

# Survey 2

Statenfreude

## Introduction

The goal of this survey was to determine which new shopping options are preferred by people in Laramie, Wyoming: Target, Costco, Whole Foods, and Trader Joe's. Our survey comprised three items which were intended to gauge respondent sentiment through ranking of options, rating of store brand characteristics, and monetary allocation decisions.

## Questions

The questions used in the survey were:

**Question 1:** *Please rank the following stores in order of your preference (1-4) for a new store in Laramie.*

This was a forced ranking item with 4 rank options. Lower values indicate higher ranking.

**Question 2:** *Please rank the following characteristics of each store: price, quality, and variety.*

The question is a multiple rating scale asking respondents to rate the 4 store brand characteristics on a scale of 1 to 5 where higher ratings are better.

**Question 3:** If you had \$100 to spend at the following stores, how much would you spend at each? (total must be \$100)

Question 3 is a fixed sum item.

## A priori hypotheses

The 3 hypotheses explored were:

- 1) For question 1, we expected Target and Costco to be rated the highest out of the four options.
- 2) There was an alternate hypothesis that Trader Joe's and Whole Foods might be more popular with students given that students are probably most interested in food options rather than general shopping.
- 3) Target has been experiencing push back on DEI business decisions and that may affect its ranking.
- 4) For question 2, we expected that the mean (combined price, quality, and variety scores) of overall approval of Whole Foods will be higher for individuals who rated Target higher than Costco in question 1. This is based on the impression that ranking Target above Costco implies cost may be less important to ranking, which would diminish one of the most salient cons of Whole Foods (price).

We did not capture demographic data, but nearly all of our sampling was conducted in the student union, so most of the survey respondents are very likely to be students at the university.

## Methods

### Focus group

We conducted a focus group with two teaching assistants and one university staff member. We selected this group because they were readily available and willing to provide quick feedback on our survey design. The focus group was conducted in the Center for Assistance with Statistics and Mathematics (CASM) and lasted about five minutes.

We used a focus group to quickly evaluate the clarity and effectiveness of our survey questions. Group discussion allowed us to identify areas where respondents might become confused, misinterpret instructions, or feel limited by the response options.

To see if participants could easily complete the ranking in Q1 without confusion. To test if the rating scale in Q2 (price, quality, variety) captured meaningful differences across stores. To evaluate if the fixed-sum allocation in Q3 (splitting \$100) felt natural or confusing for respondents.

Overall, participants seemed comfortable with the survey questions. For Question 1 (Forced Ranking), we assumed that "1" would represent the highest rating, rather than the lowest. We did not clarify this during the session, which highlighted how easily both researchers and

respondents can misinterpret scale instructions. Participants also noted that some respondents might be interested in other store brands beyond the four we listed. This suggests that including an option such as “Other” could make the survey more inclusive. For the remaining questions, no major issues were raised, and participants indicated they were clear and straightforward.

## Data Collection

Surveys were printed and data were collected in person. The sample was a convenience sample consisting of data collected at the University of Wyoming student union during a Friday lunch hour (37 of 40 respondents) and 3 family members sampled off campus. Of the 40 surveys collected, question 1 was filled out incorrectly in 3 of them and these data were recorded as NA as a result.

Data were first recorded in Google Sheets in wide format to assist with data entry and then imported in R for analysis in both long and wide formats.

## Results

### Question 1

Question 1 asked respondents to “rank the following stores in order of your preference (1-4) for a new store in Laramie.” This question only had 37 usable responses.

The highest ranked store was Target, followed by Costco. The mean rankings and other descriptive statistics are listed in the table below.

Table 1: Descriptive statistics for store rankings,  $n = 37$ .

Store	Avg	Std dev	Min	Max	Median
Target	2.1	0.98	1	4	2
Whole Foods	3.1	1.03	1	4	3
Costco	2.3	1.05	1	4	2
Trader Joe’s	2.5	1.19	1	4	2

### Hypothesis 4

For respondents who rank Target above Costco, the aggregate rating score for Whole Foods is 2.95. The aggregate rating score for Whole Foods of respondents who rank Costco above Target is 3.32.

## Question 2

The second survey question asked respondents to rate each store on 3 characteristics: price, quality, and variety. Each characteristic is measured on a multiple rating scale from 1 (poor) to 5 (excellent). The average characteristic score for each store is presented in the heat map below.



Figure 1: Heatmap of store characteristics. Darker colours indicate higher rankings.

## Question 3

Question 3 asked respondents to answer “If you had \$100 to spend at the following stores, how much would you spend at each? (total must be \$100)” Descriptive statistics of the results are shown in the following table:

Table 2: Descriptive statistics for amount spent at each store,  $n = 40$ .

Store	Avg	Std dev	Min	Max	Median
Target	30.2	26.70	0	100	25
Whole Foods	13.6	21.96	0	100	0
Costco	35.0	29.64	0	100	30
Trader Joe's	20.0	24.71	0	100	15

## Discussion

### Hypotheses 1-3

This is counter to the second hypothesis about store rankings but may support the first. Target did rank the highest in the survey, which runs counter to the hypothesis that Target is perceived in a negative light. However, the survey was not designed to explore this question, so no firm conclusions cannot be drawn from this result.

### Comparison of store rankings

Lower scores indicate a higher preference



Figure 2: Commentary need for this figure.

### Hypothesis 4

Mention transitivity issues here.

Could we have ordered the questions different to make responses more consistent?

Contrary to our first hypothesis, and the results of question 1, in question 3 Costco had the highest average amount spent (mean = \$35, median = \$30), while Whole Foods had the lowest (mean = \$13.60, median = \$0). These results seem to agree with those of question 2. Some of the dissonance between question 1 and questions 2 and 3 may be explained by the ambiguity of the scale in question 1. This question had some interesting responses, as respondents seemed to prefer extreme splits over more even distributions of the proposed \$100. For example, many respondents chose to allocate \$50 each to two stores or \$100 to one store as opposed to distributing the \$100 across all four. This may be because \$100 is not quite

enough to spend across multiple stores, or because the stores are similar enough that one or two stores are sufficient and there may not be need to go to all four.

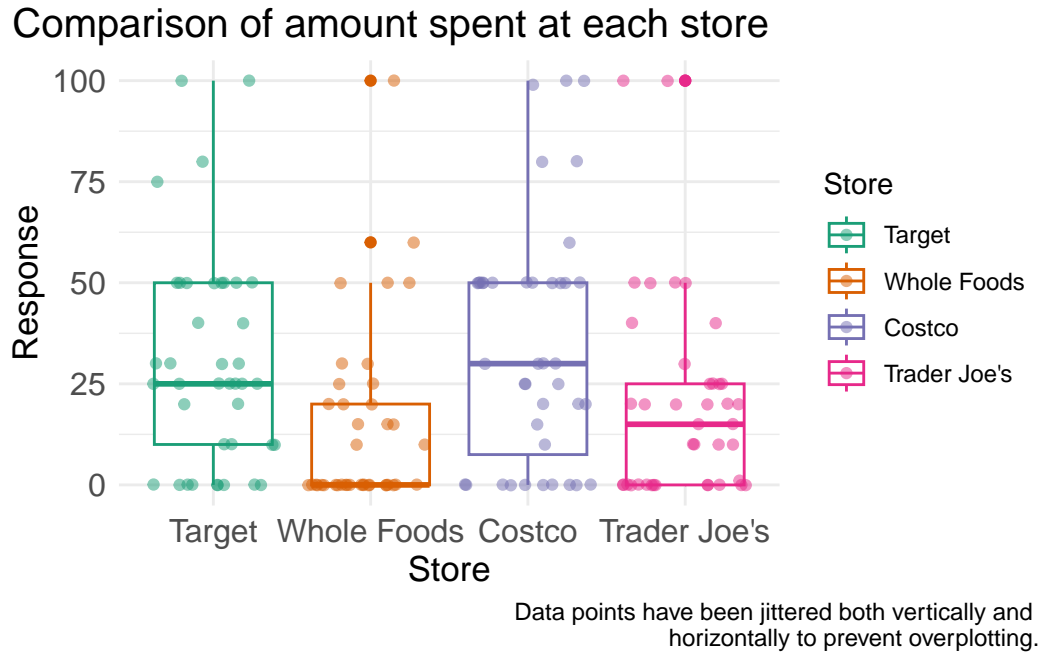


Figure 3: Commentary need for this figure.

## Challenges & Limitations

The most severe issues occurred with question 1, namely unexpected missingness and scale use ambiguity. Missingness occurred here via respondents misunderstanding what the item was asking. A small handful circled a single store instead of providing a ranking out of 4 for each. These responses were coded as NAs.

Additionally, the instructions for using the question 1 scale were ambiguous, which invalidates the results of the question. This item asked respondents to “...rank the following stores in order of [their] preference (1-4)...” Without clarification of whether 1 signifies the highest or lowest preference, the responses to this question are invalid. We did intuitively assume that 1 would be interpreted as the highest preference for analysis’ sake.

An issue throughout question 1 and 2 (but particularly 2) was inapplicability. Several respondents indicated that they had never been to some of the stores, or that they had not been frequently enough to gauge the usual price, quality, or variety. This resulted in one respondent giving NA responses, and murky interpretability around the ‘No opinion’ response option. (I.e., do ‘No opinion’ responses mean the respondent feels neutral about the store, or that they do not know because it does not apply to them?)

An issue underlying the whole of the survey was an undefined population. In other words, we did not go into survey collection with a target population in mind, and sampled solely by convenience. As aforementioned, the majority of our respondents were people we approached in the student union and asked to complete a short survey. Since we had neither a target population we were hoping to generalize our results to, nor demographic information about our respondents, our conclusions and hypotheses can only be general.

## Conclusions

In line with our initial hypothesis for question 1, Target received the highest ranking across the four stores. However, there was some dissonance between this result and the results of question 2, which showed that Costco ranked the highest for each of price, quality, and variety.

Contrary to our second hypothesis, ranking Target above Costco in question 1 was not associated with a higher overall approval of Whole Foods. With price assumingly out of the question, it is unclear what may explain the opposite association observed in the data. Collection of demographic data and other opinions on store characteristics could help explain this.

These results are tentative due to the small sample size, undefined target population, and ambiguity in the question 1 wording.

## Appendix

All R code used to clean, trans The code to examine hypothesis 4 included below.

```
df_pref_tgt <- df_wide |> filter(target_1 > costco_1)

wf_mean_tgt <- df_proc |> filter(question==2 & brand=="Whole Foods" &
  !is.na(response)) |>
  select(respondent, response) |>
  group_by(respondent) |>
  summarise(
    agg_response = mean(response)
  ) |> inner_join(df_pref_tgt, by="respondent") |>
  select(respondent, agg_response) |>
  summarise(
    wf_pref_avg = mean(agg_response)
  ) |> pull() |> round(2)

wf_mean_not_tgt <- df_proc |> filter(question==2 & brand=="Whole Foods" &
  !is.na(response)) |>
```

```
select(respondent, response) |>
group_by(respondent) |>
summarise(
  agg_response = mean(response)
) |> anti_join(df_pref_tgt, by="respondent") |>
select(respondent, agg_response) |>
summarise(
  wf_pref_avg = mean(agg_response)
) |> pull() |> round(2)
```