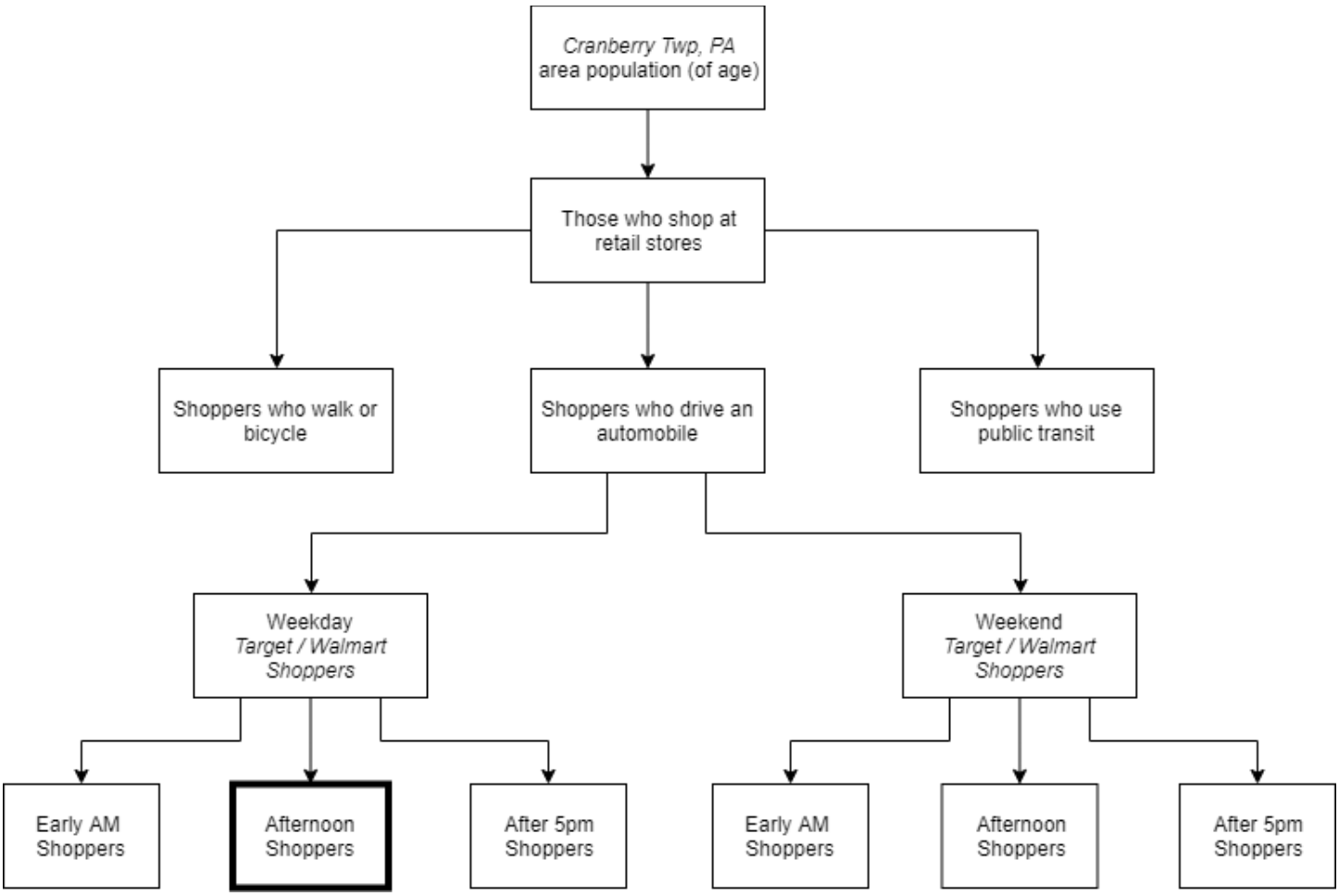
Analysis Question:

Can you see a difference in a customer-base of a store by looking at the cars in the parking lot? Comparing cars between Target and Walmart parking lots, are there nicer cars at one store? Are there newer ones?

Classification Tree:



Sub-Population:

The population chosen for this study is:

"*Afternoon Shoppers* at *Target/Walmart* who *Drive an Automobile* in *Cranberry Twp, PA*"

Variables:

To compare the difference in customer automobiles, 4 variables will be recorded for each car:

1. Make (the manufacturer who produced the car)
2. Model (the type of car by the manufacturer)
3. Visual Age (an approximation of how old the car is)
4. Notes (any outstanding feature about the car. e.g. rust, dents, etc)

Sampling Procedure:

Prep-work:

1. Prepare graph paper (or a printed excel sheet) with the necessary row/columns
2. Review popular models of cars from the past several years to help visually estimate age
3. Roll a d4+1 (4-sided die + 1) to randomize how many cars to skip before another measurement

Sampling:

1. Determine what time to sample and day of week
    a. Time should fall within 3 categories: Early AM, Afternoon, After 5pm
    b. Day of week should be either M-F or Sat-Sun
2. Select the parking lot rows to sample
    a. The row(s) that align with the main door will be the center row(s) of the group
    b. Choose an equal number of rows on each side of the center row(s)
        i. The number of rows sample will be equal for both stores
3. Sample a row
    a. Begin at the 'top' of the row
        i. This is the parking spot that is closest to the entrance
    b. Record a car
        i. Write down: make, model, visual age, notes
    c. Skip the predetermined number of cars
        i. Empty spots do not count
    d. Record again and repeat until the end of the row
        i. The end of the row is when the adjoining parking spots are interrupted (e.g. a pathway to drive, end of the lot)
    e. Return to the 'top' of the next row and begin again

Related Articles:

"Meeting the Average Target Shopper" :
https://www.pymnts.com/news/retail/2016/average-target-shopper-customer-demographics/

- "Target shoppers are also a bit younger: 58–62 percent of Target's shoppers are between the age of 18 and 44, as opposed to Walmart, where that age demographic represents about 48 percent of shoppers;…"
- "Target's consumers are more than young — they are more affluent than their peers who are shopping at Walmart. On average, 25- to 34-year-olds who shop at Target make about $12,000 more a year more than their counterparts…"
- "Consumers who make more than $50,000 per year represent over 60 percent of Target's consumer base (by comparison, that same demographic is about 45 percent of Walmart's.)"

"Target vs. Walmart: A Tale of Two Shoppers" :
https://civicscience.com/16699-2/

- "Target fans are … more likely to be between 18-34 years old."
- "Walmart fans look as if they could be the parents of Target fans. They are more likely to have children, live in the US South, and be over 55."

"This is what the average Walmart shopper looks like" :
https://www.businessinsider.com/walmart-shopper-demographics-2016-10

- "…the average Walmart shopper is a white, 51-year-old female with an annual household income of $56,482."
- "…Target's shoppers are five years younger, on average, and they make approximately $13,000 more annually…"

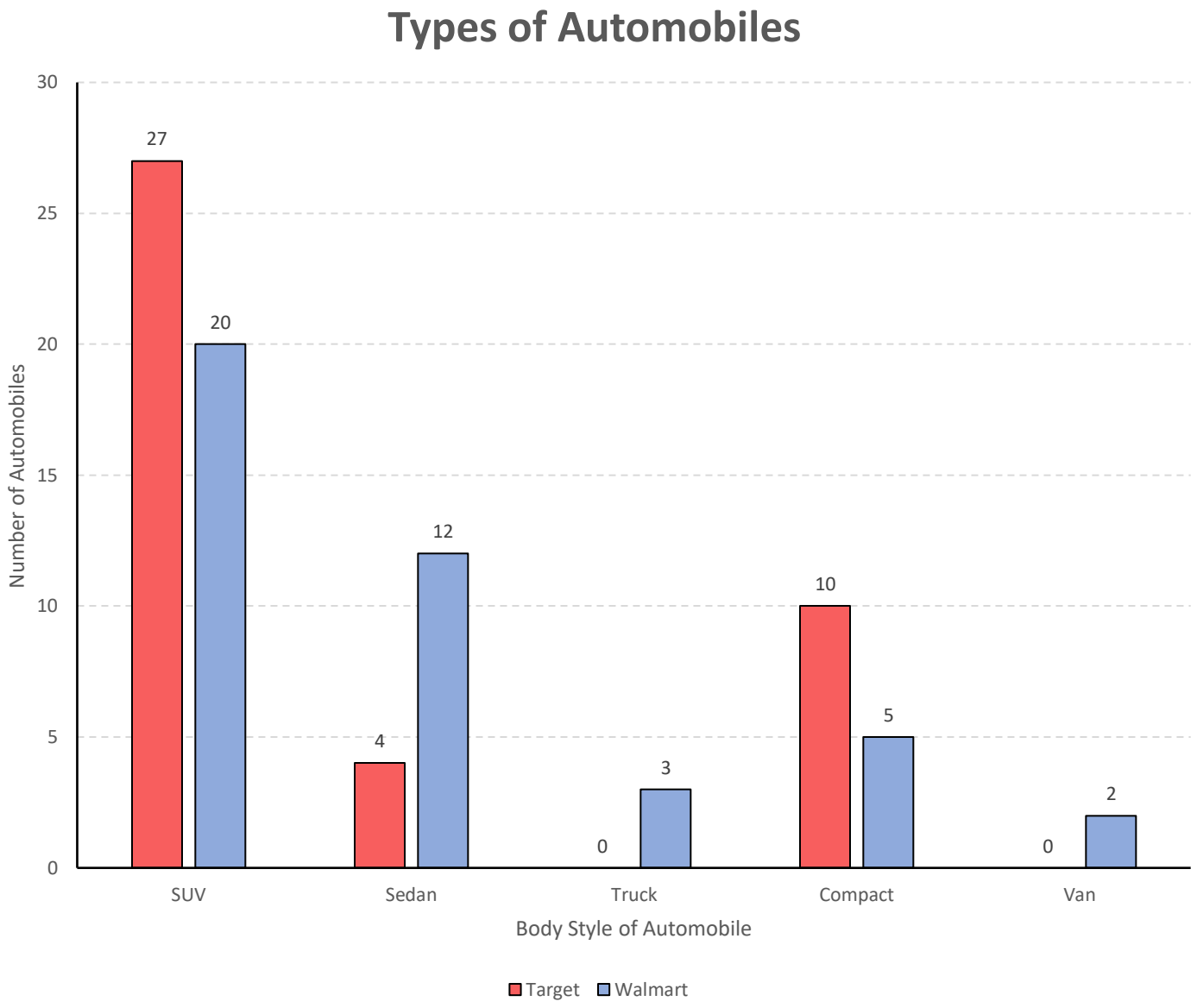
Hypothesis:

Cars that are in the Target parking lot will be newer/nicer than those in the Walmart parking lot.

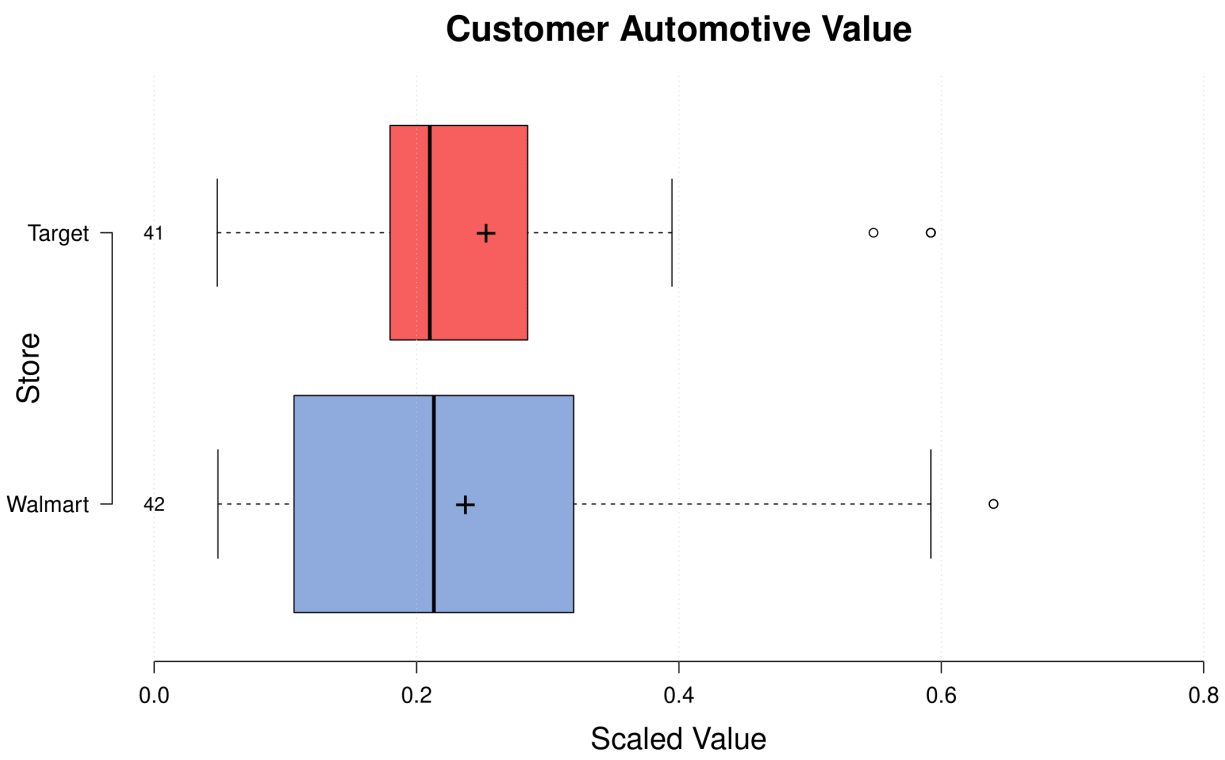
The difference in customer-base will be reflected in the condition of their cars. Walmart has a social stigma (perpetuated by those who only shop at Target) of having customers that are 'gross.' Some shoppers want to separate themselves and thus shop at Target. With these social beliefs in mind, do the cars the shoppers drive reflect what they believe? Do Target shoppers drive nicer cars than Walmart shoppers?

Data Analysis:

Sampling was conducted on a Tuesday, at 2:00pm. In both stores' parking lot, 6 rows were selected. Target had 41 automobiles and Walmart had 42 automobiles. Some trends began to emerge looking at the different body types and the visual age condition.

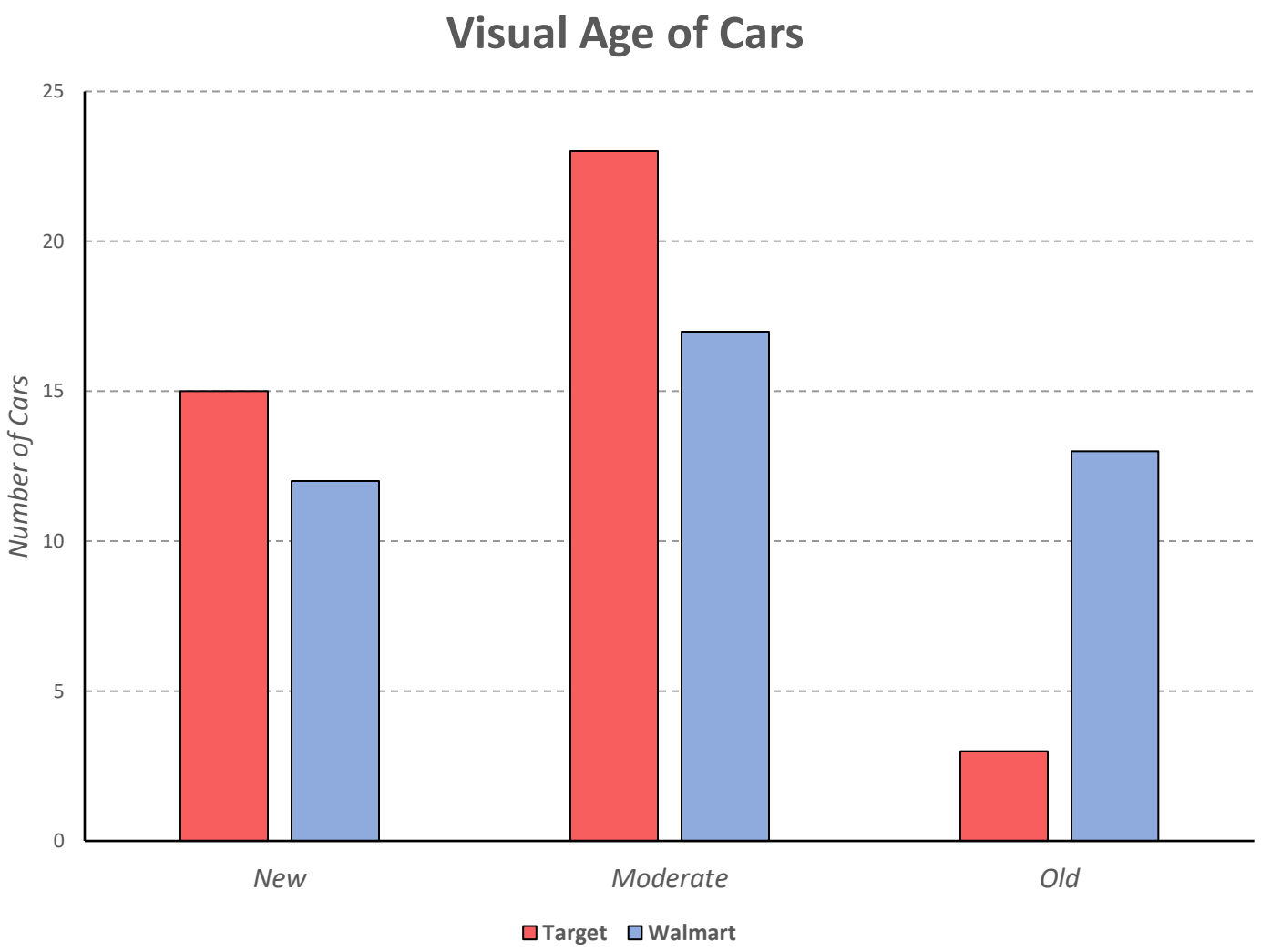


The differences in body types of automobiles were not that great. The only standouts were that there were no Trucks or Vans in the Target lot. Target did have a larger number of SUVs (66% of the total) compared to Walmart (48% of the total). Overall, with the small sample size, not much can be concluded.



The Automotive Value was calculated by using a database of new automobiles per manufacturer, taking the average of all automobiles per manufacturer, then dividing by 100,000 to have them all be on a 0-1 point scale. Each sample was then given the corresponding manufacturer value number that matched the Make. To account for age, each value number was multiplied by an age multiplier (New = 1.0, Moderate = 0.667, Old = 0.333).

The above boxplot was generated from the resulting Value of each sample per store. While Walmart did show more variance within its data it is not different enough from Target (p value = 0.630).



Visual age approximation between the two stores begins to show real differences. With a p value = 0.030, we can reject the null hypothesis and say that there is a statistical difference in the visual age.

Conclusion:

In conclusion, there is no statistical difference between the value of cars between Target and Walmart. There is statistical difference in the visual age of the cars. Cars in the Walmart parking lot are older (visually) than Target.

Future Students:

Gathering the data for this project was pretty easy and straight-forward. You would spend 15-30 minutes in each parking lot gathering the data. One source of error during collection is approximating the visual age. If you are not very familiar with cars of the past 20 years, or if you are not good at seeing/analyzing smaller automobile details, you will have issues with approximating the age.

To redo this project, I would sample from either, more time slots on the same day, or more days in the same time slot. Sampling more days in the same time slot seems like it would provide more accurate data overall, compared to shoppers that only happened to shop on a particular day.

References:

Classification tree: https://www.draw.io/
Boxplot: http://www.lock5stat.com/StatKey/
Articles:

https://www.businessinsider.com/walmart-shopper-demographics-2016-10
https://civicscience.com/16699-2/
https://www.pymnts.com/news/retail/2016/average-target-shopper-customer-demographics/