take about 5 minutes of your time. You will answer a few questions in the study. The data will be strictly anonymous. Your participation is entirely voluntary, and you can withdraw at any point without any penalty. Your data in the study will be recorded (e.g., any answer you give) for data analysis purposes. If you are not sure about any instructions, please do not hesitate to ask. Your data will only be used for student projects in the class. There are no risks associated with participating in this experiment.
Confidentiality Your identity will be kept strictly confidential. All documents will be identified only by code number and kept in a locked filing cabinet. You will not be identified by name in any reports of the completed study. Data that will be kept on a computer hard disk will also be identified only by code number and will be password protected so that only the principle investigator and course instructor, Dr. Jiaying Zhao and the teaching assistant will have access to it. Following the completion of the study, the data will be transferred to a password protected hard drive and stored in a locked filing cabinet. Please note that the results of this study will be used to write a report which is published on the SEEDS library.
Remuneration There is no remuneration for your participation.
Contact for information about the study This study is being conducted by Dr. Jiaying Zhao, the principal investigator. Please contact her if you have any questions about this study. Dr. Zhao may be reached at (604) 827-2203 or jiayingz@psych.ubc.ca.
Contact for concerns about the rights of research subjects If you have any concerns or complaints about your rights as a research participant and/or your experiences while participating in this study, contact the Research Participant Complaint Line in the UBC Office of Research Ethics at 604-822-8598 or if long distance e-mail RSIL@ors.ubc.ca or call toll free 1-877-822-8598.
Consent Your participation in this study is entirely voluntary and you may refuse to participate or withdraw from the study at any time without jeopardy to your class standing. You may also withdrawal from the experiment at any time during or after your participation and request that your

data be deleted. Please feel free to ask the experimenter any additional questions you may have about the study.

By clicking the button below, you acknowledge that your participation in the study is voluntary and that you are aware that you may choose to terminate your participation in the study at any time and for any reason.

o I agree (1)

o I do not agree (2)

End of Block: Default Question Block

Start of Block: Block 1 Control

Q2a How many days a week are you willing to eat a plant-based diet?

o 0 days a week (1)

o 1 day a week (2)

o 2 days a week (3)

o 3 days a week (4)

o 4 days a week (5)

o 5 days a week (6)

o 6 days a week (7)

o 7 days a week (8)

End of Block: Block 1 Control

Start of Block: Block 2 Loss

Q2b How many days a week are you willing to eat a diet that does not contain animal products such as meat, fish, dairy, or eggs?

o 0 days a week (1)

o 1 day a week (2)

o 2 days a week (3)

o 3 days a week (4)

o 4 days a week (5)

o 5 days a week (6)

o 6 days a week (7)

o 7 days a week (8)

End of Block: Block 2 Loss

Start of Block: Block 3 Gain

Q2c How many days a week are you willing to eat a diet that solely contains vegetables, fruits, seeds, nuts, legumes, and grains?

- o 0 days a week (1)
- o 1 day a week (2)
- o 2 days a week (3)
- o 3 days a week (4)
- o 4 days a week (5)
- o 5 days a week (6)
- o 6 days a week (7)
- o 7 days a week (8)

End of Block: Block 3 Gain

Start of Block: Block 4 Questions

Q3 To you, a plant based diet consists of which of the following? (Answers must total to 100%)
Animal products such as meat, fish, dairy, and eggs : _____ (1)
Vegetables, fruits, seeds, nuts, legumes, and grains : _____ (2)
Total : _____

Q4 How many days a week do you currently consume any animal products such as meat, fish, dairy, or eggs?

- o 0 days a week (1)
- o 1 day a week (3)
- o 2 days a week (4)
- o 3 days a week (5)
- o 4 days a week (6)
- o 5 days a week (7)
- o 6 days a week (8)
- o 7 days a week (9)

Display This Question:
If How many days a week do you currently consume any animal products such as meat, fish, dairy, or e... != 0 days a week

Q5 On the days you consume animal products, what percentage of your average meal consists of animal products (such as meat, fish, dairy, or eggs)?

0 20 40 60 80 100

Percentage of meal consisting of animal products (1)	

Display This Question:
If How many days a week do you currently consume any animal products such as meat, fish, dairy, or e... != 0 days a week

Q6 A plant-based diet is a diet that contains vegetables, fruits, seeds, nuts, legumes and grains and no animal products such as meat, fish, dairy, or eggs. What do you perceive as obstacle to adopting a plant-based diet? (rank 1 being biggest obstacle)

_____ Plant-based meals don't contain enough nutrients and/or protein (1)
_____ I don't like the taste (2)
_____ I don't want to change my eating habits or routine (5)
_____ I need more information about plant-based diets (6)
_____ My family/partner does not want to eat a plant-based diet (7)
_____ Plant-based meals or snacks are not available (8)
_____ Plant-based meals or snacks are too expensive (9)
_____ I don't have enough willpower (10)
_____ Other (4)

Display This Question:
If How many days a week do you currently consume any animal products such as meat, fish, dairy, or e... != 0 days a week

Q7 If there's a barrier for you not mentioned above, please describe it

_____

Q8 How many hours of vigorous activity do you participate in during your typical week? Examples of vigorous activity are running, weight lifting, biking over 10 mph, lap swimming, sports, jump roping, uphill hiking, and singles tennis.

o 0-2 hours a week (1)
o 3-5 hours a week (2)
o 6-8 hours a week (3)
o Over 9 hours a week (4)

Q9 Who pays for your groceries?

- o Yourself (1)
- o A parent or guardian (2)
- o A significant other (3)
- o Roommate (4)
- o Other (5)

Q10 Who selects your groceries?

- o Yourself (1)
- o A parent or guardian (2)
- o A significant other (3)
- o Roommate (4)
- o Other (5)

Q11 Can you estimate in which of the following groups your personal annual income falls?

- o Less than $30,000, including income loss (1)
- o $30,000 and more (2)

Display This Question:
If Can you estimate in which of the following groups your personal annual income falls? = Less than $30,000, including income loss

Q12 Was your personal annual income…?

- o Less than $5,000 (1)
- o $5,000 to less than $10,000 (2)
- o $10,000 to less than $15,000 (3)
- o $15,000 to less than $20,000 (4)
- o $20,000 to less than $25,000 (5)
- o $25,000 to less than $30,000 (6)

Display This Question:
If Can you estimate in which of the following groups your personal annual income falls? = $30,000 and more

Q13 Was your personal annual income…?

- o $30,000 to less than $40,000 (1)
- o $40,000 to less than $50,000 (2)
- o $50,000 to less than $60,000 (3)

- o $60,000 to less than $70,000 (4)
- o $70,000 to less than $80,000 (5)
- o $80,000 to less than $90,000 (6)
- o $90,000 to less than $100,000 (7)
- o $100,000 and over (8)

Q14 How old are you? (input your age in years numbers only)

_____

Q15 What is your gender?

- o Female (2)
- o Male (1)
- o Other (3)
- o Prefer not to say (4)

Q16 Are you a university student?

- o Yes (1)
- o No (2)

APPENDIX B: Results

Table 1 Framing on Willingness

ANOVA – Willingness ▼

Cases	Sum of Squares	df	Mean Square	F	p
Conditions	26.442	2.000	13.221	2.550	0.081
Residual	772.552	149.000	5.185		

Note. Type III Sum of Squares

Table 2 Post Hoc framing on willingness

Post Hoc Comparisons – Conditions

		Mean Difference	SE	t	Cohen's d	p_{tukey}
control	gain frame	−0.037	0.453	−0.082	−0.015	0.996
	loss frame	0.864	0.455	1.896	0.403	0.143
gain frame	loss frame	0.901	0.449	2.007	0.396	0.114

Note. Cohen's d does not correct for multiple comparisons.

Descriptives Plot ▼

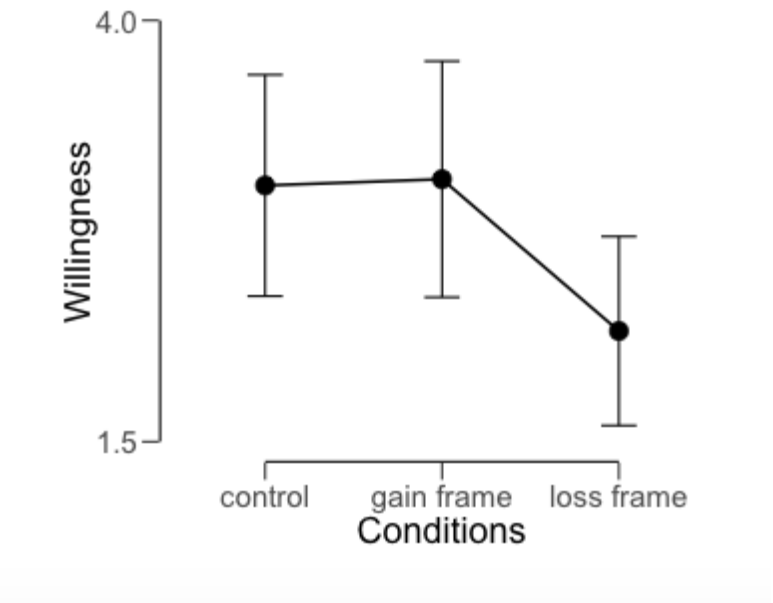

Figure 1 Framing on willingness

Table 3 Framing on perception and current consumption

ANOVA

ANOVA – Q3_1 share of animal products

Cases	Sum of Squares	df	Mean Square	F	p
Conditions	250.800	2.000	125.400	0.303	0.739
Residual	61610.194	149.000	413.491		

Note. Type III Sum of Squares

ANOVA

ANOVA – Q4 current animal consumption

Cases	Sum of Squares	df	Mean Square	F	p
Conditions	8.062	2.000	4.031	1.214	0.300
Residual	494.780	149.000	3.321		

Note. Type III Sum of Squares

Table 4 Barriers weighted sum model

Barrier	**Named as #1**	**Named as #2**	**Named as #3**	**Total score**
Routine	30	23	19	155
Taste	9	14	12	73
Nutrients	19	16	20	109
Info	12	13	23	85
Family	21	12	13	100
Available	5	10	10	45
Price	12	29	22	116
Willpower	24	23	16	134
other	14	6	6	60

Table 5 Correlations between barriers

Pearson Correlations ▼

		Q8 Vigorous Activity	Q6_10 willpower	Q6_1 nutrients/protein	Q6_2 taste	Q6_5 routine	Q6_6 lack information	Q6_7 family	Q6_8 not available
Q8 Vigorous Activity	Pearson's r	—							
	p-value	—							
Q6_10 willpower	Pearson's r	0.170	—						
	p-value	0.044	—						
Q6_1 nutrients/protein	Pearson's r	−0.176	−0.137	—					
	p-value	0.037	0.105	—					
Q6_2 taste	Pearson's r	−0.060	−0.047	−0.220	—				
	p-value	0.483	0.582	0.009	—				
Q6_5 routine	Pearson's r	−0.065	−0.046	−0.066	−0.068	—			
	p-value	0.443	0.588	0.435	0.420	—			
Q6_6 lack information	Pearson's r	0.061	−0.234	−0.014	−0.136	−0.397	—		
	p-value	0.473	0.005	0.865	0.107	< .001	—		
Q6_7 family	Pearson's r	0.154	0.005	−0.083	−0.304	−0.062	−0.067	—	
	p-value	0.068	0.956	0.331	< .001	0.464	0.428	—	
Q6_8 not available	Pearson's r	0.031	−0.168	−0.121	−0.160	−0.297	0.012	−0.176	—
	p-value	0.714	0.047	0.152	0.059	< .001	0.884	0.037	—
Q6_9 expensive	Pearson's r	0.057	−0.166	−0.116	−0.064	−0.192	0.019	−0.087	0.077
	p-value	0.501	0.050	0.172	0.451	0.023	0.819	0.303	0.367

Table 6 Control on willingness

Descriptive Statistics ▼

	Willingness
Valid	49
Missing	0
Mean	3.020
Std. Deviation	2.287
Minimum	0.000
Maximum	7.000

Table 7 Control on perception

Pearson Correlations

		Willingness	Q3_1 share of animal products
Willingness	Pearson's r	—	
	p-value	—	
Q3_1 share of animal products	Pearson's r	−0.058	—
	p-value	0.692	—

Table 8 Control perception

Descriptives

Descriptive Statistics

	Q3_2 share of vegetables
Valid	49
Missing	0
Mean	86.327
Mode	100.000
Std. Deviation	19.439
Minimum	20.000
Maximum	100.000

Table 9 Gain frame on willingness

Descriptive Statistics ▼

	Willingness
Valid	52
Missing	0
Mean	3.058
Std. Deviation	2.516
Minimum	0.000
Maximum	7.000

Table 10 Gain frame on perception

Pearson Correlations

		Willingness	Q3_1 share of animal products
Willingness	Pearson's r	—	
	p-value	—	
Q3_1 share of animal products	Pearson's r	−0.368	—
	p-value	0.007	—

Table 11 Gain frame perception

Descriptives

Descriptive Statistics

	Q3_2 share of vegetables
Valid	52
Missing	0
Mean	83.288
Mode	100.000
Std. Deviation	23.414
Minimum	20.000
Maximum	100.000

Table 12 Loss frame on willingness

Descriptive Statistics

	Willingness
Valid	51
Missing	0
Mean	2.157
Std. Deviation	1.994
Minimum	0.000
Maximum	7.000

Table 13 Loss frame on perception

Pearson Correlations

		Willingness	Q3_1 share of animal products
Willingness	Pearson's r	—	
	p-value	—	
Q3_1 share of animal products	Pearson's r	−0.003	—
	p-value	0.981	—

Table 14 Loss frame perception

Descriptives

Descriptive Statistics

	Q3_2 share of vegetables
Valid	51
Missing	0
Mean	85.490
Mode	100.000
Std. Deviation	17.614
Minimum	20.000
Maximum	100.000

Table 15 Descriptive statistics

Descriptive Statistics ▼

	Q15 gender 1=male	Q14 age	Q16 univesity 1=yes	Q8 Vigorous Activity
Valid	152	151	152	152
Missing	0	1	0	0
Mean	1.658	24.033	1.276	3.717
Std. Deviation	0.541	8.181	0.449	2.638
Minimum	1.000	16.000	1.000	1.000
Maximum	4.000	88.000	2.000	9.000

Appendix C: UBC support

Source: https://twitter.com/ubcprez/status/891349871982034944?lang=en