

# KEY\_Lesson20\_BarCharts\_Histograms

June 4, 2020

## 1 Bar Charts and Histograms

### 1.1 Bar Charts

Bar charts are used to display how a *categorical* variable relates to a *continuous* variable. In bar charts the *categorical* variable is displayed on the x-axis and the *continuous* variable is displayed on the y-axis.

- Categorical variables are variables with different categories or groups.
  - Examples: gender, city
- Continuous variables are numeric variables.
  - Examples: time, height, length

```
[1]: # import seaborn, matplotlib
import seaborn as sns
import matplotlib.pyplot as plt
# set up inline figures
%matplotlib inline
```

We will be using the titanic dataset in this example. Let's load and preview it.

```
[2]: # read in titanic data
titanic = sns.load_dataset("titanic")
# preview data
titanic.head()
```

```
[2]:   survived  pclass    sex  age  sibsp  parch    fare embarked  class \
0         0      3   male  22.0     1     0   7.2500         S   Third
1         1      1  female  38.0     1     0  71.2833         C   First
2         1      3  female  26.0     0     0   7.9250         S   Third
3         1      1  female  35.0     1     0  53.1000         S   First
4         0      3   male  35.0     0     0   8.0500         S   Third

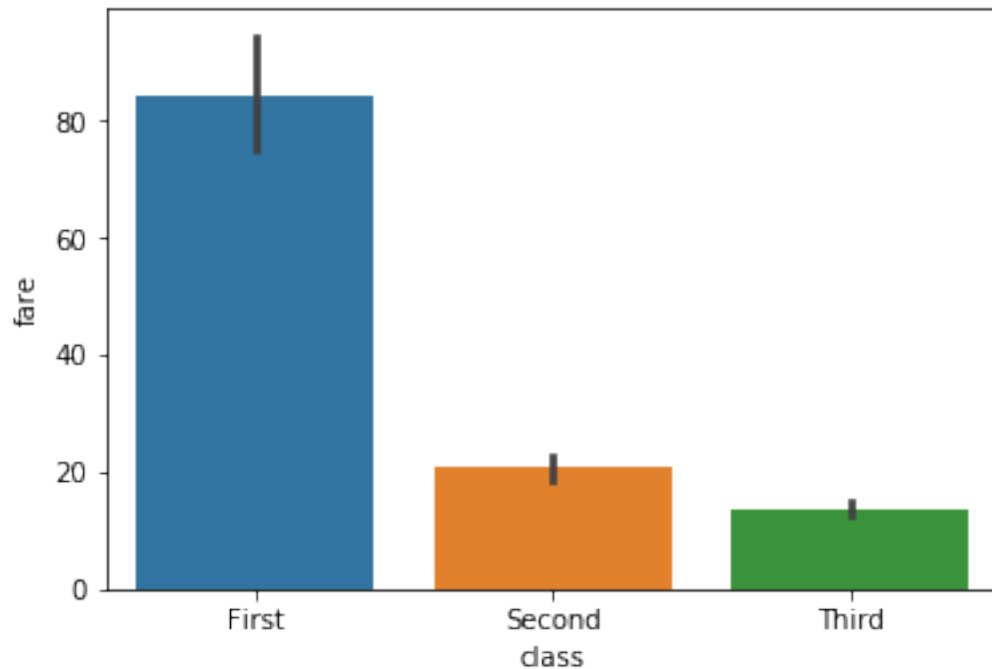
      who  adult_male  deck  embark_town  alive  alone
0    man         True  NaN  Southampton    no  False
1  woman        False   C   Cherbourg   yes  False
2  woman        False  NaN  Southampton   yes   True
3  woman        False   C   Southampton   yes  False
```

```
4    man      True  NaN  Southampton    no    True
```

Let's say we want to compare the mean fare price across the three classes of tickets for all passengers.

```
[3]: # barplot of class vs fare
sns.barplot(x="class", y = 'fare', data=titanic)
```

```
[3]: <matplotlib.axes._subplots.AxesSubplot at 0x115cb1780>
```



Notice how **seaborn** magically computes the mean fares and generates the plot exactly as we want without us even specifying!

What if we wanted to look at the data more granularly and further *stratify* each `class` bar by the `sex` variable? Based on what you know about **seaborn** so far, how do you think we can do that?

```
[4]: # barplot of class vs fare stratified by sex
sns.barplot(x="class", y = 'fare', hue = "sex", data=titanic)
```

```
[4]: <matplotlib.axes._subplots.AxesSubplot at 0x1192bbba8>
```



## 1.2 Histograms

Histograms are used to visualize the *distribution* of a *continuous* variable.

Let's say we wanted to see how the **age** was distributed across all passengers in our dataset. We can use the `distplot` function to generate our histogram.

```
[5]: # histogram of age
sns.distplot(titanic['age'].dropna(), kde=False)
```

```
[5]: <matplotlib.axes._subplots.AxesSubplot at 0x119367198>
```



We can change the number of bins used to plot our histogram to change the *granularity* of our distribution plot.

```
[6]: # histogram of age
sns.distplot(titanic['age'].dropna(), kde=False, bins=10)
```

```
[6]: <matplotlib.axes._subplots.AxesSubplot at 0x119428080>
```



```
[7]: # histogram of age
sns.distplot(titanic['age'].dropna(), kde=False, bins=80)
```

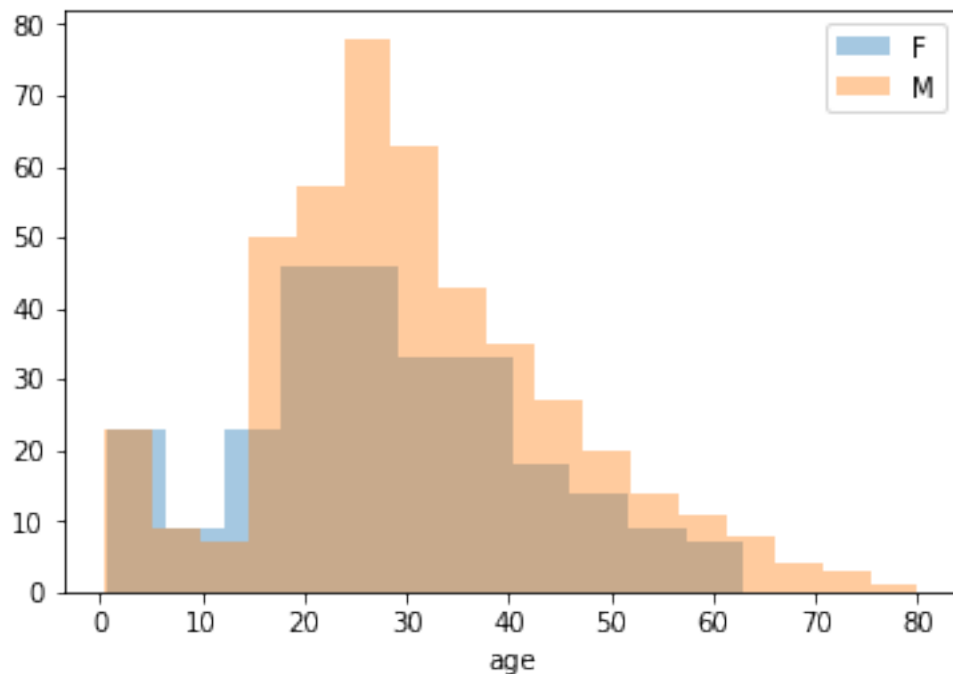
```
[7]: <matplotlib.axes._subplots.AxesSubplot at 0x1194b5518>
```



Unfortunately we can't color our histograms by another variable, but we can compare the distributions of certain variables between *subsets* of our DataFrame by *layering* them.

```
[8]: # histogram of age for females
sns.distplot(titanic.query('sex == "female"')['age'].dropna(), kde=False,
             label="F")
sns.distplot(titanic.query('sex == "male"')['age'].dropna(), kde=False,
             label="M")
plt.legend()
```

```
[8]: <matplotlib.legend.Legend at 0x119436978>
```



### 1.3 Count Plots

Count plots can be thought of as histograms for categorical variables.

Let's say we wanted to visualize how many passengers there were in each class.

```
[9]: # count plot of class
sns.countplot(x="class", data=titanic)
```

```
[9]: <matplotlib.axes._subplots.AxesSubplot at 0x119585828>
```



Now, let's stratify each class by the **sex** variable using color. By now you're an expert in this!

```
[10]: # stratify class by sex variable  
sns.countplot(x="class", hue = "sex", data=titanic)
```

```
[10]: <matplotlib.axes._subplots.AxesSubplot at 0x1198e82e8>
```

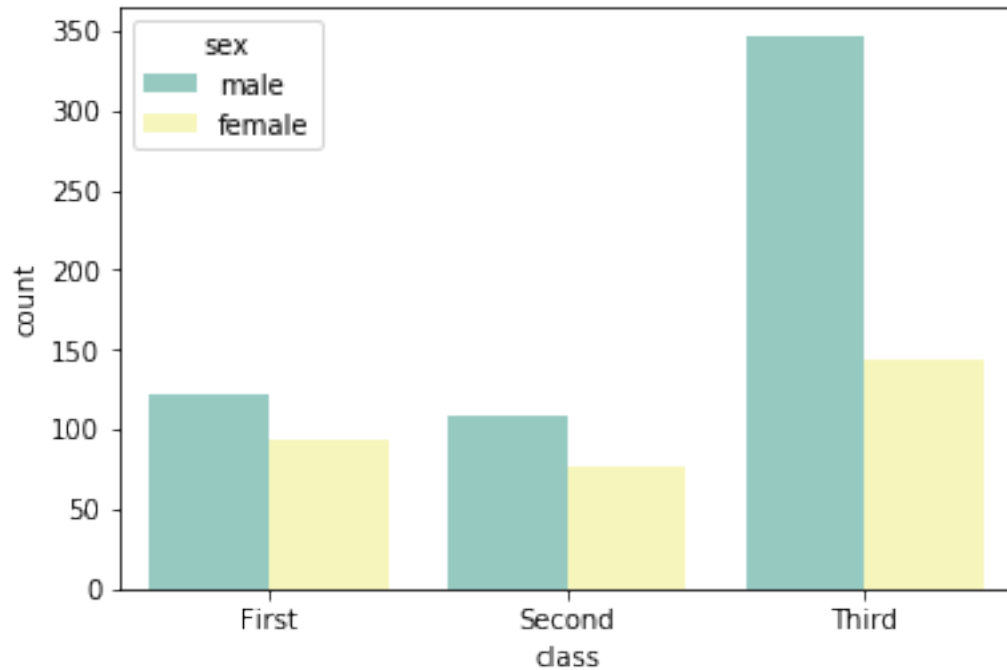


As always we can change the color palette:

```
[11]: # change color palette
sns.countplot(x="class", hue = "sex", palette = "Set3", data=titanic)
```

```
[11]: <matplotlib.axes._subplots.AxesSubplot at 0x1199a0e80>
```





In this lesson you learned: \* How to create barplots in seaborn \* How to stratify barplots by another variable using color (**hue**) \* How to create histograms in seaborn \* Changing the granularity of the histograms (**bins**) \* How to create count plots in seaborn \* How to stratify count plots by another variable using color (**hue**)