What Meats the Eye: How the Description and Labeling of Vegetarian Dishes Affects Food Choice

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Envirotroopers
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Executive summary

The purpose of this study was to understand what factors affect meat consumption among students at the University of British Columbia (UBC), in order to reduce meat consumption on campus and reduce overall environmental impact . Does the description and labeling of vegetarian dishes affect food choice for non-vegetarians? It was hypothesized that description and labeling would affect food choice among non-vegetarians in the following ways: fewer students would select a vegetarian dish compared to a meat dish when the word "vegetarian" was used in the title; more students would select a vegetarian dish compared to a meat dish when the meat/meat alternative was placed at the end of the ingredient list; and more students would select a vegetarian option when nutritional data was provided. Two hundred and thirteen surveys were collected at UBC. Results do not demonstrate consistent patterns in the effects of ingredient order, "vegetarian" label, or the presence of nutritional information across all food options. The presence of nutritional information for the chili dish significantly increased the selection of a vegetarian compared to a non-vegetarian meal. Providing nutritional information may help to decrease meat consumption. We recommend further research into which nutritional information is most persuasive.

Research Question

Does the way vegetarian food is labeled and described affect food choice for non-vegetarians?

Research Hypothesis

We predicted that the way vegetarian food is labeled and described will affect food choice for non-vegetarians. More specifically, we predicted that fewer people would select a vegetarian dish compared to a meat dish when the word "vegetarian" was present in the title (compared to absent); more people would select a vegetarian dish compared to a meat dish when the meat ingredient was placed at the end of the list (compared to at the beginning); and more people would select the vegetarian option compared to the meat option when nutritional data was provided (compared to when it is not).

Participant Population

Two hundred and thirteen surveys were distributed across six locations on UBC campus. Six buildings were chosen in order to provide a diverse sample of students from different backgrounds and faculties. The six locations were the Walter Gage lobby, the AMS Nest, Woodward library, the Henry Angus (Sauder) Building, the Centre for Interactive Research on Sustainability (CIRS) building, and the Irving K. Barber Library.

Two hundred and thirteen surveys were collected and used to provide demographic information, as well as information on meat consumption behaviour. One hundred and eighty-two surveys were used for data analysis of the mock menu (the 31 surveys of vegetarian respondents were omitted).

Four different survey versions (see S1, S2, S3, S4 in the appendix) were used. Each survey was in the form of a mock menu consisting of four questions (four different dishes), each consisting of two options: one vegetarian and one non-vegetarian. In the control, the vegetarian and non-vegetarian dishes that students were to chose between had neutral names that did not suggest the presence or absence of meat, had the meat or meat alternative ingredient placed first in the ingredient list, and did not present any nutritional information about either option. The control was manipulated in three different ways to produce three conditions, each changing the way the vegetarian dish was contrasted from the non-vegetarian dish. For the first condition, instead of neutral dish names, the vegetarian option included the word vegetarian in the dish title, and the meat option included the type of meat in the title (eg. chicken or beef). In the second condition, the meat or meat alternative was placed as the last ingredient in the ingredient list, instead of as the first ingredient. In the third condition, nutritional information for both the meat and vegetarian option were presented below the ingredients. Each survey question manipulated a single condition. So for example, S3 consisted of Question 1, using the word "vegetarian" for the salad; Question 2, including nutritional information about fat, protein, fibre and iron content; Question 3, control; Question 4, meat ingredient listed as the last ingredient rather than the first. Four different versions of the survey were created in order to manipulate these variables across different dishes, thereby framing the same manipulations within different foods (nutritional information for a lasagna in one survey, and nutritional information for a soup in another survey). This was done in order to decrease the effect of food preference on choice.

Measures

The proportion of vegetarian dishes selected in each control question was calculated. The proportion of vegetarian dishes selected in each condition was also calculated, and then compared to the control. A chi-square test was used to test statistical significance.

Procedure

Two hundred and thirteen survey responses were obtained from UBC undergraduate students in six locations across campus from February 22nd to 26th, and March 18th to 22nd. The survey was in the form of a four course mock menu, from which students selected their preference between a vegetarian and non-vegetarian option. The number of vegetarian dish selections compared to meat dish selections in each condition and the control was counted. The proportion of vegetarian selections vs. non-vegetarian selections in each condition was then compared to that of the control using a chi-square test to determine statistical significance. This was done using R statistical analysis, an open-source program used in science.

Results

The proportion of vegetarian selections in the control and each condition is shown in Figure 1. Figure 2 compares each condition to the control by showing the difference between the proportion of the two. A chi-square test was used to test the significance of the results. The p-values in Table 1 indicate one significant difference (p-value < 0.05). In the chili condition, significantly more students selected the vegetarian option when nutritional information was present, compared to when it was not. While there were no other significant differences, fewer vegetarian lasagnas and soups were selected when the word "vegetarian" was present. Fewer vegetarian lasagnas and chilis were selected when the meat ingredient was placed at the end of the list. More vegetarian salads and chilis and fewer vegetarian lasagnas and soups were selected when nutritional information was provided. Thus, while the effects were not significant, the presence of the word "vegetarian" may have slightly deterred participants from selecting the vegetarian option; the presence of nutritional information may have somewhat encouraged selection of the vegetarian option; and placing the meat ingredient as the last instead of the first ingredient may also have slightly deterred participants from selecting the meat option. However, these effects were not consistent nor significant for all conditions and across all food options.

From demographic information and follow up questions, 45% of UBC Students (n=213) consume meat more than five times per week, 40% consume meat two to five times per week, and 15% consume meat less than once per week (see Figure 3). For information regarding factors influencing meat consumption, refer to Figure 4. Note that students were able to select more than one factor as influencing their meat consumption (some selected up to three).

Discussion

There was no significant effect of the word "vegetarian" in the dish title, or of the placement of the meat/meat alternative ingredient on the selection of the vegetarian compared to non-vegetarian option. It was initially hypothesized that the word "vegetarian" might act as a deterrent due to possessing a strong political and social identity. As a result, we believed that those who did not identify with the "vegetarian identity" would be less likely to select food that they perceived to be intended for a particular group from which they were excluded. While the label did slightly affect the number of vegetarian dishes selected, the result was not significant. We attribute this to the possibility that the "vegetarian identity" at UBC is more inclusive that we had previously thought, and the political and social weight that the word "vegetarian" carries might in fact be less than predicted. Moreover, what deters non-vegetarians from selecting vegetarian dish may extend beyond simply the notion that vegetarian food is intended for a group to which they do not belong. Participants may have quickly seen more than the "vegetarian" title, for instance the ingredients, and selected the meat option. Participants may associate more with being a "meat-eater" than with *not being a vegetarian*,or being anti-vegetarian".

Meat consumption decision-making probably encompasses far more than meat-eating and vegetarian identities, and preferences as well as habits must be taken into account in further research. The lack of significant effects for each condition across all four dishes (salad, soup, chili, lasagna) may come down to food preference. Respondents' tastes likely affected food choice. For instance, a non-vegetarian respondent may have been uncomfortable with the prospect of tofu in lasagna, but found beans in chili appealing. It is difficult to account for how food preference may have interacted with each manipulated condition in the selection of vegetarian or non-vegetarian dishes. Preference is also related to food habits and what the participants are used to eating. A question that arises then is can plant-based proteins be incorporated more often into a non-vegetarian diet so that they become a (perceived) norm rather than an unusual alternative for the more open-minded individual?

The presence of nutritional information alongside both the vegetarian and non-vegetarian chili bowls significantly reduced the number of meat chilis selected. The chili dish may have held the only significant difference for this condition (while the salad, soup and lasagna did not) because the nutritional information provided the greatest contrast in protein and fat content. The vegetarian chili purported to have 20.2g less fat and 3g more protein than the non-vegetarian chili. Compared to the lasagna, salad, and soup options, the vegetarian chili was the only dish to advertise both less fat and more protein than the meat option. Students may care most about protein and fat content, provoking questions as to which nutrition information is most influential on food choice, and can draw attention in decreasing meat consumption.

Furthermore, health management concerns affect meat consumption in 46% of non-vegetarian respondents (n=182), with 39% believing that meat is an essential part of the human diet (Figure 5). Nutritional information showed participants who consume meat for health management reasons, that meat alternatives can provide equivalent sources of protein and iron (and additional fibre). Objective nutritional information may have encouraged selection of the vegetarian option. In the absence of nutritional information, people may have selected the meat option on the preconceived notion that meat is essential to a healthy diet, perhaps believing that meat is a superior source of protein than plant-based foods.

The research has several limitations. The mock menu format decreases external validity, as it does not generalize to making food choices in real life situations, where money and other factors are involved. The use of Western names and dishes may have also affected food choice for the diverse student body at UBC. While we intended to keep the purpose of the study hidden, it is possible that respondents understood that they were constantly choosing between meat and vegetarian dishes, and this may have impacted their decision-making. Finally, this study looked only at the way vegetarian food is presented in three very specific manipulations, and does not delve into ethical issues, animal rights, or environmental protection as factors that influence meat consumption and deserve further research as they may have the potential to reduce meat consumption among UBC students.

Implications and Recommendations for Clients

While the results of the study are mostly insignificant, some of the results may help to better understand meat consumption among UBC students. Vegetarian eating can possibly be encouraged by advertising nutritional information to show that vegetarian options can be nutritious, and good sources of protein.

The almost unanimous support for a vegetarian food truck (92% of 213 respondents) implies a mostly positive attitude towards vegetarianism at UBC. Since a large proportion of respondents (n=31) were already vegetarian, this also suggests that there is a substantial vegetarian population at UBC, which would utilize a vegetarian-only food service. The AMS already provides two vegetarian food options in the student nest (Liquid Nutrition and Palette). It would be interesting to see how successful these locations are and what proportion of their customers are vegetarians compared to non-vegetarians. Thus, future research that could be used in reducing meat consumption on UBC campus could include exploring what specific nutrition information influences the selection of vegetarian compared to non-vegetarian dishes; how food taste and habits affect food choice and how expectations of vegetarian food or protein alternatives can be swayed in order to encourage the consumption of vegetarian food; and how the identities of "vegetarianism" and "being a meat-eater" impact food choices and habits.

Contribution to UBC

Results may be applicable to the development of more strategic meal labels and descriptions to reduce meat consumption on campus. Reducing meat consumption would lessen UBC's environmental impact as the meat industry is a major contributor to greenhouse gas emissions and water consumption. Choosing vegetarian options over meat options could also contribute to healthy eating on campus as consuming beans and peas instead of meat generally results in higher protein and fiber intake, with lower saturated fat intake.
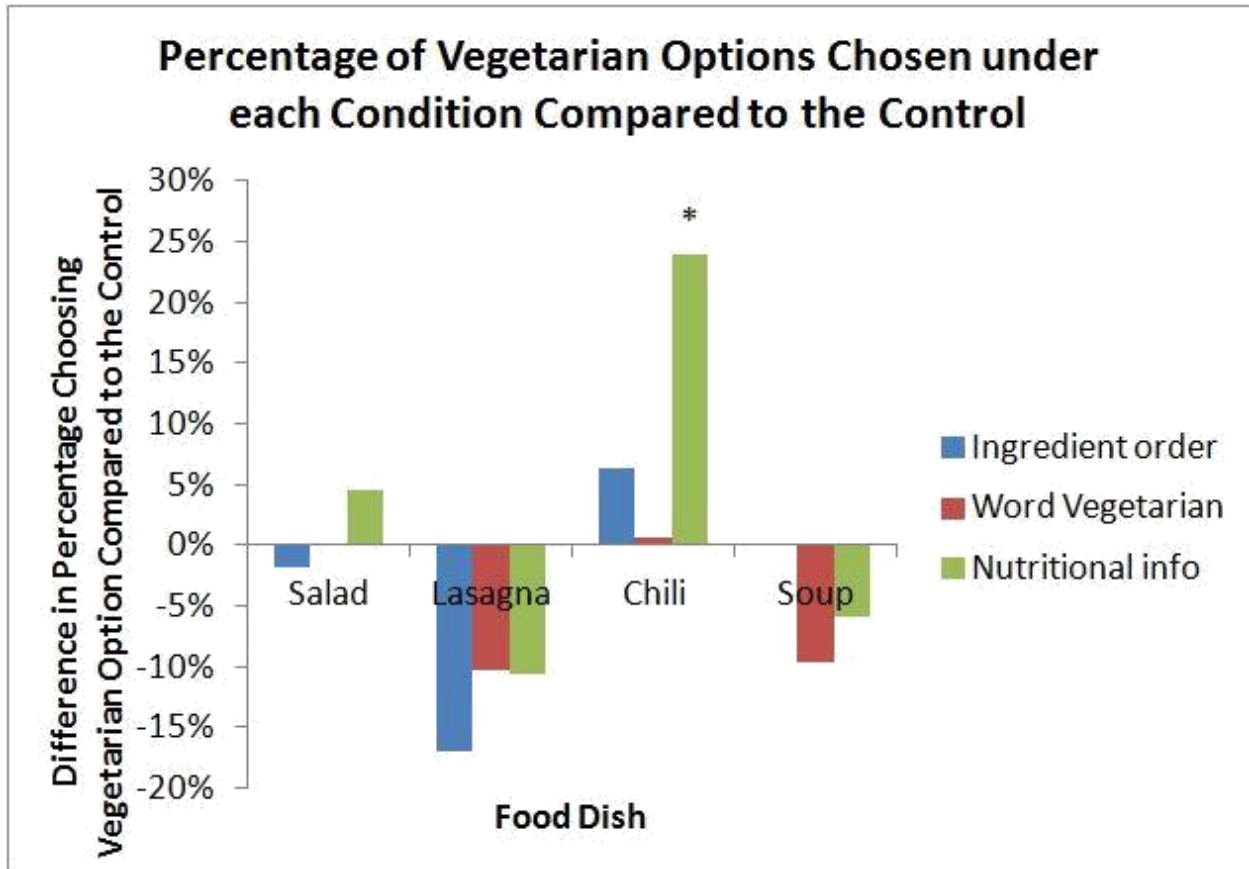
Appendix :

Table 1. P-values for chi-square test results for the difference in vegetarian options chosen under each condition compared to the control. *indicates a significant difference.

|	Salad	Lasagna	Chili	Soup
Ingredient Order	0.8266	0.06371	0.4871	1.000
Word Vegetarian	1.000	0.2777	0.9496	0.3037
Nutritional Info	0.6013	0.2361	**0.0161***	0.5446
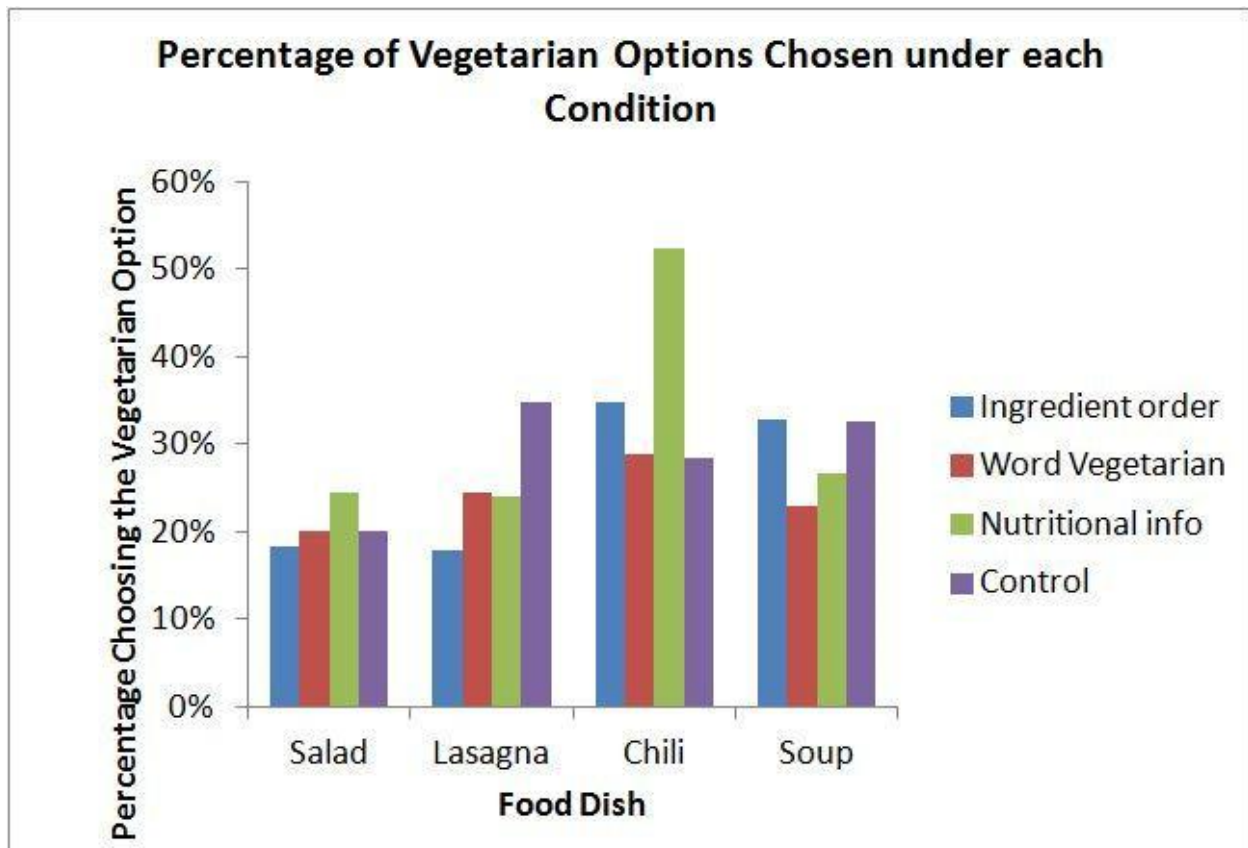
Figure 1. The percentage of vegetarian options chosen under each condition, as well as under the control for non-vegetarian UBC students.
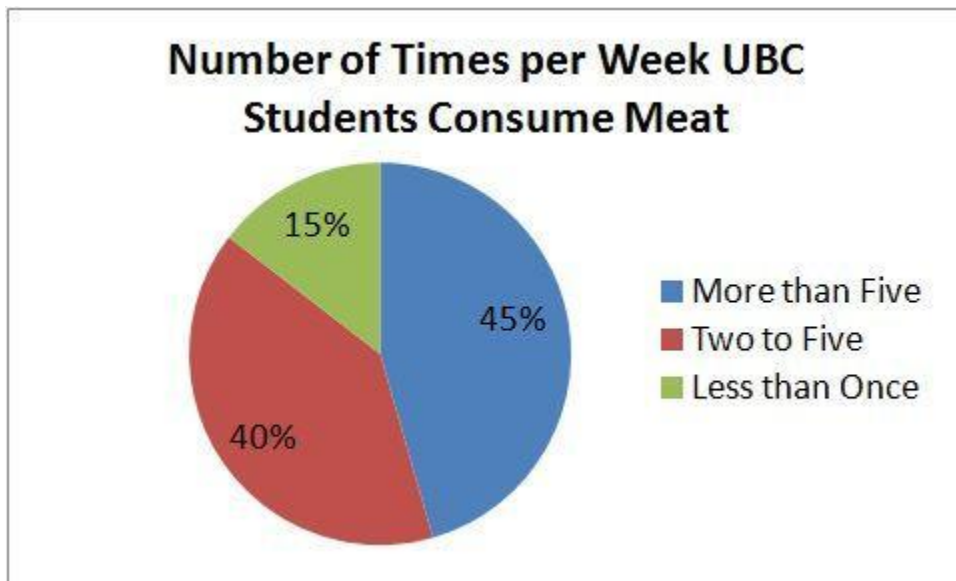
Figure 2. The difference in percentage of vegetarian options chosen under each condition compared to the control, for non-vegetarian UBC students. *indicates a significant difference.
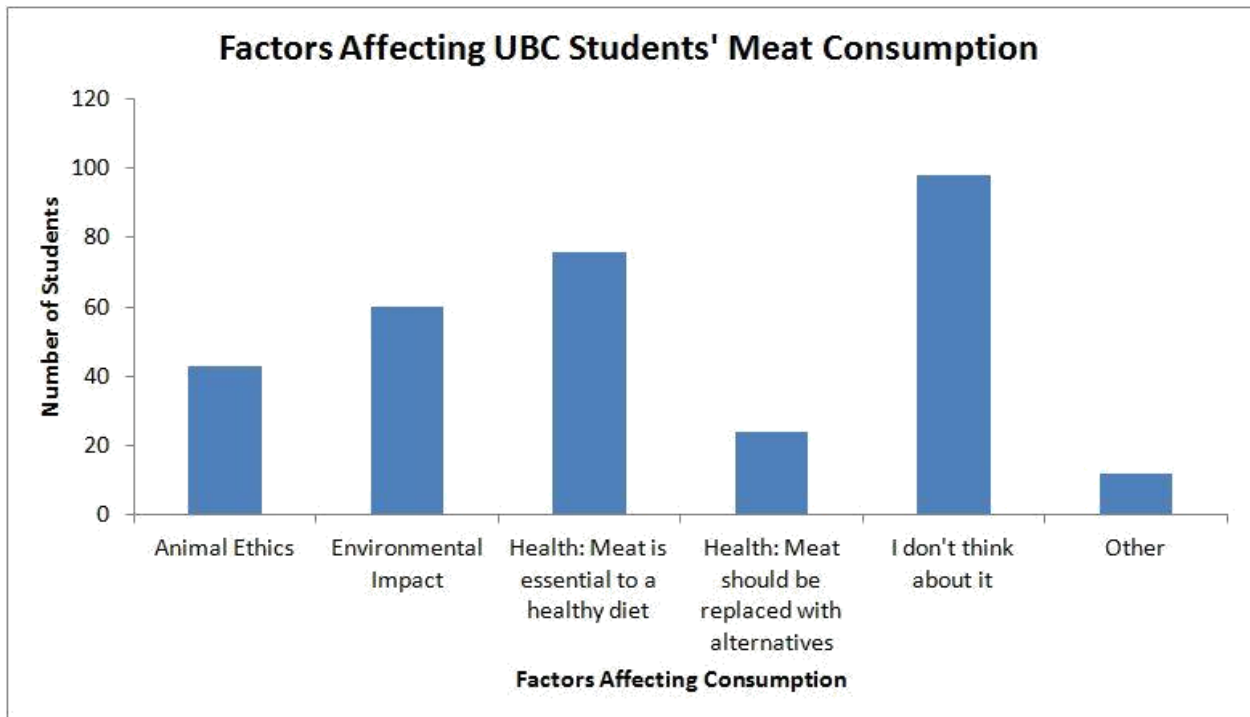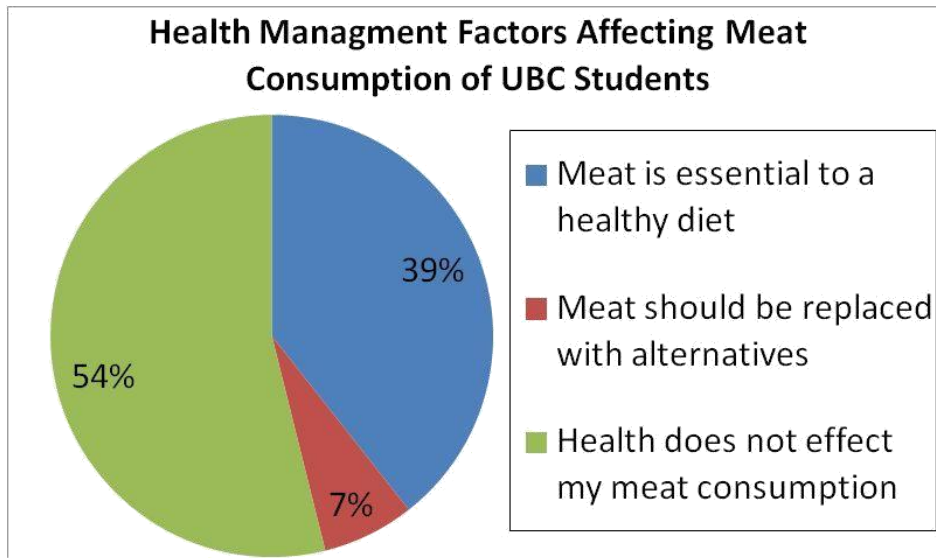
Figure 3. Factors affecting the meat consumption of UBC students (includes vegetarians). Students were able to select more than one factor.

Figure 4. The number of times per week UBC students report consuming meat (includes vegetarians).

Figure 5. Health management factors affecting the meat consumption of non-vegetarian UBC students.

Sample Survey

Consent Form

You are invited to take part in a research survey about food preferences. Your participation will require approximately 3-5 minutes. There are no known risks or discomforts associated with this survey. By participating in this study you will help shape UBC food options on campus. Your responses will be kept strictly confidential and only the general patterns of the survey will be reported to UBC Food Services. Any report of this research that is made available to the public will not include your name or any other individual information by which you could be identified. If you have questions or want a copy or summary of this study's results, you can contact the researchers at hadley.louisa@gmail.com.Completing this survey indicates that you are 18 years of age or older and indicates your consent to participate in it.

• Yes, I agree

Date: Signature:

Age: ____

Gender
- Male
- Female
- Other (please specify): ____
- Prefer not to say

UBC affiliation
- Undergraduate student
- Graduate student
- Faculty
- Employee
- Other (please specify): ____

Faculty
- Arts
- Science
- Applied Science
- Sauder School of Business
- Kinesiology
- Social work
- Other (please specify): ____

Year level
- First year
- Second year
- Third year
- Fourth Year
- Fifth Year +
- Other (please explain): ____

Are you an athlete?
- Yes
- No

Do you regularly participate in sports/exercise?
- Yes
- No

Are you a vegetarian?
- Yes
- No

Do you have any food allergies?
- Yes (please specify): ____
- No

What is your religion?
- Buddhist
- Sikh
- Muslim
- Christian
- Hindu
- Agnostic
- Atheist
- None
- Other (please specify): ____

Do you have any religious restrictions in your food intake?
- Yes (please specify which kind of food): ____
- No

Roughly how many times per week do you consume meat?
- Less than once a week
- 2-5 times a week
- More than 5 times a week

What factors influence your meat consumption behaviours? (Check all that apply)
- My environmental impact
- Health management. I believe meat is essential to a healthy diet.
- Health management. I believe meat should be replaced with alternatives.
- Animal ethics
- I don't think about my meat consumption; I eat what I want
- Other, please specify ____

Would you be supportive of a vegetarian food truck and/or restaurant on UBC campus?
- Yes
- No

MENU

We are conducting a survey to find out more about the food preferences of UBC students, so we can enhance your dining experience on campus! Please read over our sample menu, and select which salad, lasagna, chili bowl, soup, and desert you would prefer.

**Salad

- **Betty's Salad** – Mixed beans on crisp romaine lettuce, spinach, bell pepper, diced tomato, feta cheese, and black pepper with your choice of dressing

- **Emily's Salad** – Chicken breast on crisp romaine lettuce, spinach, bell pepper, diced tomato, feta cheese, and black pepper with your choice of dressing

**Lasagna

- **Aunty Lasagna** – Zucchinis, yellow squash, red peppers, onions, tomatoes, mozzarella cheese, lasagna noodles, Italian sausage and ground beef

- **Mammy Lasagna** – Smoked tofu, tomatoes, mozzarella cheese, zucchinis, yellow squash, red peppers, onions, and lasagna noodles

**Chili Bowl

- **Beef Chili Bowl** - A hearty blend of ground beef, tomatoes, corn, and bell peppers topped with guacamole and blue corn chips, served on a heap of rice.

- **Vegetarian Chili Bowl** - A hearty blend of red kidney beans, black beans, tomatoes, corn, and bell peppers topped with guacamole and blue corn chips, served on a heap of rice.

MENU

**Soup

- **Aleksander Soup**– Chicken shreds, chicken broth, orzo pasta, tomato soup, garlic, and cilantro. 8 g fat, 1 g fibre, 10 g protein, 5% daily value of iron

- **Anatoli Soup**– White kidney beans, orzo pasta, vegetable broth, tomato soup, with garlic, and cilantro. 8 g fat, 8.5 g fibre, 18 g protein, 23% daily value of iron

**Dessert

- **Double Chocolate Wonder** - Rich chocolate brownie, topped with chocolate fudge ice cream

- **Apple Pie** - Tender apple slices baked in a delicate crust, sprinkled with cinnamon and nutmeg

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**Salad

- **Betty's Salad** – Mixed beans on crisp romaine lettuce, spinach, bell pepper, diced tomato, feta cheese, black pepper, and your choice of dressing

- **Emily's Salad** – Crisp romaine lettuce, spinach, bell pepper, diced tomato, feta cheese, black pepper, and your choice of dressing topped with chicken breast

**Lasagna

- **Beef Lasagna** – Italian sausage, ground beef, zucchinis, yellow squash, red peppers, onions, tomatoes, mozzarella cheese, lasagna noodles

- **Vegetarian Lasagna** – Smoked tofu, zucchinis, yellow squash, red peppers, onions, tomatoes, mozzarella cheese, lasagna noodles

**Chili Bowl

- **Ben's Chili Bowl** - A hearty blend of ground beef, tomatoes, corn, and bell peppers topped with guacamole and blue corn chips, served on a heap of rice.
  30 g fat, 9g fibre, 14 g protein, 8% daily value of iron

- **Max's Chili Bowl** - A hearty blend of red kidney beans, black beans, tomatoes, corn, and bell peppers topped with guacamole and blue corn chips, served on a heap of rice.
  10.8 g fat, 12 g fibre, 17 g protein, 10% daily value of iron

MENU

***Soup

- **Aleksander Soup**— Chicken shreds, chicken stock, orzo pasta, tomato soup, garlic, and cilantro.

- **Anatoli Soup**—White kidney beans, orzo pasta, vegetable broth, tomato soup, with garlic, and cilantro.

**Dessert

- **Double Chocolate Wonder** - Rich chocolate brownie, topped with chocolate fudge ice cream

- **Apple Pie** - Tender apple slices baked in a delicate crust, sprinkled with cinnamon and nutmeg

MENU

We are conducting a survey to find out more about the food preferences of UBC students, so we can enhance your dining experience on campus! Please read over our sample menu, and select which salad, lasagna, chili bowl, soup and desert you would prefer.

**Salad

- **Vegetarian Salad** – Mixed beans on crisp romaine lettuce, spinach, bell pepper, diced tomato, feta cheese, and black pepper with your choice of dressing

- **Chicken Salad** – Chicken breast on crisp romaine lettuce, spinach, bell pepper, diced tomato, feta cheese, and black pepper with your choice of dressing

**Lasagna

- **Aunty Lasagna**– Italian sausage, ground beef, zucchinis, yellow squash, red peppers, onions, tomatoes, mozzarella cheese, and lasagna noodles
  24 g fat, 24 g protein, 3.4 g fibre, 10% of daily value of iron

- **Mammy Lasagna** – Smoked tofu, zucchinis, yellow squash, red peppers, onions, tomatoes, mozzarella cheese, and lasagna noodles
  11 g fat, 16 g protein, 5 g fibre, 25% daily value of iron

**Chili Bowl

- **Ben's Chili Bowl** - A hearty blend of ground beef, tomatoes, corn, and bell peppers topped with guacamole and blue corn chips, served on a heap of rice.

- **Max's Chili Bowl** - A hearty blend of red kidney beans, black beans, tomatoes, corn, and bell peppers topped with guacamole and blue corn chips, served on a heap of rice.

MENU

**Soup

- **Aleksander Soup**– Orzo pasta, tomato soup, garlic, cilantro, chicken stock and chicken shreds.

- **Anatoli Soup**– White kidney beans, orzo pasta, vegetable broth, tomato soup, with garlic, and cilantro.

**Dessert

- **Double Chocolate Wonder** - Rich chocolate brownie, topped with chocolate fudge ice cream

- **Apple Pie** - Tender apple slices baked in a delicate crust, sprinkled with cinnamon and nutmeg

MENU

We are conducting a survey to find out more about the food preferences of UBC students, so we can enhance your dining experience on campus! Please read over our sample menu, and select which salad, lasagna, chili bowl, soup and desert you would prefer.

**Salad

- **Betty's Salad** – Mixed beans on crisp romaine lettuce, spinach, bell pepper, diced tomato, feta cheese, and black pepper with your choice of dressing
7.0 g fat, 16 g protein, 17 g fibre, 20% daily value of iron.

- **Emily's Salad** – Chicken breast on crisp romaine lettuce, spinach, bell pepper, diced tomato, feta cheese, and black pepper with your choice of dressing
7.0 g fat, 17 g protein, 6 g fibre, 15% daily value of iron

**Lasagna

- **Aunty Lasagna**– Italian sausage, ground beef, zucchinis, yellow squash, red peppers, onions, tomatoes, mozzarella cheese, and lasagna noodles

- **Mammy Lasagna** – Smoked tofu, zucchinis, yellow squash, red peppers, onions, tomatoes, mozzarella cheese, and lasagna noodles

**Chili Bowl

- **Ben's Chili Bowl -** Juicy tomatoes, sweet corn, and red bell peppers topped with guacamole and blue corn chips, served on a heap of rice and ground beef.

- **Max's Chili Bowl -** A hearty blend of red kidney beans, black beans, tomatoes, corn, and bell peppers topped with guacamole and blue corn chips, served on a heap of rice.

MENU

**Soup

- **Chicken Orzo Soup**– Chicken shreds, chicken stock, orzo pasta, tomato soup, garlic, and cilantro.

- **Vegetarian Orzo Soup**– White kidney beans, orzo pasta, vegetable broth, tomato soup, with garlic, and cilantro.

**Dessert

- **Double Chocolate Wonder -** Rich chocolate brownie, topped with chocolate fudge ice cream

- **Apple Pie -** Tender apple slices baked in a delicate crust, sprinkled with cinnamon and nutmeg