Climate Friendly Food System Label Impact Evaluation on Consumer Behaviour

Phase 3

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SEEDS Sustainability Program

UBC sustainability

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Executive Summary

In partnership with UBC Food Services and the SEEDS Sustainability Program, our Behavioural Insights intervention (supervised by the Department of Psychology) was part of UBC's goal to become carbon neutral. Our main objective was to encourage greater consumption of plant-based, climate-friendly foods at foodservice locations on the UBC campus. We hypothesized that students would be more likely to choose more sustainable meal options by introducing icons on the left side of menu items to indicate the climate-friendly menu items, supplemented with educational posters. Our intervention was part 3 of the Climate-Friendly Food System Label Evaluation pilot project (3 phases in total); the previous findings indicated the icons had the potential for success, but more research and tweaks were needed. After reviewing the previous findings and the substantial existing literature on using BI to promote sustainable food choices, we felt confident that our solution showed substantial promise.

We created a single icon that we felt was a potent symbol for climate-friendly meals through input from the SEEDS team, support from a graphic designer, and a student survey of potential icon designs. We had access to two food hall locations with similar populations, formats, and menus. We then collected baseline sales data at both locations for one month, and the following month, we ran the intervention at one location, Open Kitchen. At the same time, the other, Vanier, served as a control site. We supplemented the icons by introducing a poster that educated students on its meaning. It also included a QR code for students who were curious about how we calculated climate impact for the menu items.

After looking through the results of our experiment, we came across a few interesting findings in the data. First off, the icon performed similarly to its predecessors in the two trials (phase 1 and 2) before it (the traffic light icons). We had hypothesized that adding BI solutions to the problem would have a much more positive result than before. However, this did not end up being the case. After first sifting through the data, we found that our climate-friendly icon backfired, as the number of sustainable meals sold when the icon was in place went down. After diving deeper into the data, we found evidence that this might not be the case. Upon further review, our results showed that more non-sustainable items were sold during our implementation period instead of the baseline period. This led us to believe that if the ratio of sustainable items to non-sustainable items increased, we would see a much more promising result.

Based on these findings, we recommend looking into some combination of the following:

1. Conduct a campus-wide survey for students to see their preference for menu icons and level of familiarity with sustainable eating
2. Dive deeper into behavioural insight interventions such as framing effects, social norms, and messenger effects
3. Future research similar to the three completed trials but with a larger ratio of sustainable items to non-sustainable items. This was our most promising lead from analyzing our data, and we believe this could be more beneficial towards getting a higher uptake of sustainable foods at UBC

Part A. Problem Background

The Issue

Climate change is shifting the culture around our eating habits. With global temperatures, sea levels, and CO2 emissions on the rise, more people emphasize eating sustainably. (Vennard et al., 2019) explain that "Production of animal-based foods accounts for more than three-quarters of global agricultural land use and around two-thirds of agriculture's production-related greenhouse gas emissions, while only contributing 37 percent of the protein in the global food supply" (p. 2). These emissions are not sustainable for the payoff of only a tiny portion of the world's protein supply. New research continues to bring to light that there are better ways for everyone to get proper nutrition while still being environmentally conscious. Our BI project aimed to contribute to the solution in partnership with the UBC SEEDS sustainability program. Our challenge was to lower the carbon footprint of UBC's campus by nudging students to choose sustainable food options at campus meal halls.

SEEDS informs and coordinates applied research about Climate-Friendly Food Systems while UBC Food Services is committed to adding more plant-based food items to the menus on campus in alignment with CAP2030 target to reduce GHG emissions by 50% in food systems in 2030 compared to the 2019 baseline. SEEDS has highlighted this issue as the central area of focus for the group. Prior to our intervention this semester, their team executed two trials in 2021 during the spring/summer and last fall. Our trial followed those beginning on February 7 and concluding on April 8.

Ensuring students' freedom of choice regarding what they eat is essential. Therefore, introducing drastic changes to their menus, such as removing meat and dairy, is not an option. Therefore, it was an ideal opportunity to introduce the BI approach. Research from (Ensaff, 2021) states, "It is essential that policy and practice prioritizing health and wellbeing embrace

the complexity of food choice and look beyond traditional routes. Evidence to date on nudge strategies to change food choices is growing and shows great promise. Choice architecture has a distinct and vital role in improving populations' diets" (p. 203). BI is still a growing and evolving field, but a growing body of research supports it as an effective way to change people's food choices to encourage a sustainable earth. Using the BI framework, we can actively try to influence students to make better decisions for themselves and their community without infringing on their rights to make what they feel is the best choice for them. It is crucial to ensure that we have the students' best interests in mind; otherwise, this could be a damaging and unnecessary task.

Why Behavioural Insights (BI)?

In a recent student survey that was completed by more than 1000 respondents from the UBC community conducted by the previous trial teams and SEEDS, 84% of respondents stated they wanted to see climate impact labels on food items.

Refer to Appendix 1: Previous Survey Questionnaire for the survey.

However, only about 25 to 30% of daily meals sold on campus are low climate impact items suggesting a substantial gap between what students intend to do and what they are doing. This is likely due to the many strong barriers impacting their choices, including societal norms of eating meat frequently, avoiding novel foods, social and cultural identity, and perceptions of taste and satisfaction. Given the strong indication of an intention-action gap, a behavioural approach seems warranted even with ample options to choose from.

By changing the choice architecture UBC students were subject to on the menus, they can still possess the ability to make the same choices but with new information. (Thaler & Sunstein, 2008) define choice architecture as "organizing the context in which people make decisions." We attempted to leverage this by changing the menu design to provide an easy, salient illustration highlighting climate-positive food choices.

The prior trials gave us valuable insights from which we elaborated. Previously, visibility was a concern due to the icons' size and colour contrast. Additionally, a three-icon system required some effort to understand, and there was feedback from students that the "red" icons might induce a sense of shame. Lastly, the second trial took place at a location where dairy is a crucial ingredient for the dominant food (pizza), which may have skewed results. We considered these insights as we developed our research design.

Part B. Behaviour & Context

Feasibility

The initiative was comparatively simple in design and execution. We considered the following:

1. <u>Locations:</u> We had access to direct communication with the UBC Food Services team, who made two locations available to us. This allowed us to introduce a control group to the trial (trials 1 and 2 did not use controls).
2. <u>UBC Food Services Experience:</u> The Food Services team is accustomed to labelling items on campus since they already have labels for factors such as gluten and halal, so we felt confident they could execute the icons. Given the two previous trials, the data collection was also something the UBC Food Services team was familiar with.
3. <u>Strong Partners:</u> Students from the Environmental Studies program collaborated with the SEEDS Sustainability Program, UBC Food Services, Sustainability and Engineering, and Campus + Community Planning to execute this initiative. In parallel to this research, another student's team was in charge of calculating the GHG emissions, nitrogen and water footprints for the available food items at both restaurants to indicate which items were climate-friendly. Having already conducted several trials, we knew it was feasible to calculate these indicators.
4. <u>Low Cost to Execute:</u> The only costs we incurred were the graphic design fees (a one-time cost) and the cost of printing stickers to place on the menu boards. If the results were encouraging, the low cost would make this intervention easy to expand into new restaurants.
5. <u>Large sample and straightforward data collection:</u> With daily sales ranging from 2000 to 5000 meals at each location, we knew we would have an extensive data set to work with. UBC Food Services already collects this data, so it was relatively easy to collect.

Target Demographic

The target demographic was the students on UBC's Vancouver campus. Over 66,000 students are enrolled, and according to Vancouver Housing UBC, the campus houses more than 10,000 students in over 12 residences. Many of these students eat primarily on campus, as they do not have full kitchens, and many have meal plans. Our locations, Open Kitchen and Gather at

Vanier, are both located adjacent to residences and feed students on a mandatory meal plan program. While we could not collect any personal data from the students, we know residence students almost exclusively patronize these two locations.

Key Barriers

Food choices are incredibly complex. We eat traditional foods that connect us to our culture. We eat with other people to create social bonds. We eat for comfort, pleasure, health, and adventure. Therefore, attempting to change food choices comes with many barriers to consider.

1. The Key Factor in Food Choice is Taste: While students indicate they want to eat more sustainably, our secondary research suggested that taste is still the predominant factor driving food decisions (Vennard et al., 2019). The perception of plant-based foods as less delicious or satisfying is a crucial barrier.
2. Social Norms: Meat and dairy are a part of the "normal" North American diet. Burgers, steak, and milkshakes are considered quintessential foods we enjoy. Therefore, creating dynamic social norms as people migrate to more plant-based meals may be necessary (Sparkman & Walton, 2017). Additionally, avoiding terms such as "vegan" are suggested by other research due to their indication that these foods are designated for specific groups.
3. Self-Image: "You are what you eat" is a common idiom (Vartanian et al., 2007). Many people equate meat consumption to a sense of self. For example, some people see meat consumption as "masculine" (Ruby & Heine, 2011). Traditional meals such as turkey at Thanksgiving or burgers at a BBQ form part of our greater cultural identity.
4. Lack of Awareness of Climate Impact: When picking food choices, consumers are often unaware of how environmentally sustainable a food option is. On average, consumers have a rough idea of what's sustainable and what isn't, but not enough compared to health when it comes to making food choices (calories, carbs, proteins, fats, etc).

Some barriers specific to our target population include:

1. Lack of Awareness: SEEDS is working in collaboration with different stakeholders at UBC to educate the UBC community about the impact of meat and dairy food items on climate change – however, awareness alone may not be enough to overcome the previously noted barriers.
2. Young & Carefree: Most UBC students live away from their parents for the first time and enjoy the freedom to make their own choices. Sometimes they may be compelled to explore previously unavailable options, such as partying late at night or eating a lot of

junk food. There may be a positive to this in that they may also be more open to trying new foods.

3. <u>Budget-Conscious:</u> Many students have a limited budget and may try to stack their meals with high-calorie, low-budget foods. Although plant-based meals are generally not the most expensive, since meat and dairy tend to be costly, the perception of satisfaction and nutrition value-per-dollar may be lower for plant-based foods.
4. <u>More Non-Sustainable Foods Available:</u> On-campus, more non-sustainable foods are available for consumers to eat than sustainable foods.

Our intervention does not address all of these barriers. We believe it would not be easy to overcome them with a single tool. Our intervention aims to address the lack of awareness.

Touchpoints

There are two touchpoints in our design. First, we used a poster at the intervention restaurant that showed a large image of the icon and a brief to indicate its meaning. Secondly, the icons themselves were placed to the left of the menu items that are "sustainable," capturing students' attention as they made their meal selections.

We expected that by showing customers a sustainable icon menu option right as they were ordering, they would choose a sustainable menu item. Based on the previous survey conducted, that is what they wanted. The poser and icon showed them the benefits in a simple, easy-to-read manner, making the decision uncomplicated. Additionally, our posters offered students the option to access more information. By introducing a QR code, curious students could further find out why some dishes got icons and some did not based on the calculations done by the environmental studies program. This was important to include for transparency, giving students confidence that the calculations were scientifically sound.

Part C. BI Solution

Behavioural Theories Used in Solution

The primacy effect suggests that humans tend to remember the first piece of information they encounter better than other information they receive later on ([The Decision Lab, 2019](#)).

At the same time, the anchoring bias suggests that people are usually influenced by the first piece of information they receive when making a decision compared to information given after (The Behavioural Insights Team, 2017).

When combined, both biases result in an individual relying too heavily on the first piece of information they find. This combination usually results in neglected information collected in the future (The Decision Lab, 2019).

Designing the Icon: Avoiding Veganism, Staying Positive and Being Seen

When designing the icon, three critical features attributed to its final design:

- Our secondary research found that promoting sustainability positively rather than negatively with threats or fear tactics worked better at encouraging environmentally friendly food choices (Bissing-Olson et al., 2016), (Schneider et al., 2017), (The Behavioural Insights Team, 2020); and (Truelove et al., 2014).
- Our research also showed that avoiding the term "veganism" or "vegetarianism" also encouraged sustainable food choices (Vartanian et al., 2007; Ruby & Heine, 2011; The Behavioural Insights Team, 2020).
- Our icon was placed on a menu board behind the cash at Open Kitchen and needed to be seen from a distance.

We hired a graphic designer to brainstorm different ideas for the icon based on these findings. Some ideas included a checkmark, a thumbs up, a happy face, a trophy, an earth, and a leaf. After looking at many options, our team came down to the final three (see below).

We created a qualitative survey (see Appendix 3: Qualitative Survey Results) to analyze UBC students' thoughts and feelings about the three proposed icons. Some questions asked how they felt about the icon when seeing it and what they thought the icon meant. After collecting the analysis, the results showed that the best icon to go with was the "happy face planet." After a few more edits, the final icon we used is shown below.

Placing Icons on the Left Side of Sustainable Menu Items

After figuring out the icon design, the BI Solution also replicated a study where calories were placed on the left rather than the right of menu items and how it decreased calorie consumption ([Dallas et al., 2018](#)). Our intervention did something similar; setting the sustainable icon on the left side of sustainable menu items rather than on the right to see if it influenced customers to choose sustainable food choices at the treatment group Open Kitchen.

Image of the BI Solution at Open Kitchen
Sustainable Icon was Placed on the Left Rather than the Right

We believed that if customers saw whether the menu item was sustainable before the menu item, price and description, it would influence customers to choose a sustainable food option. They would "anchor" onto the first piece of information provided, and it would weigh heavily on their food choice.

Poster Design

The intervention also included a poster for customers at Open Kitchen (see below). This sign indicates what the icon on the menu board meant and provided a QR code that sent customers to a web link for more details on the sustainable food items. Open Kitchen placed this poster into a plastic paper holder on a glass counter, where customers started their orders.

Part D. Research Design

Overview of Research Design

Our experiment was conducted using a Quasi-Experimental Design with baseline and intervention periods at both a control and treatment location.

The Treatment Overview

Prior to our experiment, UBC students in the Environmental Studies program calculated the climate impact of menus at two UBC foodservice locations. Menu items were evaluated for water stress, nitrogen, and carbon emissions. These sustainable menu items (referred to interchangeably as "green") were labelled with a simple icon at the treatment location. The icon was placed to the left of sustainable menu items rather than the right based on the primacy and anchoring effects. Posters in the foodservice area informed students of the icon's meaning and included a QR code for more information. The icon and poster combined were the independent variable in this test.
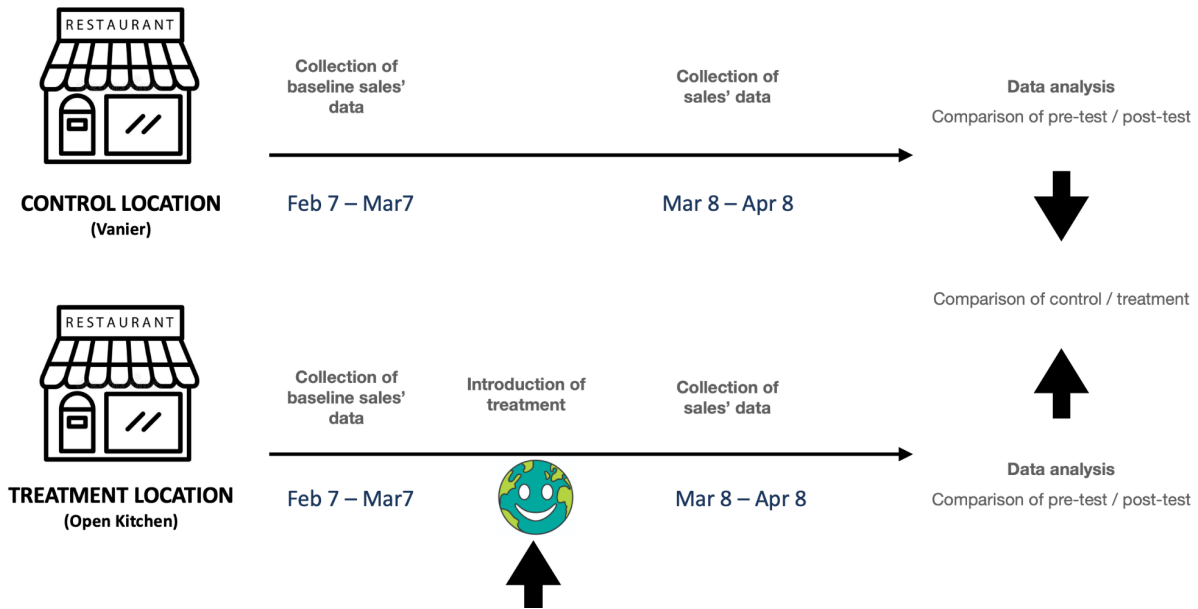
The Participants

Our target group was UBC students who eat at campus food service locations. Approximately 60,000 students at UBC and about 10,000 live close to the two sites participating in this program. During the two months, we collected data for 418,697 individual meals sold. The research design did not allow us to calculate the exact number of participants or gather any personal information. Many students live in residences adjacent to these food service locations and eat there frequently.

In a study conducted during the previous trial, 84% of students surveyed stated they wanted to see climate labels on on-campus menus and correctly identified sustainable meals as more sustainable. (Refer to Appendix 1: Previous Survey Questionnaire for more details.) This suggested there was a substantial "intention-action" gap. However, we discovered there may have been a self-selection bias with the survey, as it was distributed to an email list of organizations focused on sustainability. Therefore, the survey respondents may have been more focused on sustainability than the average UBC student, considering that the intention to eat more sustainably may not be as high as previously thought. Still, the University is committed to reducing its environmental impact throughout campus – an initiative with broad student support.

Groups

Two campus food service locations participated in the study. One was the treatment location (Open Kitchen), and the other served as the control location (Vanier). The food service

locations are similar - both are food halls within a campus residence, they share the same chef, and the menus share many common items with the same recipe.

Method of Randomization

We could not randomly assign different food service locations due to a logistical constraint in the climate calculations for the menu items. In this case, one location had this data calculated prior to the study. The other location did not have a complete data set for sustainability before launch. Therefore, we were restricted to using the first location for the treatment. Therefore, this is not a pure RCT and would fall into the category of an experimental design.

Methods of Control

The two foodservice locations participating in the trial are relatively similar, with many of the same menu items. The control location and baseline periods served as our primary methods of control.

Key factors that contribute to control:

- Both locations are food halls on campus adjacent to a student residence.
- Both are operated by UBC Foodservice and have many of the same menu items.
- Both serve students almost exclusively.
- We collected daily sales of each item for each location during a 29-day baseline period and a 31-day trial period.

One unexpected confound to our data was the rotation of menu items. We were aware there would be some daily changes, but when we received the data, we saw that many items were only available once or twice a week. This meant the ratio of sustainable items to non-sustainable items available daily fluctuated. We, therefore, included a daily ratio of sustainable to non-sustainable items based on what was sold each day rather than using the entire menu, which was not fully available.

Measured Outcomes

The primary data we collected to measure our intervention was the number of sustainable menu items purchased during the experiment. We counted sales of the "sustainable" and the "non-sustainable" items at both locations. This sales data is our dependent variable. We collected sales data for four weeks before the test for the pre-test baseline. We then introduced the icon and poster to the treatment location and collected sales

data for the following four weeks. In addition, we calculated the daily ratio of sustainable and non-sustainable items that were available for purchase.

Justification of Research Design

We have strong evidence that students want to make more sustainable food choices. Since the two locations and populations are very similar and the amount of data we collected was significant, we felt we had a strong chance of seeing a precise result.

Our secondary research discovered that other food choices had been successfully influenced using icons, including healthy choices. We also discovered that placing labels to the left of food items has increased their efficacy. This is due to the primacy and anchoring effects, where the first thing seen or read weighs heavier in a decision than the following factors. Additionally, we found ample examples of how positive framing is more effective in nudging sustainable food choices than messages that attempt to use negative feelings such as guilt.

Past Trials Influencing the Research Design Choice

In previous similar trials, a "traffic light" model using red, yellow, and green icons was used to indicate which items had a high, medium, or low sustainability. We were concerned that this framework represented some food choices as "bad" and inducing guilt might backfire. Interestingly, after having discussed this internally, the client informed us they received feedback criticizing the traffic light model. Therefore, using only one label for "sustainable" items was chosen. The downside was that we could not provide information about which items are least sustainable and are therefore unable to nudge students to avoid those items. However, we felt this was an appropriate compromise because shame could derail the entire initiative.

Part E. Research Results

Setup Overview

To compare results between different timeframes and restaurants, the intervention period at Open Kitchen was compared to a baseline period before the intervention was implemented, a control restaurant when the intervention was implemented and the same control restaurant before the intervention was implemented. Vanier was chosen as the control restaurant, and Open Kitchen was treated as the treatment group. Due to the different time frames and restaurants, this created four categories of sales data to analyze.

- Open Kitchen before the intervention (February 7 to March 7, 2022)
- Open Kitchen during the intervention (March 8 to April 8, 2022)
- Vanier before the intervention (February 7 to March 7, 2022)
- Vanier during the intervention at Open Kitchen (March 8 to April 8, 2022)

Comparing data between these periods and restaurants could reduce time effects and the different food options available at each restaurant in the analysis.

Results

After analyzing sales data between the control and treatment groups between February 7 to April 8, 2022, we believe the BI intervention did not make an impact in encouraging sustainable food choices at the treatment location.

### Analysis 1: Percentage of Sustainable Food Items Sold
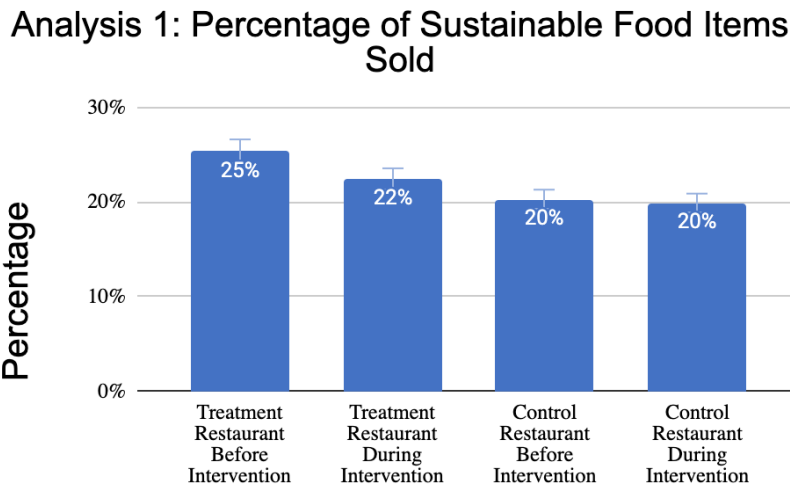
In the bar chart, roughly 25% of sales were sustainable in the treatment group before the intervention but then dropped by 3% to 22% during the intervention. Meanwhile, the control group stayed the same at 20%. After running a two-way ANOVA table, there was no statistically significant interaction on sustainable food choices due to the icons being placed on the left side of sustainable menu items and the icon's design; $F(1,118) = 2.37$, $p = 0.13$, $\eta2 = 0.02$).

Conclusion: The sustainability icons placed on the left side of sustainable menu items did not encourage sustainable food choices.
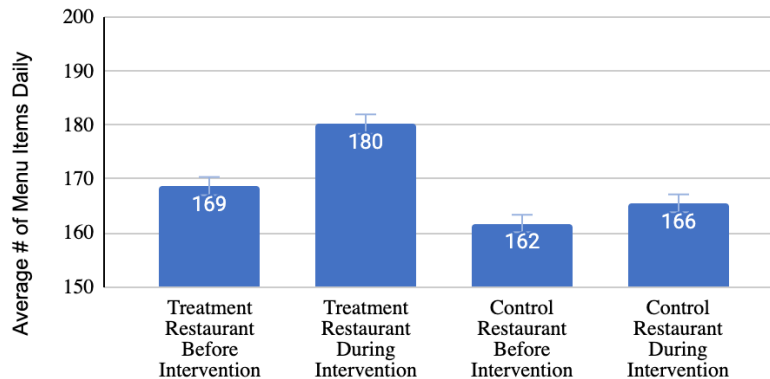
Analysis 2: Average # of Sustainable Menu Items Available Daily
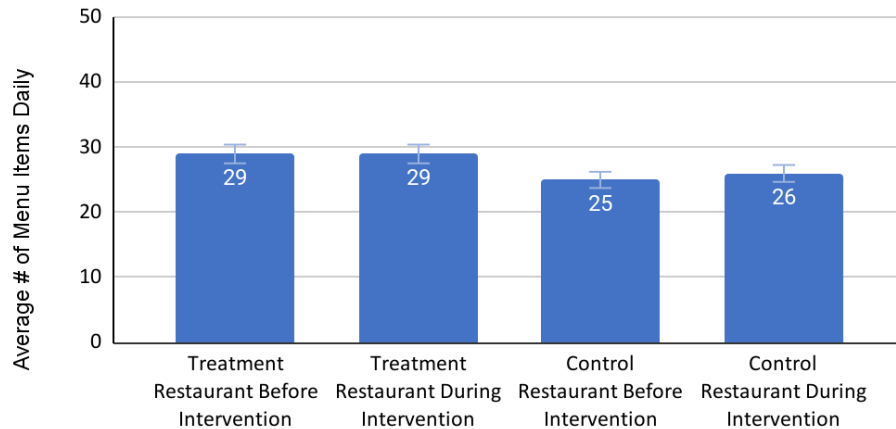
Both groups maintained the same average number of sustainable menu items available per day as they did before the intervention. After running a two-way ANOVA table, there was no statistically significant interaction between the average number of sustainable menu items available daily at each restaurant during each period; $F(1,118) = 0.36$, $p = 0.55$, $\eta2 = < 0.01$).

Conclusion: The average number of sustainable menu items available at both restaurants stayed roughly the same before and during the intervention in both groups.

Analysis 3: Average # of Non-Sustainable Menu Items Available Daily

However, the treatment group increased the average number of non-sustainable food items available per day during the intervention. In contrast, the control group roughly maintained the average number of non-sustainable food items per day compared to their baseline period. After running a two-way ANOVA table, there was a marginally significant interaction between the average number of non-sustainable menu items available daily for the treatment restaurant before and during the intervention period; $F(1,118) = 3.43$, $p = 0.07$, $\eta2 = 0.02$).

Further diving into this finding, a correlation was conducted between the percentage of sustainable item sales and the percentage of sustainable food items available per day. This resulted in a significant correlation between the two ($r = 0.52$, $p = < 0.01$), suggesting that the more sustainable food items on the menu per day, the more likely sustainable sales are. The opposite also stands true (the more non-sustainable food items available per day, the more non-sustainable sales).

A regression was also completed that used the baseline vs. intervention periods and the percentage of sustainable items available to predict the percent of green items sold for the treatment group's data.

See the chart below.

	Estimate	Standard Error	t Value	p Value
Baseline vs Intervention Period	-0.02	0.01	-1.46	0.15
% Sustainable Items Available	1.41	0.28	5.06	<.001

The regression shows that once the percentage of sustainable items available per day is added, the baseline vs intervention period factor is no longer significant. Instead, the percentage of sustainable food items available per day is significant.

Conclusion: The analysis suggests that the increase in non-sustainable food items available in the treatment group during the intervention may have caused a percentage decrease in sustainable food item sales. This finding argues that if more sustainable menu items were available, it could have increased the percentage of sustainable sales.

Please review Appendix 2: Additional Results for additional analysis.

Part F. Recommendations

Based on the results of our research analysis, we would not recommend scaling this icon across the UBC campus at this stage. Our recommendations fall into three categories: future trials of a climate-friendly food icon, other BI tools to explore, and a trial to explore the effect of sustainable to non-sustainable ratios on food choices.

Future Icon Research

If UBC and SEEDS want to conduct a fourth trial of the icon, we would suggest the following considerations to support a more robust research design:

- Conduct a campus-wide survey to understand the attitudes, preferences, and current behaviours of students concerning food choices. The survey previously conducted was circulated primarily by groups with a strong sustainability focus, likely resulting in a self-selection bias.
- Run the trial at multiple food halls and ensure randomization is possible. We noted that the two locations in our trial served slightly different groups (the treatment group Open Kitchen has a higher number of international students, for example).
- During the trial, reduce rotation of menu items to keep a consistent number of sustainable and non-sustainable items available daily. For rotating items, ensure that a consistent ratio of sustainable to non-sustainable items is available throughout the week at all participating locations.
- Ensure a cross-reference of sustainable items across all locations to ensure consistency. In our trial, we discovered some items were labelled sustainable at one location but not at another, creating some challenges in analysis.

Other BI Interventions

That being said, we hypothesize the icon was ineffective because it does not address some of the more significant barriers to overcome: taste perceptions, social norms, and budget being some we see as highly relevant. The icon may become more effective once some of these issues are addressed. These are some BI interventions we think may hold promise for addressing these barriers:

1. <u>Framing around taste and satisfaction:</u> Describing plant-based meals in similar language as we typically use for meat, emphasizing satisfaction and flavour.
2. <u>Dynamic, evolving social norms:</u> Showing students how many plant-based meals are being chosen each day or using strategies that suggest an increasing number of people are eating more sustainably is an area for potential research. This could also include social media campaigns that allow users to participate.
3. <u>Messenger effects:</u> UBC's Head Chef is well-connected within the Vancouver restaurant industry. Leveraging his connections to bring in "celebrity chefs" to make a plant-based unique item or leveraging Vancouver foodie influencers to promote their favourite plant-based item on the menu are ideas worth considering.
4. <u>Experiment and educate with numbers instead of icons:</u> Based on the research we tried to replicate, it used calories in the meal (numbers) instead of icons. We recommend trying to use a number such as the amount of water consumption, nitrogen, or greenhouse gases a meal produces to influence sustainable food choices. The only downside is that water consumption, nitrogen, and greenhouse gas emissions are not well known now compared to calories. (If a meal produces 56 metric ounces of greenhouse gas emissions, how do you know whether that is good or bad?) Education on what is good vs bad will be required. However, this places UBC in an exciting position to lead the way as other organizations have not measured food items' sustainability impact yet.

A Strong Direction for Research - Ratio of Sustainable to Non-Sustainable Items

Although our intervention was unsuccessful, the research illuminated a new direction for UBC Foodservice and SEEDS to explore: the ratio of sustainable items available on any given day. Our findings show a correlation between a higher number of sustainable menu items to choose from and the percentage of sustainable meal sales.

A future research project could involve a similar research design, but with the ratio of menu items being the independent variable. For example, one location could maintain the same ratio throughout the trial, while the treatment location could get a supersized sustainable ratio during the intervention. We understand that the complexity of operations may make this line of research more challenging than a simple climate label. However, we think there may be some potential tweaks UBC Foodservice could make to increase the overall ratio of sustainable items and keep it more consistent.

Here are some considerations:

- Consider making a higher number of sustainable items available every day – many sustainable meals were only available as rotating items.
- Consider making a higher number of non-sustainable items rotating (not available every day)
- Ensure a balance of sustainable to non-sustainable in the rotating menu items so that each week there is a consistent ratio

Part G. Discussion of BI & Research Ethics

Ethical Considerations Overview

Since we did not collect personal information, there is no ethical concern around handling personal data. The ethical considerations in this project are about food and the relationships between food and socio-economic status, culture, and food-specific mental health concerns such as eating disorders. In all the research we conducted, we carefully considered those complex issues.

Planned Intervention - Ethical Considerations

Socio-Economic Status and Sustainable Food Choices Shifting global diets to include more plant-based foods and less animal-based choices is widely accepted as critical to increasing food equity. The resources required to produce animal-based foods are significantly higher than plant-based foods. Therefore, meat and dairy are generally higher per calorie than the cost of plant-based foods.

- We suggest the client commit to making all the sustainable labelled items fall into the lowest 30% of prices, even if UBC had to subsidize some items so that the sustainable items were the most affordable.

Culture and Sustainable Food Choices Due to the cost of meat and dairy, wealthier countries are more likely to consume more of these products. When translating dishes from other cultures, rich countries are likely to introduce or increase meat to the item. However, some cultures, specifically Indigenous cultures, have meat as a primary diet aspect. There could be an ethical concern about labelling Indigenous menu items as "unsustainable" or not promoting them, especially given that Indigenous people's traditional relationship with animals and the earth is built on a sustainable philosophy.

- None of the restaurants involved were Indigenous restaurants, and there are no Indigenous-specific menu items. However, this is something for future research to consider carefully.

Eating Disorders and Sustainable Food Choices Some labelling programs, such as those focusing on weight loss or calories, have been shown to have a detrimental effect. We wanted to consider whether labelling food for sustainability would negatively affect those with eating disorders. We could not find any research or literature linking climate-friendly food choices to eating disorders.

Scaling Had this intervention proven effective, it would have been very cost-effective and easy to scale. However, we do not recommend it be scaled due to the null result.

Other Ethical Considerations

- The initiative did nudge for good; there is no financial benefit to the University.
- Additionally, UBC created the initiative due to students petitioning for more significant climate action. In a survey conducted on campus, an overwhelming majority wanted to see climate labels on food items.
- Students, food service operators, and other staff on campus all played a vital role in the research and information gathering for the initiative.
- The program is undoubtedly replicable: this intervention completed the third trial of the program.
- There was no way to hide the nudge. We explained the purpose of the labels on posters at the treatment location.
- There was no impact on freedom of choice.

Part H. Project Reflections

While UBC students appear highly intent on changing their food choices, this icon does not appear sufficient in helping them overcome the barriers to making new choices. Although the experiment design was relatively easy to conduct, cost-effective, and easily replicable, the intervention alone is not enough to make people change the way they eat which is a multifaceted challenge with cultural, social, and personal implications. It appears probable that more work understanding the barriers to shifting to a sustainable diet is required to design effective BI solutions.

The menu items that change daily are not an ideal format for behavioural experiments. If UBC wishes to repeat the trial, planning an equal daily ratio of sustainable to non-sustainable items would help provide a more robust result.

Did We Come to the Correct Conclusion?

The experiment seems straightforward: we had clean, clear independent and dependent variables, robust controls, and a large sample. However, the data was telling us a much more convoluted story. We strongly feel we have come to the correct conclusion: we spent considerable time reviewing and analyzing the data, considering the many puzzling questions we discovered in the review.

Is the Icon Worth Considering in Other Environments?

Student food halls on campus are different from classic restaurants. Students who live in residences may eat on-site daily, even multiple times a day. Generally, there is a broader range of items than one would find in a typical restaurant. The results from this study are most applicable to similar environments, including hospital or institutional cafeterias, educational food service facilities and food halls that are part of extensive office facilities.

The idea of a climate-friendly food icon may be worth considering in other restaurant environments where the menu is static and the population is varied. However, an icon on its own is unlikely to move the needle. We also believe that reevaluating an icon may be warranted once other barriers are addressed.

Key Lessons

Lesson 1: Curiosity in Data Analysis is Essential

Asking questions about our data led us to conduct significantly more analysis than we expected, resulting in a different, more significant conclusion.

Lesson 2: Being Trial 3 is Harder Than it Looks

Coming into a project already in motion is like trying to jump onto a moving merry-go-round. We missed specific facts in translation as information handed down was sometimes missing context or relevant details that directly impacted our research. Documentation of process, research and conclusions are critical to replicability.

Lesson 3: Food Comes with Complications

There are numerous research papers about influencing food choices, both for health and sustainability. Many of the factors that influence what we eat are deeply emotional and

connected to our ideas about who we are. It is possible that by changing what people eat, we are trying to change an aspect of their identity. While many of the ideas we developed seem grounded in solid behavioural theory, would they stand up to the mighty emotional attachments we have to food? We are inspired by the commitment of our partner at UBC, where innovative solutions are all on the table. A multi-faceted, fully committed approach seems the only possible way to be successful in changing dietary habits. Based on the many previous studies we have annotated here in this report, some solutions that show promise include menu design, education, leveraging strong messengers such as local celebrity chefs, and framing of plant-based meals through the lens of flavour and satisfaction. When there are multiple barriers to behavioural change, more than one approach is required to address these various factors.

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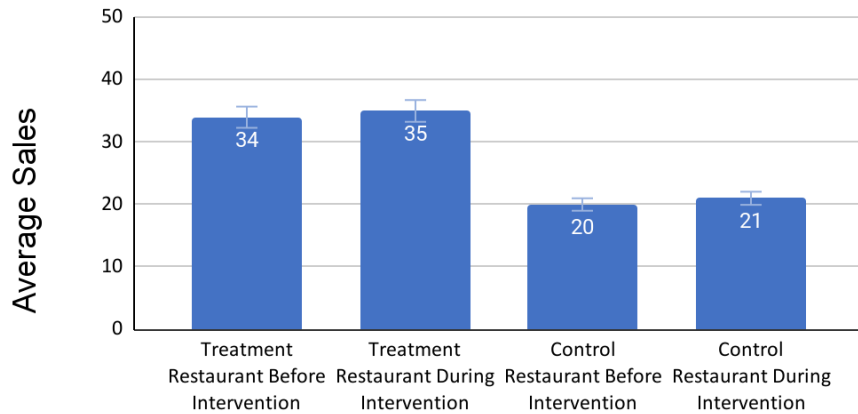
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Appendices

Appendix 1: Previous Survey Questionnaire

Please click the following link to review the survey: <u>Survey Questionnaire Phase 1.pdf</u>.

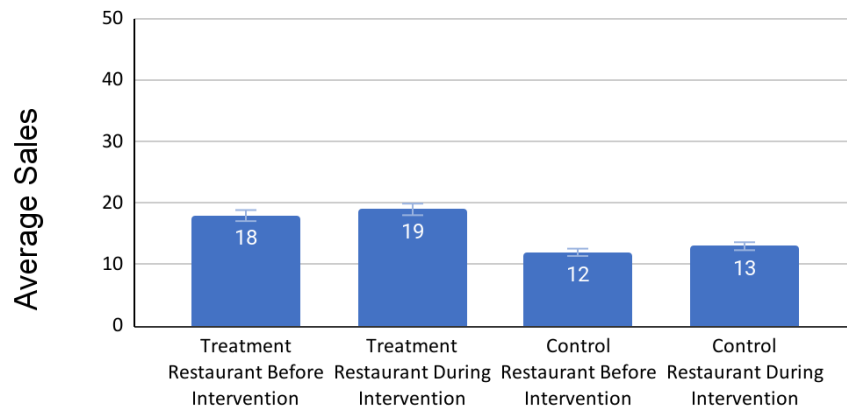## Appendix 2: Additional Results

Analysis 4: Average Sales per Sustainable Item Available

<u>Bar Chart Showing the Average Sales per Sustainable Item Available During Each Period</u>

- The average sales per sustainable food item available on the menu stayed roughly the same before and during the intervention. After running a two-way ANOVA table, there was no statistically significant interaction between the average sales per sustainable item available; $F(1,118) = 0.08$, $p = 0.78$, $\eta2 = {<}0.01$).

Analysis 5: Average Sales per Non-Sustainable Item Available

Bar Chart Showing the Average Sales per Non-Sustainable Item Available During Each Period

- The average sales per non-sustainable food item available on the menu stayed roughly the same both before and during the intervention. After running a two-way ANOVA table, there was no statistically significant interaction between the average sales per non-sustainable item available; $F(1,118) = 2.61$, $p = 0.11$, $η2 = < 0.01$).

Appendix 3: Qualitative Survey Results

Please click the following link to review the survey: Icon Survey Results Final.pdf.