🧠 Customer-Behavior-MySQL2Hive Visualization

In [159…
```
# Import Libraries
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns
from collections import Counter
```

In [160…
```
# Display Setting
pd.set_option('display.max_columns', None)
sns.set(style="whitegrid")
sns.set_palette("magma")
```

In [161…
```
df=pd.read_csv("E-commerce Customer Behavior.csv")
print("Data Loaded Successfully!")
print("\nShape of DataSet:",df.shape)
```

```
Data Loaded Successfully!

Shape of DataSet: (350, 11)
```

In [162…
```
print("\nData Info:")
df.info()
```

```
Data Info:
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 350 entries, 0 to 349
Data columns (total 11 columns):
 #   Column                   Non-Null Count  Dtype  
---  ------                   --------------  -----  
 0   Customer ID              350 non-null    int64  
 1   Gender                   350 non-null    object 
 2   Age                      350 non-null    int64  
 3   City                     350 non-null    object 
 4   Membership Type          350 non-null    object 
 5   Total Spend              350 non-null    float64
 6   Items Purchased          350 non-null    int64  
 7   Average Rating           350 non-null    float64
 8   Discount Applied         350 non-null    bool   
 9   Days Since Last Purchase  350 non-null    int64  
 10  Satisfaction Level       348 non-null    object 
dtypes: bool(1), float64(2), int64(4), object(4)
memory usage: 27.8+ KB
```

In [163…
```
print("\nFirst 5 Rows:")
df.head()
```

```
First 5 Rows:
```

Out[163…

	Customer ID	Gender	Age	City	Membership Type	Total Spend	Items Purchased	Average Rating	Discount Applied	Days Since Last Purchase	Satisfaction Level
0	101	Female	29	New York	Gold	1120.20	14	4.6	True	25	Satisfied
1	102	Male	34	Los Angeles	Silver	780.50	11	4.1	False	18	Neutral
2	103	Female	43	Chicago	Bronze	510.75	9	3.4	True	42	Unsatisfied
3	104	Male	30	San Francisco	Gold	1480.30	19	4.7	False	12	Satisfied
4	105	Male	27	Miami	Silver	720.40	13	4.0	True	55	Unsatisfied

Q1: Total Customers

In [164…
```
total_customers = df['Customer ID'].nunique()
print("Total Customers:", total_customers)
```

```
Total Customers: 350
```

Q2. Average Total Spend

In [165…
```
avg_spend = df['Total Spend'].mean()
print("Average Total Spend:", round(avg_spend, 2))
```

```
Average Total Spend: 845.38
```

Q4. City with Highest Average Spend

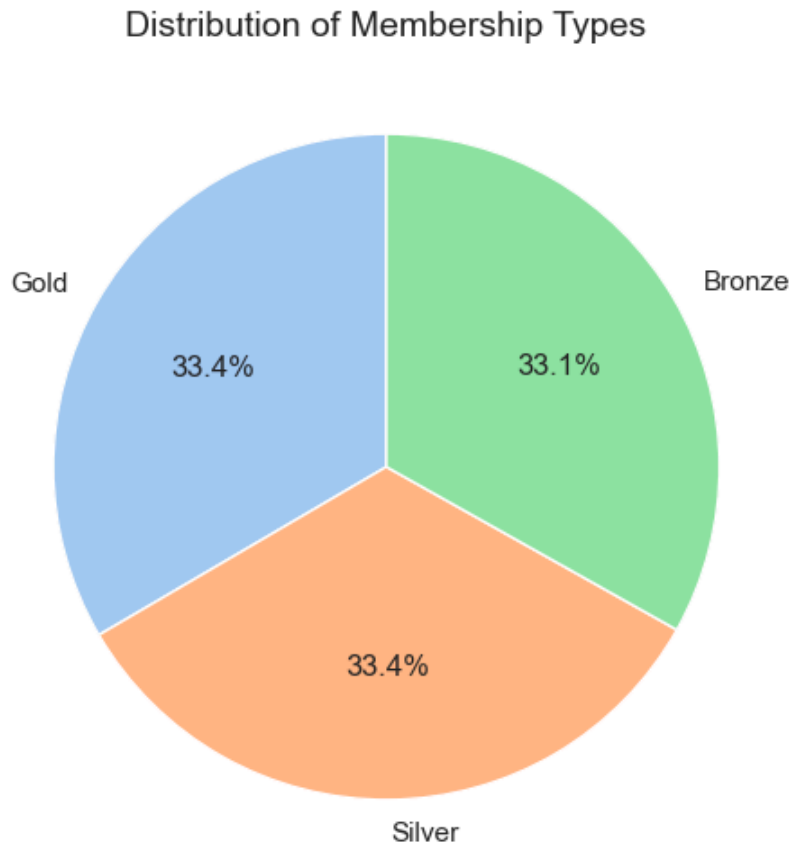
In [166…
```
city_spend = df.groupby('City')['Total Spend'].mean().sort_values(ascending=False)
city_spend.plot(kind='bar', color='skyblue', figsize=(7,4))
plt.title("Average Spend by City")
plt.xlabel("City")
plt.ylabel("Average Spend")
plt.show()
```

Q4. Customers per Membership Type

In [167…
```
# sns.countplot(data=df, x='Membership Type', palette='cool')
sns.countplot(data=df, x='Membership Type', hue='Membership Type', palette='cool', legend=False)
print()
plt.title("Customers by Membership Type")
plt.show()
```

In [184…

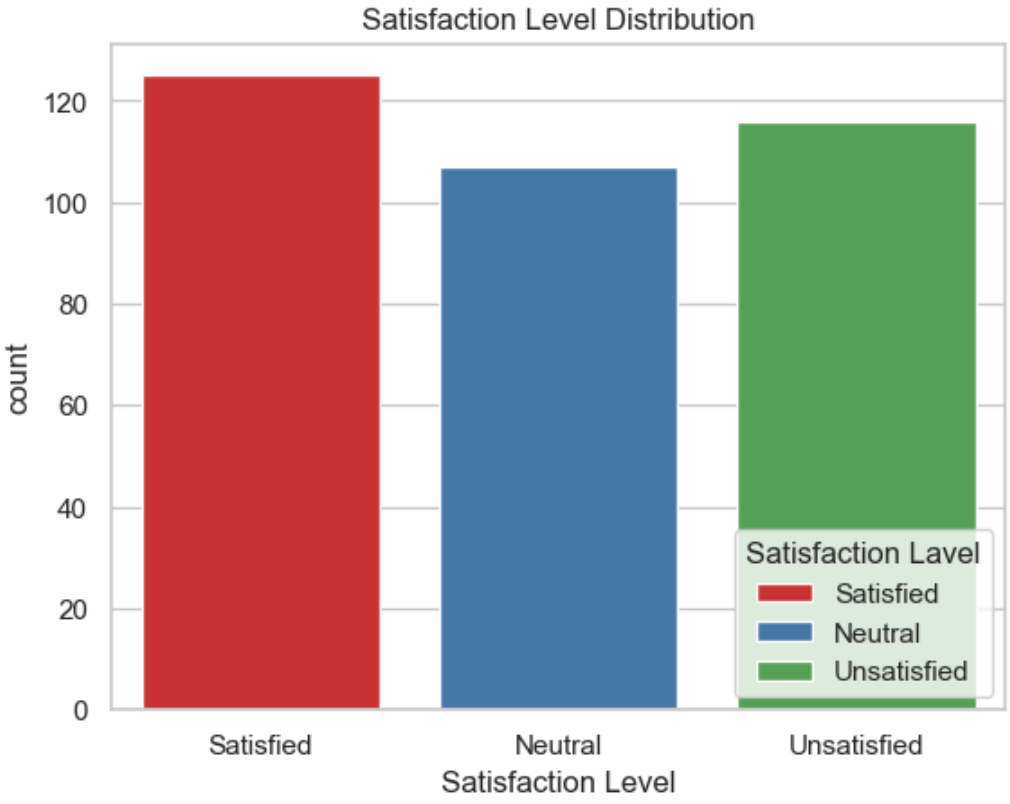
```
membership_counts = df['Membership Type'].value_counts()

# Create Pie Chart
colors = sns.color_palette("pastel")[0:len(membership_counts)]
plt.figure(figsize=(6,6))
plt.pie(membership_counts,
        labels=membership_counts.index,
        autopct='%1.1f%%',
        colors=colors,
        startangle=90)
plt.title("Distribution of Membership Types", fontsize=14)
plt.show()
```



Q5. Satisfaction Level Distribution

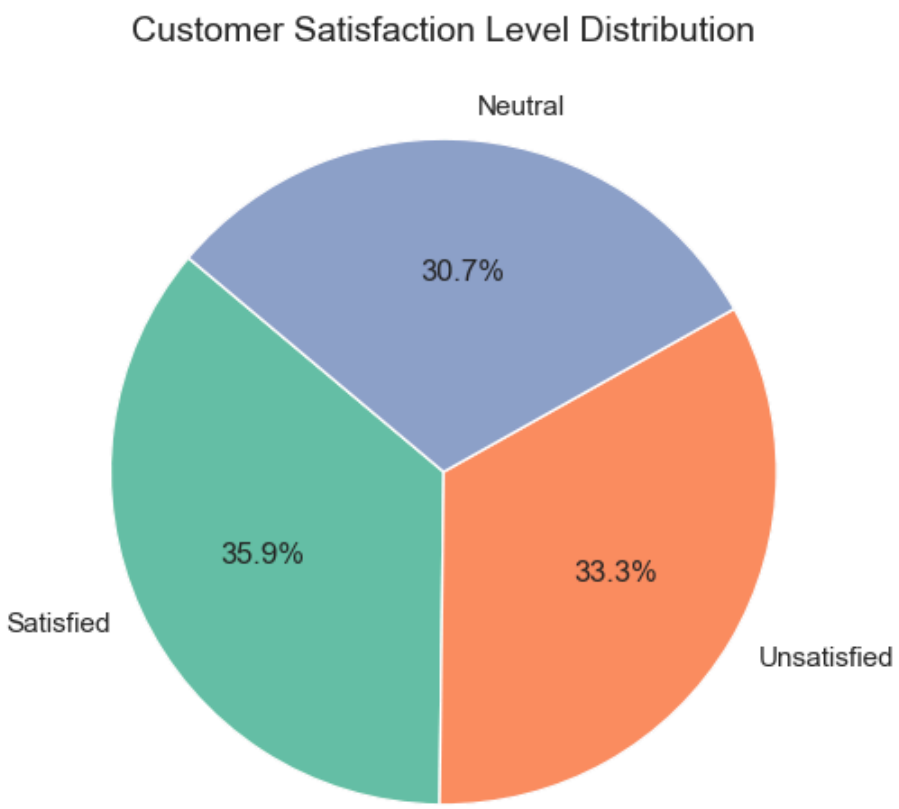
In [186…

```
sns.countplot(data=df,
              x='Satisfaction Level',
              hue='Satisfaction Level',
              palette='Set1',
              legend=True)
plt.title("Satisfaction Level Distribution")
plt.legend(title='Satisfaction Lavel', loc='lower right')
plt.show()
```



In [182…

```
satisfaction_counts = df['Satisfaction Level'].value_counts()

colors = sns.color_palette("Set2")[0:len(satisfaction_counts)]
plt.figure(figsize=(6,6))
plt.pie(satisfaction_counts,
        labels=satisfaction_counts.index,
        autopct='%1.1f%%',
        colors=colors,
        startangle=140)
plt.title("Customer Satisfaction Level Distribution", fontsize=14)
plt.show()
```

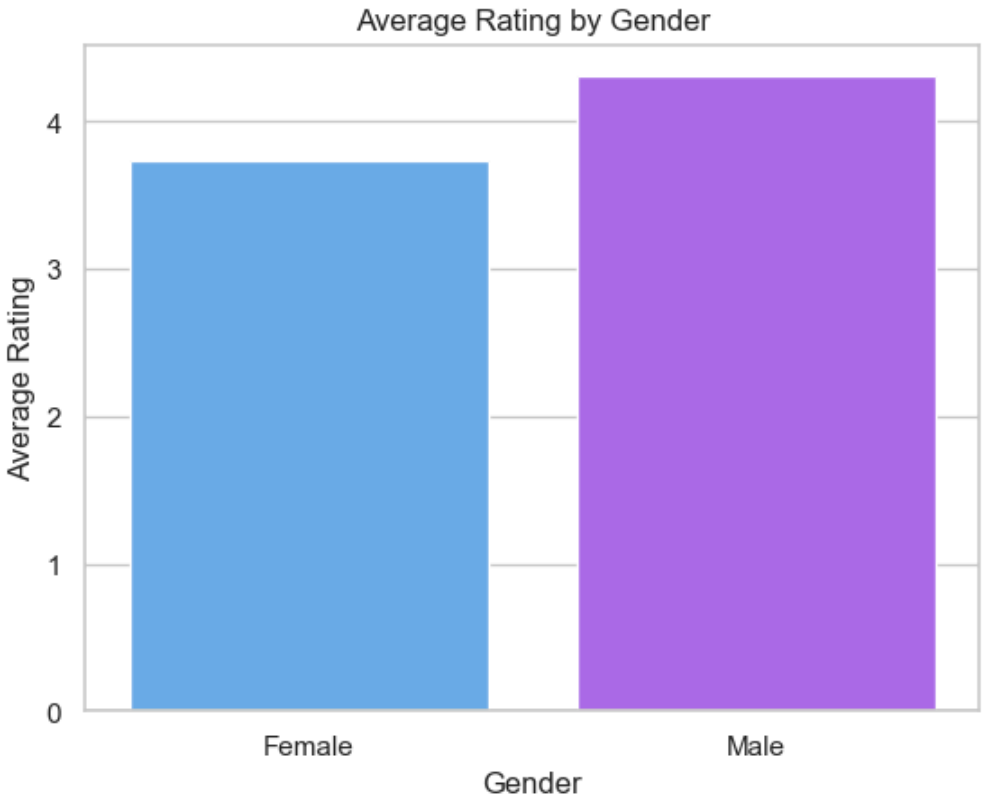


Q6. Average Rating by Gender

In [171…

```
avg_rating = df.groupby('Gender')['Average Rating'].mean().reset_index()
print(round(avg_rating,1))
sns.barplot(data=avg_rating, x='Gender', y='Average Rating', legend=False, hue='Gender', palette='cool')
plt.title("Average Rating by Gender")
plt.show()
```

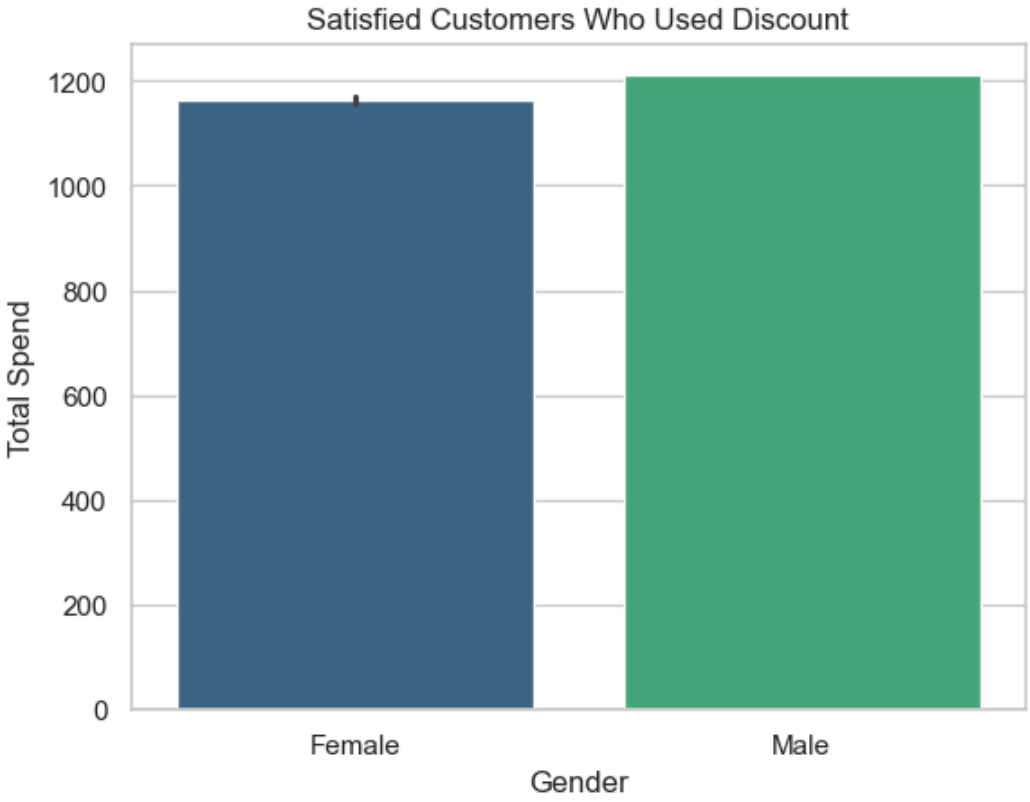
```
   Gender  Average Rating
0  Female             3.7
1    Male             4.3
```



Q7. Customers Who Used Discount and Were Satisfied

In [172…

```
discount_satisfied = df[(df['Discount Applied'] == True) & (df['Satisfaction Level'] == 'Satisfied')]
sns.barplot(data=discount_satisfied, x='Gender',hue='Gender', y='Total Spend', palette='viridis')
plt.title("Satisfied Customers Who Used Discount")
plt.show()
print('first 5 records')
discount_satisfied.head()
```




```
first 5 records
```

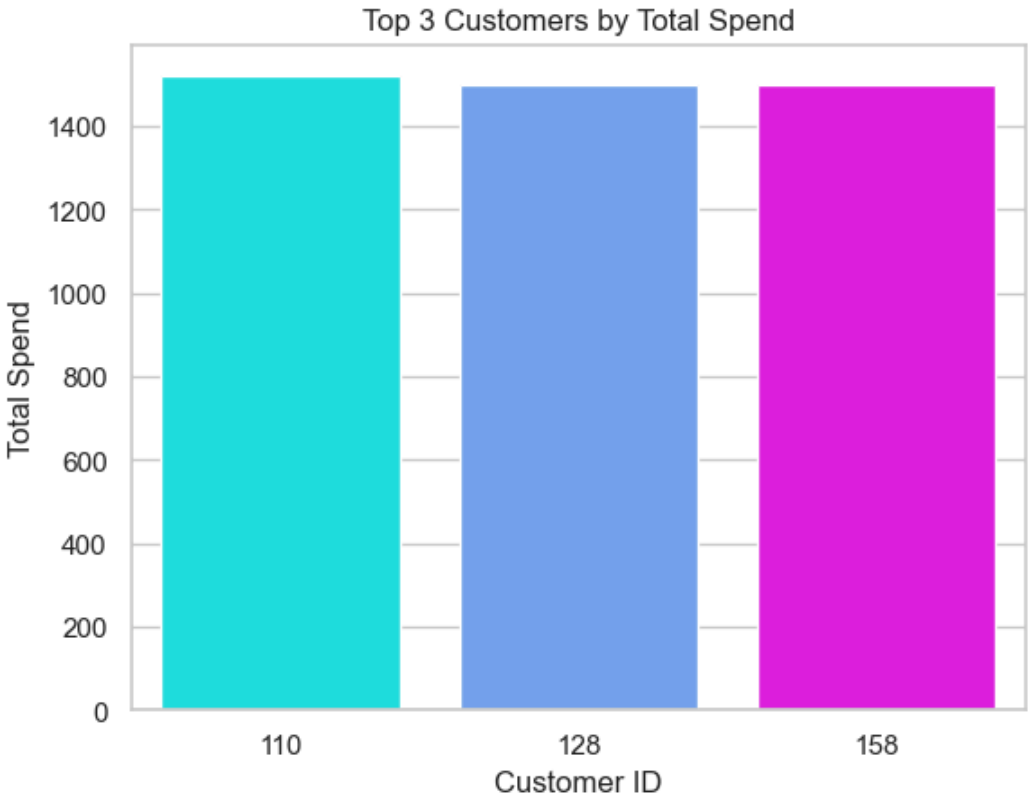
Out[172…

	Customer ID	Gender	Age	City	Membership Type	Total Spend	Items Purchased	Average Rating	Discount Applied	Days Since Last Purchase	Satisfaction Level
0	101	Female	29	New York	Gold	1120.2	14	4.6	True	25	Satisfied
6	107	Female	31	New York	Gold	1150.6	15	4.5	True	28	Satisfied
12	113	Female	30	New York	Gold	1200.8	16	4.3	True	21	Satisfied
18	119	Female	32	New York	Gold	1170.3	14	4.7	True	29	Satisfied
24	125	Female	31	New York	Gold	1140.6	15	4.6	True	27	Satisfied

Q8. Top 3 Customers by Spend

In [173…

```
top3 = df.nlargest(3, 'Total Spend')[['Customer ID', 'City', 'Total Spend']]
sns.barplot(data=top3, x='Customer ID', y='Total Spend', hue='Customer ID', palette='cool', legend=False)
plt.title("Top 3 Customers by Total Spend")
# plt.legend(title="City", loc='lower right')
plt.show()
top3
```



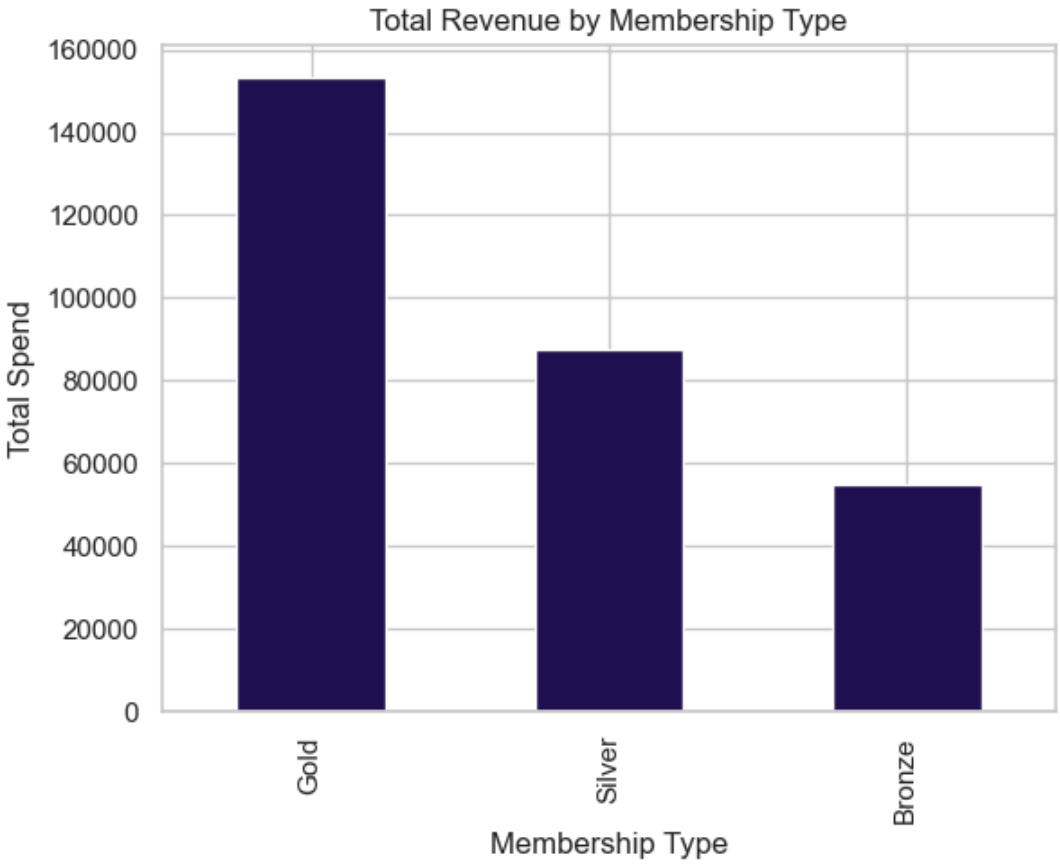
Out[173...

	Customer ID	City	Total Spend
9	110	San Francisco	1520.1
27	128	San Francisco	1500.1
57	158	San Francisco	1500.1

Q9. Revenue by Membership Type

In [174...

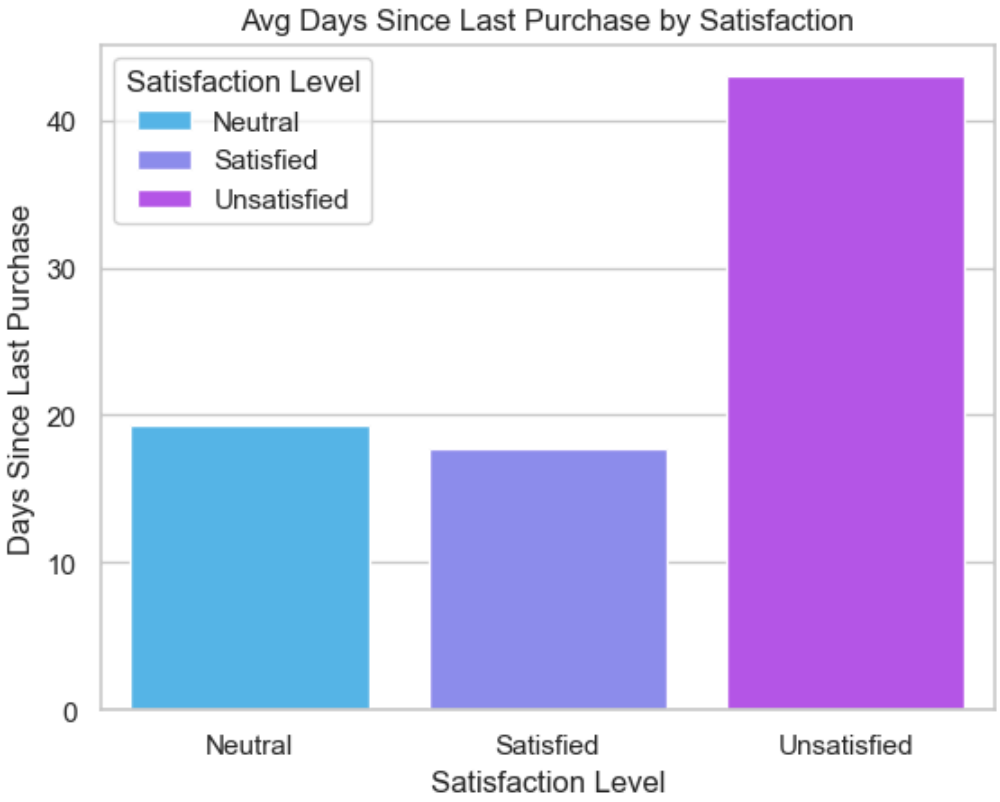
```
membership_revenue = df.groupby('Membership Type')['Total Spend'].sum().sort_values(ascending=False)
membership_revenue.plot(kind='bar')
plt.title("Total Revenue by Membership Type")
plt.ylabel("Total Spend")
plt.show()
membership_revenue
```



Out[174…
```
Membership Type
Gold      153403.9
Silver     87566.6
Bronze     54913.1
Name: Total Spend, dtype: float64
```

Q10. Average Days Since Last Purchase per Satisfaction Level

In [181…
```
days_avg = df.groupby('Satisfaction Level')['Days Since Last Purchase'].mean().reset_index()
sns.barplot(
    data=days_avg,
    x='Satisfaction Level',
    hue='Satisfaction Level',
    legend=True,
    y='Days Since Last Purchase',
    palette='cool')
plt.title("Avg Days Since Last Purchase by Satisfaction")
plt.show()
# days_avg['Last Purchase']= round(days_avg['Last Purchase'],2)
days_avg
```



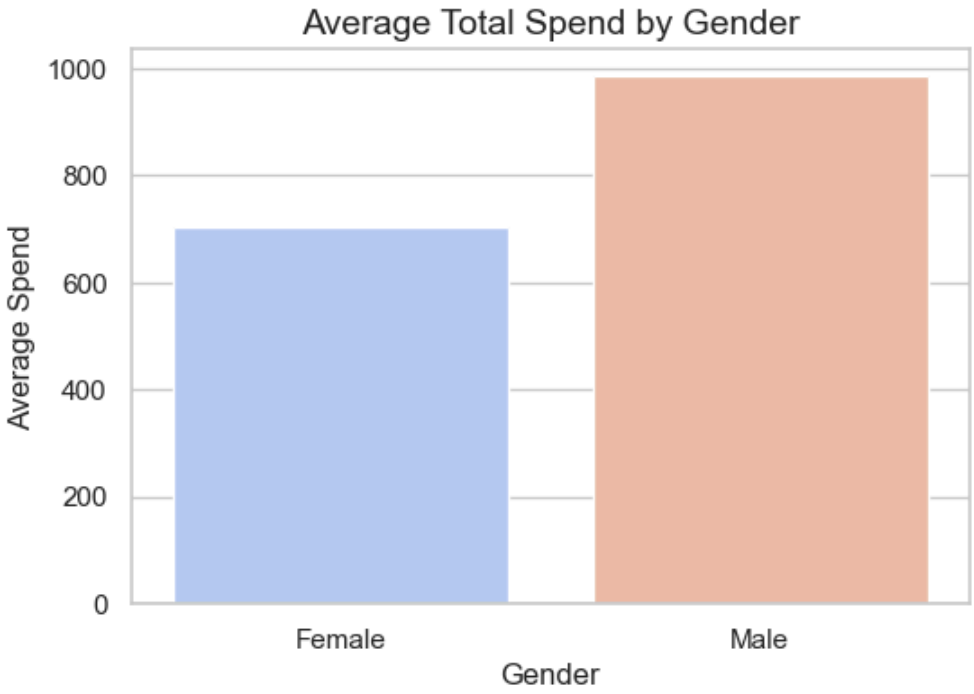
Out[181...

	Satisfaction Level	Days Since Last Purchase
0	Neutral	19.289720
1	Satisfied	17.696000
2	Unsatisfied	42.982759

Q11. Which Gender Spends More on Average?

In [176...

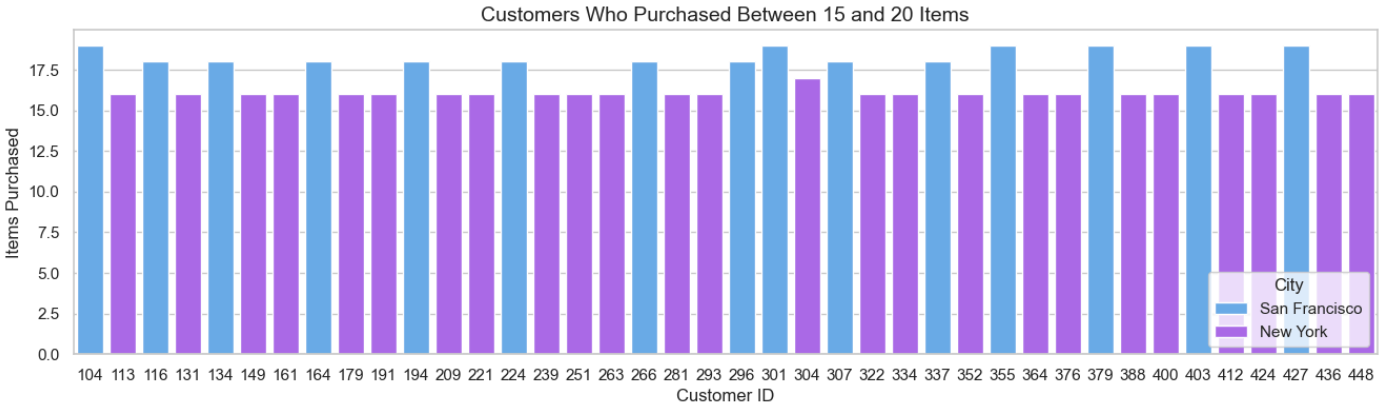
```
avg_spend_by_gender = df.groupby('Gender')['Total Spend'].mean().reset_index()

plt.figure(figsize=(6,4))
sns.barplot(data=avg_spend_by_gender, x='Gender',hue='Gender', y='Total Spend', palette='coolwarm')
plt.title("Average Total Spend by Gender", fontsize=14)
plt.xlabel("Gender")
plt.ylabel("Average Spend")
plt.show()
```



Q12. Find Customers Who Purchased More Than 15 Items & Less Than 20 Items.

In [177…

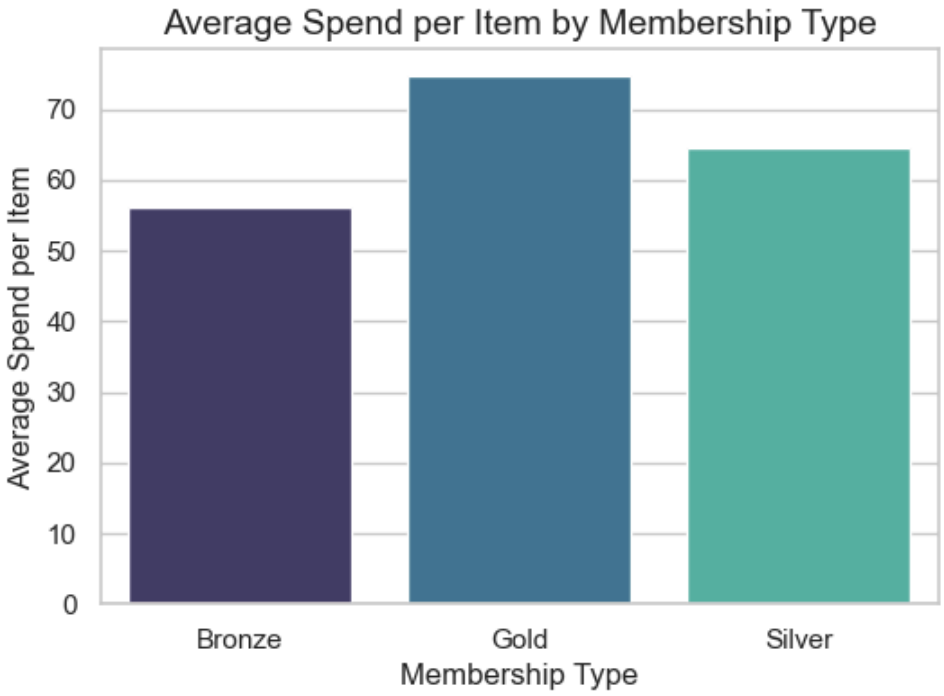
```
filtered_customers = df[(df['Items Purchased'] > 15) & (df['Items Purchased'] < 20)]

# Visualization
plt.figure(figsize=(16,4))
sns.barplot(data=filtered_customers, x='Customer ID', y='Items Purchased', hue='City', palette='cool')
plt.title("Customers Who Purchased Between 15 and 20 Items", fontsize=14)
plt.xlabel("Customer ID")
plt.ylabel("Items Purchased")
# plt.xticks(rotation=10, ha='right')
plt.legend(title= 'City', loc='lower right')
plt.show()
```



Q13. Find Average Spend per Item for Each Membership Type

In [178…

```
df['Spend per Item'] = df['Total Spend'] / df['Items Purchased']
avg_spend_per_item = df.groupby('Membership Type')['Spend per Item'].mean().reset_index()

plt.figure(figsize=(6,4))
sns.barplot(data=avg_spend_per_item,
            x='Membership Type',
            hue='Membership Type',
            y='Spend per Item',
            palette='mako')
plt.title("Average Spend per Item by Membership Type", fontsize=14)
plt.xlabel("Membership Type")
plt.ylabel("Average Spend per Item")
plt.show()
```


Average Spend per Item by Membership Type
Average Spend per Item
0
10
20
30
40
50
60
70
Bronze
Gold
Silver
Membership Type

In [ ]: