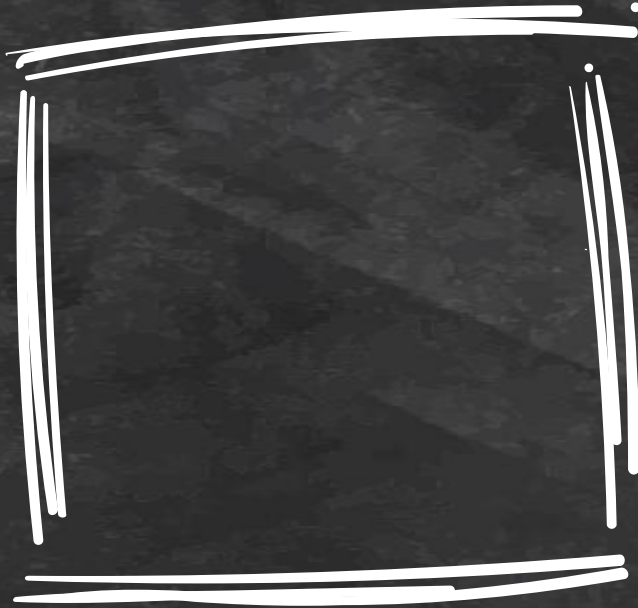# 01

INTRODUCTION

Why I chose this topic
Hypotheses
How I will analyze my data

WHY I CHOSE THIS TOPIC

- I have to wait in line every day :(

- Polarized opinions about the foods served may mean different levels of popularity

- It takes time to restock, so popularity may not be completely indicative of wait time

α = 0.05

H₀

NULL HYPOTHESIS

The time taken to receive food is the same regardless of the type of cafeteria food served.

H_a

ALTERNATE HYPOTHESIS

The time taken to receive food differs depending on the type of cafeteria food served.

χ² test for homogeneity

Instead of being continuous, times were categorized into groups (> 1 min, 1–2 min, etc).

This allowed me to compare the differences between the distributions of wait times for each food.

02

DATA COLLECTION

Timeline
Process

TIMELINE

RICE BOWLS
Monday, May 16

NACHOS
Tuesday, May 17

SPICY CHICKEN SANDWICHES
Thursday, May 19

HOT DOGS
Monday, May 23

STUFFED SHELLS
~~ROTINI IN MEAT SAUCE~~
Tuesday, May 24

PROCESS

- 12:35–12:50: 5 mins passing time, first 10 mins of period 6
  - Encompasses all times people get food to avoid bias (the results will only be generalizable to period 6)
  - Wednesdays weren't included due to lack of seniors (including me)
- Systematic random sample: every 5th person to enter the line
  - If I was unable to reach the next selected person due to being busy explaining the project to a participant, I picked the next person who entered the line, then restarted the cycle from there.
- Timing
  - Participants were instructed to start the stopwatch on their phone when they enter the line, stop when they exit the line with food
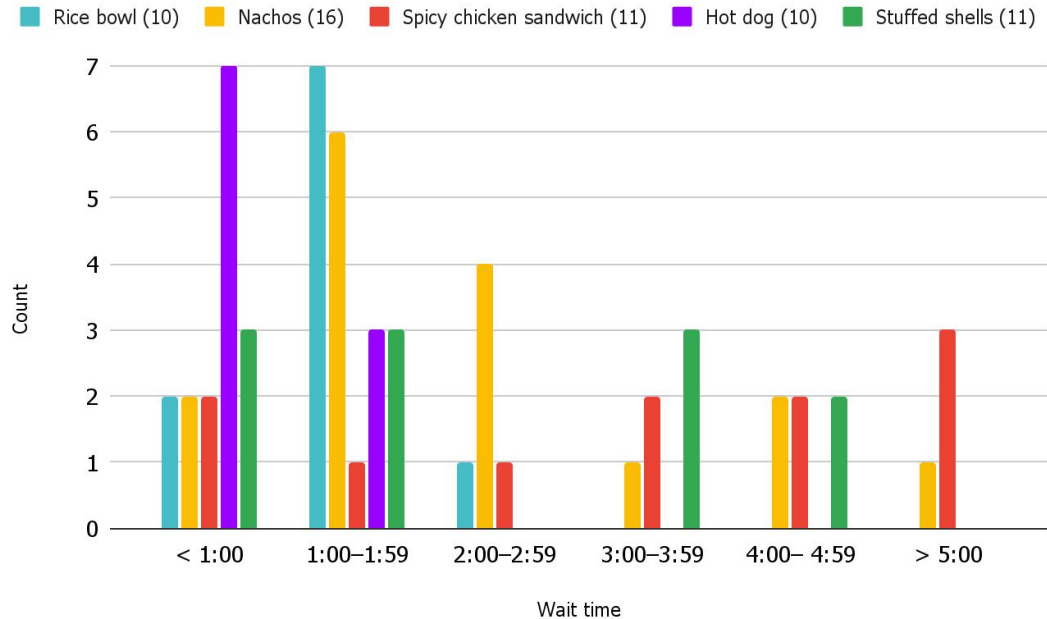 - I tallied the times into one of the six time categories

03

RESULTS

Raw data
Graphs

Raw data: wait times for lunches during period 6

	RICE BOWL	NACHOS	SPICY CHICKEN SANDWICH	HOT DOG	STUFFED SHELLS
< 1:00	2	2	2	7	3
1:00-1:59	7	6	1	3	3
2:00-2:59	1	4	1	0	0
3:00-3:59	0	1	2	0	3
4:00- 4:59	0	2	2	0	2
> 5:00	0	1	3	0	0
SUM	10	16	11	10	11

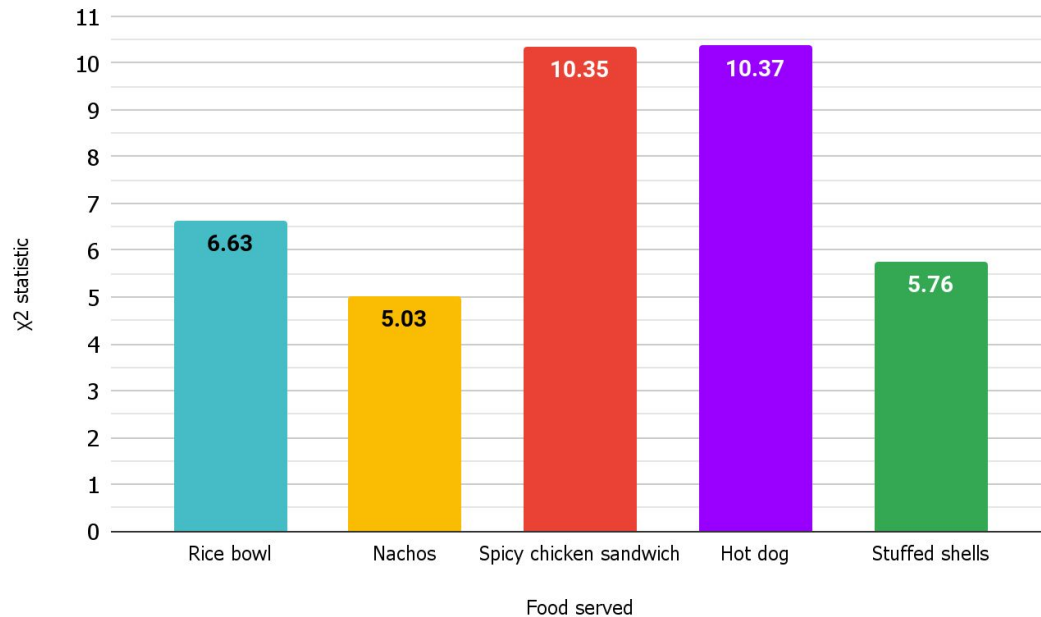Distribution of wait times for lunches during period 6
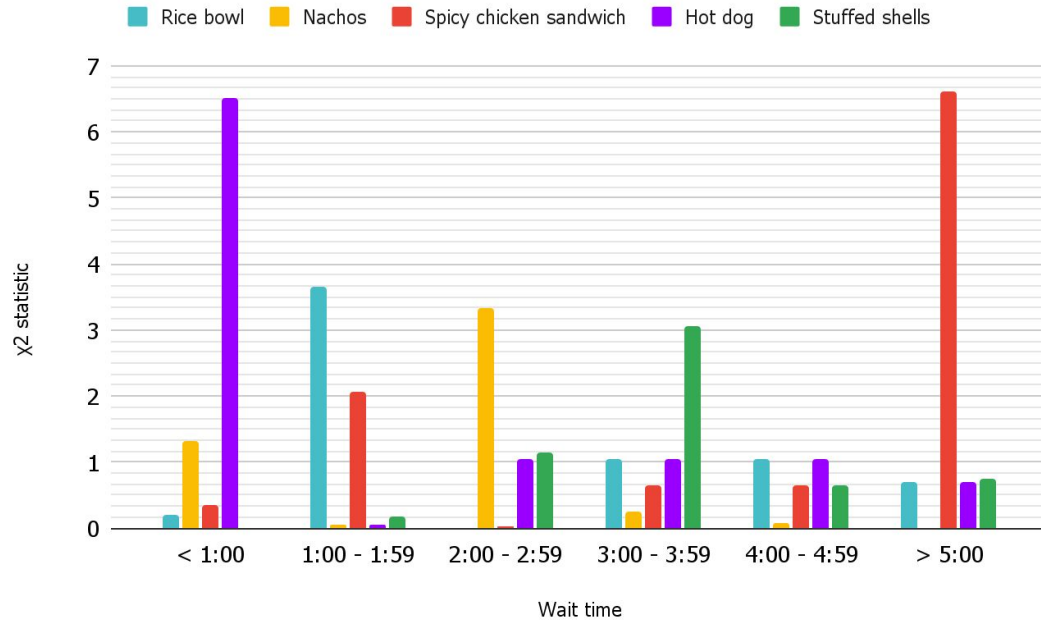
04

ANALYSIS

Test statistics
P-value

χ² test statistics for each food served

χ² test statistics for each food in each time category

38.14

Cumulative x^2 test statistic

There is a

0.0085

probability that the observed samples would occur due to random chance, assuming that there are no differences in the distribution of wait times for different foods served.

05

CONCLUSION

To reject or not reject?
Reflections

Because the p-value is less than α,

we reject the null hypothesis.

There is convincing evidence that the time taken to receive food differs depending on the type of cafeteria food served.

TYPE I ERROR

It is possible that the distributions of wait times are the same regardless of the food, and we incorrectly rejected the null hypothesis.

POSSIBLE IMPROVEMENTS

Conduct the survey during a more regular part of the year (not during AP/IB season)

Include other foods (pizza was notably missing)

Increase sample size

OTHER REFLECTIONS

I probably shouldn't have picked a topic that forced me to forgo lunch on some days.

Due to the chaos of the cafeteria, I often wasn't able to stick to my systematic random sample, and this may have impacted my data.

THANK YOU!