

University of British Columbia

Social Ecological Economic Development Studies (SEEDS) Sustainability Program

Student Research Report

Unwanted, Not Unlovable: Information Provision's Impact on Upcycled Food Preference

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UNWANTED, NOT UNLOVABLE

Unwanted, Not Unlovable: Information Provision's Impact on Upcycled Food Preference

Group 5: Green2Stay

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Executive Summary

Upcycled food has been identified as a formidable strategy to reduce food waste^{2,4,5}; however, the consumption thereof remains stigmatized by the general public^{3,7,8}. This study aims to investigate how providing information about upcycled and conventional meals influence consumer preference. We examine the possible mitigating effects of minimum ($n = 77$) and maximum ($n = 66$) amounts of information provision through labels, definitions, and sustainability-oriented framing in comparisons of upcycled and conventional meal options, compared to controls ($n = 69$). The one-way ANOVA and post-hoc Tukey test establish minimal information provision produces decreased upcycled food choice ($p = .03$); however, maximal information did not significantly recuperate these effects ($p = .06$). Chi-squared analyses did not show significant preference for certain meal types to be upcycled. Further Pearson's correlations demonstrate significant effects ($p < .001$) of familiarity, perceptions of safety, disgust, and environmental sustainability as additional mitigators of upcycled food choice. From these results, future studies and clients can consider (1) more thoroughly emphasizing the sustainability of upcycled food, (2) increasing public familiarity of upcycled food's comparable quality, and (3) specifically targeting UBC Dining hall clientele to increase public acceptance of upcycled food consumption and reduce food waste.

Keywords: sustainability, food waste, upcycled food, information provision, UBC Dining

Unwanted, Not Unlovable: Information Provision's Impact on Upcycled Food Preference

The United Nations estimates nearly one third of food produced globally goes to waste—14% of which is lost between harvest and retail, resulting in over 1 billion tons of food thrown away before reaching consumers¹. The identification of this significant waste of energy and resources has turned current environmental research to exploring vital new methods of food waste reduction, including increasing consumer acceptance of food waste consumption using upcycled food^{2,3}. Upcycled food is a novel food category composed of peculiar-looking, unmarketable, or surplus ingredients that would otherwise become food waste^{3,4}. These include by-products of food-manufacturing processes, agricultural surpluses, and food scraps produced by existing, verifiable supply chains^{2,3}. Current research identifies the consumption of upcycled food as a formidable strategy for the reduction of food waste, resource use, and carbon emissions to satisfy the growing global demand for a more sustainable food system^{2,4,5}.

But despite its recognized sustainability, there remains a widespread stigma against upcycled food, with past environmental consumerism research recognizing the lack of familiarity or understanding of upcycled food as underlying contributors^{2,3,5,6}. Bhatt et al.'s seminal work on consumer acceptance of upcycled food investigates how different labels for upcycled food and definitions comparing upcycled, conventional, and organic foods impact consumer perceptions of upcycled food. However, these studies focus on establishing upcycled food as being a unique food category, and do not consider how labels and definitions impact consumer preferences between these food categories. McCarthy et al. partially address this gap by focusing on labels to compare consumer preferences in UK and Australian populations, and establish consumers are significantly less likely to choose upcycled food when labeled in comparison to conventionally produced food options. It stands to reason that the provision of minimal labeling results in significantly reduced consumer preference for upcycled food, confirming the presence of said stigma; however, this is not formally compared to providing complete definitions about either food option. Furthermore, neither of these studies incorporate sustainability considerations into either their labeling or definitions^{2,6}. Moshtaghian et al.'s review on the barriers to upcycled food acceptance recognizes information provision—namely, consumer-friendly definitions—could ease consumers' hesitance about accepting upcycled food. The study secondarily establishes that participants who are more concerned about the environmental consequences of food waste are more likely to purchase upcycled food. It follows that providing definitions containing a sustainability-oriented framing would increase consumer acceptance of upcycled food, however this remains uninvestigated by the literature.

To acknowledge these gaps, this study will investigate how providing information about upcycled and conventional meals influences consumer preference. This information will include a combination of descriptions, labeling, and sustainability-oriented framing to best understand its impact on forced consumer choice between upcycled and conventionally produced food. Based on the findings by McCarthy et al., participants are hypothesized to least frequently choose the upcycled meal option when given the minimum amount of information about upcycled food. Given Moshtaghian et al.'s considerations of the benefits of sustainability-oriented framing, participants are also hypothesized to most frequently choose the upcycled meal option when given the maximum amount of information about upcycled food. This study will also analyze demographic perceptions of sustainability as an additional comparison. This combined and tiered approach to the presentation of upcycled food is key to furthering current understanding of consumer perceptions while offering a possible solution to increasing consumer acceptance of upcycled food in retail settings.

Further research identifies safety concerns, feelings of disgust, and food neophobia—the fear of novel foods—as added contributors to the stigma against upcycled food; however, the literature remains heavily divided on how significantly each factor contributes to consumers' perceptions^{3,5,7,8}. This study will additionally provide insight on the relationship between each of these factors and upcycled food choice.

Research Question and Hypotheses

Our research question is: how does information provision for upcycled and conventional meals influence consumer preference? To investigate this research question, we first hypothesized participants would be least likely to choose upcycled meal options when provided a minimum amount of information about upcycled food. Our second hypothesis was that participants would be most likely to choose upcycled meal options when provided the maximum amount of information about upcycled food (Appendix B: Figure 1).

Methods

Participants: According to an a priori power analysis (assuming a minimum effect size of 0.20, $\alpha = .05$, and power = 0.80) conducted using G*Power, we aimed to recruit a sample of 246 participants with 82 participants per condition. Our final sample consisted of 212 English-fluent participants divided between the control ($n = 69$), minimum information ($n = 77$), and maximum information ($n = 66$) conditions. Out of 306 total responses, 94 were excluded from analysis for not having completed the mandatory meal choice selections. Of the participants who completed the non-mandatory demographic questions, 68% were between the ages of 18 - 24; 67% identified as female, 27% as male, and 5% as non-binary (Appendix B: Figures 2, 3). Half of the respondents were UBC undergraduate students, 30% of whom eat at UBC Dining halls. 17% of participants reported having dietary restrictions (Appendix B: Figure 4).

Conditions: In our between-subjects experimental design, the independent variable was the amount of information provided for each of the three randomly assigned conditions: control, minimum, and maximum information. This information was operationalized as the presentation of a combination of definitions and labels. In the control condition, participants received no mention of upcycled or conventional foods, and were asked to indicate their preference between two images for each of the five meals labeled as either “Option A” or “Option B”. In the minimum and maximum information conditions, participants were presented with definitions for upcycled and conventional food and were asked to choose between “Upcycled” or “Conventional” labels for each of the five meal sets. Both conditions defined conventional food as food commonly sold to the general public, whereas upcycled food was defined in increasing levels of detail. Namely, the minimum information stated upcycled food is food made from ingredients that otherwise would have been thrown away. Meanwhile the maximum information condition's definition was more informative, highlighting upcycled food's safety, nutrition, taste, sustainability, and availability in markets. Both conditions also used formatting such as bolding for emphasis and enhancing readability. The maximum condition also included emotional wording by using second-person statements and exclamatory phrases. See Appendix B: Figure 5 for a complete comparison of information provided across conditions.

Measures

Dependent Variable: The dependent variable of our study is the number of participants' choices of either “Option A” in the control condition or “Upcycled” in the experimental conditions. We used a binary choice scale to force participants to select their preference between two mirrored images of five different meal options; the mirroring was used to standardize the visual stimuli and mitigate potential image-based biases. The meals included soup, wrap,

sandwich, pasta, and salad; their order and labeling were randomized for each condition to control for order and choice effects (Appendix B: Figure 6, Figure 9).

Sustainability and Upcycled Food Perception Demographics: We modified Environmental Awareness statements from the Environmental Consciousness Survey of University Students and combined these into a single measure (enviroscore) representing participants' sustainability and likelihood of supporting and implementing food waste reduction methods⁹ (Appendix C: Table 4). Because there is yet to be a holistic analysis of the relationship between upcycled food acceptance and factors such as general food neophobia, familiarity, disgust, and perceived safety of upcycled food, these statements had to be designed from scratch^{3,5,8} (Appendix C: Table 4).

Procedure

Data was collected for 28 days from March 16th to April 13th, 2023 through distributions of a survey poster (Appendix D) via the researchers' (1) personal Instagram stories, (2) class announcements, (3) affiliated UBC clubs (i.e. UBC Psi Chi, UBC DAS Lab), and (4) displaying posters at UBC Dining halls. After viewing and accepting the consent form, participants were randomly sorted by Qualtrics into one of the three conditions and were instructed to select their preferred choice between two options for five meal sets, regardless of personal dietary restrictions. Experimental participants were then prompted to read their respective definitions before proceeding to meal selection. Control participants were instructed to make a selection without receiving further information. After, all participants were prompted to complete the non-mandatory demographics questions (Appendix A for complete surveys; Appendix B: Figure 7 for survey flow). Though we initially received 306 responses, 31% of our participants did not complete the meal choices, preventing our study from having sufficient power. Removing incomplete responses further resulted in an uneven participant distribution across conditions.

Results

A One-Way Analysis of Variance (ANOVA) was performed on our three conditions at $\alpha = .05$ and showed that the effect of different levels of information provided impacted the likelihood of choosing "Option A" or "upcycled"; this was significant with a trivial effect size (Appendix C, Table 1), $F(2, 209) = 3.863, p = .023, \eta^2 = .036$. A Post Hoc Tukey test indicated a significant decrease in choice of "upcycled" between the control ($M = 2.61, SD = 1.10$) and minimum conditions ($M = 2.04, SD = 1.45$), $p = .032, d = .419$. There was no significant results between control ($M = 2.61, SD = 1.10$) and maximum condition ($M = 2.08, SD = 1.49$), $p = .061, d = .392$; or the minimum ($M = 2.04, SD = 1.45$) and maximum condition ($M = 2.08, SD = 1.49$), $p = .986, d = .027$ (Appendix C, Tables 2 and 3). These findings support the hypothesis that participants are least likely to choose the upcycled meal option when given the minimum amount of information about upcycled food. Since there were no other significant findings between any of the other conditions (Appendix B, Figure 8) we reject our second hypothesis, meaning participants are equally or not as likely to choose the upcycled meal option when given the maximum amount of information about upcycled food.

Five chi-square tests of independence were performed to see if there were any differences between the rates of choosing the upcycled or conventional food options for specific meal types between our minimum and maximum conditions. Each test produced an insignificant result with a critical value of 3.841 and $\alpha = .05$ for each of the five meals: pasta $X^2(1, N = 143) = 0.16, p = .692$, wrap $X^2(1, N = 143) = 0.17, p = .676$, salad $X^2(1, N = 143) = 0.63, p = .429$, soup $X^2(1, N = 143) = 0.06, p = .813$, sandwich $X^2(1, N = 143) = 0.62, p = .43$. Thus, we cannot conclude that there is a significant difference in the rates of choosing upcycled or conventional food options

for specific meals in each condition.

Further analyses of the sustainability and upcycled food perception demographics were conducted using Pearson's correlations. These factors impacting upcycled food acceptance were calculated from participants' level of agreement with the provided statements (Appendix C: Tables 5). Overall, medium but significant associations were found between participants' rates of choosing upcycled food and their perceptions of upcycled food as being safe, $r(141) = 0.428$, $p < .001$; not being disgusted by consuming upcycled food, $r(140) = 0.376$, $p < .001$; and familiar with upcycled food, $r(140) = 0.309$, $p < .001$. A small but significant association was found between upcycled food choice and their enviroscores, $r(139) = 0.249$, $p < .001$. Levels of participant neophobia had minimal and insignificant relation to upcycled food choice, $r(140) = 0.079$, $p < 0.256$.

Discussion

Previous studies have identified the stigmatization of upcycled food when presented alongside upcycled food options, with further research identifying information provision as a possible mitigator of this effect^{2,3,5}. This study sought to address this knowledge gap by investigating the varied impact of three tiers of information provision on consumer choice between upcycled and conventional food.

Participants provided with no information for the control condition demonstrated no preference between either meal option, allowing further conclusions from experimental conditions to emphasize the impact of information provision on upcycled and conventional meal choice. The study additionally implemented mirrored images for each meal option instead of actual upcycled food images—establishing a clear control demonstrated by the absence of preference between either meal option until information is introduced in the experimental conditions. Though this limits the conclusions that can be drawn about the impact of the appearance of upcycled food, it narrows down the observed effects to information provision alone. Future studies can use photos or real samples of upcycled foods—such as from UBC Dining—to better investigate the impact of appearance, smell, and taste on upcycled food preference. As predicted by our first hypothesis and McCarthy et al., participants provided with minimal information about upcycled food were significantly less likely to choose the upcycled meal option compared to conventional. This replicates the finding that minimal labeling confers stigmatization of upcycled food⁶, and further establishes providing minimal definitions matches this effect. Therefore, future implementations of comparisons between upcycled and conventional food would better not comparatively label or provide minimally detailed information about said products. Contrary to our second hypothesis and predictions by Moshtaghian et al., provision of a maximally detailed, consumer-friendly definition and sustainability-oriented framing did not increase participant preference for upcycled food; in fact, said provision produced a similar though insignificant decrease. One possible explanation for this finding is that this stigma persists despite said framing. However, it is also possible that the sustainability aspect of the definition was not emphasized sufficiently compared to other details of the definition, or the definition was overlooked entirely. Future studies can investigate alternative methods of formatting or emphasizing sustainability criteria to confirm these preliminary observations.

Further examination of demographics indicates participants' perceptions of upcycled food as safe and not disgusting and being already familiar with upcycled food had medium but significant correlation with rates of upcycled food choice; environmental consciousness was not as well correlated. Studies based on this research can investigate each of these factors more in-

depth with specific emphasis on personal sustainability values. Despite the insignificance of sustainability-oriented framing in the definition, participants who are more environmentally conscious and taking active steps to reduce their food waste are correlated with higher rates of upcycled food choice. Therefore, future efforts to increase public acceptance of upcycled food consumption can work to generally increase consumer awareness of food waste and environmental consciousness. The implication of this conclusion is reassuring, as even general sustainability awareness has the potential to mitigate upcycled food consumption stigma. Such studies could help inform more effective strategies in promoting more sustainable food systems to reduce food waste^{1,2}.

At UBC, food upcycling has been embodied in the past through maximal reduction in food waste by using food scraps in stocks; however, recent efforts have seen UBC Dining halls purchasing soups marketed specifically to be made from upcycled food. This is the first study at UBC to provide a formal analysis of student perceptions of upcycled food compared to conventional food options using different levels of information provision. While the implications of this study have the potential to guide further upcycled food marketing and purchasing choices at UBC Dining halls, only 17% of the study's total sample eat at UBC Dining halls, limiting its ecological validity. Additionally, because the age demographics question was presented as a choice between categories, more detailed conclusions about mean age are not possible, which can be easily accommodated for in future studies. Future studies focused on informing UBC Dining should also strictly advertise at UBC Dining Halls and first year residences. In-person recruitment at these locations could also ensure survey completion, thereby helping the study reach sufficient power and preventing uneven condition grouping during data cleaning.

Client Recommendations

Our results have important implications for shifting consumer attitudes towards upcycled food and promoting more sustainable food choices on UBC campus.

Instead of labeling food as upcycled, consider focusing on its sustainability: For some consumers, the term "upcycled" may continue to carry negative connotations. Labels and definitions were found to be ineffective in increasing upcycled food acceptance; however, consumers who care about sustainability are more likely to support upcycled choices. Therefore, UBC Dining Services' marketing team can collaborate with programs such as the Digital Food Hub, AMS Sustainability, Sprouts, and Food Hub Market to appeal to UBC students who prioritize environmentally conscious food choices.

Offer samples and special promotions of upcycled dishes: Offering samples in the Dining hall or events can allow consumers a low-stakes opportunity to experience the food and discover that it is just as delicious as conventional meal selections. Special promotions showcasing upcycled food can also help generate interest and entice consumers to try it out, thereby addressing price and taste concerns often associated with stigma towards upcycled food, as indicated by the demographic questions in our study. This can be done by providing discounts, meal deals or featuring upcycled food in special menus. The UBC culinary team can hold weekly demonstrations in first year dining halls, explaining how the food is prepared and showing the potential for reducing food waste.

Promote upcycled food through social media: Social media platforms can assist in reaching a wider audience by producing engaging content, such as recipe videos that highlight the creative possibilities of upcycling food. The distinctive flavors and environmental benefits of upcycled food can be showcased on Instagram and TikTok, along with a dedicated hashtag for UBC's upcycled food.

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Appendix A: Qualtrics Survey
Consent Form for All Conditions



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Consent Form

Class Research Projects in PSYC 421 - Environmental Psychology

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Introduction and Purpose

Students in the PSYC 421 – 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, collect and analyze data, present their findings in class, and submit a final report. Their final reports will be published on the SEEDS online library (<https://sustain.ubc.ca/teaching-applied-learning/seeds-sustainability-program>). Their projects include online surveys and experiments on a variety of sustainability topics, such as waste sorting on campus, student health and wellbeing, food consumption and diet, transportation, 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 10 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 encrypted and password protected so that only the principal investigator and course instructor, Dr. Jiaying Zhao and the teaching assistants will have access to it. Following the completion of the study, the data will be transferred to an encrypted and 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.

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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. You also may postpone your decision to participate for 24 hours. You have the right to choose to not answer some or any of the questions. By clicking the "continue" button, you are indicating your consent to participate; hence, your signature is not required. The researchers encourage you to keep this information sheet for your records. Please feel free to ask the investigators any additional questions that you have about the study.

Ethics ID: H17-02929

Do you consent to participating in this survey?

- Yes, I have read and understand the above information and agree to participate in this study.
- No, I do not agree to participate in the study.



Control Condition:

During this survey, you will be shown a few sets of two meal options.

For each set, please indicate your preference between the two meal options.

*Note: Your choice should **not** be based on your personal dietary preferences.



For each set of meals, please select your preference.



Option B



Option A

Please indicate your meal preference:



Option B



Option A

Please indicate your meal preference:



Option A



Option B

Please indicate your meal preference:



Option A



Option B

Please indicate your meal preference:



Option A



Option B

Please indicate your meal preference:



Minimum Information Condition:

Please read the following **carefully**:

Conventional food: Food that is **commonly** sold to the general public.

Upcycled food: Food that is made from ingredients that **otherwise would have been thrown away**.



During this survey, you will be shown a few sets of two meal options.

For each set, please **indicate your preference between the two meal options**.

*Note: Your choice should **not** be based on **your personal dietary preferences**.



For each set of meals, please select your preference.

Conventional food: Food that is commonly sold to the general public.

Upcycled food: Food that is made from ingredients that otherwise would have been thrown away.



Upcycled



Conventional

Please indicate your meal preference:



Upcycled



Conventional

Please indicate your meal preference:



Conventional



Upcycled

Please indicate your meal preference:



Upcycled



Conventional

Please indicate your meal preference:



Upcycled



Conventional

Please indicate your meal preference:



Maximum Information Condition:

Please read the following **carefully**:

Conventional food: Food that is **commonly** sold to the general public.

Upcycled food: Food that is made from **consumable ingredients** that otherwise would have been thrown away.

- This includes peculiar-looking produce or food scraps that are **equally safe, nutritious, and tasty!**
- This helps to **conserve global resources and reduce your food waste!**
- It can come from **grocery stores and farmers' markets!**



During this survey, you will be shown a few sets of two meal options.

For each set, please **indicate your preference between the two meal options.**

*Note: Your choice should **not** be based on your personal dietary preferences.



For each set of meals, please select your preference.

Conventional food: Food that is commonly sold to the general public.

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- This includes peculiar-looking produce or food scraps that are **equally safe, nutritious, and tasty!**
- This helps to **conserve global resources and reduce your food waste!**
- It can come from **grocery stores and farmers' markets!**



Upcycled

Please indicate your meal preference:



Conventional



Upcycled

Please indicate your meal preference:



Conventional



Conventional

Please indicate your meal preference:



Upcycled



Upcycled



Conventional

Please indicate
your meal
preference:



Conventional



Upcycled

Please indicate
your meal
preference:



Demographic Section for All Conditions:

When choosing a preferred meal, what factor(s) influenced your choice the most?

- The food's appearance
 The food labels
 The information provided about the food options
 Other (please elaborate)

Please indicate the extent to which you agree or disagree with the following statements:

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
I care about being sustainable in my day-to-day life.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I'm concerned about environmental problems.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Preventing food waste is important for a sustainable environment.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I was familiar with upcycled food prior to this survey.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I don't feel disgusted when thinking about consuming upcycled foods.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Upcycled food is safe to consume.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I'm not afraid to eat new things.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Do you have any dietary restrictions? (eg. allergies, intolerance, food sensitivity, celiac disease, etc.)

- Yes
 No



Please indicate the extent to which you agree or disagree with the following statement:

I am concerned about upcycled food because of possible cross-contamination.

- Strongly Disagree
- Disagree
- Neutral
- Agree
- Strongly Agree

Are you a university or college student?

- Yes
- No

Are you affiliated with UBC?

- Yes
- No



How are you affiliated with UBC?

- Faculty
- Student
- Staff
- Other

Do you eat at UBC dining halls? (Orchard Commons: Open Kitchen, Totem Park: Feast, Place Vanier: Gather)

- Yes
- No

What gender do you most identify with?

- Man
- Woman
- Non-Binary
- Prefer not to answer
- Other

What is your age?



How are you affiliated with UBC?

- Faculty
 Student
 Staff
 Other

What degree level are you in?

- Undergraduate
 Master's
 PhD
 Other

Do you live in UBC residence?

- Yes
 No

Do you eat at UBC dining halls? (Orchard Commons: Open Kitchen, Totem Park: Feast, Place Vanier: Gather)

- Yes
 No

What gender do you most identify with?

- Man
 Woman
 Non-Binary
 Prefer not to answer
 Other

What is your age?

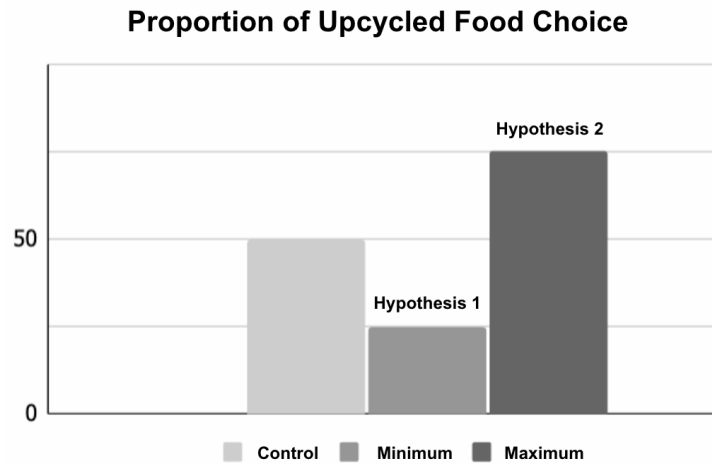


We thank you for your time spent taking this survey.
Your response has been recorded.

Note. Certain options are selected in the screenshots to display conditional questions.

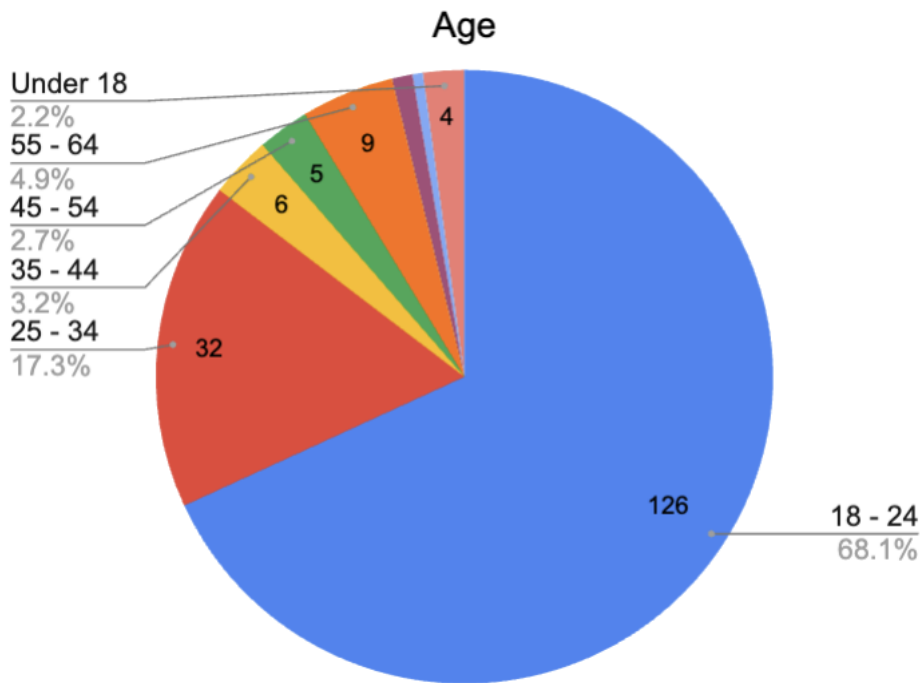
Appendix B: Data Analysis Figures

Figure 1: Hypothetical Comparisons of Upcycled or Option A Choices Between Conditions



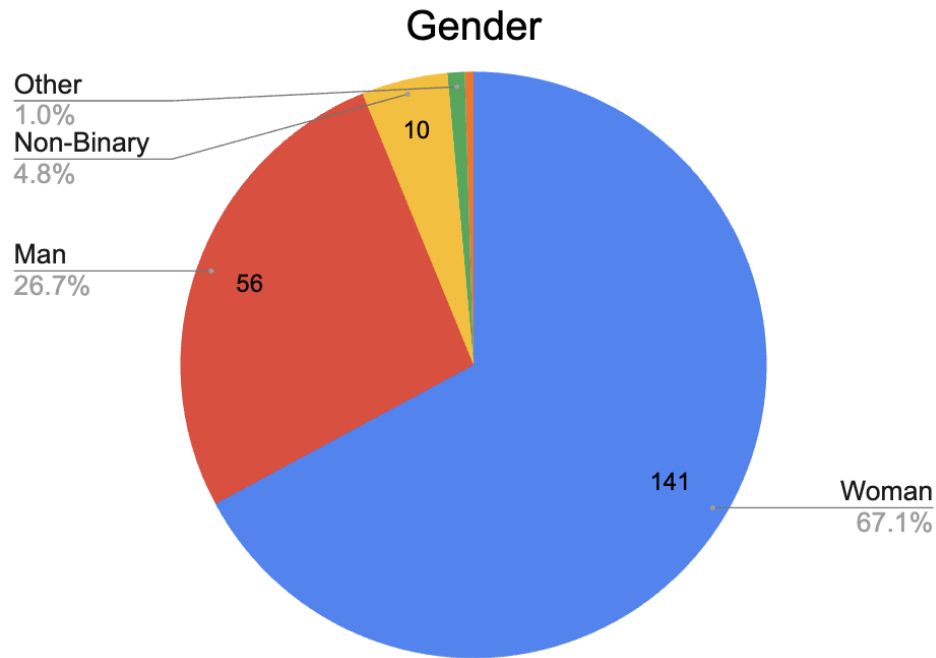
Note. The control condition is expected to produce a 50% choice of “Option A” given it is a control comparison of photos without definitions. Predicted levels of choice for the minimum and maximum conditions are non-numerical and strictly their relations between conditions.

Figure 2: Demographics: Age



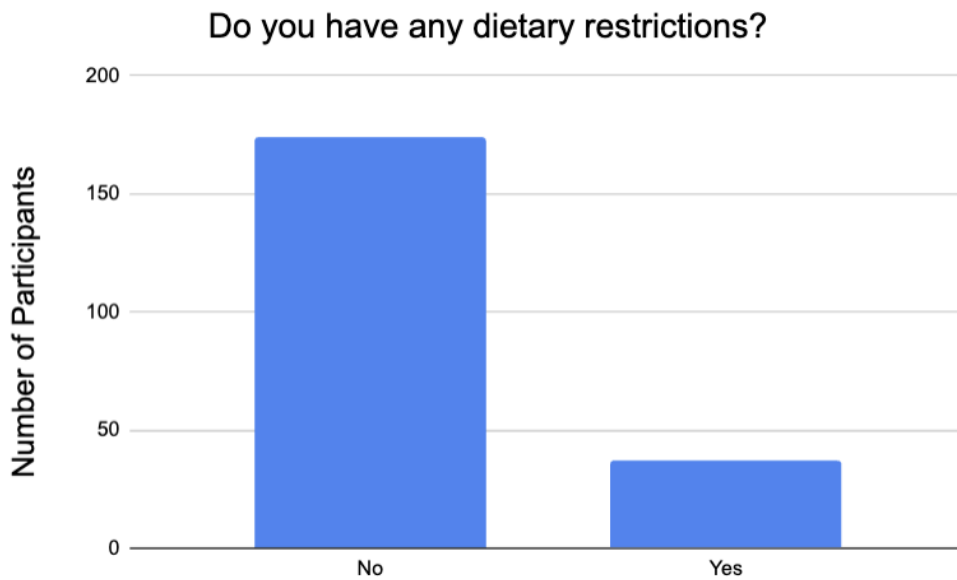
Note. Unlabeled sections include 65 - 74 years old ($n = 2$) and 85 or older ($n = 1$). Total number of participants who answered the age demographic question was $n = 185$.

Figure 3: Demographics: Gender





Note. Unlabeled section includes “Prefer Not to Say” ($n = 1$). Total number of participants who answered the gender demographic question was $n = 211$.

Figure 4: Demographics: Dietary Restrictions



Note. Total number of participants who answered the dietary restriction demographic question was $n = 211$.

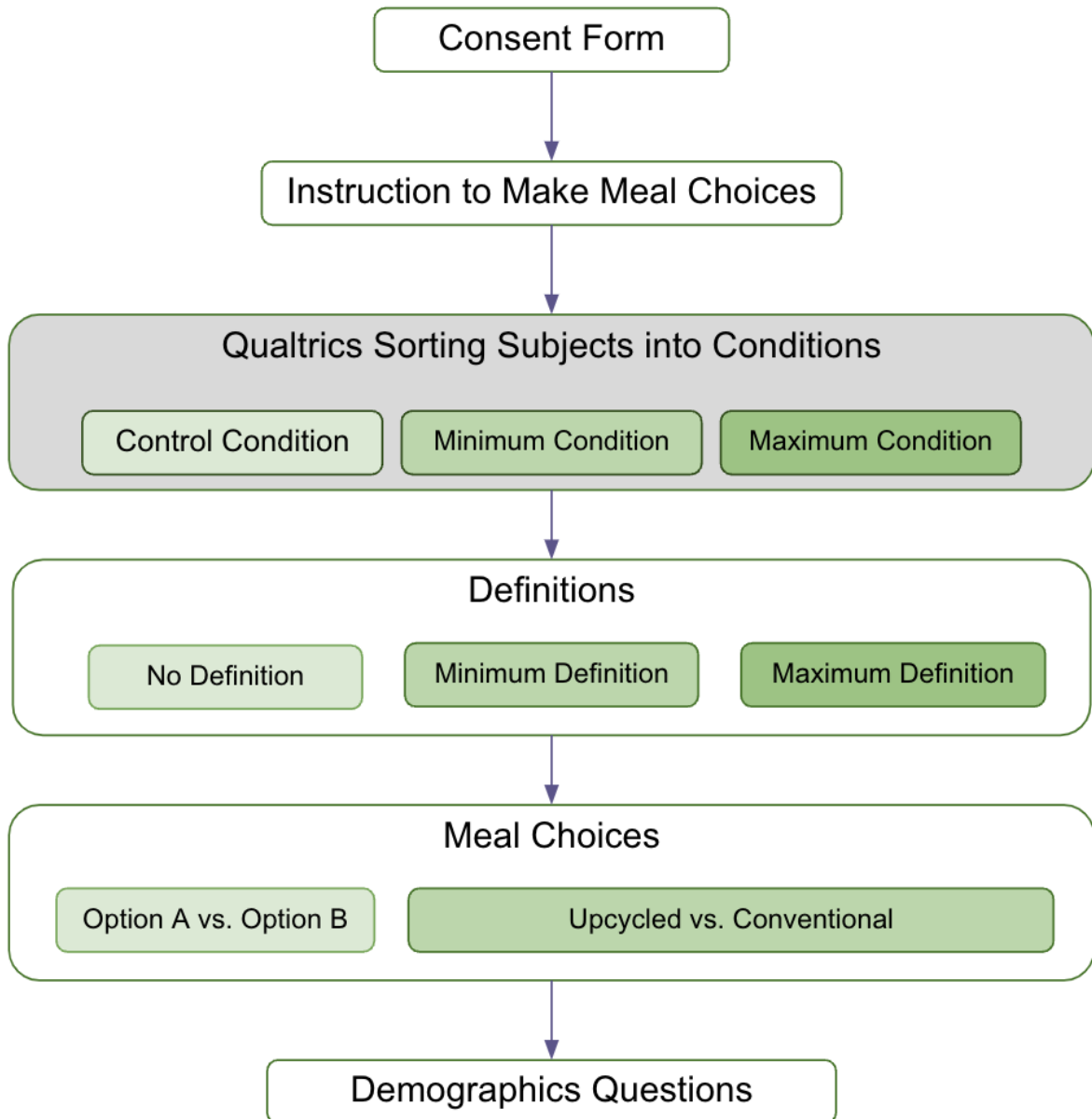
Figure 5: Definitions, Labels and Example Meal Choices for Study Conditions

Condition:	Control	Minimum Information	Maximum Information
Definition:		<p>Conventional food: Food that is commonly sold to the general public.</p> <p>Upcycled food: Food that is made from ingredients that otherwise would have been thrown away.</p>	<p>Conventional food: Food that is commonly sold to the general public.</p> <p>Upcycled food: Food made from consumable ingredients that otherwise would have been thrown away.</p> <ul style="list-style-type: none"> This includes peculiar-looking produce or food scraps that are equally safe, nutritious, and tasty! This helps to conserve global resources and reduce your food waste! It can come from grocery stores and farmers' markets!
Label:	Option A or Option B	Upcycled or Conventional	
Example Meal Choice:	 <p>Option A Option B</p> <p><input type="radio"/> <input type="radio"/></p>	 <p>Upcycled Conventional</p> <p><input type="radio"/> <input type="radio"/></p>	

Note. The control condition had no definition provided. Participants were instructed to make their preferred meal choice for each condition prior to receiving their respective definitions. Meal choices additionally included sandwich, wrap, soup, and salad options.

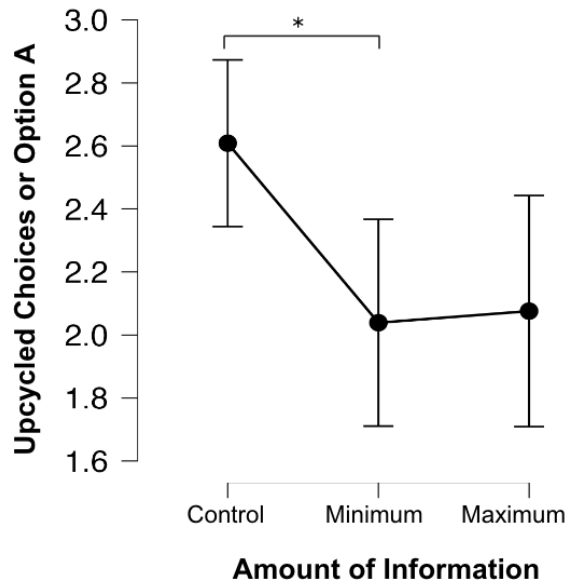
Figure 6: Meal Images (Pasta, Wrap, Salad, Soup, and Sandwich)



Figure 7: *Qualtrics Survey Flow*

Note. “Qualtrics Sorting Subjects into Conditions” does not provide participants with any question or definition prompts; Qualtrics automatically randomizes participants into the three conditions. Participants are only shown (1) the consent form, (2) definitions, (3) meal choices, and (4) demographics.

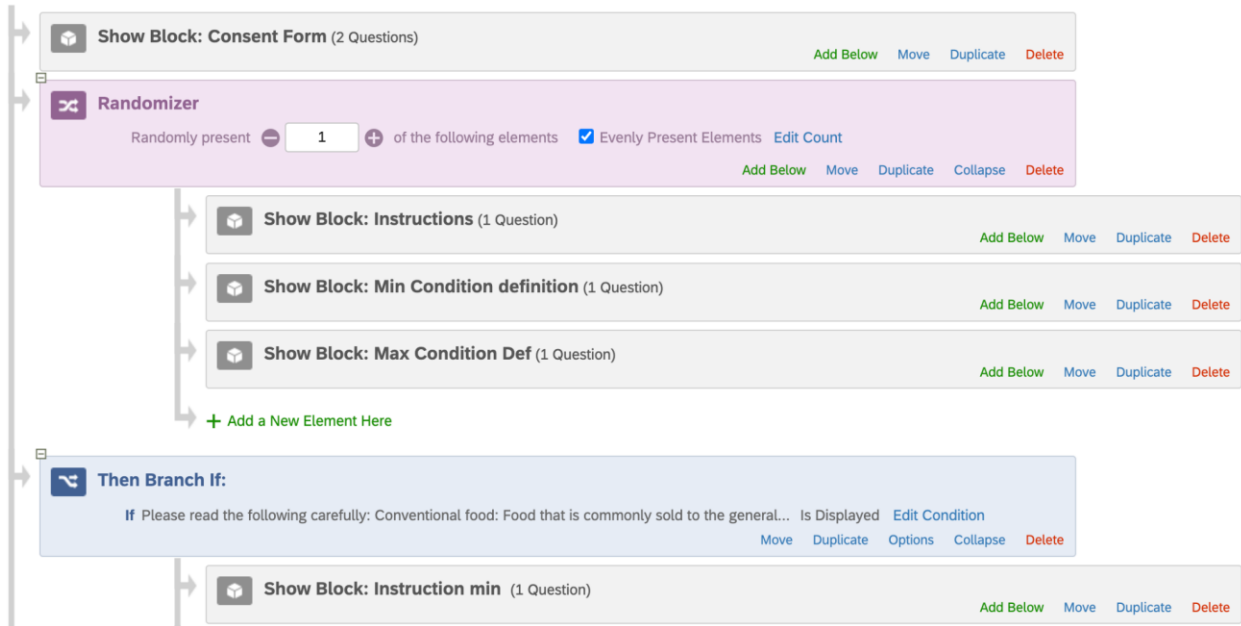
Figure 8: Descriptive Plot of Dependent Variable Between Conditions

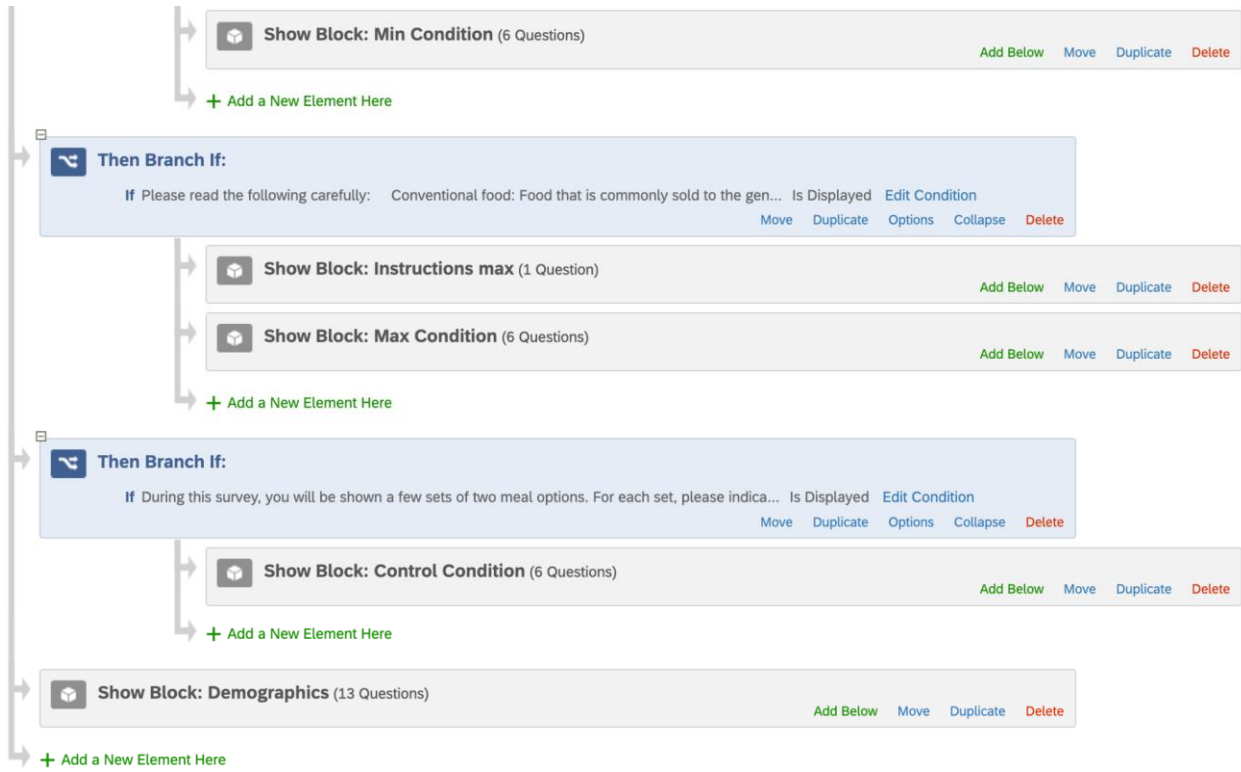


Note. Error bars represent 95% confidence interval. Vertical axis represents the amount of Upcycled or Option A choices out of five presented meal options.

* $p < .05$

Figure 9: Qualtrics Survey Flow and Randomization





Appendix C: Data Analysis Tables**Table 1: Analysis of Variance (ANOVA) Results with ETA squared effect size**

ANOVA – upcycledand_optiona

Cases	Sum of Squares	df	Mean Square	F	p	η^2
condition	14.268	2	7.134	3.863	0.023	0.036
Residuals	385.939	209	1.847			

Note. Type III Sum of Squares**Table 2: Post Hoc Test with Tukey test and Cohen's d effect size**

Post Hoc Comparisons – condition

		Mean Difference	SE	t	Cohen's d	P _{Tukey}
Control	Maximum	0.533	0.234	2.278	0.392	0.061
	Minimum	0.570	0.225	2.529	0.419	0.032*
Maximum	Minimum	0.037	0.228	0.161	0.027	0.986

Note. P-value adjusted for comparing a family of 3

* p < .05

Table 3: Descriptive Statistics: Mean Likelihood of Choosing Upcycled for Each Condition**Descriptives ▼**

Descriptives – upcycledand_optiona

condition	N	Mean	SD	SE	Coefficient of variation
Control	69	2.609	1.101	0.133	0.422
Maximum	66	2.076	1.492	0.184	0.719
Minimum	77	2.039	1.446	0.165	0.709

Table 4: *Survey Demographics Statements and Respective Correlation Variable Name*

Survey Demographic Statement for Likert Rating	Pearson's Correlation Variable
I care about being sustainable in my day-to-day life.	enviro_score
I'm concerned about environmental problems.	
Preventing food waste is important for a sustainable environment.	
I was familiar with upcycled food prior to this survey.	familiarity_score
I don't feel disgusted when thinking about consuming upcycled foods.	notdisgust_score
Upcycled food is safe to consume.	foodsafe_score
I'm not afraid to eat new things.	notneo_score

Note. Statements used for the enviro_score were modified Environmental Awareness questions from the Environmental Consciousness Survey of University Students⁹. For each statement, participants were asked to rate their level of agreement on a Likert scale (Strongly Disagree, Disagree, Neutral, Agree, Strongly Agree).

Table 5: *Pearson's Correlations Table*

Pearson's Correlations		
Variable		upcycled_choices
1. upcycled_choices	Pearson's r	—
	p-value	—
2. enviro_score	Pearson's r	0.249
	p-value	< .001
3. notdisgust_score	Pearson's r	0.376
	p-value	< .001
4. familiarity_score	Pearson's r	0.309
	p-value	< .001
5. foodsafe_score	Pearson's r	0.428
	p-value	< .001
6. notneo_score	Pearson's r	0.079
	p-value	0.256

Note. Scores are calculated from converting Likert rating for respective statements (See Table 4) for each variable into numerical values (Strongly Disagree = 1, Disagree = 2, Neutral = 3, Agree = 4, Strongly Agree = 5).

Appendix D: Poster for Survey Distribution



Note. During survey distribution, research team members advertised the survey as being open to all English-fluent individuals.

Appendix E: Team Contributions

Kateryna Voznyuk:

1. Planning: made initial outlines of research proposal and survey flow and explained the premise of the project during the progress check-in meeting with Dr. Zhao
2. Proposal: wrote introduction, research question, hypotheses, and anticipated outcomes; contributed major edits to conditions, methods, and implications
3. Survey: wrote demographics sustainability and upcycled preference factor questions; created and coded formatting of images
4. Distribution: created poster including QR code and tinyurl; posted survey on social media (Facebook, Instagram); contacted professors (Canvas, Piazza), external organizations (UBC Psi Chi, UBC DAS Lab), and clients (UBC Dining halls)
5. Data Analysis: cleaned preliminary and final datasets in Excel; performed preliminary and final Pearson's R correlations in JASP
6. Presentation: designed all presentation slides and diagrams on Google Slides; performed major edits on all script sections; presented introduction and research question
7. Final Report: wrote executive summary, introduction, research question, hypotheses, participants, procedure, discussion, limitations, and references; contributed edits and writing to recommendations, conditions, and measures
8. Appendix: designed Appendix B Figures 1-8 and Appendix C Tables 4 and 5; created Appendices D and F
9. Communication: contributed to communication with teaching team and clients; coordinated group efforts and provided throughout project process
10. Extracurricular: volunteered to distribute promotional materials for Peko Produce (~3hrs)

Melika Tahvili:

1. Explored and reviewed published research papers to identify a knowledge gap in research on upcycled food
2. Contributed to developing a research question and the hypotheses, and writing the research proposal
3. Explored the literature to develop demographics questions
4. Assisted in creating, designing, and formatting the survey
5. Contributed to survey distribution (social media, professors, external organizations)
6. Helped in creating the presentation slides
7. Presented the hypotheses and demographics and was active in the Q&A section
8. Contributed to writing the abstract, introduction, methods, and discussion sections of the final report
9. Edited the final report for clarity, flow, and accuracy

Emma Lee Lyon:

1. Proposal: Worked on the Methods section and aided in the editing process
2. Created the survey design in qualtrics including sourcing the photos, randomizations, assignment of participants and coding for preliminary and final versions of the survey .
3. Contributed to survey distribution (social media, professors, external organizations)
4. Presented the results section and was very active in the Q&A section

5. Analyzed the preliminary chi-square data and was active in choosing applicable tests to analyze our data
6. Cleaned our final dataset for JASP analysis
7. Was in communication with prof and TA's about team questions specifically on Stats.
8. Presented our groups survey for our project approval meeting
9. Final Report: Analyzed and interpreted the Anova and post Hoc, Interpreted the Chi-square data, contributed to the methods, results, and discussion sections. Did overall edits across the report.
10. Appendix: Figure 9 and Tables 1-4
11. Extracurricular: volunteered to distribute promotional materials for Peko Produce (~3hrs)

Martina Francisco:

1. Contributed to survey distribution (social media, professors, external organizations)
2. Contributed to writing the research proposal: Methods (measures and stats)
3. Assisted in creating, designing, and formatting the survey
4. Researched demographic questions for the survey.
5. Presented the results section for Pearson's R correlations, implications, and recommendation sections
6. Final Report: Analyzed the data using Chi-Square, and G-power analysis, and worked on interpreting the results for the report
7. Final Report: Wrote the Chi-Square analysis, Pearson's R analysis and recommendations section, and edited results and discussion sections on the report.
8. Extracurricular: volunteered to distribute promotional materials for Peko Produce (~3hrs)

Sushmita Mahadani:

1. Contributed to survey distribution (social media, professors, external organizations)
2. Contributed to developing and finalising the preliminary conditions for the research proposal
3. Assisted in creating, designing, and formatting the survey
4. Presented the methods and conditions sections and was active in the Q&A section
5. Conducted A priori power testing for the proposal and the report
6. Conducted preliminary ANOVA and post-hoc Tukey testing and worked on interpreting those results for the proposal and the report
7. Conducted final Chi Square testing for the report
8. Helped finalize the conditions, methods, and recommendations for the report

Appendix F: *Additional Discussion on Study Process*

Extracurricular Contributions: The team is highly passionate about advancing the use of upcycled food by the general public. We have volunteered on behalf of Peko Produce during the term, handing out promotional materials at various Vancouver locations and Metro stops to advance public awareness of upcycled food. Pictured below: research team members distributing promotional materials to downtown Vancouver citizens.



Difficulties: Our team experienced significant extenuating circumstances over the course of the semester, including but not limited to: family illness and accidents, stress due to family challenges, acute health challenges during the later half of the term (ie. surgery, bronchitis), and chronic illness (ie. severe concussion) over the course of the semester. As a result, the group has had to be particularly flexible in coordinating work on the project and communicative with the teaching team on negotiating extensions or rescheduling of project sections. We would like to thank and acknowledge Dr. Zhao and the teaching team for their flexibility and support during this difficult term.