🚕 Taxi Tip Comparison

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Context: I'll be looking customer tips from a taxi company. The goal of this project is to determine whether there's a significant difference in average tip amount between yellow and green taxis in NYC.

This analysis uses a 2-sample t-test in Python with SciPy.

=== 1. Import Libraries ===

```
import pandas as pd
import seaborn as sns
from scipy import stats
```

=== 2. Load and Explore the Dataset ===

```
# Load the CSV file into a dataframe.
taxi_samples = pd.read_csv('https://bit.ly/taxi-samples')
```

```
# Calculate the dimensions of the dataset.
# 584 records, 8 columns
taxi_samples.shape
```

```
(584, 8)
```

```
# List the columns in the dataset along with their data types.
# The data found in the "tip" column are float types
taxi_samples.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 584 entries, 0 to 583
Data columns (total 8 columns):
 #   Column      Non-Null Count  Dtype  
---  ------      --------------  -----  
 0   id          584 non-null    int64  
 1   passengers  584 non-null    int64  
 2   color       584 non-null    object 
 3   distance    584 non-null    float64
 4   fare        584 non-null    float64
 5   tip         584 non-null    float64
 6   tolls       584 non-null    float64
 7   total       584 non-null    float64
dtypes: float64(5), int64(2), object(1)
memory usage: 36.6+ KB
```

```
# Preview the first 5 records in the dataset.
taxi_samples.head()
```

	id	passengers	color	distance	fare	tip	tolls	total
0	1	1	green	0.72	5.5	1.11	0.0	7.56
1	2	3	yellow	2.16	10.0	2.88	0.0	15.80
2	3	1	green	0.15	7.0	2.19	0.0	8.40
3	4	3	yellow	7.35	22.5	5.38	0.0	27.30
4	5	1	green	3.44	12.5	3.35	0.0	15.96

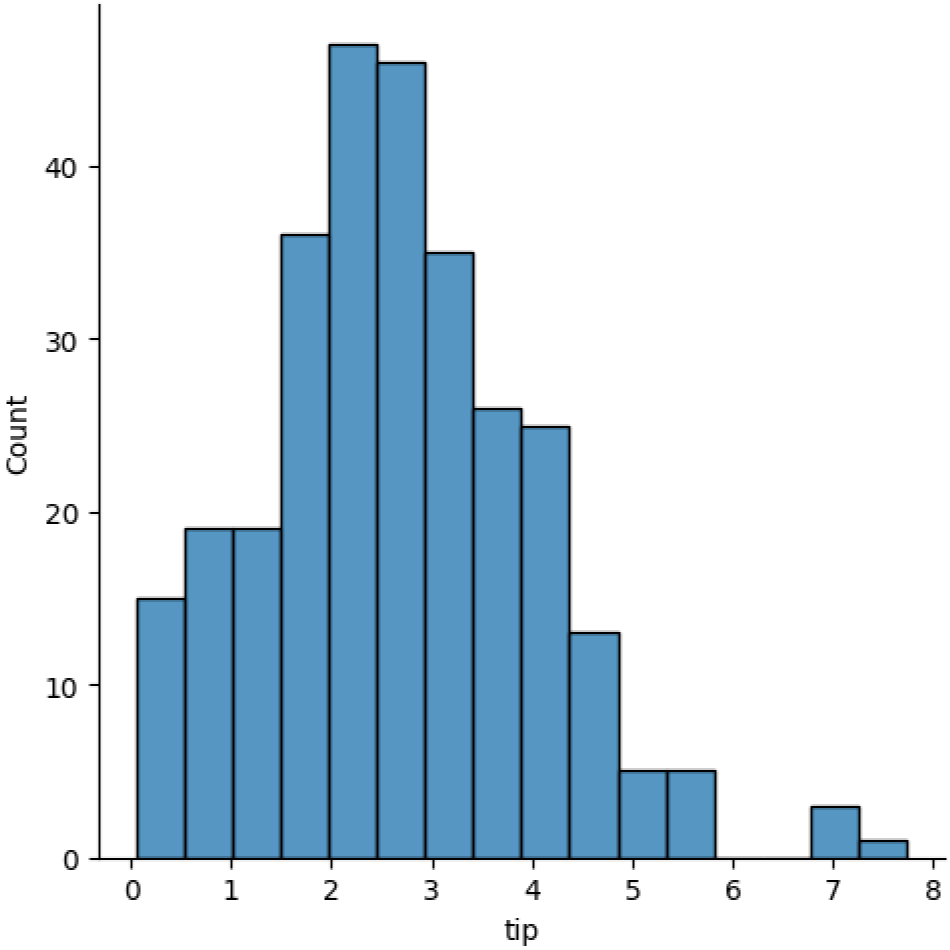
```
# Generating descriptive stats for the numeric columns in the dataset.
# The average tip across the dataset is $2.65
taxi_samples.describe()
```

	id	passengers	distance	fare	tip	tolls	total
count	584.000000	584.000000	584.000000	584.000000	584.000000	584.000000	584.000000
mean	292.500000	1.446918	2.333699	10.687500	2.651558	0.053836	15.912483
std	168.730554	1.126900	2.038913	6.368975	1.364825	0.541843	7.891350
min	1.000000	0.000000	0.000000	3.000000	0.060000	0.000000	4.810000
25%	146.750000	1.000000	1.000000	6.500000	1.697500	0.000000	10.380000
50%	292.500000	1.000000	1.595000	8.500000	2.580000	0.000000	13.555000
75%	438.250000	1.000000	3.012500	13.125000	3.530000	0.000000	19.560000
max	584.000000	6.000000	13.900000	50.000000	7.730000	5.760000	57.800000

=== 3. Segment Data by Cab Color and Visualize ===

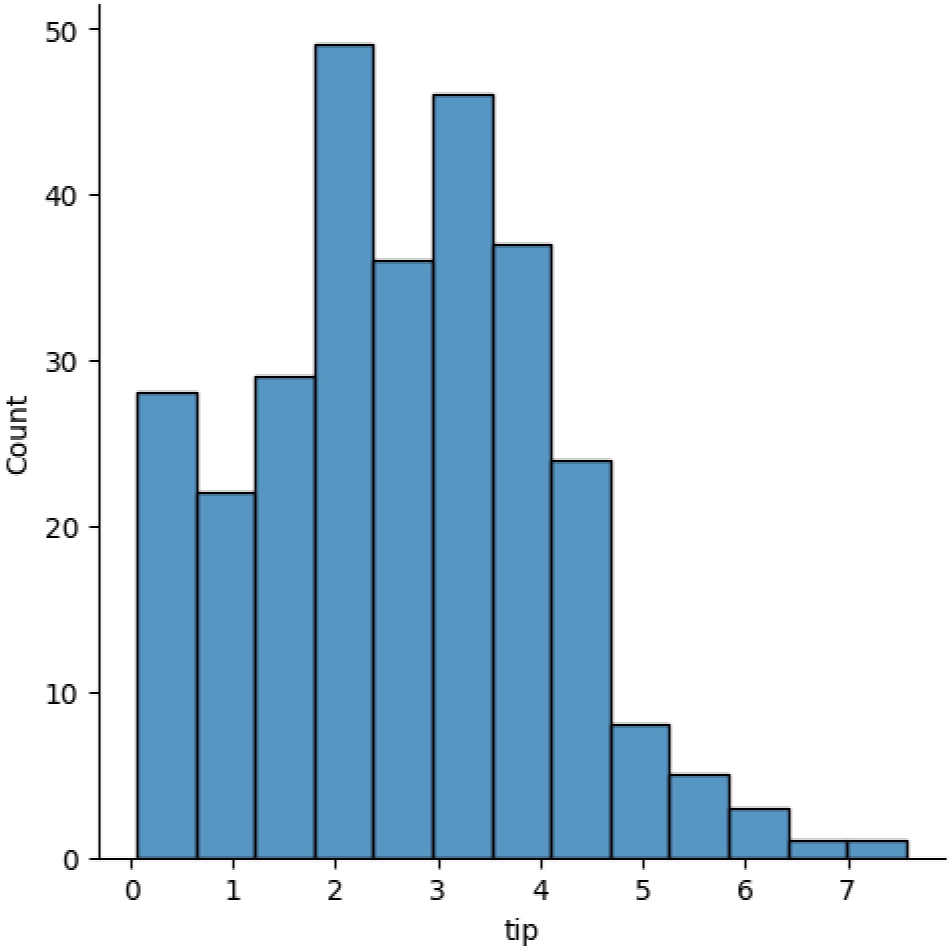
```
# Here I segmented the data, so that I can have two additional dataframes -- one with yellow
# I called them "df_taxi_yellow" and "df_taxi_green".
df_taxi_yellow = taxi_samples[taxi_samples['color'] == 'green']
df_taxi_green = taxi_samples[taxi_samples['color'] == 'yellow']
```

```
# I generated a histogram to visualize the distribution of tips within the yellow cab data.
sns.displot(df_taxi_yellow['tip']);
```



```
# I generated a histogram to visualize the distribution of tips within the green cab data.
sns.displot(df_taxi_green['tip'])
```

```
<seaborn.axisgrid.FacetGrid at 0x7a41c10b43d0>
```



=== 4. Test for Normality ===

```
from os import stat
# Next, I will perform a normality test to see if the data within the "tip" columns for yell
# If the p-values are > 0.05, that means that each dataset is normal
x = df_taxi_yellow['tip']
y = df_taxi_green['tip']


# Perform normaility test
# Based on results from the normality tests (p-values), both of the datasets is "normal enou
print(stats.normaltest(x))
print(stats.normaltest(y))
```

```
NormaltestResult(statistic=18.463276952811235, pvalue=9.789270985641703e-05)
NormaltestResult(statistic=3.64258187700985, pvalue=0.16181672060489052)
```

=== 5. Test for Equal Variance (Bartlett’s Test) ===

```
# Prior to conducting the 2-sample t-test, I performed a Bartlett's test to evaluate the equa
# We can assume NO differences in variance as the p-value (0.379) > 0.05.
stats.bartlett(x, y)
```

```
BartlettResult(statistic=0.7714482981698573, pvalue=0.37976938229166823)
```

=== 6. Conduct 2-Sample T-Test ===

```
# I then conducted a 2-sample t-test to determine if there is a statistically significant dif
stats.ttest_ind(x, y)
```

```
TtestResult(statistic=-0.04542243544132782, pvalue=0.9637861790300399, df=582.0)
```

```
# Based on the results from the t-test, we cannot state there is a difference in average tip
# Since the p-value 0.963 > 0.05, we fail to reject the null hypothesis and assume no differe
```