

Will a customer accept a coupon?

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```
In [14]: data.isnull().sum()
```

```
Out[14]: destination          0
passanger                    0
weather                      0
temperature                  0
time                         0
coupon                       0
expiration                   0
gender                       0
age                          0
maritalStatus                0
has_children                  0
education                     0
occupation                    0
income                        0
car                           12576
Bar                           107
CoffeeHouse                   217
CarryAway                     151
RestaurantLessThan20         130
Restaurant20To50             189
toCoupon_GEQ5min              0
toCoupon_GEQ15min             0
toCoupon_GEQ25min             0
direction_same                0
direction_opp                 0
Y                              0
dtype: int64
```

3. Decide what to do about your missing data -- drop, replace, other...

```
In [15]: data["CarryAway"].fillna("never", inplace=True)
data["Bar"].fillna("never", inplace=True)
data["RestaurantLessThan20"].fillna("never", inplace=True)
data["Restaurant20To50"].fillna("never", inplace=True)
data["CoffeeHouse"].fillna("never", inplace=True)
data["car"].fillna("do not drive", inplace=True)
```

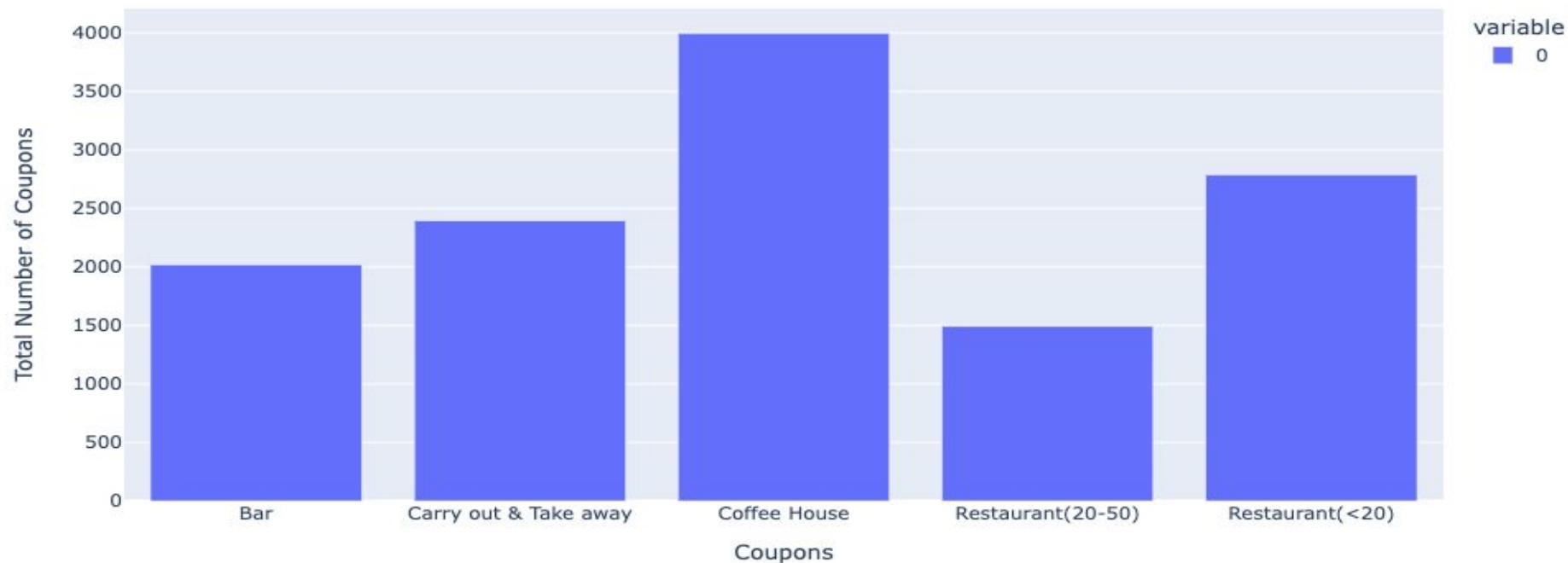
4. What proportion of the total observations chose to accept the coupon?

```
In [16]: data.query('Y == 1').shape[0]/data.shape[0]
```

```
Out[16]: 0.5684326710816777
```

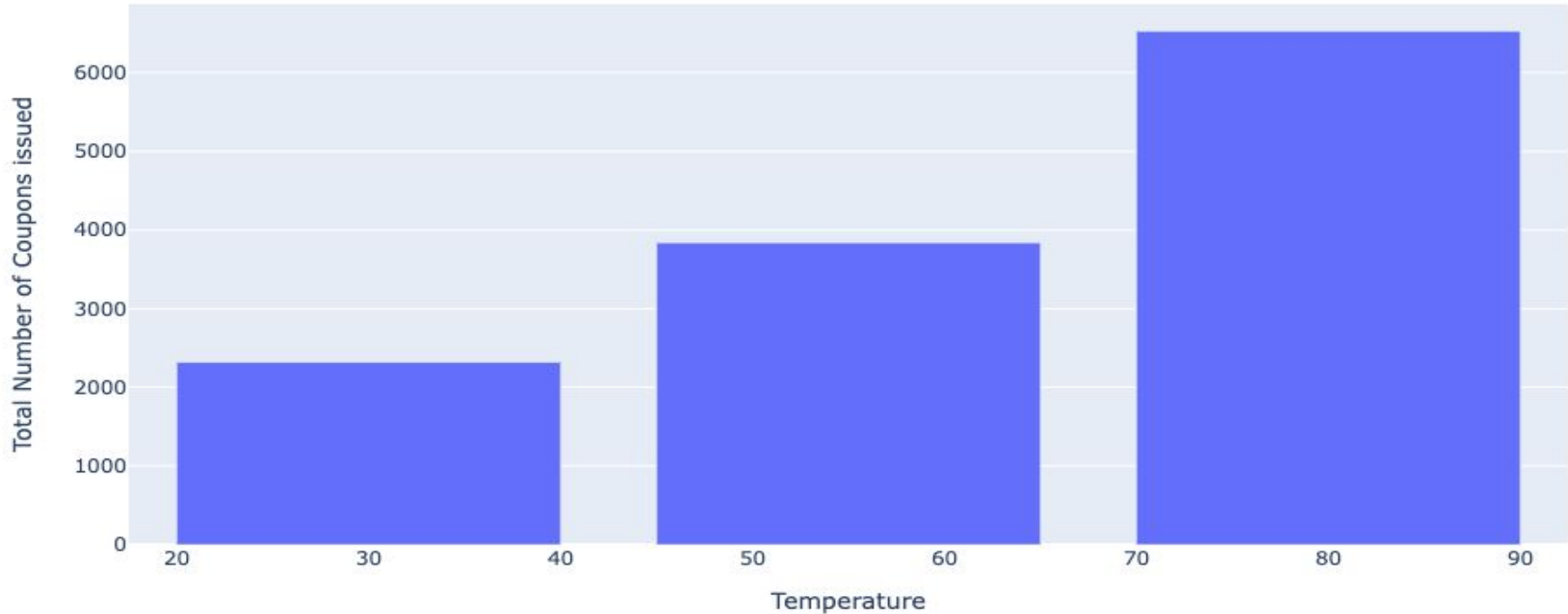
Use a bar plot to visualize the coupon column - We see that the number of coupons for the Coffee House are the most and the least number of coupons are for Restaurant(20-50).

Total Number of coupons per Coupon type



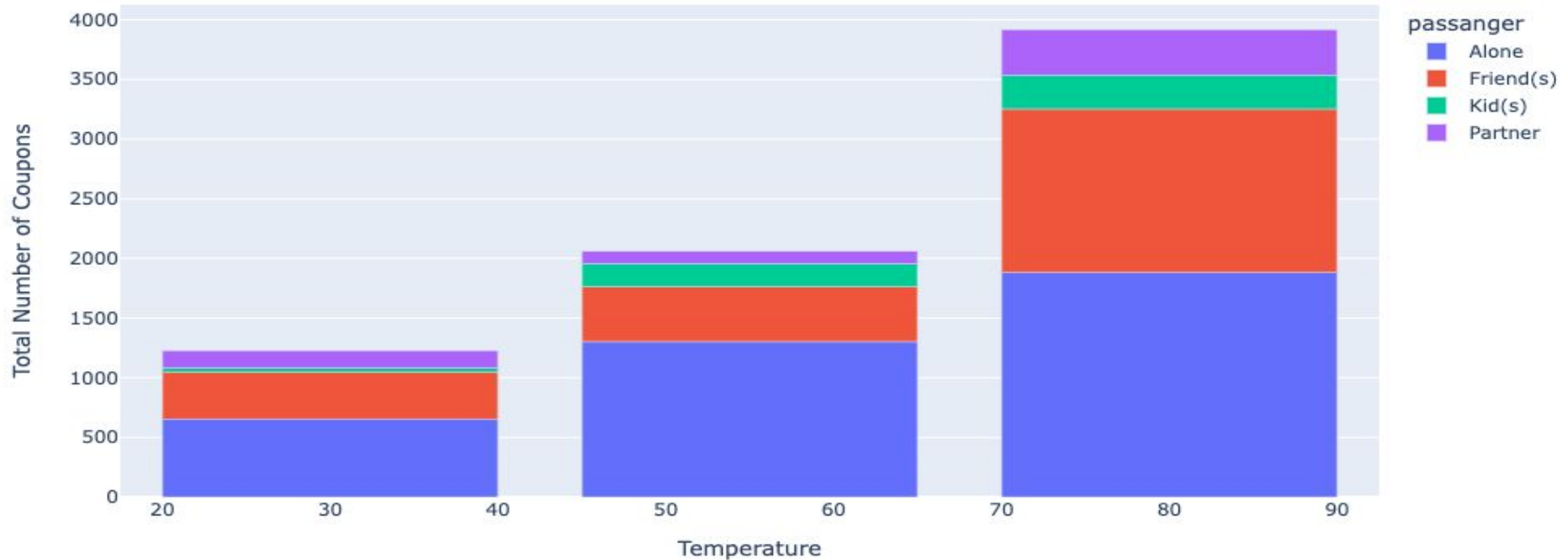
6. Use a histogram to visualize the temperature column - Based on the temperature, the total number of coupons issued increases with increase in temperature.

Histogram by temperature

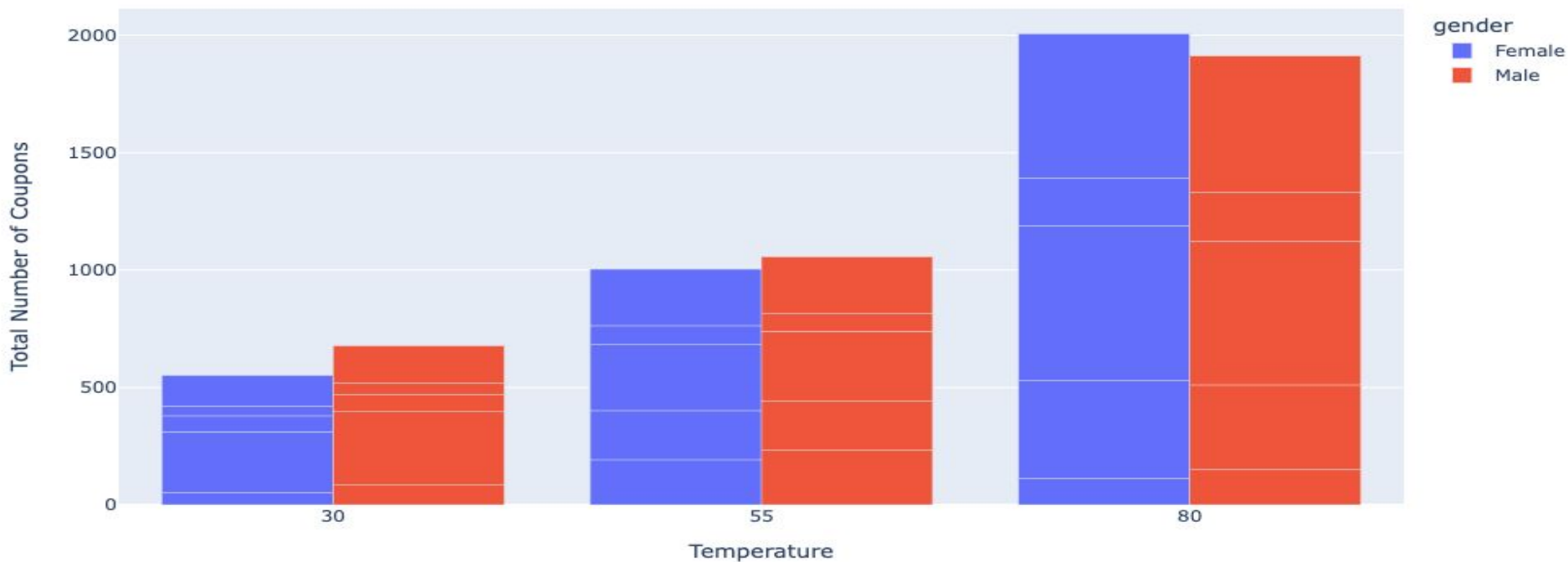


Additional visualization to view temperature by coupons and passenger type.

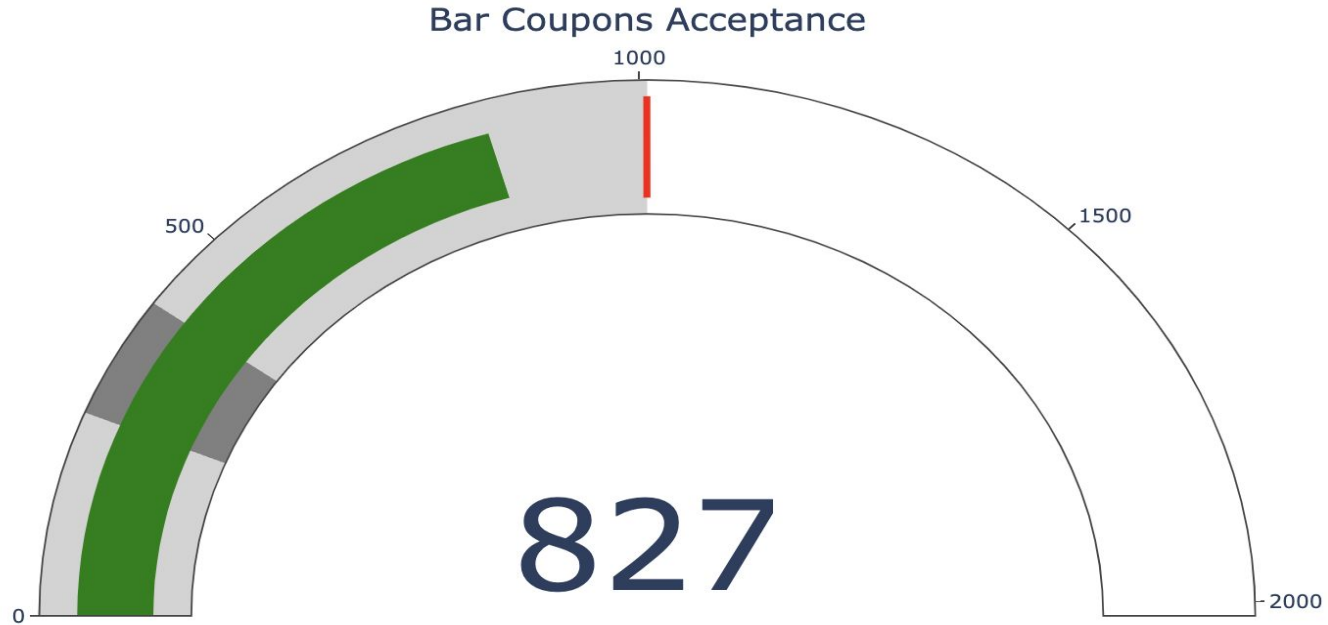
Accepted Coupons by Temperature for different passenger types



Additional visualization to view temperature by coupons and gender. Acceptance of coupons by females increases when temperature is 80 F.

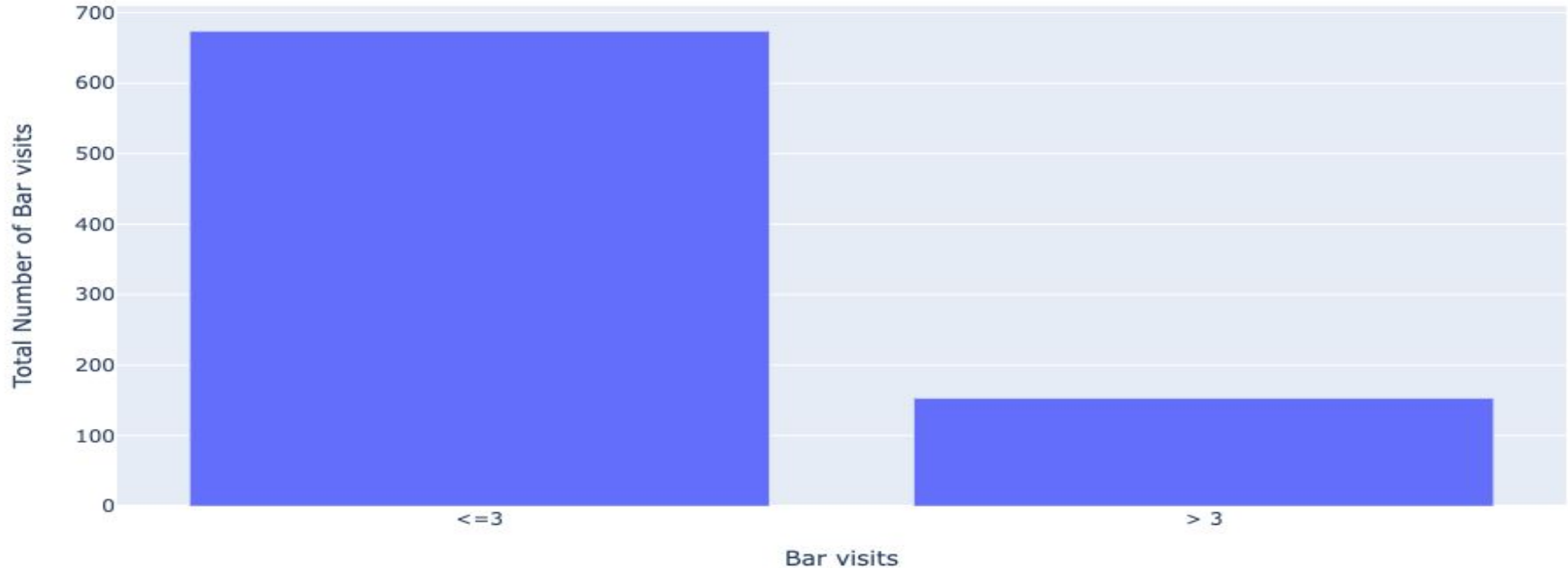


Bar Coupons - The total number of coupons issued were a little over 2000 and the acceptance is less than 50%.



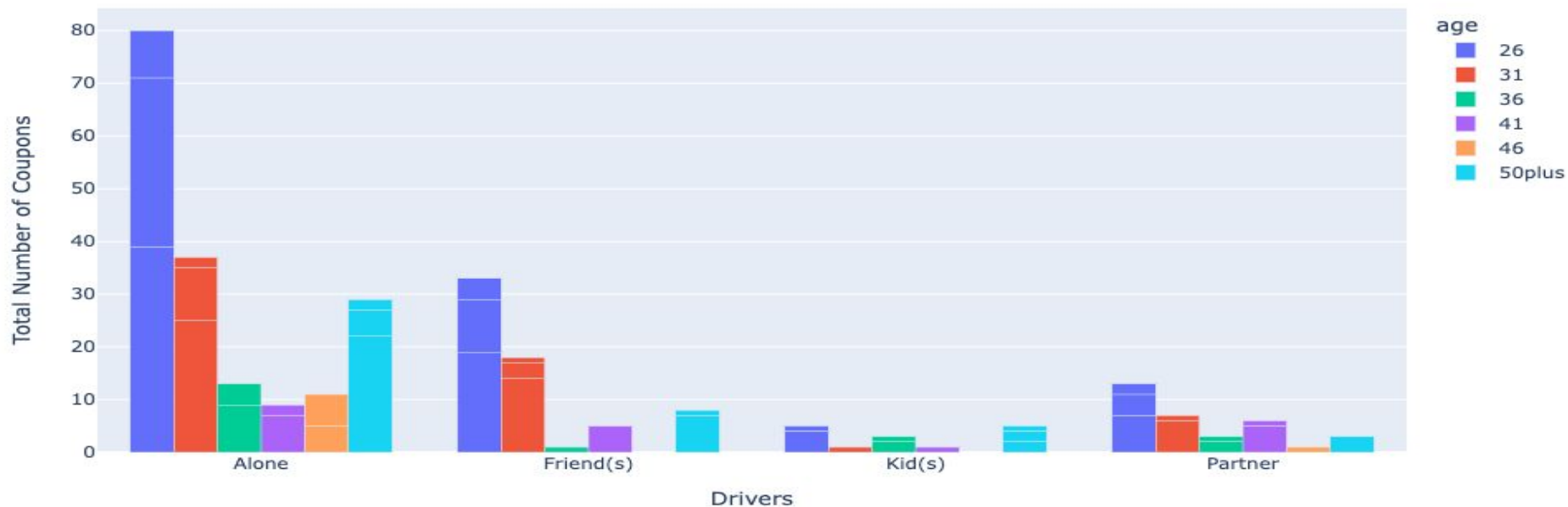
The drivers visiting the bar less than or equal to 3 times accept more bar coupons than those visiting the bar more than 3 times.

Acceptance rate between those went to bar 3 or fewer times a month to those who went more.



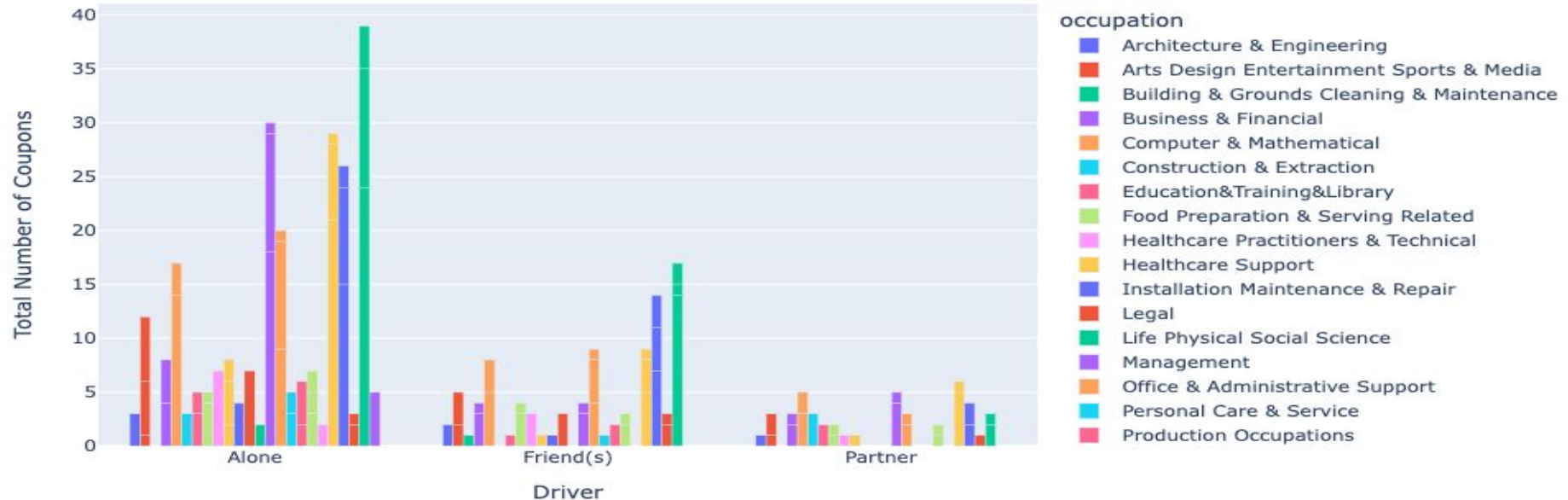
The acceptance rate of drivers who go to a bar more than once a month and are over the age of 25. Based on the visualization, drivers driving alone and with age of 26, seem to be accepting more number of bar coupons.

Difference between acceptance rate of drivers who go to a bar more than once a month and are over the age of 25



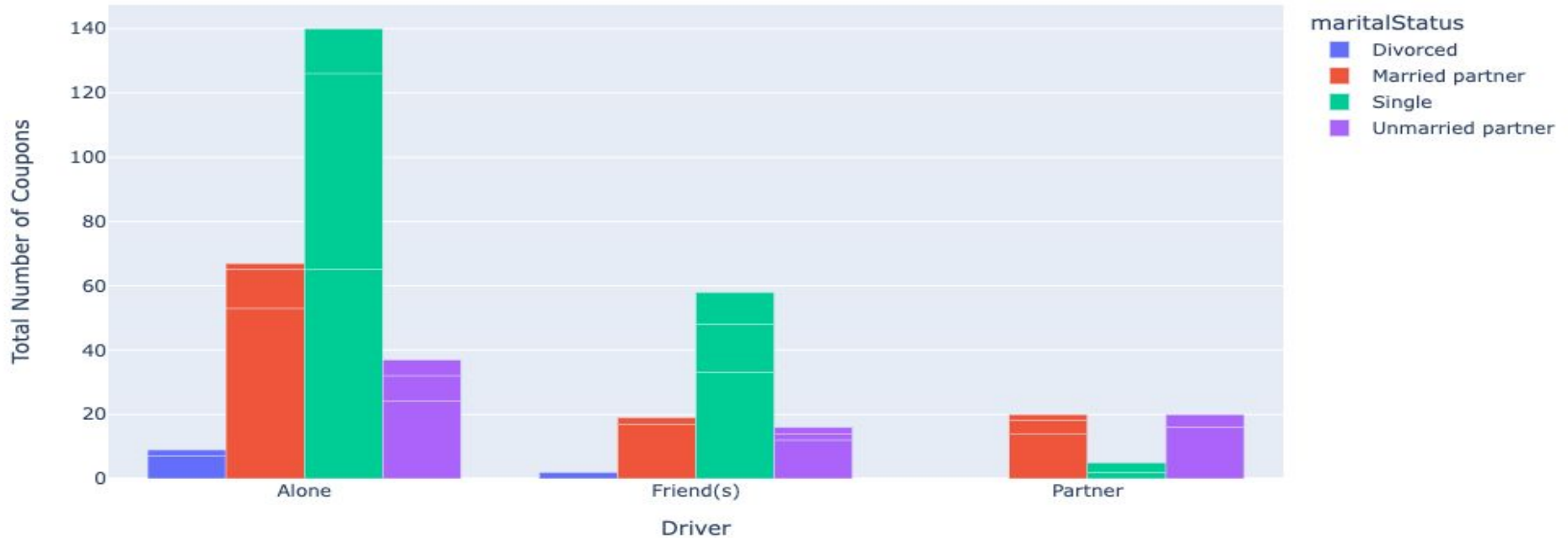
For those accepting bar coupons, those driving alone work at Building & Grounds Cleaning & Maintenance. Those with occupation of Business and Financial come second in terms of acceptance coupons.

Accepted Coupons by Driver and occupation



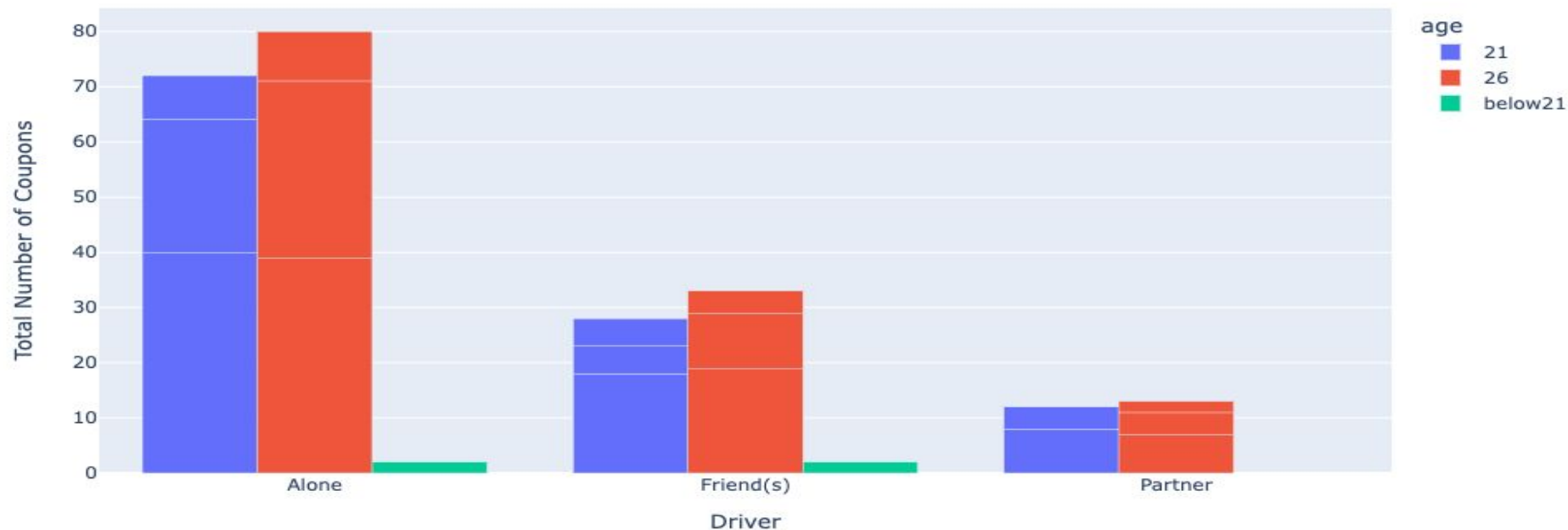
Based on the below chart, Bar coupons are accepted by drivers driving alone and are single. The drivers who are married come distant second.

Accepted Coupons by Driver and marital status



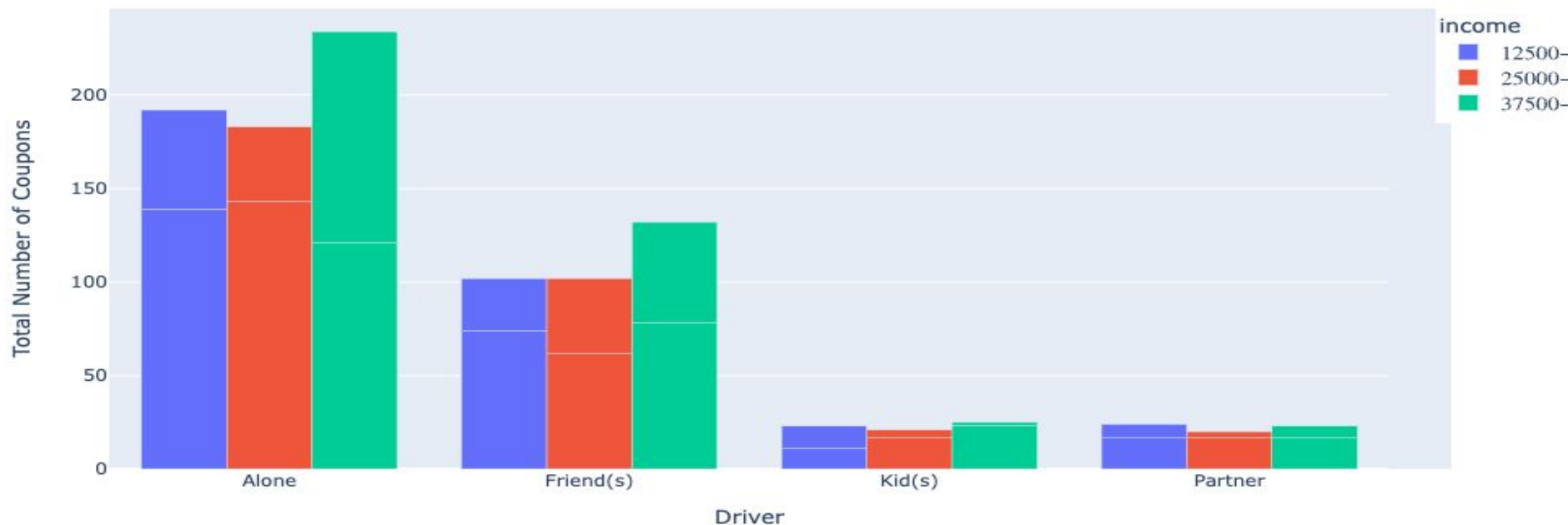
Visualization - Drivers who go to bars more than once a month and are under the age of 30.

Accepted Coupons by Driver and age



Drivers who go to cheap restaurants more than 4 times a month and income is less than 50K

Accepted Coupons by drivers for cheap restaurants

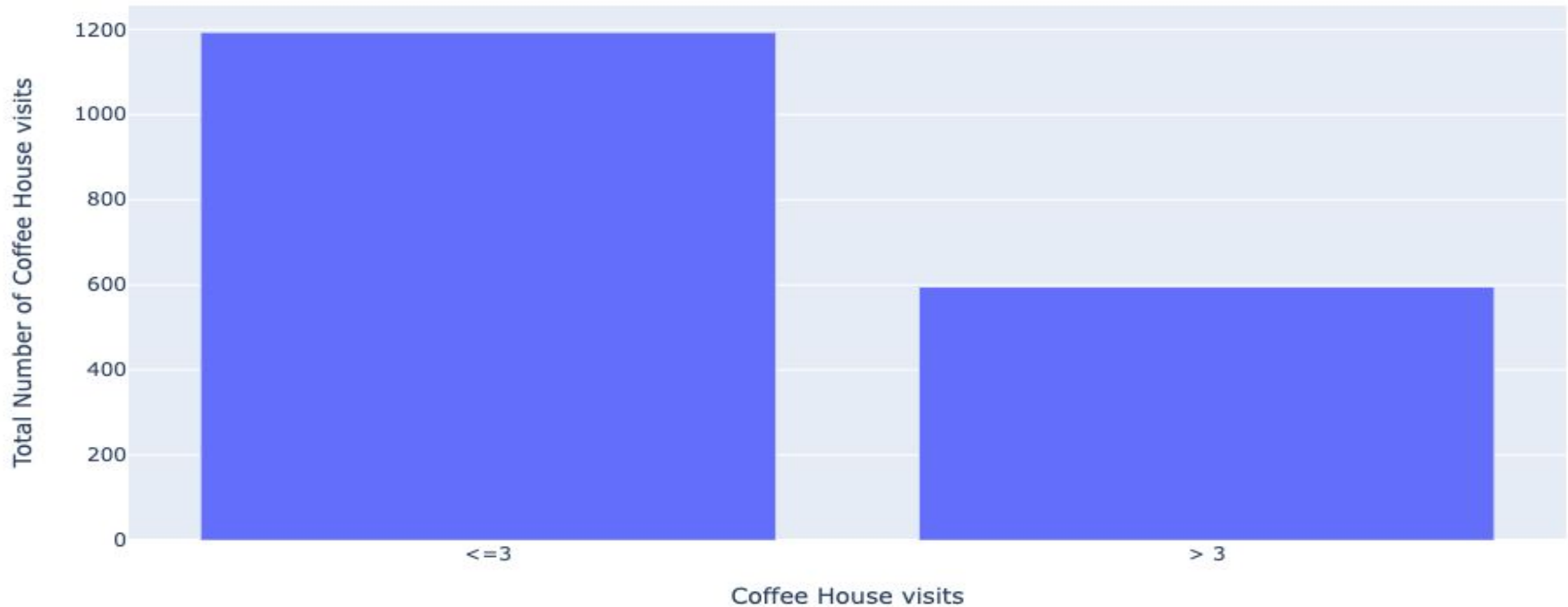


Hypothesis about drivers who accepted the bar coupons.

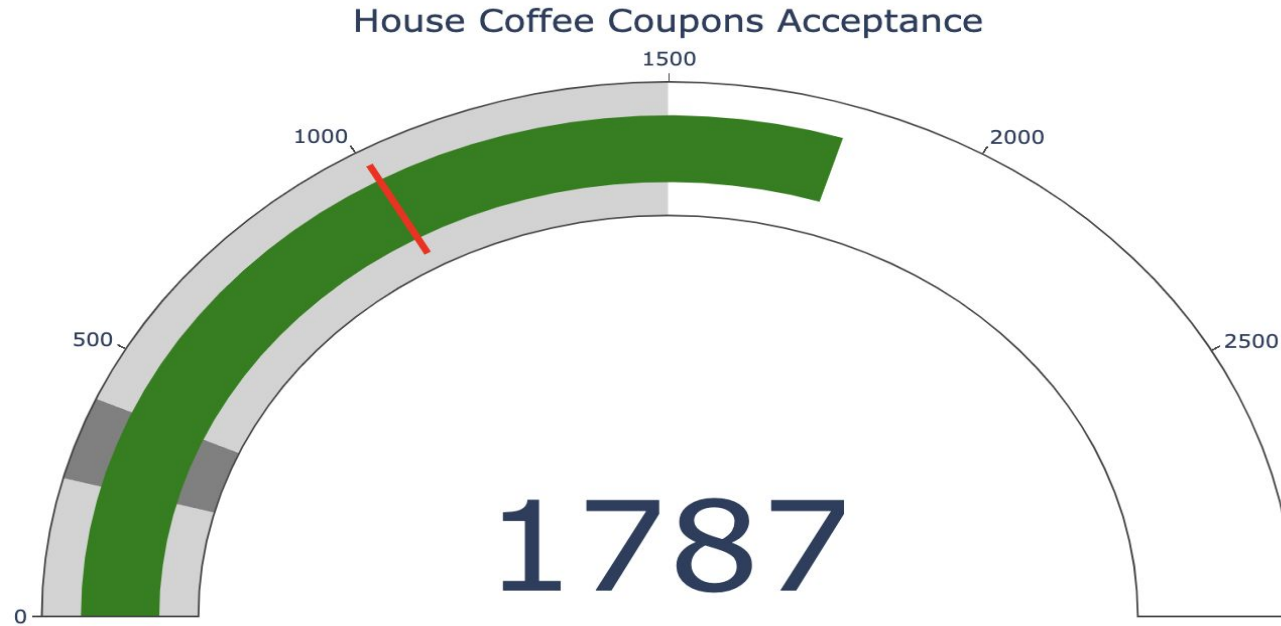
Overall Acceptance of bar coupons by drivers is around 41%. Drivers who tend to visit the bar less than 3 times a month accept more coupons than the drivers who visit more than 3 times. Drivers in the age group of 26 years accept more bar coupons compared to the other age groups over 25. However, drivers with kids and partners visit bar fewer times compared to the drivers driving alone or with friends. Drivers who drive alone tend to accept more coupons irrespective of the outside temperature. At lower temperatures, male drivers accept more coupons compared to female drivers who accept when the temperature outside is good. Number of coupons accepted by the drivers increases with increase in temperature. Drivers who drive alone and work at building, ground cleaning and maintenance accept coupons more number of times compared to the other occupation. Drivers with age 26 tend to accept more coupons compared to other age groups below 30. In terms of income, drivers whose income is more than \$37500-\$49999 tend to visit more often and income around \$25000-\$374999 visit less often.

Independent Analysis - Coffee House.

Acceptance rate between those went to Coffee House 3 or fewer times a month to those who went more.

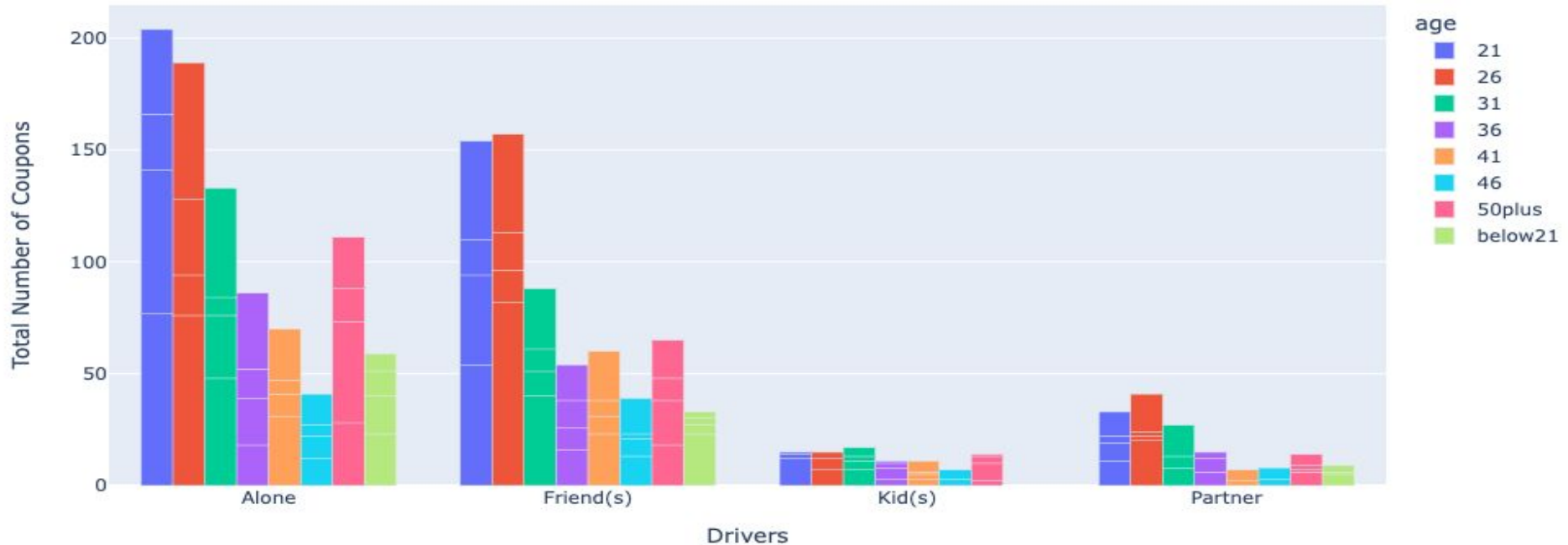


The acceptance rate for Coffee House Coupons is a over 50%.



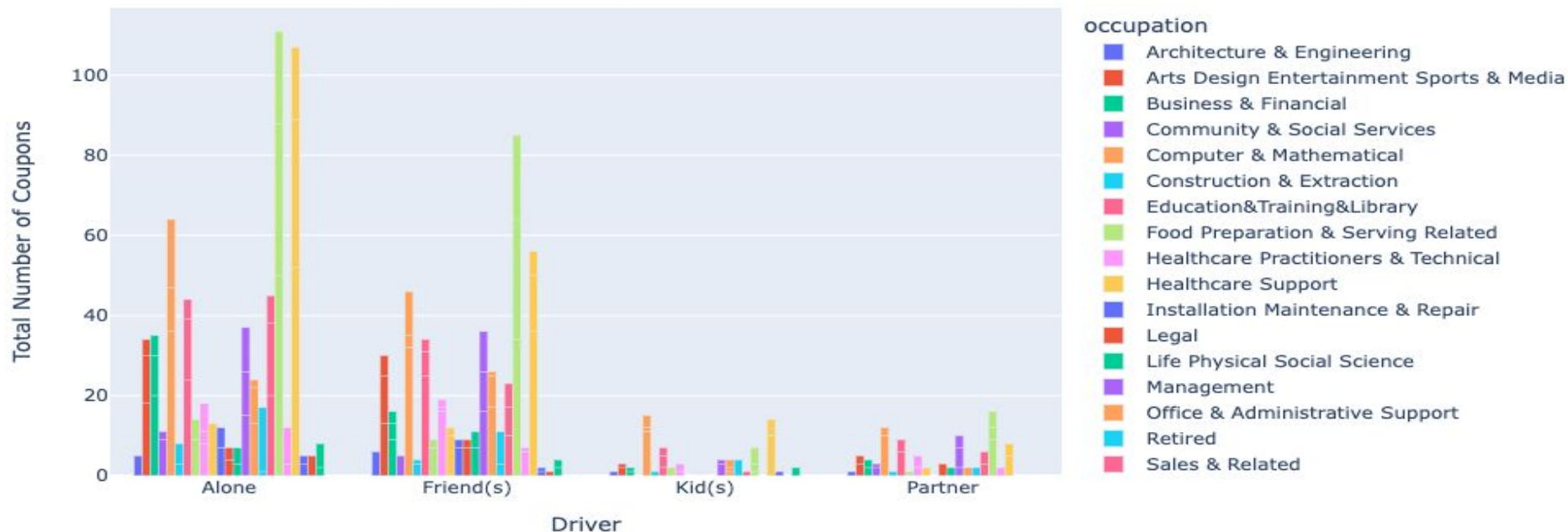
Based on the chart, drivers with age of 21 and 26 have accepted more number of coupons compared to the other drivers.

Acceptance rate of drivers who go to a Coffee House more than once a month.



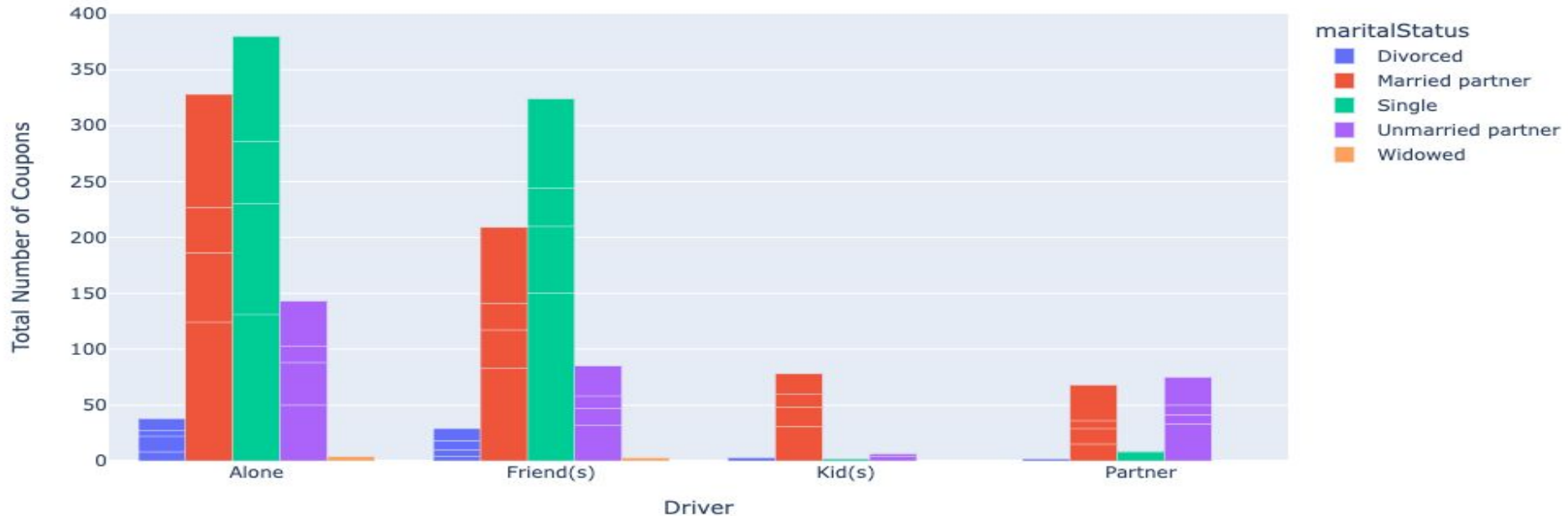
Food Preparation & Serving Related jobs consume accepted more coupons from the Coffee House.

Accepted Coupons for Coffee House by Driver and occupation



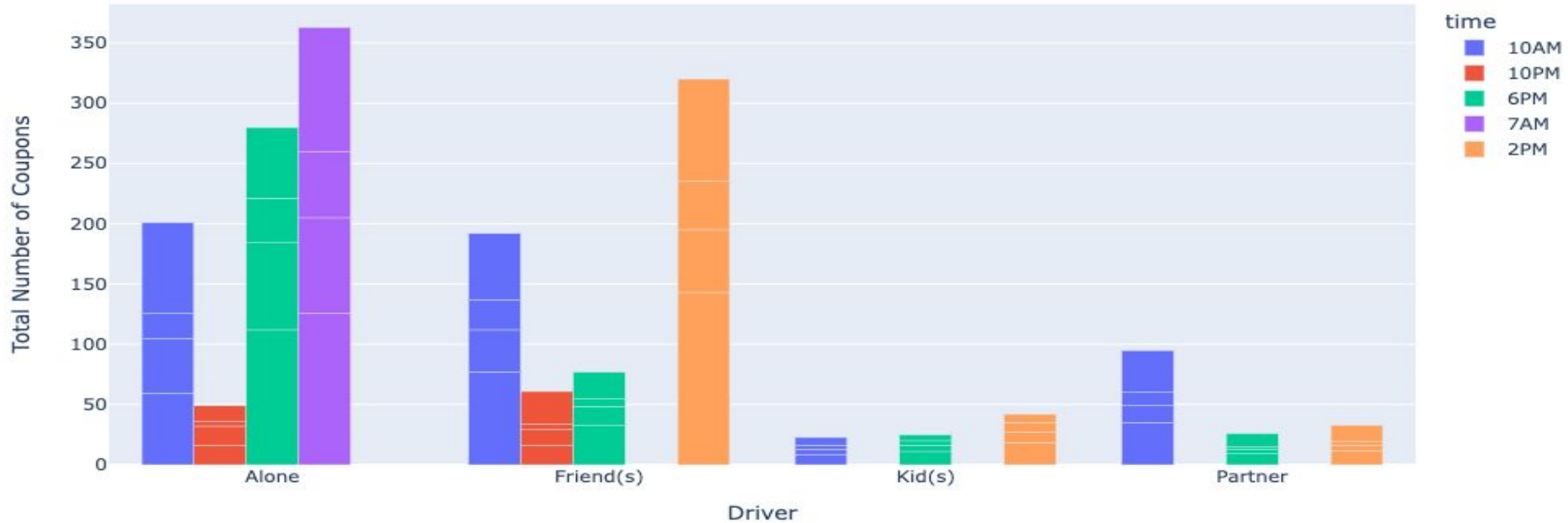
Drivers who are alone and single accepted more number of coffee coupons

Accepted Coupons for Coffee House by Driver and marital status



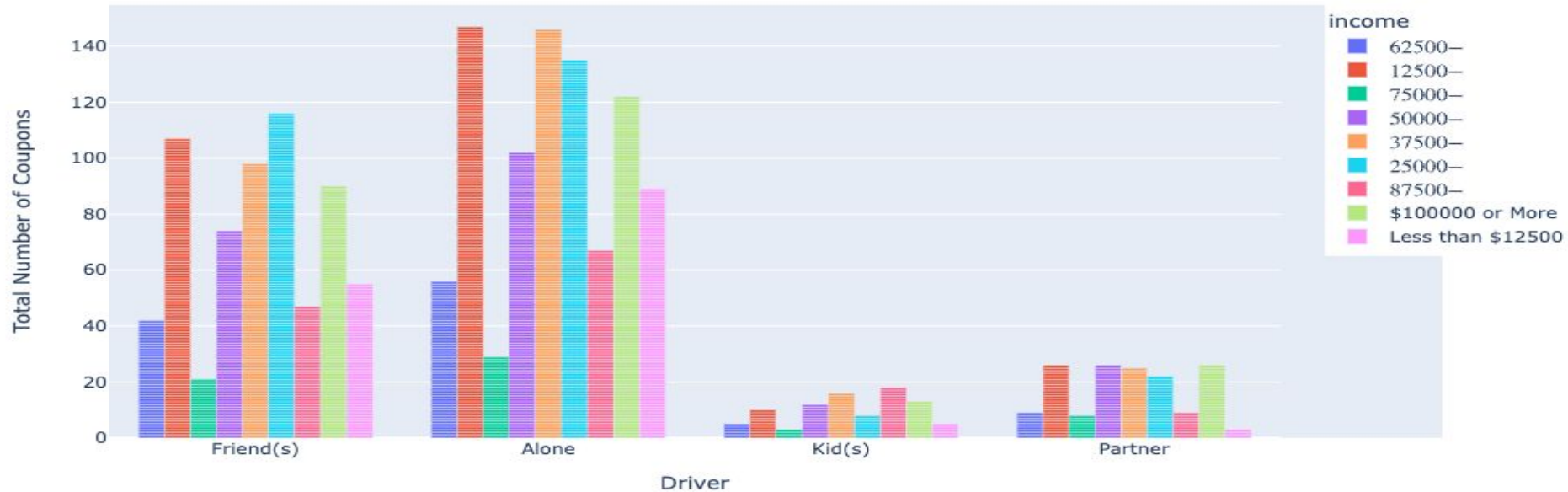
As expected, drivers driving alone in the morning accepted more coupons from the coffee House.

Accepted Coupons for Coffee House by Driver and time



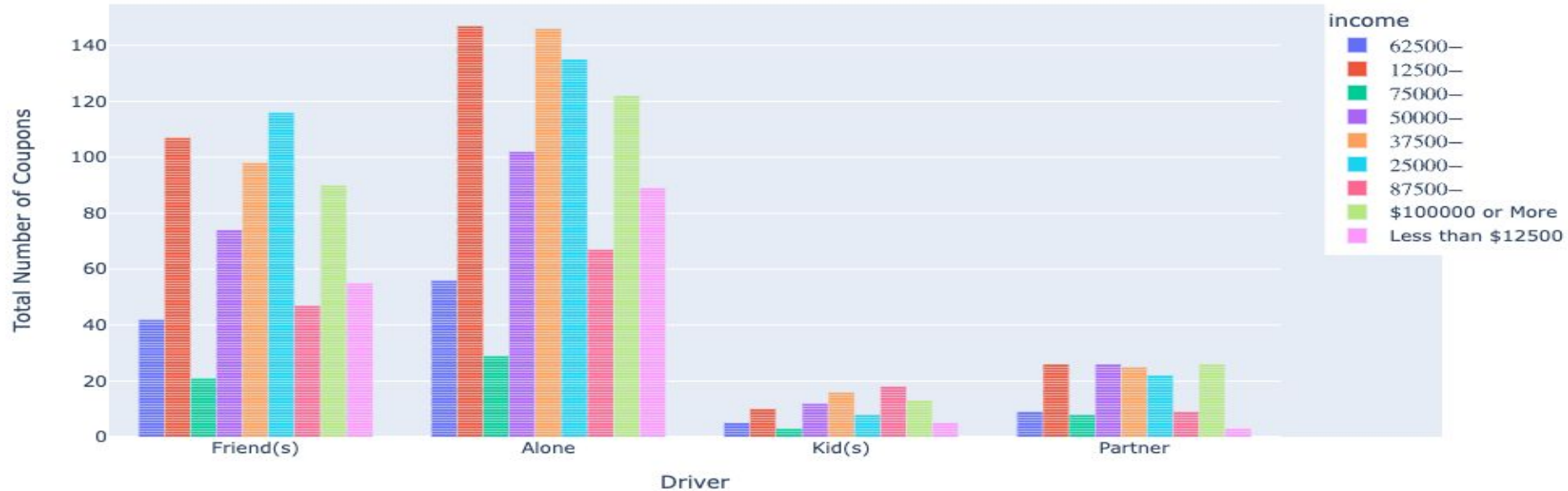
Drivers driving alone and income of 12500 accepted more number of coupons followed by drivers with income of 37500.

Accepted Coupons by drivers and income



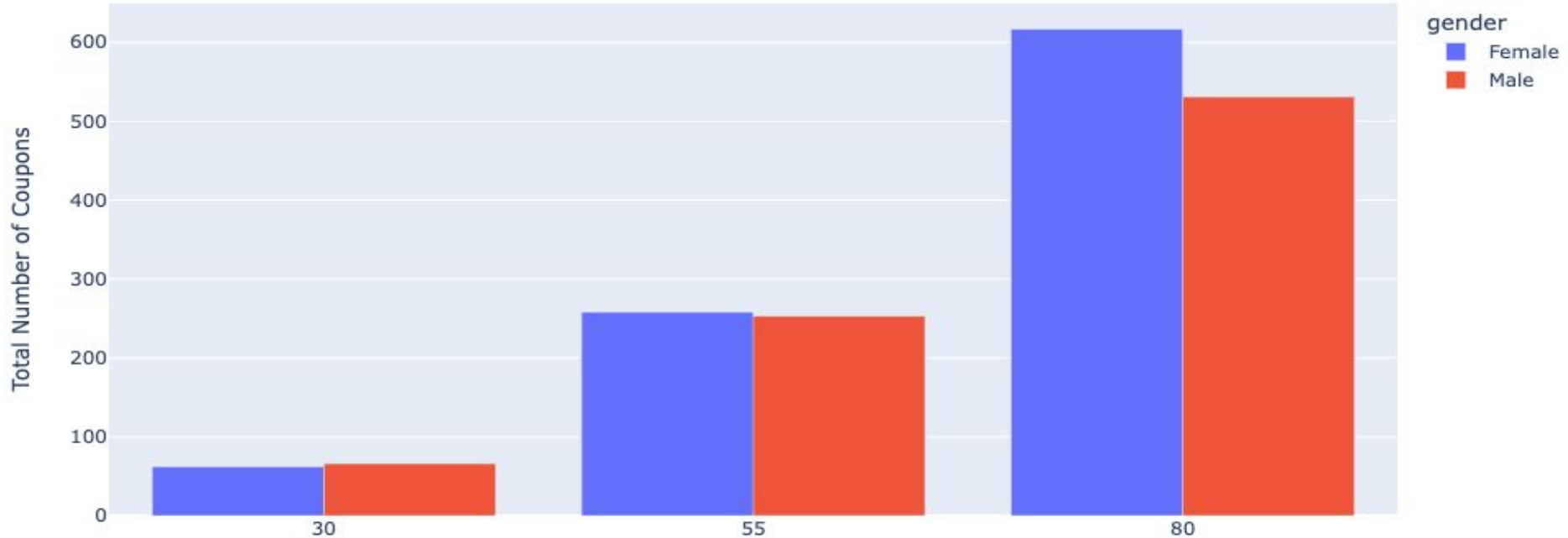
Drivers driving alone and income of 12500 accepted more number of coupons followed by drivers with income of 37500.

Accepted Coupons by drivers and income



Female drivers have accepted more coffee house coupons compared to male drivers.

Male vs Female drivers acceptance of coupons by temeperature



Hypothesis about drivers who accepted Coffee House Coupons

In conclusion, drivers who visited the coffee house less than 3 times have accepted more number of coupons. The acceptance rate for coffee house coupons is over 50%. Drivers of age 21 and 26 have accepted more number of coupons compared to the other drivers. Food Preparation and serving related seem to accept more coffee house coupons. Drivers who are single and alone accepted the most number of coupons. Drivers driving alone at 7am have accepted more number of coffee house coupons. In terms of income, drivers with salary of 12500 and 37500 have accepted more number of coupons. Female drivers have accepted more number of coupons than male drivers.