



**Plant-based Food Perceptions Survey: Insights into the Experiences of ASU Students**

Melanie Chen MSUS Spring 2023  
Markkus Pfirman Schlosser MSUS Spring 2023  
Carli Van Valkenberg MSUS 2023

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## **Executive Summary**

The work developing, conducting, and analyzing the Plant-Based Food Perceptions Survey (PBFPS) took place over the Winter and Spring of 2022/2023. New Norm worked with Sun Devil Hospitality (Aramark) at Arizona State University to create a survey that could be used to engage student stakeholders, and better understand their needs, relative to plant-based eating. What we found were strong trends among respondents in how they understood the benefits associated with plant-based food, but also the important “knowledge gap” barriers that if properly addressed will benefit ALL students, plant-based or not. We expand on the recommendations and insights from the survey both in the Primary Report as well as the Marketing Report. This Survey Report explores the development of the survey, and the insights gained from the data gathered, before offering recommendations for future engagement through surveying.

## **Introduction**

We conducted the PBFPS to further our understanding of how students accessed, understood, and built perceptions about plant-based foods. We hope that the ability to articulate which elements promote students to choose a plant-based option, as well as the forces that make this decision challenging. We found that by sorting groups by their willingness to eat plant-based, insights about group behavior could be made, and recommendations curated based on the findings for each group. While this survey was a success overall in collecting and analyzing data, we urge Aramark to continue surveying as an engagement method. New Norm has specific recommendations for the future use and development of these scales, and additional information that would further Aramark's understanding of their stakeholders.

## **Recruitment and Sampling**

The PBFPS was an online survey accessed through the platform SurveyMonkey. New Norm worked with Sun Devil Hospitality to coordinate a time and place to survey students, and on February 10, 2023, over lunchtime hours collected a total of 52 respondents. In the analysis of results, we refer to this group as "In Person".

After experiencing some challenges engaging students at the in-person survey, students were offered a chance to win a \$20 Amazon gift card if they completed the survey, which helped to enlist survey respondents. This might have been more powerful than the content of the survey itself, as a small number of respondents seem to have rushed through the survey to enter the giveaway.

Between March and April, Sun Devil Hospitality hung posters in their campus dining halls, with the same QR code, and the offer of another Amazon gift card (\$50). We encouraged Aramark to hang these posters (appendix E) prominently, to ensure that regular users of dining halls could take the survey on their own time. The language of this poster was similar to the language used to engage students in person but was likely noticed and engaged with by students who cared more about plant-based food, than the random sampling from the in-person data collection.

Lastly, Aramark used the same QR code for an in-person tabling event for their "Cool Foods" Initiative, which highlights Aramark's lower-carbon menu items. Anticipating a high number of respondents for this event, we added an additional "question" for the survey, asking whether students were recruited via the posters hung up in the dining halls or whether they were engaging with the "Cool Foods Event". Ultimately, this event only recruited 2 respondents, not enough to draw meaningful conclusions from, and they were added to the "QR Code" group, which included all respondents which New Norm had not recruited in person, in February.

Our first analysis was a comparison of data based on the sampling method: the independent variable being the response groups "In person" and "QR Code," and the dependent variables their responses to the Q1 Power of Influence factors: taste, nutrition, environmental, variety, and access/availability.

| Group            | Mean          | Taste       | Nutrition   | Environmental | Variety     | Availability | Composite   |
|------------------|---------------|-------------|-------------|---------------|-------------|--------------|-------------|
| <b>In Person</b> | Mean<br>N(52) | 3.77        | 3.83        | 3.65          | 3.85        | 3.96         | 3.81        |
| <b>QR Code</b>   | Mean<br>N(27) | 4.3         | 3.93        | 4.52          | 4.26        | 4.3          | 4.26        |
| <b>Total</b>     | Mean<br>N(79) | <b>3.95</b> | <b>3.86</b> | <b>3.95</b>   | <b>3.99</b> | <b>4.08</b>  | <b>3.96</b> |

Table 1: breakdown of sampling method (DV) and mean scores for (IV).

Immediately we noticed strong differences in the response data, which moved us in the direction of exploring *what made the groups different*. Q1 and Q2 rely on self-reported behavior, which is inherently biased. Instead, we looked at one question in particular: a hypothetical question, placed toward the end of the survey, (appendix A) strategically after students had engaged with questions about the power of influence (Q1) and concerns and barriers (Q2). This question allowed us to create predictive groupings, which helped make sense of the findings overall.

Q3 asked respondents if they would be willing to increase the amount of Plant-Based foods in their diets:

- “No (I am not willing to increase the amount of plant-based foods in my diet),
- “Yes” (I am willing) and
- “I already eat primarily plant-based/ vegan/ vegetarian”.

While the in-person sampling was powerful in understanding the general population that uses the campus dining halls, we were only able to engage 3 students who were already plant-based eaters. Every respondent who accessed the survey through the QR Code was either plant-based already or willing to increase their intake of them. While we recognize that neither sampling group is likely representative of the student population as a whole, we urge Aramark to work specifically with students with specific dietary needs, to see how challenges in access can be addressed.

| Group        | No        | Yes       | Already Plant-Based | Total     |
|--------------|-----------|-----------|---------------------|-----------|
| In-Person    | 18        | 30        | 3                   | 51        |
| QR Code      | 0         | 16        | 11                  | 27        |
| <b>Total</b> | <b>18</b> | <b>46</b> | <b>14</b>           | <b>78</b> |

Table 2: breakdown of sampling method (IV) and response to Q3 (DV)

The way we analyze and interpret data in the following questions, as well as the recommendations we formulate in the separate marketing report are often written based on how respondents answered Q3.

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### Results, and Insights:

Responses were collected using SurveyMonkey's online platform, but analysis of the data took place using SPSS (appendix B). A full codebook with interpretation and scale information was also created (appendix C).

**Question 1: How likely** are the following factors to influence your decision to **choose plant-based foods over animal/ meat-based options?**

This question measures Power of Influence (PoI); the likelihood of a user making a decision based on elements outside of their control. Understanding which factors are more powerful gives Aramark an opportunity to reinforce their own practices, for example, making sure access and availability are addressed by improving labeling and signage or addressing the taste of foods, by offering tasting events, where students can gain familiarity with new tastes and give feedback specifically on them.

Respondents are asked to indicate how likely the following factors (Taste, Nutrition, Environmental benefits, Variety, and Availability) are to influence them to choose a Plant-based Food item over an animal-based product. For each of the listed factors, respondents indicated on a scale of Very Unlikely (1) to Very Likely (5). A composite score was also created for each respondent, based on the mean of their responses for the 5 factors. Individual respondents, as well as group composite scores created, taken as the mean of the responses to individual factors.

**Scoring:**

Very Unlikely (1) ⇌ Very Likely (5) to influence choice

Highest in group Lowest in group **\*\*Highest total\*\*** **\*\*Lowest total\*\***

| Willing to increase? (Q3)           | Taste           | Nutrition | Environmental | Variety | Availability    | Composit for IV |
|-------------------------------------|-----------------|-----------|---------------|---------|-----------------|-----------------|
| <b>No</b><br>(N18)                  | <b>**2.61**</b> | 2.89      | 2.78          | 3.06    | 2.89            | 2.84            |
| <b>Yes</b><br>(N46)                 | 4.48            | 4.3       | 4.33          | 4.3     | <b>**4.52**</b> | 4.39            |
| <b>Already Plant-Based</b><br>(N14) | 3.93            | 3.64      | 4.14          | 4.14    | 4.21            | 4.01            |
| <b>Composit by DV</b> (N78)         | 3.95            | 3.86      | 3.94          | 3.99    | 4.09            | 3.96            |
| <b>Std. Deviation</b>               | 1.270           | 1.185     | 1.154         | 1.245   | 1.207           |                 |

Table 3: breakdown of PoI factors by Willingness to Increase

It might not be surprising that the lowest PoI was observed in the “No” group, [among students who report not being willing to increase the amount of plant-based foods in their diet (2.84)]; but even within this response group, we can see that ‘taste’ had the lowest influence on this group (2.61), suggesting that these respondents have not found plant-based foods that they enjoy. ‘Variety’ was the most likely factor to influence this group, another potential way to engage this group specifically.

Initially, we expected to see the highest composite scores for the group of “Already plant-based” respondents, but instead, the highest composite scores were found in the “Yes” group, students willing to increase the plant-based foods in their diet. This might be an example of “illusory optimism,” or the unrealistic expectation that an individual has about their performance or behavior before attempting it. While we do not know how often the “yes” group *actually* tries to seek out plant-based foods, we can assume that the group of already plant-based students would have a perspective that is based on the reality of accessing the foods they rely on. A deeper look into the experiences of this group specifically might uncover the *reality* of being a plant-based student at ASU.

When looking at respondents as a whole, we see that ‘access to’ and ‘availability of plant-based foods’ has a relatively high likelihood of influencing choice (4.09), this factor was reported at the highest rate in the “Yes” and “Already Plant-based” groups.

Standard deviation helps understand the distribution of data within a response set, as well as between groups. A higher standard deviation, like that for “taste” across the groups, shows the range of responses within the group.

**Reliability analysis on factors:**

In order to test how closely related the multiple variables of this question are, we conducted a reliability analysis. A Chronbachs alpha test gives scores to each item, from a scale of 0-1, the higher the score, the more related the items can be understood to be. A Chronbachs alpha over .8 is usually considered a strong enough score, but the removal of low-scoring items might also raise the Cronbach's Alpha score.

Because the Cronbach’s Alpha of the entire measure was .846, and the removal of the “Environmental” variable would only bring up the score .01, we decided to keep it included in the PoI measure. We suspect the reason this item was interpreted differently was that users are not making decisions in the dining hall setting based on the environmental footprint associated with their foods. This is an opportunity for Aramark to bring in more signage and increase awareness of the crucial relationship between food and the planet.

**Reliability Statistics**

| Cronbach's Alpha | Cronbach's Alpha Based on Standardized Items | N of Items |
|------------------|--|------------|
| .846             | .845   | 5          |

**Item–Total Statistics**

|               | Scale Mean if Item Deleted | Scale Variance if Item Deleted | Corrected Item–Total Correlation | Squared Multiple Correlation | Cronbach's Alpha if Item Deleted |
|---------------|----------------------------|--------------------------------|----------------------------------|------------------------------|----------------------------------|
| Taste         | 15.87                      | 14.420                         | .695                             | .541                         | .802                             |
| Nutrition     | 15.96                      | 14.960                         | .696                             | .545                         | .803                             |
| Environmental | 15.87                      | 16.522                         | .521                             | .311                         | .847                             |
| Variety       | 15.84                      | 15.011                         | .640                             | .490                         | .818                             |
| Availability  | 15.75                      | 14.653                         | .718                             | .568                         | .797                             |

Table 4 shows the Chronbach’s Alpha for the PoI factors

Table 5 shows Chronbach’s Alpha if an item was deleted

**Question 2: “What concerns do you have about replacing animal-based food options with plant-based options?”**

This question aims to understand how students experience Concerns and Barriers (CaB) that prevent them from **accessing and enjoying** plant-based foods.

We identified barriers in three categories, based on whether they are factors of **personal attitudes/ preferences**, the **environment**, or whether they are the **result of “knowledge gaps”**. The justification for this question is that by identifying, articulating, and addressing these barriers, as well as their prevalence across groups, we can begin to offer focused recommendations to address them. Respondents were asked to select as many concerns or barriers as they experienced, with the option to indicate “None” and “other”. A respondent who selected “None” received a composite score for this question, and each additional item was reflected in the score. Unlike the PoI question (Q1), a high composite score for this question suggests a lower likelihood of accessing plant-based foods.

Concerns by category:

- Personal
  - “Plant-based foods don’t taste good to me”
  - “I am concerned about getting the nutritional content my body needs”
- Environmental (functions of physical availability as well as perceptions of peers *within* the environment)
  - Convenience of meat/ inconvenience of plant-based foods
  - I feel pressure from friends/ family/ culture to eat MEAT
  - I feel pressure from friends/ family/ culture to eat PLANT-BASED
- Knowledge Gaps
  - “I’ve never considered going plant-based”
  - “I’m not familiar with plant-based foods, or plant-based alternatives to the foods I love”
- Other/ None
  - “None”
  - “Other” (please explain)

## Results:

| Concern Category           |                      | Personal                                   |  | Environmental   |                      |                             | Knowledge Gap                             |   | “none”                               | Composite (Concerns per Person) |
|----------------------------|----------------------|--|--|---|----------------------|-----------------------------|---|---|--------------------------------------|---------------------------------|
| Groupings based on Q3      |                      | “Plant-based foods don’t taste good to me” | “I am concerned about getting the nutritional content my body needs” | “Convenience of Meat/ Inconvenience of Plant-based options” | Pressure to eat MEAT | Pressure to eat PLANT-BASED | “I’ve never considered going plant-based” | “I’m not familiar with plant-based foods (or plant-based alternatives)” | “No concerns” with plant-based foods |                                 |
| “No” (18)                  | N                    | 12   | 8  | 5   | 0                    | 1                           | 11  | 8   | 0                                    | 2.5                             |
|                            | % of total for group | 66%  | 44%  | 27%   | 0%                   | 5%                          | 61%                                       | 44%   | 0%                                   |                                 |
| “Yes” (46)                 | N                    | 6  | 16   | 12  | 1                    | 4                           | 11  | 11  | 10                                   | 1.4                             |
|                            | % of total for group | 13%  | 35%  | 26%   | 2%                   | 9%                          | 24%                                       | 24%   | 22%                                  |                                 |
| “Already Plant-based” (14) | N                    | 2  | 4  | 2   | 1                    | 0                           | 1   | 0   | 8                                    | .71                             |
|                            | % of total for group | 14%  | 29%  | 14%   | 7%                   | 0%                          | 7%  | 0%  | 57%                                  |                                 |
| Total 78 respondents       | N                    | 20   | 28   | 19  | 2                    | 5                           | 23  | 19  | 18                                   | 1.54                            |

Table 6: Breakdown of Concerns and Barriers by category, with response frequencies and %.

### **Insights by group:**

**“No”** (students not willing to increase plant-based foods in their diet)

- This group accounted for 23% of all survey respondents
- Respondents in this group reported on average 2.5 concerns, the highest of any group.
- Within this group, the most common concern was “plant-based foods don’t taste good to me” indicated by 66% of respondents.
  - This item was indicated at a rate 4x that of peers in “yes” and “Already Plant-based” groups
  - This item has the single highest response rate across concerns and groups

This also supports the earlier finding from Q1, that “taste” is rather unlikely (2.61) to influence this group to choose a plant-based item over a non-plant-based item.

- This group reported a high rate of “Knowledge Gap” concerns and barriers, with
  - 61% reporting never having considered eating plant-based
  - 44% said they are not familiar with plant-based foods

Both reported at a significantly higher rate than peers in the “yes” and “Already Plant-based” groups.

**“Yes”** (students willing to increase plant-based foods in their diet)

- This group accounted for 58% of all survey respondents:
- Respondents in this group report on average 1.4 concerns
  - a rate 78% lower than the “No” group, but still higher than the “Already Plant-based” group
- The concern reported at the highest rate was “Concern about not getting the nutrition my body needs” (35%)
- Students in this group indicated “Environmental” concerns at the highest rate of any group (12%).
  - This “concern category” is designed to show elements of the environment or relationships within interpersonal relationships an individual has with the physical accessibility of plant-based foods, as well as the cultural and peer–pressures individuals feel regarding eating a certain way.

Trends in this question mirror trends observed in how they responded to Q1, where not only did they indicate “Access and Availability” as the most likely to influence choice.

**“Already Plant-based”** (students already eating a primarily plant-based diet)

- This group accounted for 18% of all survey respondents, the smallest group.
- Respondents in this group report on average .71 concerns, the smallest of any group.
  - The reason this number is so low is due to the 58% of respondents who reported “None” to this question, which was scored as a 0.
- The concern reported at the highest rate among this group related to “Nutrition”, which is one of the most common concerns across all groups.

- Plant-based students reported the lowest rate of “Environmental” concerns, possibly reflecting the comfort and confidence this group has accessing the foods they rely on.

### **Qualitative Questions:**

Full responses to qualitative measures are available (appendix D).

We included an optional question for students to request specific ingredients or dishes:

- “Plant-based foods/ ingredients I would like to see more of”:

The qualitative questions gave specific ingredient requests from students at various comforts and familiarity with plant-based foods. Upon analyzing the results of the survey, we acknowledge that some of the respondents might have misinterpreted the wording of the question “Plant-based foods/ ingredients I would like to see more of” to include plant-based and NON-plant-based items; in about 15% of responses, students requested “meat-based” products, but notably, these requests favored chicken over red meat; chicken has a significantly lower carbon emission during production than beef, and working with the most hesitant students might involve engaging with them on these fronts before expecting them to transition away from it completely. This group also requested “Pasta” more than peers in other groups, suggesting that despite their hesitation to commit to eating more plant-based foods, they were in fact hungry for them.

Students in the “Yes” group, who are “willing to increase plant-based food” introduced a wide range of requests, from specific brands of plant-based protein to more general requests for “High protein plant-based alternatives to meat”. This group displayed the largest range in requests, but a number of students cited unfamiliarity with the ingredients they would like more of. We saw a higher rate of requests for items that are “processed foods” and fewer requests for produce and other “fresh” ingredients, but this might be because this group has never had an opportunity to try these items, and are curious to do so now.

Among primarily plant-based respondents, ingredient requests were largely for fresh, minimally processed, highly adaptable, and customizable dishes like curries. This group’s requests better mirror the requests of the “No” group, who requested plant-based ingredients that are not specifically marketed as “Plant-based” or “Vegan”.

A number of students across groups requested specific plant-based dairy replacements like almond milk, oat milk, and plant-based cheese, and there were a number of requests by plant-based students for more plant-based or vegan-friendly desserts.

40% of responses for specific ingredients included requests for plant-based protein sources like tofu, beans, and seitan.

While it is useful to know the ingredients that are requested, and which groups request them, some of the most important work in promoting a dining hall that is inclusive of all dietary styles requires food service providers to prepare food and label it in ways that make it attractive to all students, not just the vegan or plant-based population. Important marketing recommendations can be found in the Main Report, as well as the Marketing Report.

## **Limitations:**

The development of this survey was challenging due to a **lack of existing dimensions** to test for perceptions of plant-based foods. In an effort to keep the survey engaging and efficient, our group asked only the most essential of questions. While this lent to our high completion rate, it meant that we **lacked traditional demographic information** about users, which a longer survey would likely include. We were also **limited in scope**: our one-time in-person surveying event gave us **only a glimpse into the preferences and perceptions of students**, and while we got powerful responses once the QR code poster was distributed, **we still fell short of the goal of collecting 100 responses**. We would recommend Aramark gather survey data and experiences of as many students as possible, not just in one dining hall or campus. During the day we surveyed **in person, we struggled to recruit respondents**- some students had no time to take the survey, and some were not interested (after learning the survey subject matter). While we do not think that these challenges changed the fundamental findings, it is important to acknowledge that when working to improve access and awareness, the more we invest in learning from the needs and behaviors of students, the better we can meet the needs of more students. Even over the course of this project, we have been challenged to expand our own perceptions of who *might* access plant-based foods. We encourage Aramark to listen to and meet the needs of the plant-based communities on campus, but also to normalize plant-based ingredients for *all students* through providing educational tools and resources necessary to make informed decisions.

## **Conclusion:**

Over the Spring Semester, New Norm developed the Plant-based Food Perception Survey, with the intention to understand how Aramark's current plant-based food options are being accessed, and what the challenges or hesitations are experienced by students, relative to plant-based foods. While we struggled to recruit survey participants in-person, we gathered about 50 responses, and nearly 30 additional surveys, once posters were made and hung up in dining halls.

Our analysis found that the majority of students were interested in eating more plant-based foods, but cited concerns about nutrition and a lack of familiarity with plant-based foods.

While we found clear differences in the experiences and perceptions of the groups, there were also similarities between them. We recommend that Aramark build on the results of the PBFPS, to expand their ongoing surveying and engagement with students, to address these concerns through specific educational and empowerment tools, which will benefit all students.

## **Recommendations:**

These are recommendations for Sun Devil Hospitality as they continue to engage with students through the use of surveying. We also include explanations for how we would change the language and measures of the PBFPS for improved clarity with respondents.

**Expanded Sampling, ongoing data collection:** Our in-person survey was limited in time and place, and the rate at which we encountered plant-based students was significantly lower than when we had created the QR poster. We almost immediately received responses from students

looking specifically for plant-based resources. While it was valuable to see the range of experiences and needs of students, we think that this survey would have benefitted from a longer data collection time and more promotion.

While we stress the importance of ongoing surveying with this stakeholder base, we recognize that survey development, deployment, and analysis is a tricky and time-consuming process. Developing a survey as a “Customer Service” tool as opposed to a “comments box” ensures that respondents are answering specific questions and that over time, Aramark is able to measure improvements based on quantitative (Scale, yes/no questions) and qualitative (comments, requests, open-ended responses).

**Inclusion of plant-based survey questions in the end-of-year survey:** Aramark was not able to share the questions in the annual survey sent to students at the end of the academic year. This survey has a broad reach and can be used to understand and plan for the needs of students. We recommend that this survey has specific questions about plant-based foods, especially in the themes of **decision-making and choice** (Similar to PoI), and in areas of **concerns and barriers** (similar to CaB).

**Better Understanding of User Demography:** The PBFPS did not ask demography questions, while this kept the survey short and likely influenced our completion rate, it would have been useful to know more specific information in the following categories:

- **Year:** Tracking **age** or what **year students are in** at university can give Aramark information about whether students are arriving on campus as first-years students already eating plant-based, or if they tend to switch to a plant-based diet later in their academic journey.
  - **Field of study/ major:** Which groups have more knowledge about the benefits associated with plant-based diets? Which groups tend to eat them least? How might Aramark reach the needs of these groups?
  - **Dining habits:** How often are students using dining halls? Do they tend to eat specific meals at specific dining halls? How do these dining halls meet their needs, and what can be done to reduce access barriers? Asking questions about whether students follow a plant-based diet for personal, religious, or food sensitivity reasons might impact how the food is prepared, served, and accessed.
  - **Connections and broader themes:** Do students know about the water or carbon footprint associated with various items? What do they know about nutrition? How engaged are they with the supply chain and sourcing of their food? Does knowledge about these themes predict the choices users make in the dining hall?
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## Appendix

- A. Survey PDF:  PBFPS\_PDF.pdf
- B. SPSS Data File: [SPSS\\_Data\\_PBFPS.csv](#)
- C. Survey Codebook:  Submission\_Version\_Codebook\_PBFPS.xlsx - Master.pdf
- D. Qualitative Responses PBFPS  Qualitative Responses PBFPS
- E. Recruitment Posters for “QR Code” group:  Survey\_Recruitment\_Posters.pdf