**Will a customer accept the coupon?**

**Ref: Jupyter Notebook** customer\_coupon\_analysis.ipynb

**Summary**

Cleaned the data-set to drop NaN and Null valued column entries.

Once cleaned, observed there were about ~108 responses with the ‘Y’ column populated with customer responses. 62 of those responses were coupon accepts, while the remaining 48 were not accepted. Thereby, we had 57.40% of coupon acceptance rate.

**Observations across entire data set**

Then, visualized the ‘coupon’ column to see the various coupon types presented to customers across the entire data-set. From the plot, inferred that Coffee House type coupons and Coupons for Restaurants < $20 are presented more to customers than the other coupon types.

coupon count

0 Coffee House 37

1 Restaurant(<20) 25

2 Carry out & Take away 19

3 Restaurant(20-50) 14

4 Bar 13

A graph with a number of colored squares

Description automatically generated with medium confidence

Next, observed the ‘temperature’ column with a histogram. It can be concluded that the entire data-set had a higher count for a temperature range of 70-80F.

A graph showing the temperature

Description automatically generated

**Investigating the Bar Coupon types**

1. **From the data set, it can be seen that bar coupon types (14) are the lowest coupon types that get targeted to customers. Of which only 3 bar coupons got accepted by customers, i. e., Y = 1, this constitutes about a 21.43% acceptance rate with bar coupons.**

No of bar coupons accepted: 3

Total no. of bar coupons: 14

Proportion that chose to accept bar coupon (%) : 21.428571428571427

1. **From the bar coupons that got accepted, we had only 1 customer visiting the bar 3 or fewer times a month. This constitutes about 33.33% from those that accepted (1 out of 3).**

From among bar coupons accepted, # that went to the bar 3 or Fewer times a month : 1

Proportion that went to bar 3 or fewer times a month from those that accepted (%): 33.33333333333333

1. From those that accepted, those drivers that go to a bar more than once a month and over the age of 25, were about 2 out of the total 3 accepts.

From among bar coupons accepted, # that went where age > 25 and more than once a month: 2

1. From those that accepted, those drivers who go to bars more than once a month and had passengers that were not a kid and had occupations other than farming, fishing, or forestry were about 2 out of the total 3 accepts.

From among bar coupons accepted, # that went where they go more than once a month and had passengers that are not a kid and had non-farming/non-fish/non-forestry occupation: 2

1. From those that accepted, those drivers going to bars more than once a month, with passengers that were not a kid, and were not widowed (filter1)

*OR* going to bars more than once a month and are under the age of 30 (filter2)

*OR* going to cheap restaurants more than 4 times a month with income is less than 50K (filter3)

These were 2 of the total 3 with an OR of all 3 filters. For filter2, and that is when the income is less than 50k, we had 0 drivers.

For filter1, we have count = 2

For filter2, we have count = 2

For filter3, we have count = 0

**Conclusion:** Bar coupon accepts are about 3, with 2 of them having more than three visits a month. Also, customers with income <50K do not visit the bar. Other user attributes have no noticeable difference given the already low number of Bar coupon acceptance rates.

**Investigating Other Coupon Types**

Using the bar coupon example as motivation, I also explored one of the other coupon groups to determine the characteristics of passengers who accept the coupons.

1. First, observed whether the type of passengers influenced how customers accepted coupons. Created a scatter plot to show accepted passenger groups for different coupon types accepted.

A graph with dots and lines

Description automatically generated

From the above plot, inferred the below:

* Those with Alone passengers are more likely to accept coupons for coffee house(s) followed by coupons for cheap restaurants. I.e.. Restaurants < $20.00
* Those with Friend(s) passengers are more likely to accept coupons for Carry Out and Take away, followed by coupons for cheap restaurants.

1. Next, looked across all coupon types that have been accepted to see which coupon type is accepted the most. Created a bar plot to compare all coupon types with their counts WITH all accepted coupon types with their counts.

A graph with a number of colored squares

Description automatically generated with medium confidence

A graph of a bar chart

Description automatically generated with medium confidence

From the above plot, inferred the below:

* Comparing Coupon Type for **cheap restaurants** to those that were accepted, out of 25, we have 18 that accepted and 7 not accepted. 72% acceptance.
* Comparing Coupon Type for **coffee house** to those that were accepted, out of 37, we have 19 that accepted, and 18 did not accept. 51.35% acceptance.
* Comparing Coupon Type for **carry out and take away**, out of 19 sent, 13 accepted and 6 did not accept. 68.4% acceptance.
* Comparing Coupon Type for **bar**, out of 13 sent, 3 accepted, and 10 did not. 23.07% acceptance.
* Overall Conclusion: **Coupons for cheap restaurants (<$20) get accepted the most**

1. Next, observed how marital status and having children influenced coupon acceptance for cheap restaurants. Then, extended the same across all other accepted coupon types as well. Below are the two scatter plots.

A screenshot of a computer

Description automatically generated

Fig1: Marital Status and Having Children with accepted coupons for cheap restaurants ONLY.

A screenshot of a computer

Description automatically generated

Fig2: Marital Status and Having Children across ALL accepted coupon types.

From the above plots, inferred the below:

* Married partners with children are more like to accept coupon types for coffee house, followed by coupon types for restaurants(<20)
* Singles with no children are more likely to accept coupon types for restaurants(<20), followed by coupon types for coffee house

1. Next, looked to see how time of day could influence coupon acceptance.

A screenshot of a menu

Description automatically generated

A graph with colored circles and text

Description automatically generated with medium confidence

From the above grouping and plot, inferred below:

* At 10 am and 6 pm, coffee house type coupons are accepted more.
* At 2pm and 7am, restaurant(<20) coupons are accepted more.

1. Finally, looked to see how accepted coupon types for coffee house were being used. Created a plot to see how many accepted coupons visited a Coffee House between 1-3 times, 4-8 times and less than 1 time a month.

A graph with a dot in the middle

Description automatically generated

* From this plot, inferred that: Coupon types of CoffeeHouse allows for customers (10 out of the total 19 accepted) accepting this coupon type to visit less than 1-time a month because of a coupon presented.
* Merged a few data frames together to also conclude that Singles visit coffee house more often (4-8 times) than Married Partners for accepted Coffee House type coupons.

A graph with red and white squares

Description automatically generated

* Also, visualize the distribution of counts across accepted coffee house coupon types across various destinations. Conclude that: Customers are more likely to accept coffee house type coupons when their destination is "No Urgent Place" - median 10. They also are less likely to accept coffee house type coupons when their destination is "Home' - median 5.

A group of colorful squares

Description automatically generated