

Austo Motor Company

Actionable Insights & Recommendations

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BUSINESS REPORT | PYTHON DATA SCIENCE CODED PROJECT

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Executive Summary

This report analyses Austo Autos' customer data to understand key buying behaviors and preferences. The main goal is to identify the opportunities for improving sales and marketing strategies. Our findings show that the typical customer is a middle-aged, educated married male with dependents. These customers often have existing loans, which may influence their car-buying decisions. While income level is a big factor in what people spend on cars (those with higher incomes buy pricier models), their family size doesn't matter as much. Interestingly, SUVs are a big hit across the board, especially with women.

About the Data

The given dataset, named 'AustoAuto1.csv', represents information about customers of Austo Motor Company, a car manufacturer or dealership. It contains details about customer demographics, financial status, and their car purchase decisions.

It contains details about

- customer demographics,
- financial status, and
- their car purchase decisions.

Data Dictionary

Here's a dictionary describing the features (columns) in the given. dataset:

Feature	Description	Data Type
Age	Age of the customer	Integer
Gender	Gender of the customer (Male/Female)	Categorical
Profession	Profession of the customer (e.g., Salaried, Self-Employed)	Categorical
Marital_status	Marital status of the customer (e.g., Married, Single)	Categorical
Education	Education level of the customer (e.g., Graduate, Postgraduate)	Categorical
No_of_Dependents	Number of dependents the customer has	Integer
Personal_loan	Whether the customer has a personal loan (Yes/No)	Categorical
House_loan	Whether the customer has a house loan (Yes/No)	Categorical
Partner_working	Whether the customer's partner is working (Yes/No)	Categorical
Salary	Customer's individual salary	Numerical (Continuous)
Partner_salary	Customer's partner's salary	Numerical (Continuous)
Total_salary	Total combined salary of the customer and their partner	Numerical (Continuous)
Price	Price of the car purchased by the customer	Numerical (Continuous)
Make	Make of the car purchased by the customer (e.g., Sedan, SUV)	Categorical

Additional Notes:

- **Derived Features:**
 - I created 'Age_Group' by categorizing 'Age' into bins.
 - I created 'Higher_Priced' based on a price threshold (75th percentile of 'Price').
 - I created 'Partner_Working_Status' based on 'Partner_working'.
- **Missing Values: Handled missing values in 'Partner_salary' and 'Gender' during data cleaning.**
 - Inconsistent Values: Corrected inconsistencies in the 'Gender' column.

Data Quality Assessment and Preprocessing

The total records of the given customer data are 1581 rows (entries) and 14 columns (features). The details of the columns and their data types are already provided in the pervious page.

Data Cleaning: Missing data were identified in the 'Partner_salary' and 'Gender' columns. To address this, missing 'Gender' values were imputed with the mode, and missing 'Partner_salary' values were imputed with the median (where the Partner_working is a 'Yes').

Data Consistency: Inconsistencies in the 'Gender' column was rectified to ensure uniformity.

Duplicate Data: No duplicate records were found within the dataset.

Preliminary Observations:

- Significant variability was observed in features related to partner salary, household income, and partner working hours.
- Similar variations were noted in features associated with age and years of work experience.
- Potential outliers or skewed distributions were flagged for features such as partner salary, household income, and savings.

Data Snapshot – First 5 rows:

	Age	Gender	Profession	Marital_status	Education	No_of_Dependents	Personal_loan	House_loan	Partner_working	Salary	Partner_salary	Total_salary	Price	Make
0	53	Male	Business	Married	Post Graduate	4	No	No	Yes	99300	70700.0	170000	61000	SUV
1	53	Femal	Salaried	Married	Post Graduate	4	Yes	No	Yes	95500	70300.0	165800	61000	SUV
2	53	Female	Salaried	Married	Post Graduate	3	No	No	Yes	97300	60700.0	158000	57000	SUV
3	53	Female	Salaried	Married	Graduate	2	Yes	No	Yes	72500	70300.0	142800	61000	SUV
4	53	Male	Salaried	Married	Post Graduate	3	No	No	Yes	79700	60200.0	139900	57000	SUV

Data Snapshot – Last 5 rows:

	Age	Gender	Profession	Marital_status	Education	No_of_Dependents	Personal_loan	House_loan	Partner_working	Salary	Partner_salary	Total_salary	Price	Make
1576	22	Male	Salaried	Single	Graduate	2	No	Yes	No	33300	0.0	33300	27000	Hatchback
1577	22	Male	Business	Married	Graduate	4	No	No	No	32000	NaN	32000	31000	Hatchback
1578	22	Male	Business	Single	Graduate	2	No	Yes	No	32900	0.0	32900	30000	Hatchback
1579	22	Male	Business	Married	Graduate	3	Yes	Yes	No	32200	NaN	32200	24000	Hatchback
1580	22	Male	Salaried	Married	Graduate	4	No	No	No	31600	0.0	31600	31000	Hatchback

Customer Profile Overview

Let's take a look at some key numbers that tell us about our customers.

	count	mean	std	min	25%	50%	75%	max
Age	1581.0	31.922201	8.425978	22.0	25.0	29.0	38.0	54.0
No_of_Dependents	1581.0	2.457938	0.943483	0.0	2.0	2.0	3.0	4.0
Salary	1581.0	60392.220114	14674.825044	30000.0	51900.0	59500.0	71800.0	99300.0
Partner_salary	1581.0	19128.589500	19488.355948	0.0	0.0	25100.0	38000.0	80500.0
Total_salary	1581.0	79625.996205	25545.857768	30000.0	60500.0	78000.0	95900.0	171000.0
Price	1581.0	35597.722960	13633.636545	18000.0	25000.0	31000.0	47000.0	70000.0

- **Age:** The average customer is around 32 years old, with most between 25 and 38. This shows we're popular with younger and middle-aged folks.
- **Families:** Customers usually have two or three dependents, so family-sized groups are a big part of who we serve.
- **Money Matters:**
 - The average salary is about 60,392, but it varies a lot—some earn around 30,000, while others reach 99,300.
 - Partners bring in about 19,129 on average, but this varies even more. It's important to look at the combined household income, which is around 79,626 and can be anywhere from 30,000 to 171,000.
- **Car Prices:** Cars are selling for about 35,598 on average, but the range is broad—from 18,000 to 70,000.

Here's what stands out:

- Partner income is all over the place, showing that families have different money situations. We need to understand this when we set prices, offer loans, and create ads.
- Some numbers are really high or low, especially for partner salaries and total family income.

Here's what we should do next:

- **Divide and Conquer:** Group customers by age, income (both individual and family), and number of dependents. This will help us create ads and sales pitches that fit each group.
- **Cars for Everyone:** Offer different car types and features to match what different groups need and want.
- **Flexible Finances:** Offer various prices and loan choices to fit different budgets.

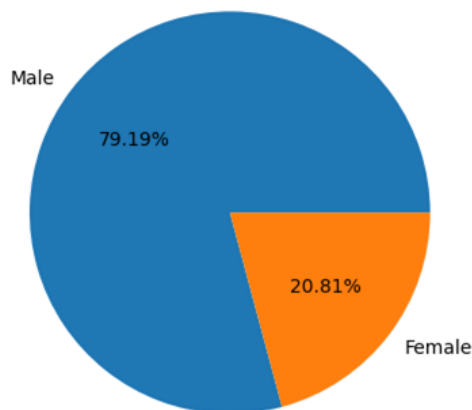
This first look gives us a good idea of who our customers are. By digging deeper into other types of information and checking those unusual numbers, we can make even better decisions that are based on the data.

Understanding Our Customers

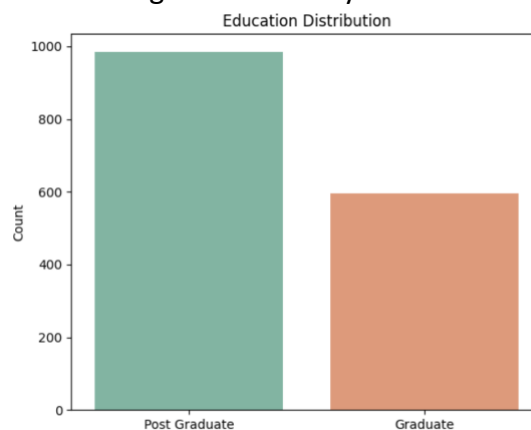
This analysis provides an initial exploration of the Austo Autos customer dataset, focusing on individual variable distributions and patterns. The analysis aims to offer preliminary insights into customer demographics, financial standing, and car purchase preferences.

Who They Are:

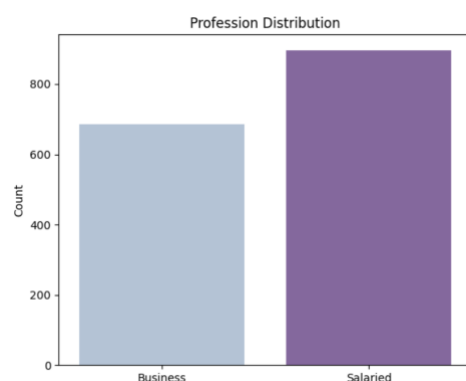
- **Gender:** The customer base is heavily skewed towards males, comprising nearly 80% of the total, with females accounting for the remaining 20%. This indicates a significant difference in car purchase behavior between the genders, suggesting potential targeted marketing opportunities.



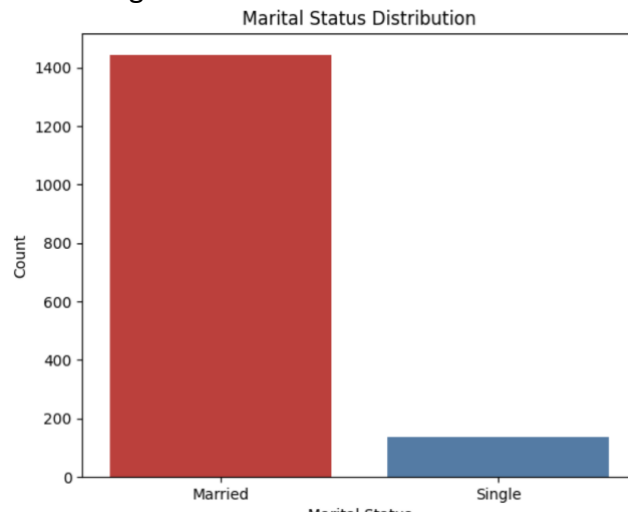
- Many of our customers have gone to college and earned postgraduate or graduate degrees. Most of them are Post-graduates. They're a well-educated bunch!



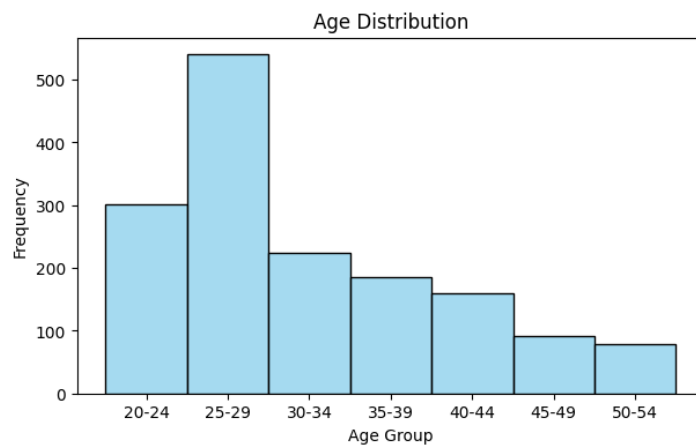
- Lots of our customers have steady jobs or own their own businesses.



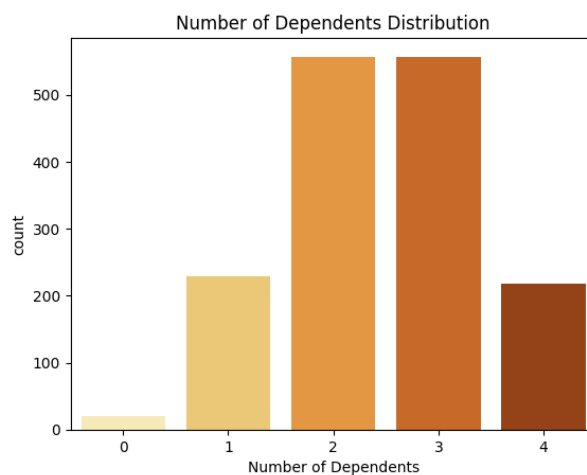
- A good number of them are married, so it's important to think about what families need when we're selling our cars.



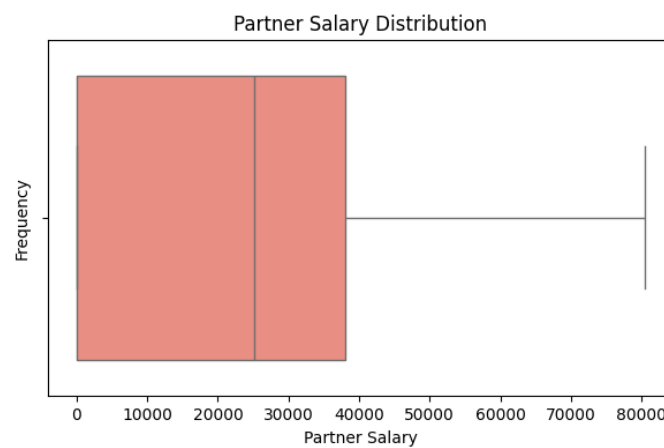
⇒ Most of our buyers are younger to middle-aged adults, with the largest group being in their 20s and early 30s. This suggests a higher concentration of younger to middle aged buyers.



- Most customers have medium sized families of 2 to 3. Almost all the customers have dependents. This can be a good reason to pitch bigger and expensive vehicles like SUV's to our customers.



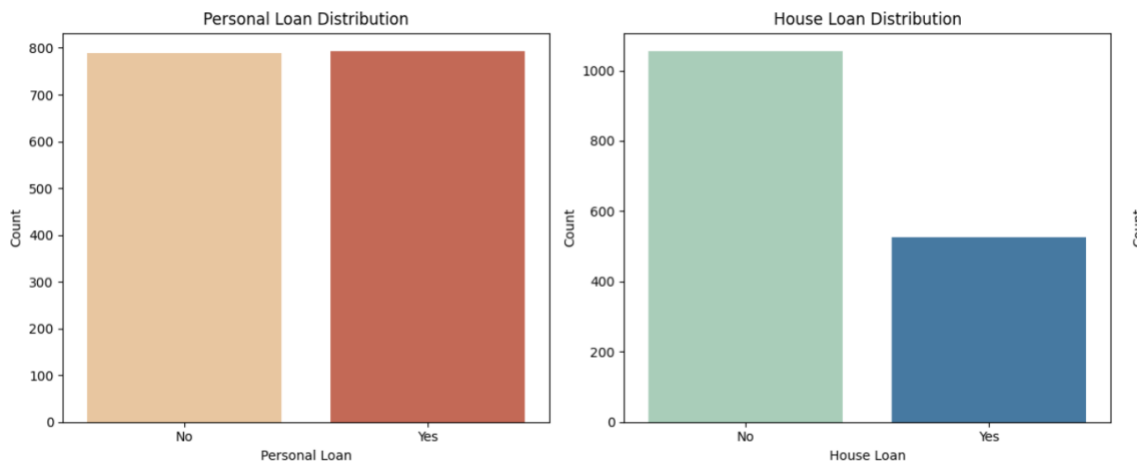
- Salary, Partner Salary, Total Salary are mostly Right skewed which indicates that most of the customers are concentrated between lower to middle income groups.



Note: There are a decent number of customers towards higher salary distribution and outliers which have exceptional earnings.

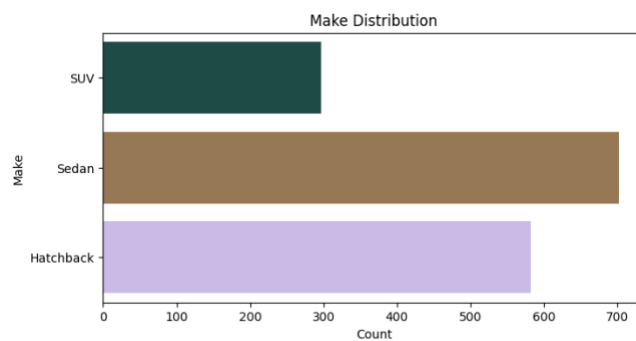
Money Matters:

- Most customers fall into the lower or middle-income brackets, but we have some high earners too.
- Many have loans for personal reasons or for their homes, which might affect how much they can spend on a car.



What They're Buying:

- Sedans are our top seller! Hatchbacks are next, followed by SUV's. Seems like people want cars with space and flexibility. This insight provides valuable info into the customers buying preference. In addition to this, Females mostly prefer SUV's, Males mostly prefer Sedan's.



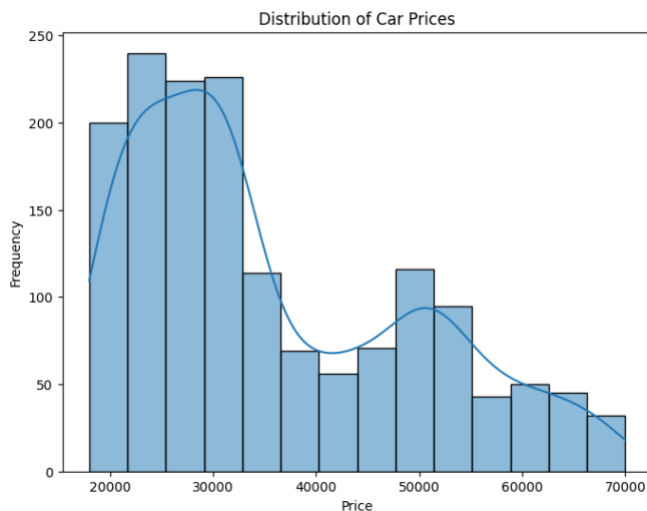
What This Means for Us:

- We need to make sure our marketing reaches both men and women effectively.
- Our ads and brochures should be smart and appeal to educated professionals.
- We need to offer cars at different prices and have good financing options so more people can afford them.
- Since almost all our customers have families, we should focus on selling them cars with plenty of space, like SUVs and larger sedans.
- We need to find a way to reach those younger customers who are just starting out. They may be in their 20s and 30s, have loans to pay off, and might not have as much money to spend as our older, more established customers. Maybe special financing deals or highlighting our more affordable models would be a good approach.
- Most of the individuals have salaries concentrated around 52000 to 72000. Some of the customers (outliers) have very high earning level, and all of them (outliers) are using SUVs.

By really understanding our customers, we can make smarter choices about how we design, market, and sell our cars.

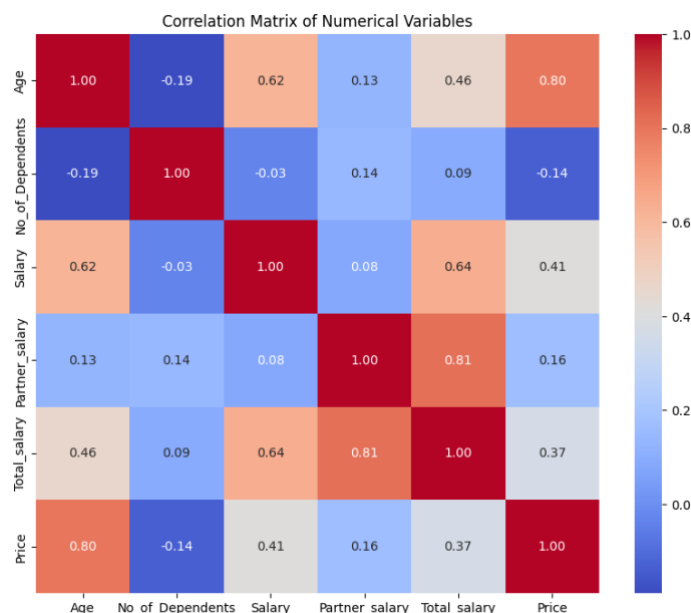
Top Selling Car Price Ranges:

- **Car Prices:** Most cars sold are in the lower to middle price range.



Connections:

- **Older = Pricier:** Older buyers tend to buy more expensive cars.
- **More Money = More Expensive Car:** This applies to both individual and combined family income.
- **Older = Higher Salary:** Older folks generally earn more (makes sense, right?).
- **Family Size Doesn't Really Matter:** The number of dependents doesn't seem to affect what people spend on cars.



Actionable Insights for the Car Manufacturer:

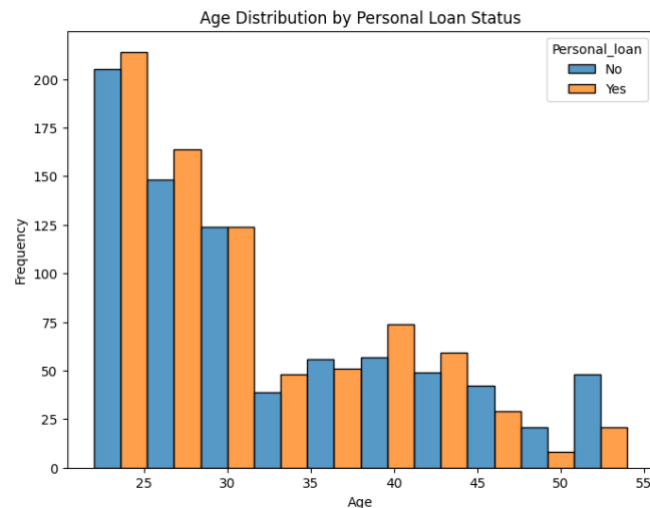
- **Target Demographics:** Focus marketing efforts on older, higher-income individuals for luxury or higher-priced models.
- **Financial Products:** Offer tailored financing options or promote joint ownership schemes, given the strong influence of both individual and partner salaries.
- **Family-Oriented Vehicles:** While the number of dependents isn't strongly correlated with price, the company should still consider the needs of families when designing and marketing specific models.

A Few Oddities:

- A couple of young buyers went for some pricey cars.
- A few people with lower incomes bought expensive cars.

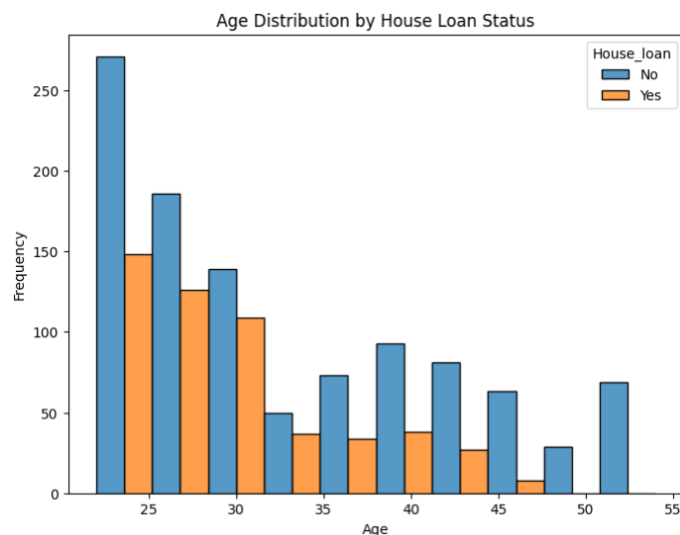
Loan Prevalence:

A significant portion of customers have taken out personal and home loans. This financial behavior is particularly pronounced among younger customers, specifically those between 20 and 30 years old. As age increases, the likelihood of having a personal loan generally decreases.



The connection between personal loans and age is crucial for Austo Autos. Younger customers, who are more likely to have personal loans, may have different financial considerations and priorities when purchasing a car. They might be more sensitive to pricing and financing options.

On the other hand, older customers, who generally have fewer personal loans, may have greater financial stability and could be more inclined towards higher-priced vehicles or premium features.



- **Young Buyers:** Focus on affordability and easy financing.
- **Older Buyers:** Highlight luxury, comfort, and cool features.

Car Variety:

- Offer a mix of cars at different prices with different features to appeal to everyone.

Money Help:

- Team up with banks or lenders to offer loans that make it easier for younger buyers to get a car.

Personalized Approach:

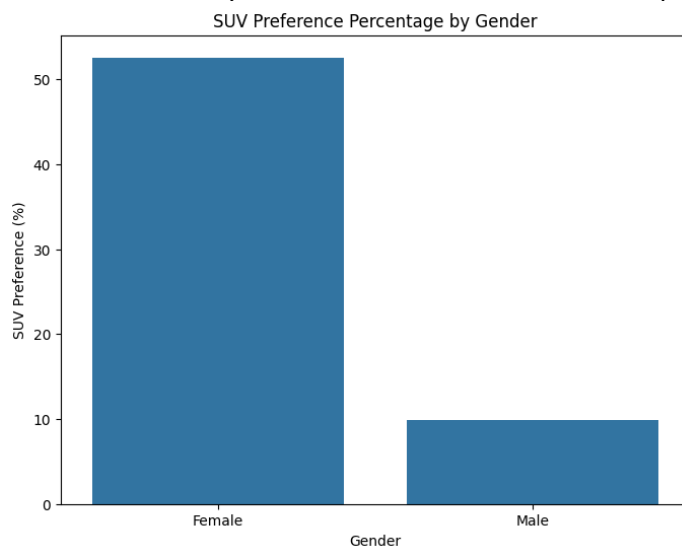
- Treat customers differently based on their age and whether they have a loan. This makes them feel valued and understood.

KEY QUESTIONS

⇒ Do men tend to prefer SUVs more compared to women?

Female customers exhibit a significantly higher preference for SUVs compared to male customers.

- Female: Over 50% of female customers prefer SUVs.
- Male: Only around 10% of male customers prefer SUVs.



⇒ What is the likelihood of a salaried person buying a Sedan?

The likelihood of a Salaried Person buying a Sedan is 44.20%

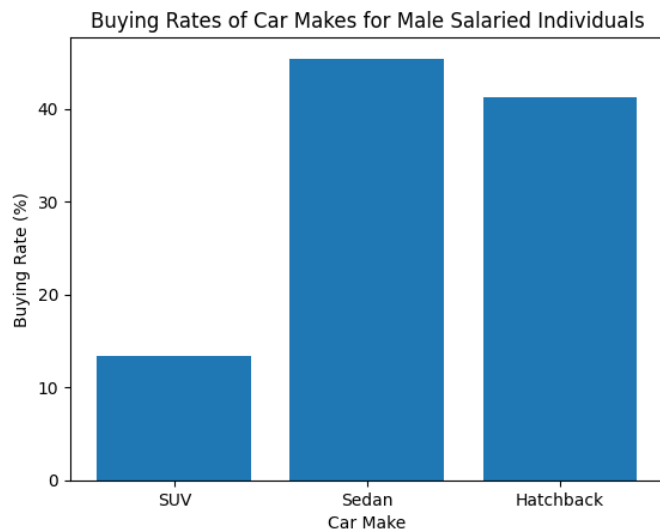
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⇒ **What evidence or data supports Sheldon Cooper's claim that a salaried male is an easier target for a SUV sale over a Sedan sale?**

SUV Buying Rate for Male Salaried Individuals: 13.39%

Sedan Buying Rate for Male Salaried Individuals: 45.39%

Hatchback Buying Rate for Male Salaried Individuals: 41.22%

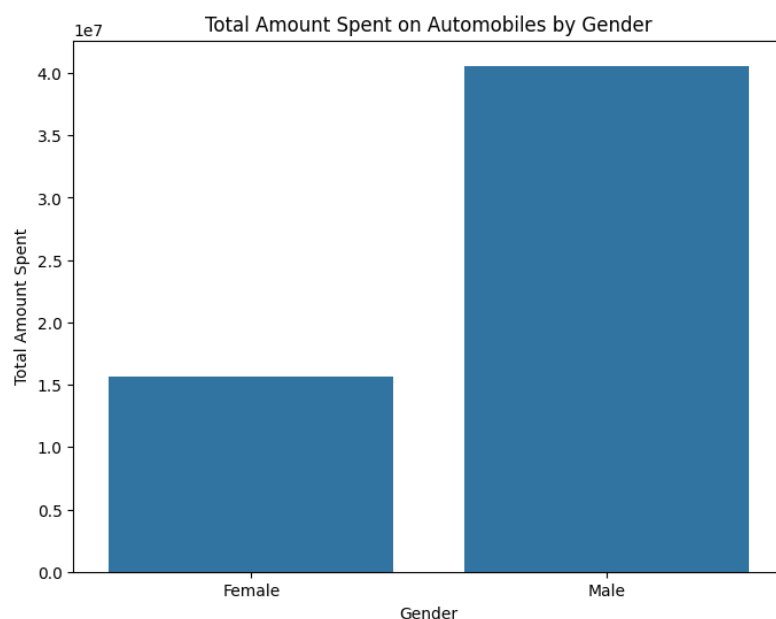


There is no direct evidence to support Sheldon Copper's claim that a salaried male is an easier target for a SUV over a Sedan sale! infract, it is the contrary.

However, there is one area which can be used to pitch SUV's to most of the customers. i.e the fact that most customers have dependents and are larger than 3 or more people family. We can pitch the benefits of bigger cars to significant number of customers.

⇒ **How does the amount spent on purchasing automobiles vary by gender?**

Overall, the amount of money spent by Male category is much higher than the Female category, it is almost 3 times high.

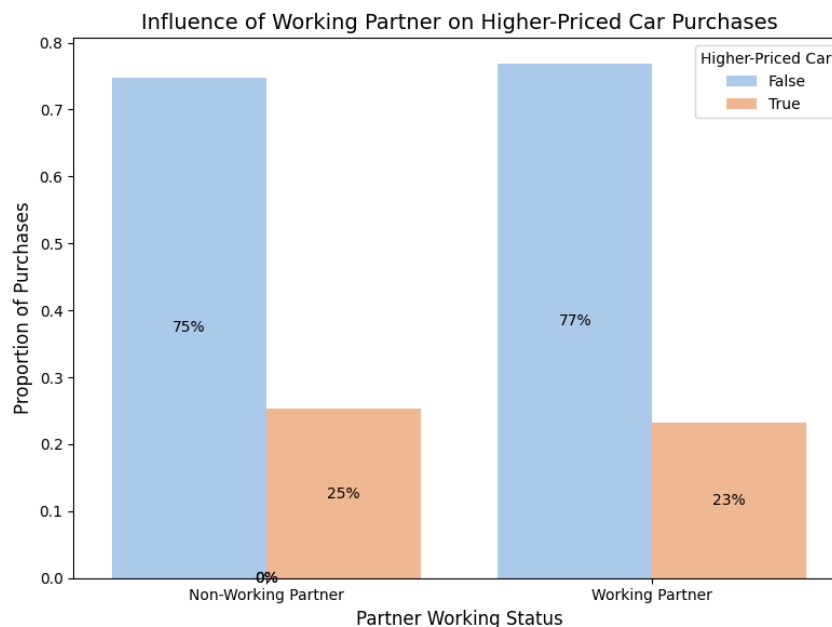


⇒ **How much money was spent on purchasing automobiles by individuals who took a personal loan?**

Total amount spent on automobiles by these individuals: \$27290000.00

⇒ **How does having a working partner influence the purchase of higher-priced cars?**

There is no impact or influence on the Partner Working status on the purchase of High-priced cars like SUVs (in this case i have considered above the 75th percentile)



Key Points to Remember:

- ◆ **Tailor the Pitch:** Younger buyers are looking for affordable options and easy financing. On the other hand, older and wealthier customers are attracted to luxury, comfort, and the latest technology. We need to cater our pitches accordingly.
- ◆ **Something for Everyone:** It's important to offer a variety of cars at different price points and with various features. This way, we can appeal to a wide range of buyers with different needs and preferences.
- ◆ **Financing Options:** Partnering with banks or other financial institutions can help younger buyers get the financial assistance they need to purchase a car. This makes our cars more accessible to them.
- ◆ **Personal Touch:** Our customers come from diverse backgrounds. By tailoring our approach based on their age, income, and any existing loans, we can make them feel valued and understood. This personalized touch can significantly enhance their buying experience.

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Conclusion:

By understanding these insights, Austo Autos can fine-tune its approach to sales and marketing, ensuring we address the specific needs of different customer segments. This data-driven strategy will not only help us boost sales but also build stronger relationships with our buyers. Additionally, further analysis can provide even more detailed insights to guide our future business decisions.