Introduction to Seaborn

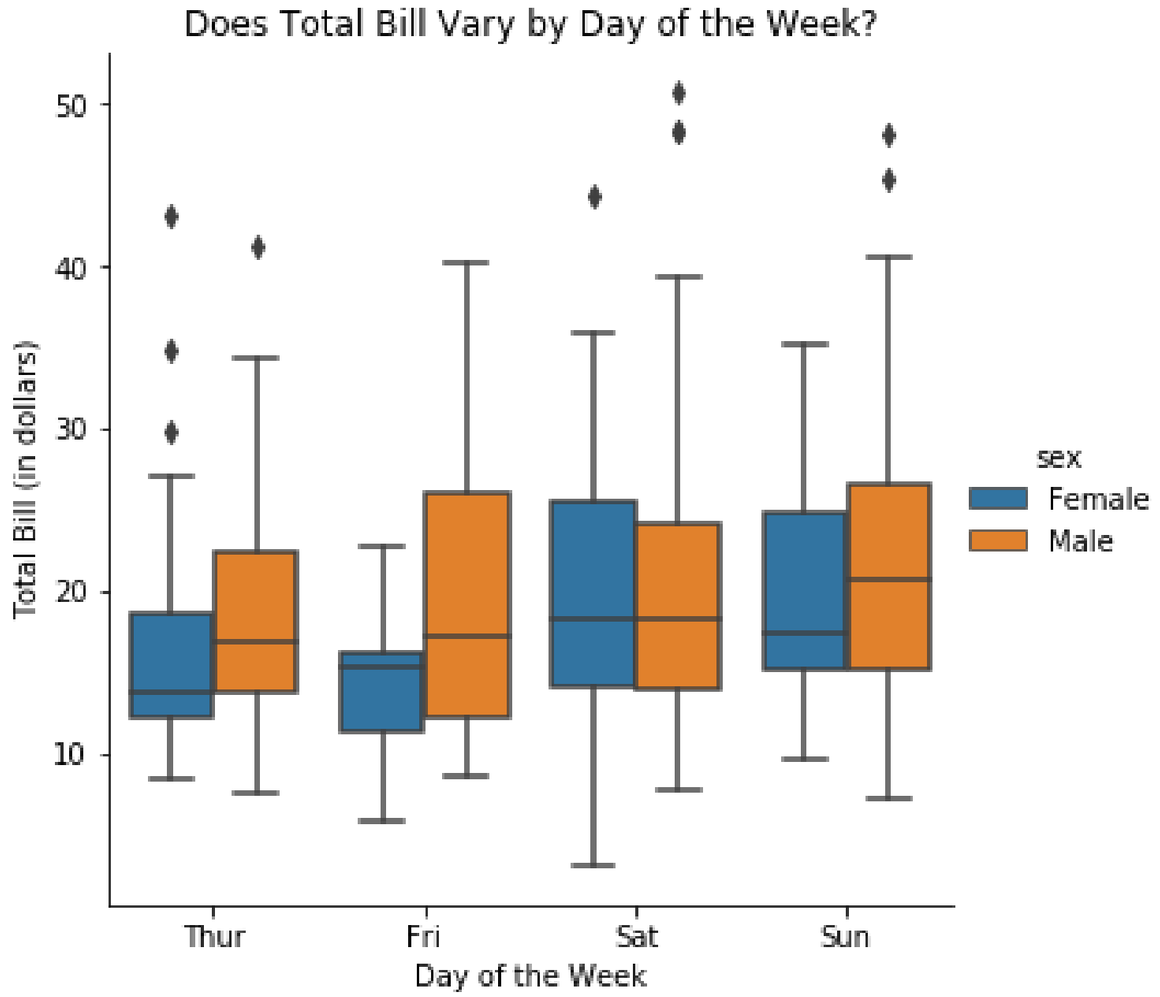
INTRODUCTION TO DATA VISUALIZATION WITH SEABORN

Erin Case
Data Scientist

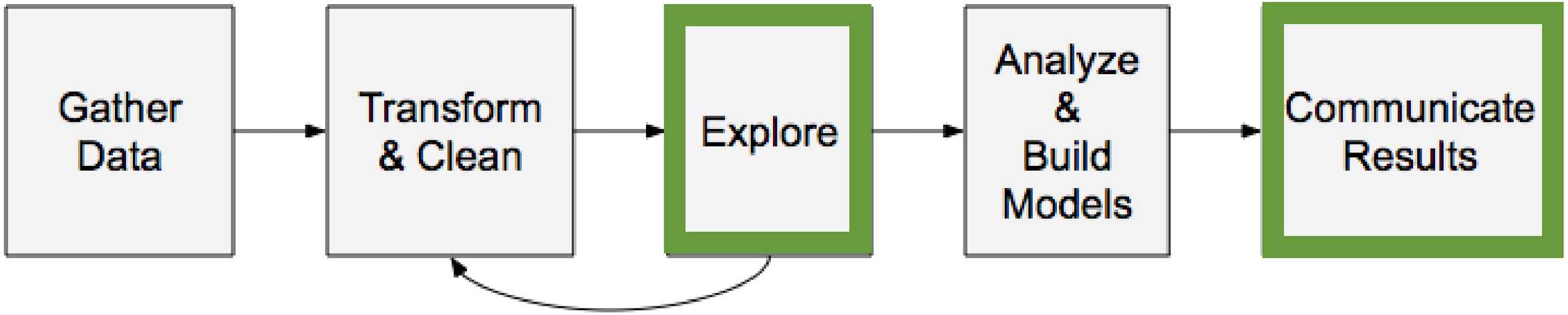
datacamp

What is Seaborn?

- Python data visualization library
- Easily create the most common types of plots



Why is Seaborn useful?



Advantages of Seaborn

- Easy to use
- Works well with `pandas` data structures
- Built on top of `matplotlib`

Getting started

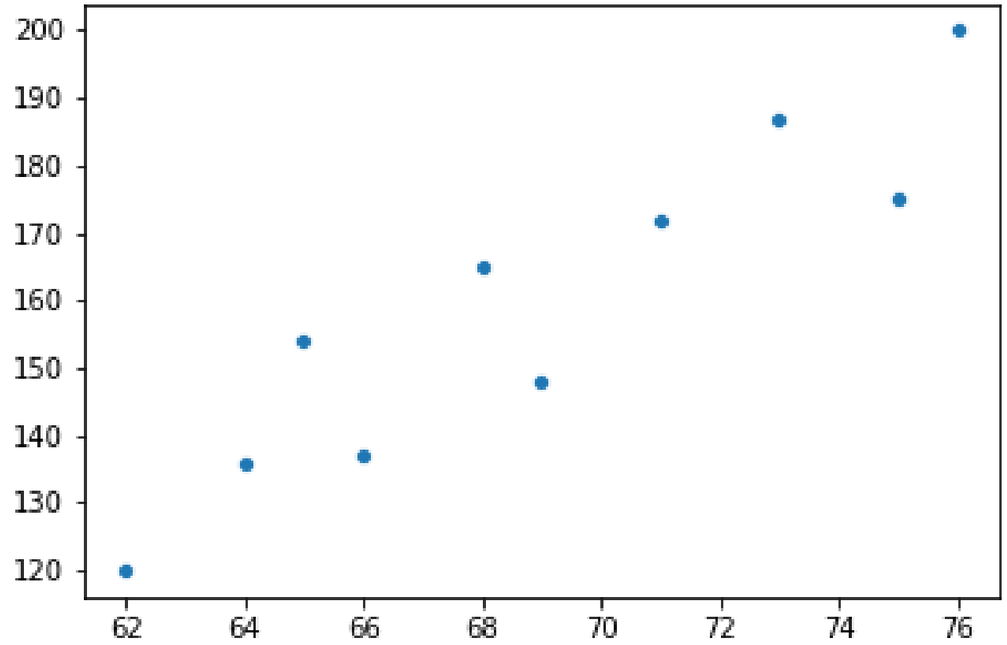
```
import seaborn as sns
import matplotlib.pyplot as plt
```

Samuel **N**orman **S**eaborn (`sns`)

- "The West Wing" television show

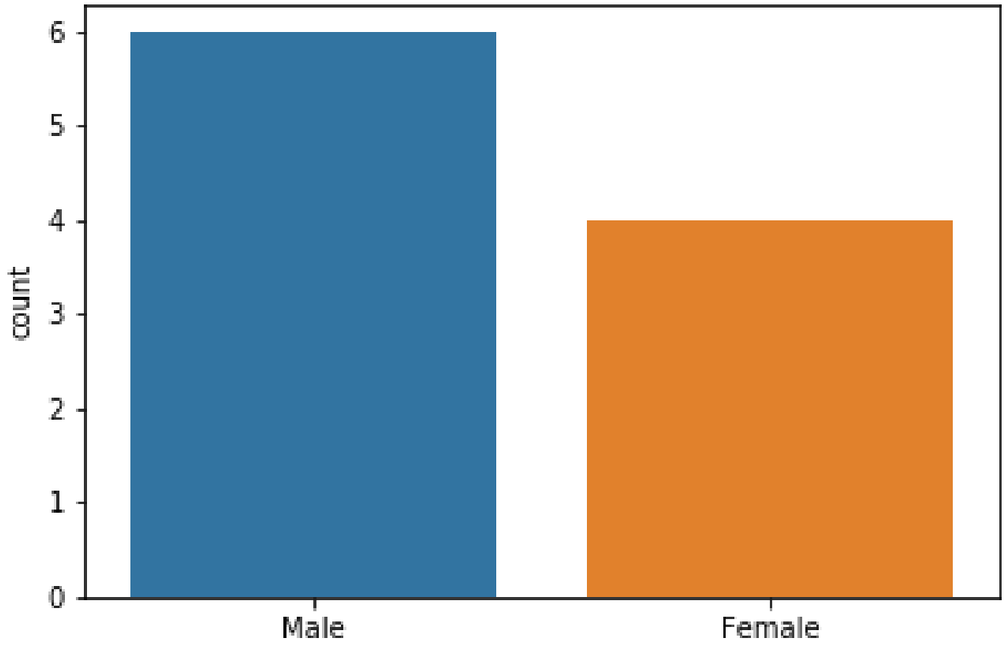
Example 1: Scatter plot

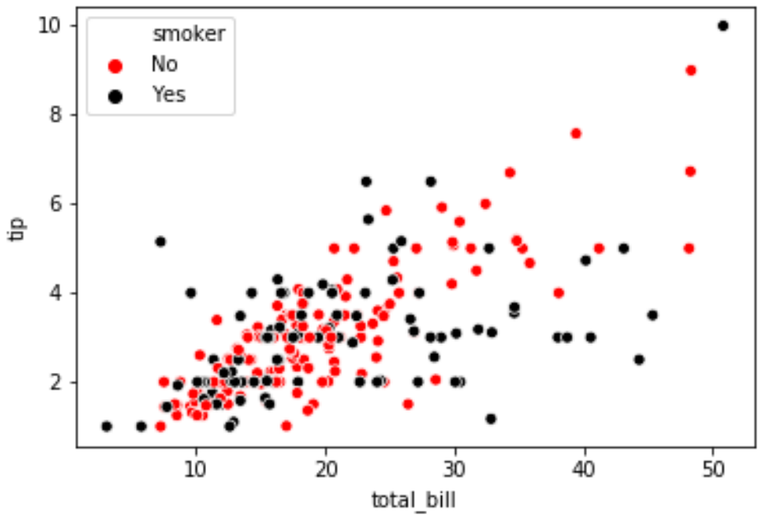
```
import seaborn as sns
import matplotlib.pyplot as plt
height = [62, 64, 69, 75, 66,
          68, 65, 71, 76, 73]
weight = [120, 136, 148, 175, 137,
          165, 154, 172, 200, 187]
sns.scatterplot(x=height, y=weight)
plt.show()
```

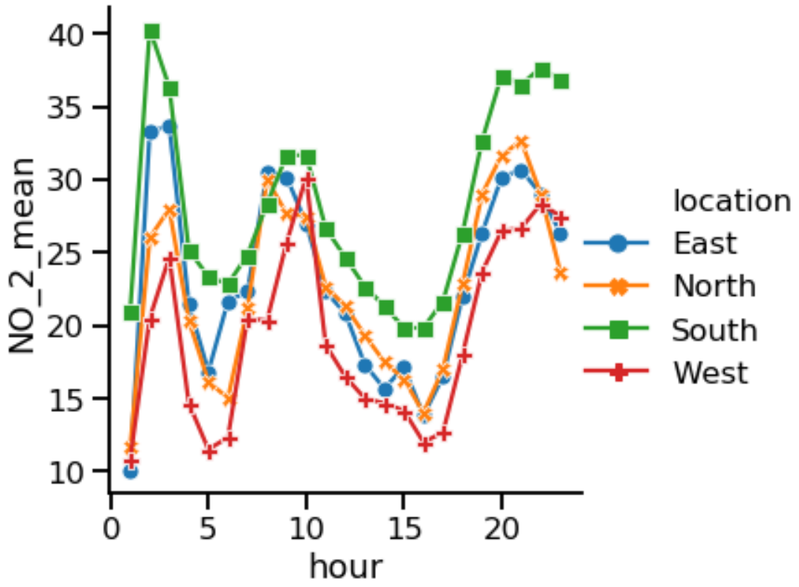


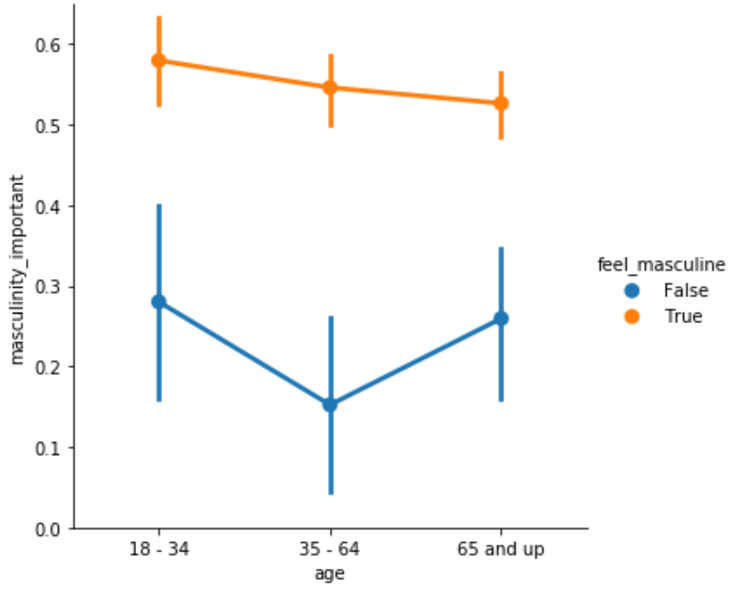
Example 2: Create a count plot

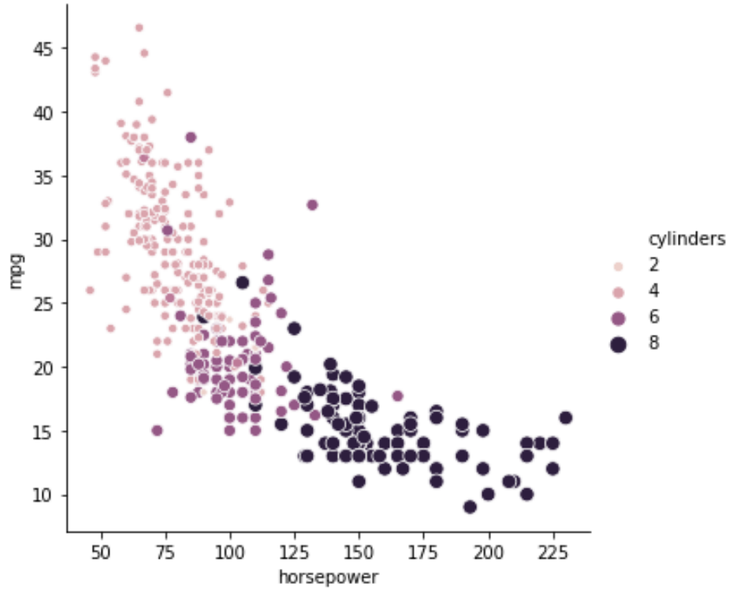
```
import seaborn as sns
import matplotlib.pyplot as plt
gender = ["Female", "Female",
          "Female", "Female",
          "Male", "Male", "Male",
          "Male", "Male", "Male"]
sns.countplot(x=gender)
plt.show()
```




smoker
No
Yes
tip
total_bill


NO_2_mean
hour
location
East
North
South
West


masculinity_important
age
18 - 34
35 - 64
65 and up
feel_masculine
False
True


mpg
horsepower
cylinders
2
4
6
8

Let's practice!

INTRODUCTION TO DATA VISUALIZATION WITH SEABORN

Using pandas with Seaborn

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What is pandas?

- Python library for data analysis
- Easily read datasets from csv, txt, and other types of files
- Datasets take the form of `DataFrame` objects

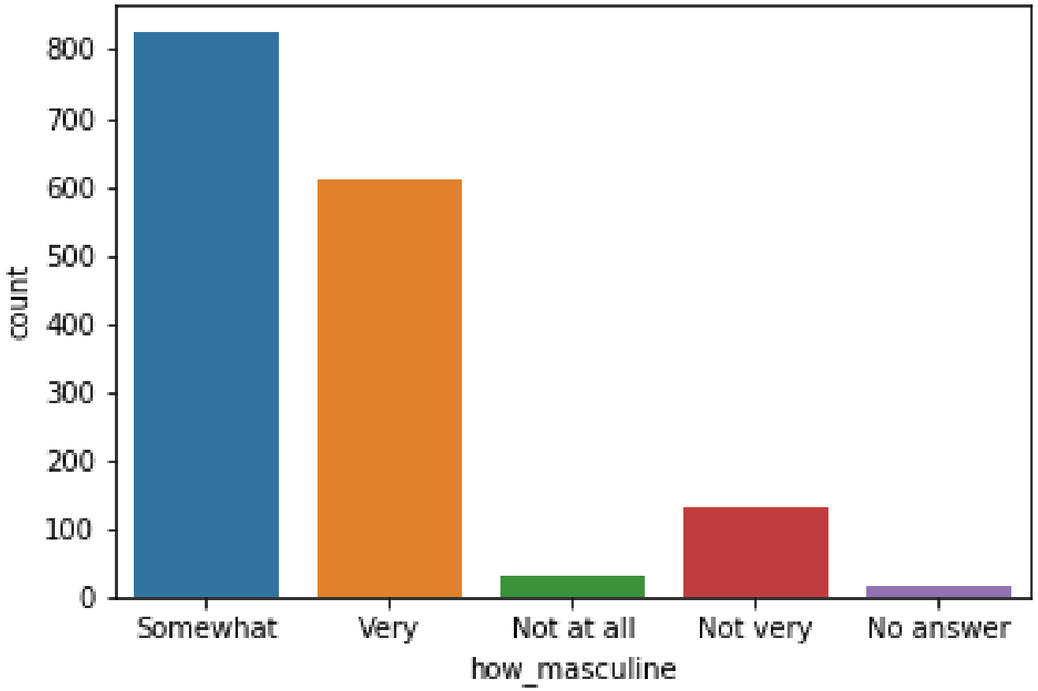
Working with DataFrames

```
import pandas as pd
df = pd.read_csv("masculinity.csv")
df.head()
```

```
   participant_id       age   how_masculine   how_important
0               1  18 - 34        Somewhat        Somewhat
1               2  18 - 34        Somewhat        Somewhat
2               3  18 - 34            Very        Not very
3               4  18 - 34            Very        Not very
4               5  18 - 34            Very            Very
```

Using DataFrames with countplot()

```
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
df = pd.read_csv("masculinity.csv")
sns.countplot(x="how_masculine",
              data=df)
plt.show()
```



	participant_id	age	how_masculine	how_important
0	1	18 - 34	Somewhat	Somewhat
1	2	18 - 34	Somewhat	Somewhat
2	3	18 - 34	Very	Not very
3	4	18 - 34	Very	Not very
4	5	18 - 34	Very	Very
5	6	18 - 34	Very	Somewhat
6	7	18 - 34	Somewhat	Not very
7	8	18 - 34	Somewhat	Somewhat
8	9	18 - 34	Very	Not at all
9	10	18 - 34	Somewhat	Somewhat

	AMONG ADULT MEN	Unnamed: 1	Adult Men	Age	Unnamed: 4	Unnamed: 5
0				18 - 34	35 - 64	65 and up
1	In general, how masculine or "manly" do you feel?					
2		Very masculine	37%	29%	42%	37%
3		Somewhat masculine	46%	47%	46%	47%
4		Not very masculine	11%	13%	9%	13%
5		Not at all masculine	5%	10%	2%	3%
6		No answer	1%	0%	1%	1%
7	How important is it to you that others see you as masculine?					
8		Very important	16%	18%	17%	13%
9		Somewhat important	37%	38%	37%	32%
10		Not too important	28%	18%	31%	37%
11		Not at all important	18%	26%	15%	18%
12		No answer	0%	0%	1%	0%

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Adding a third variable with hue

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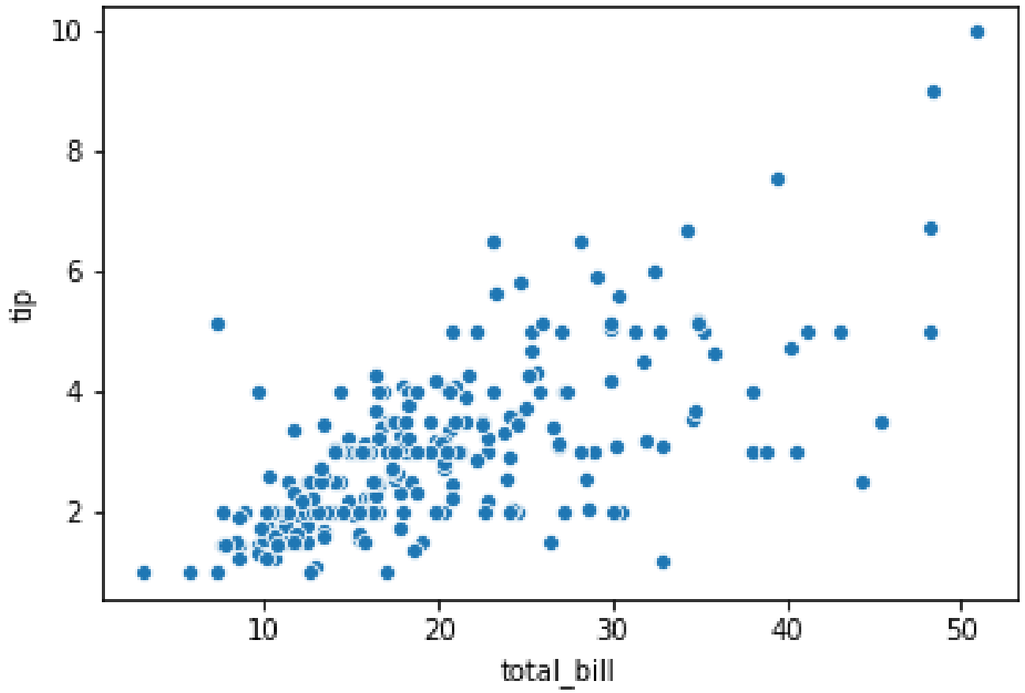
Tips dataset

```
import pandas as pd
import seaborn as sns
tips = sns.load_dataset("tips")
tips.head()
```

```
   total_bill   tip      sex smoker  day    time  size
0       16.99  1.01   Female     No  Sun  Dinner     2
1       10.34  1.66     Male     No  Sun  Dinner     3
2       21.01  3.50     Male     No  Sun  Dinner     3
3       23.68  3.31     Male     No  Sun  Dinner     2
4       24.59  3.61   Female     No  Sun  Dinner     4
```

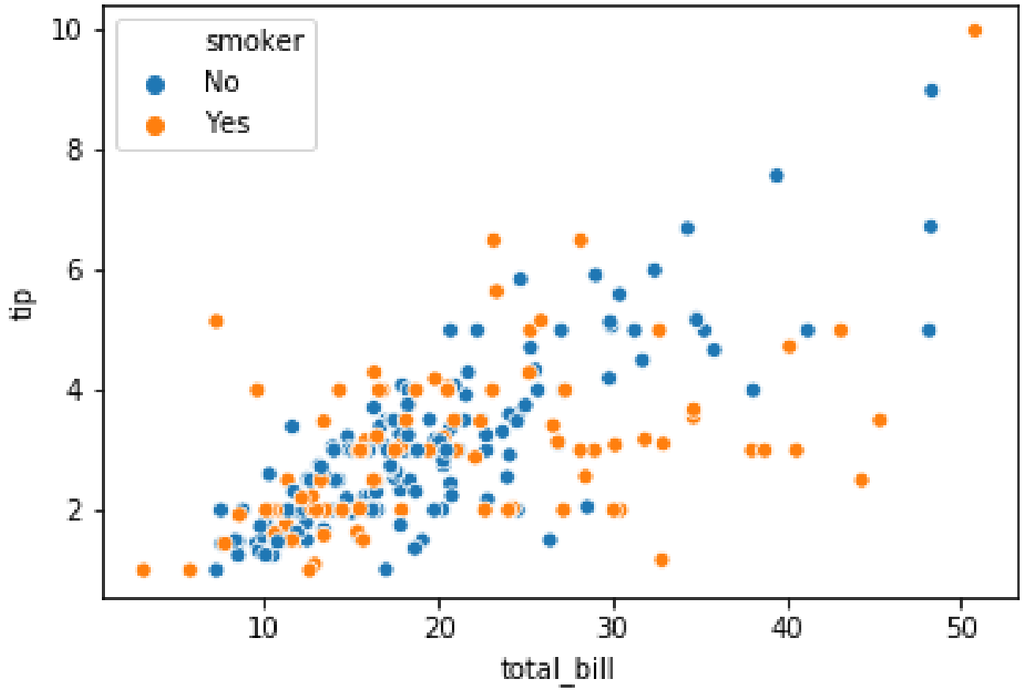
A basic scatter plot

```
import matplotlib.pyplot as plt
import seaborn as sns

sns.scatterplot(x="total_bill",
                y="tip",
                data=tips)

plt.show()
```



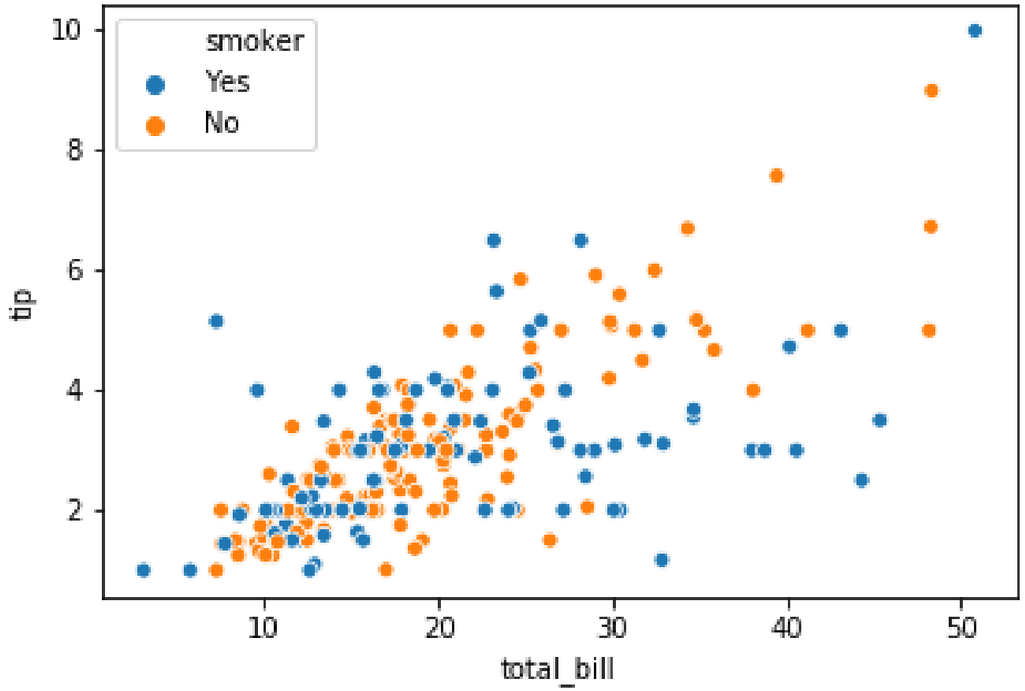
A scatter plot with hue

```
import matplotlib.pyplot as plt
import seaborn as sns

sns.scatterplot(x="total_bill",
                y="tip",
                data=tips,
                hue="smoker")
plt.show()
```



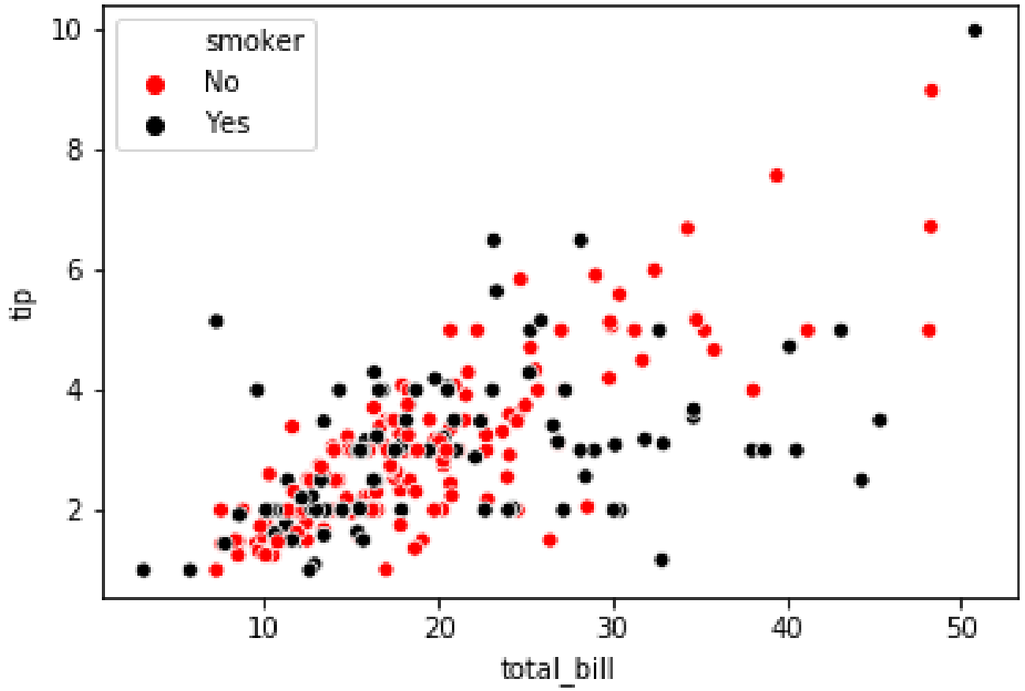
Setting hue order

```
import matplotlib.pyplot as plt
import seaborn as sns

sns.scatterplot(x="total_bill",
                y="tip",
                data=tips,
                hue="smoker",
                hue_order=["Yes",
                           "No"])
plt.show()
```



Specifying hue colors

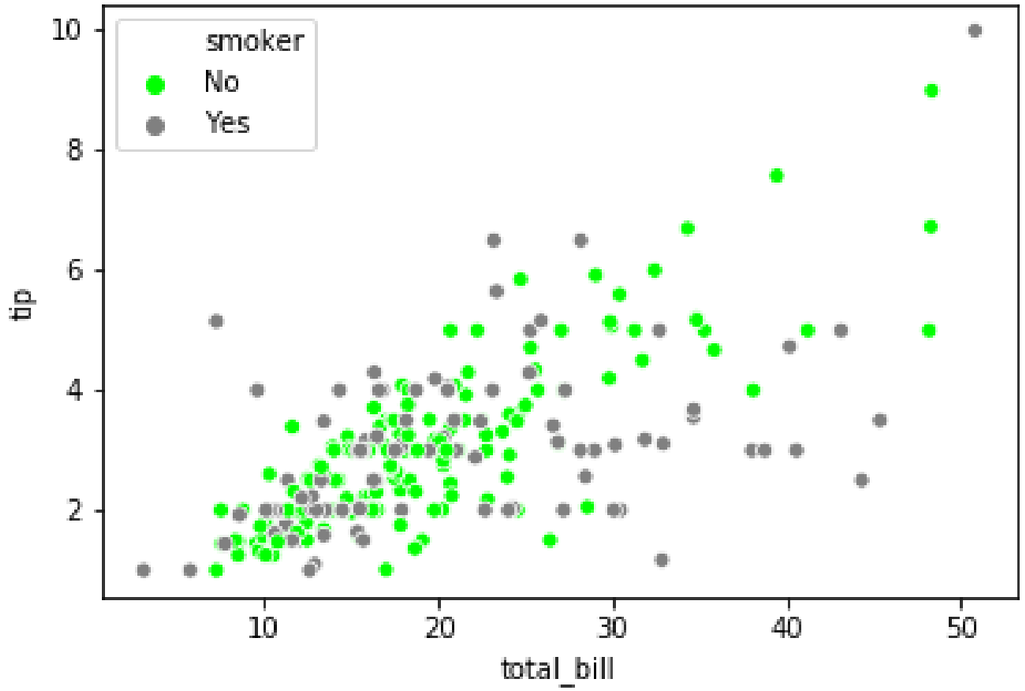
```
import matplotlib.pyplot as plt
import seaborn as sns
hue_colors = {"Yes": "black",
              "No": "red"}
sns.scatterplot(x="total_bill",
                y="tip",
                data=tips,
                hue="smoker",
                palette=hue_colors)

plt.show()
```



	Color	Matplotlib name	Matplotlib abbreviation	HTML color code (hex)
	blue	"blue"	"b"	#0000ff
	green	"green"	"g"	#008000
	red	"red"	"r"	#ff0000
	green/blue	"cyan"	"c"	#00bfbf
	purple	"magenta"	"m"	#bf00bf
	yellow	"yellow"	"y"	#bfbf00
	black	"black"	"k"	#000000
	white	"white"	"w"	#ffffff

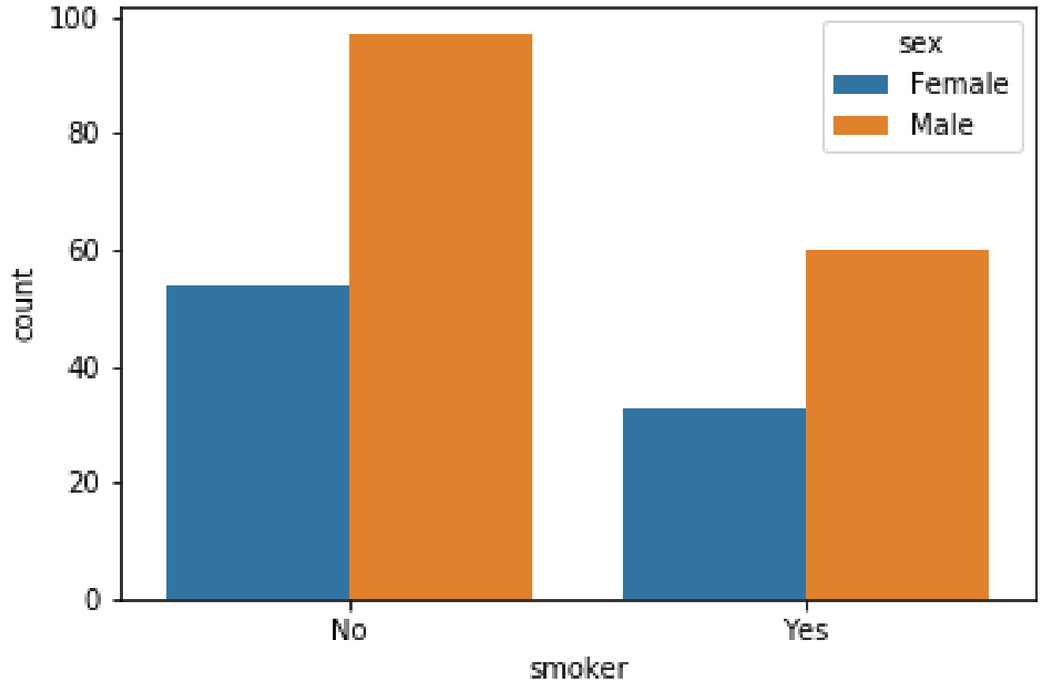
Using HTML hex color codes with hue

```
import matplotlib.pyplot as plt
import seaborn as sns

hue_colors = {"Yes": "#808080",
              "No": "#00FF00"}

sns.scatterplot(x="total_bill",
                y="tip",
                data=tips,
                hue="smoker",
                palette=hue_colors)
plt.show()
```



Using hue with count plots

```
import matplotlib.pyplot as plt
import seaborn as sns

sns.countplot(x="smoker",
              data=tips,
              hue="sex")
plt.show()
```



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INTRODUCTION TO DATA VISUALIZATION WITH SEABORN

Introduction to relational plots and subplots

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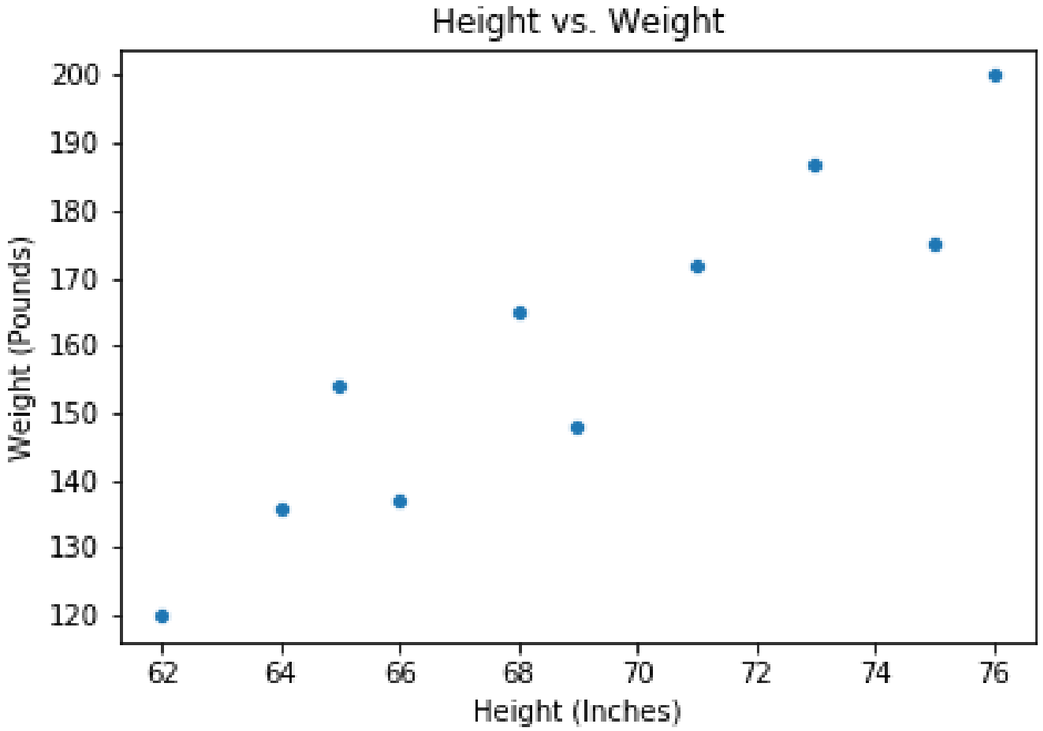
Questions about quantitative variables

Relational plots

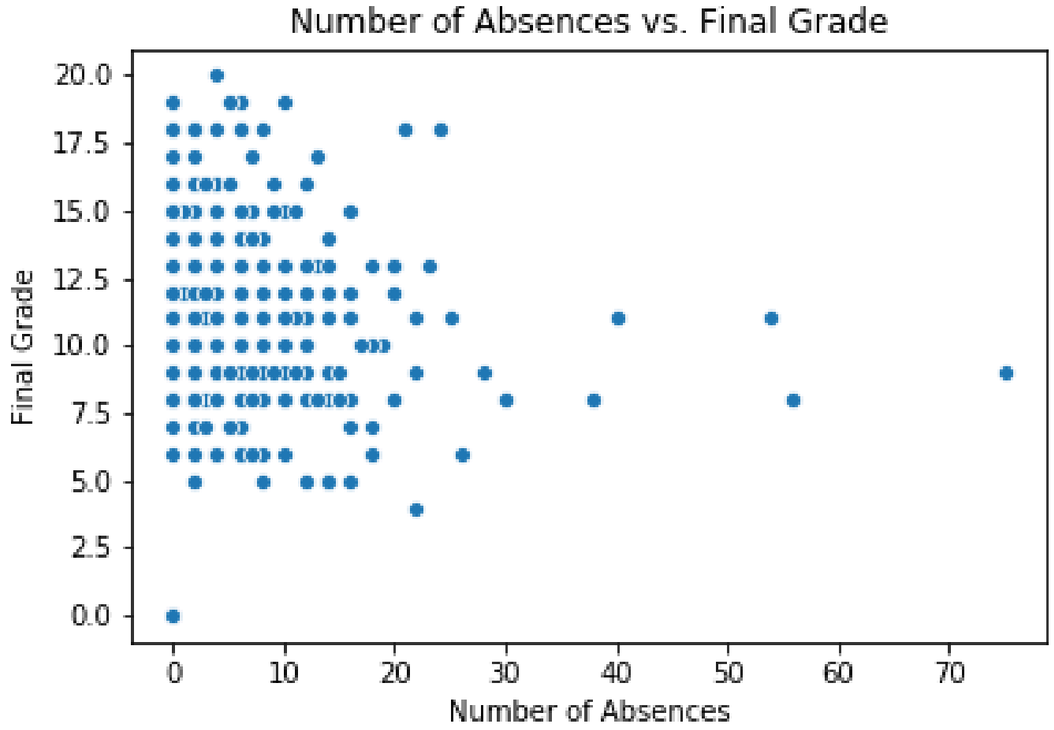
- Height vs. weight



Questions about quantitative variables

Relational plots

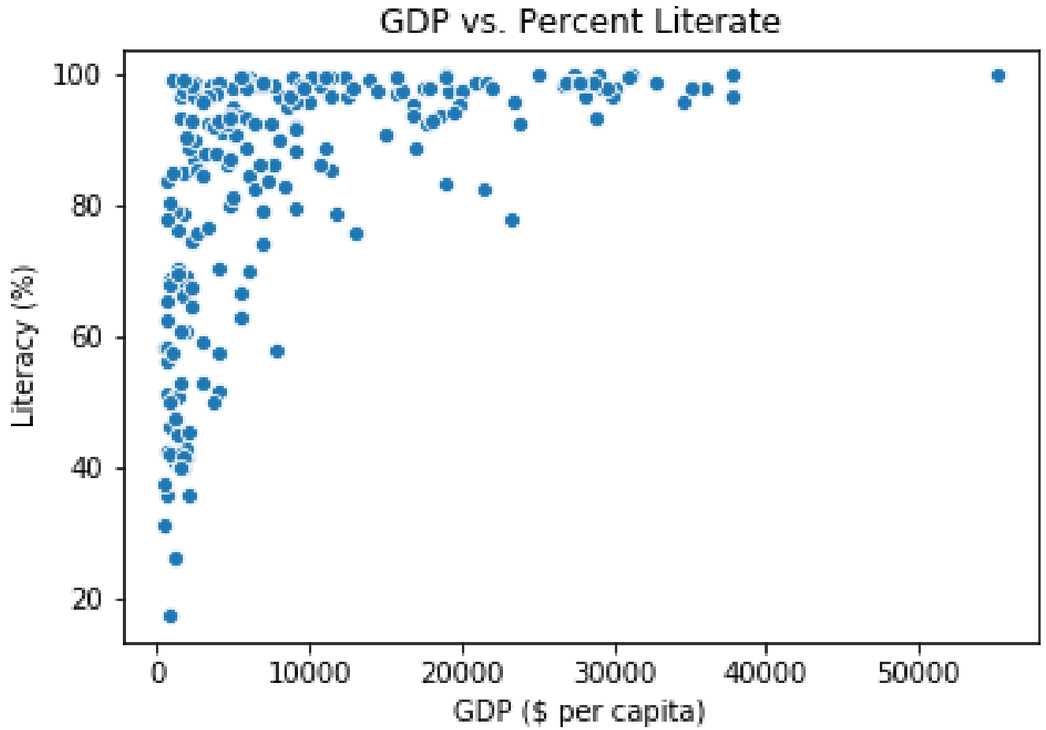
- Height vs. weight
- Number of school absences vs. final grade

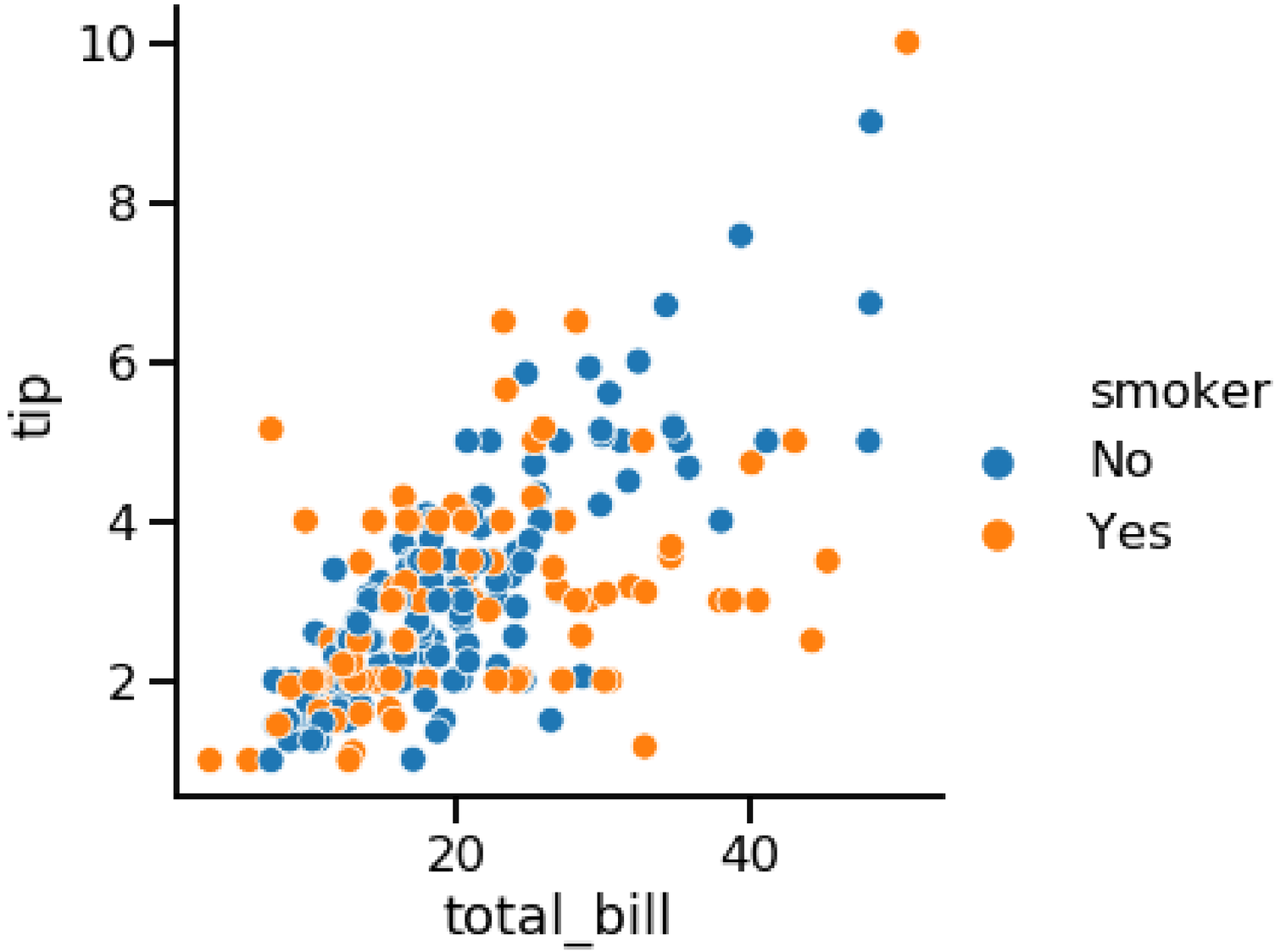


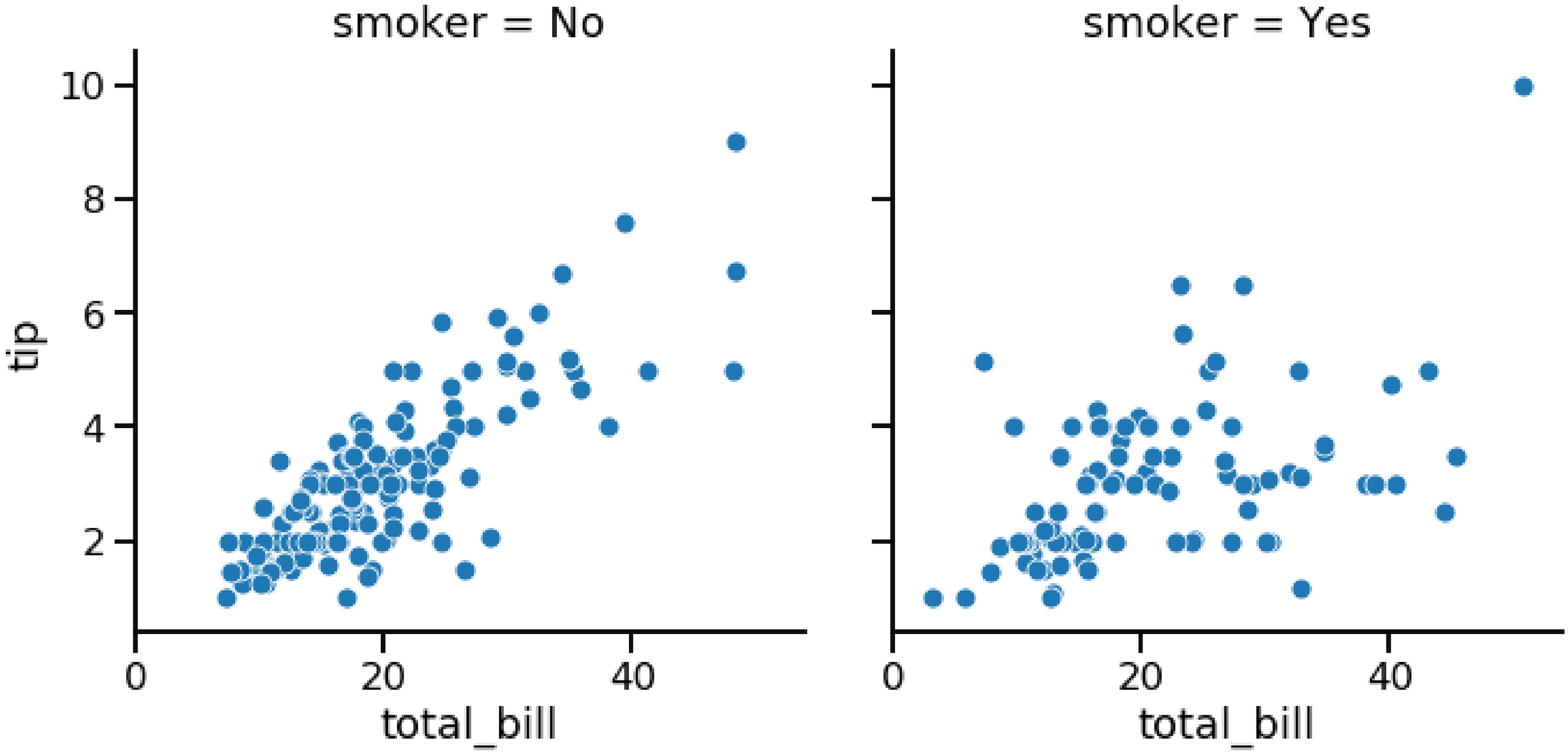
Questions about quantitative variables

Relational plots

- Height vs. weight
- Number of school absences vs. final grade
- GDP vs. percent literate




10
8
6
4
2
tip
20
40
total_bill
smoker
No
Yes


smoker = No
smoker = Yes
tip
10
8
6
4
2
0
20
40
total_bill
0
20
40
total_bill

Introducing relplot()

- Create "relational plots": scatter plots or line plots

Why use `relplot()` instead of `scatterplot()`?

- `relplot()` lets you create subplots in a single figure

scatterplot() vs. relplot()

Using `scatterplot()`

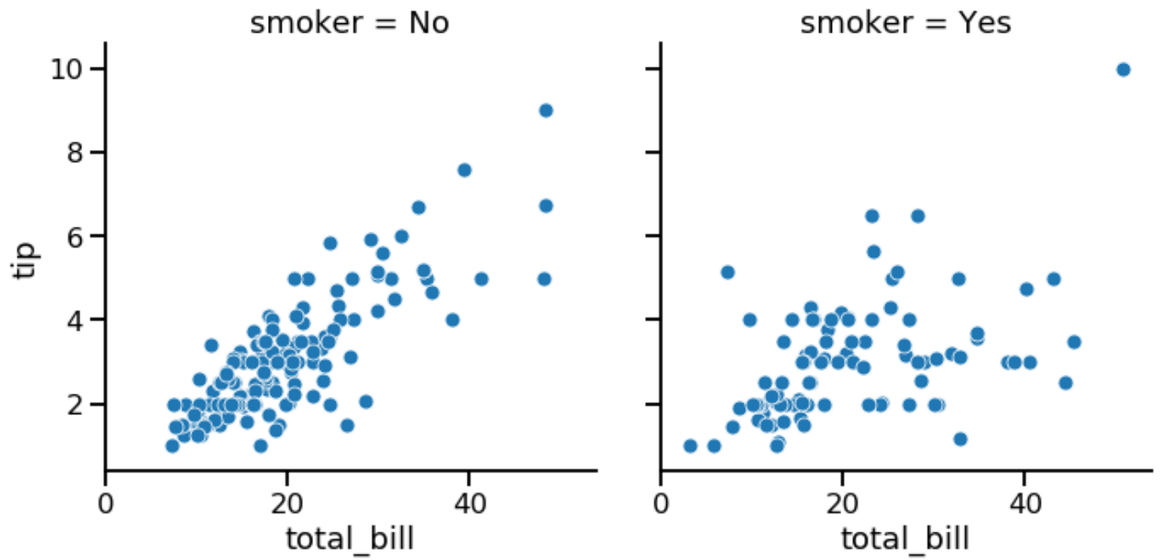
```
import seaborn as sns
import matplotlib.pyplot as plt

sns.scatterplot(x="total_bill",
                y="tip",
                data=tips)

plt.show()
```

Using `relplot()`

```
import seaborn as sns
import matplotlib.pyplot as plt

sns.relplot(x="total_bill",
            y="tip",
            data=tips,
            kind="scatter")

plt.show()
```

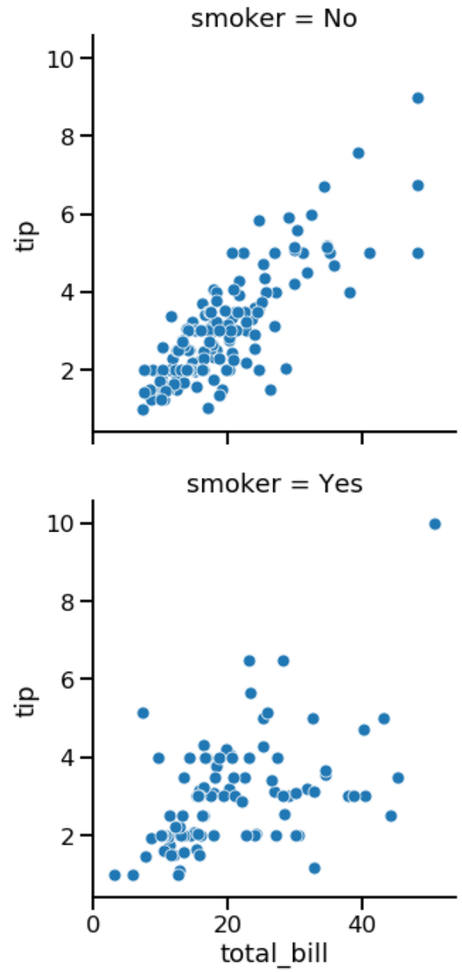
Subplots in columns

```
import seaborn as sns
import matplotlib.pyplot as plt

sns.relplot(x="total_bill",
            y="tip",
            data=tips,
            kind="scatter",
            col="smoker")
plt.show()
```



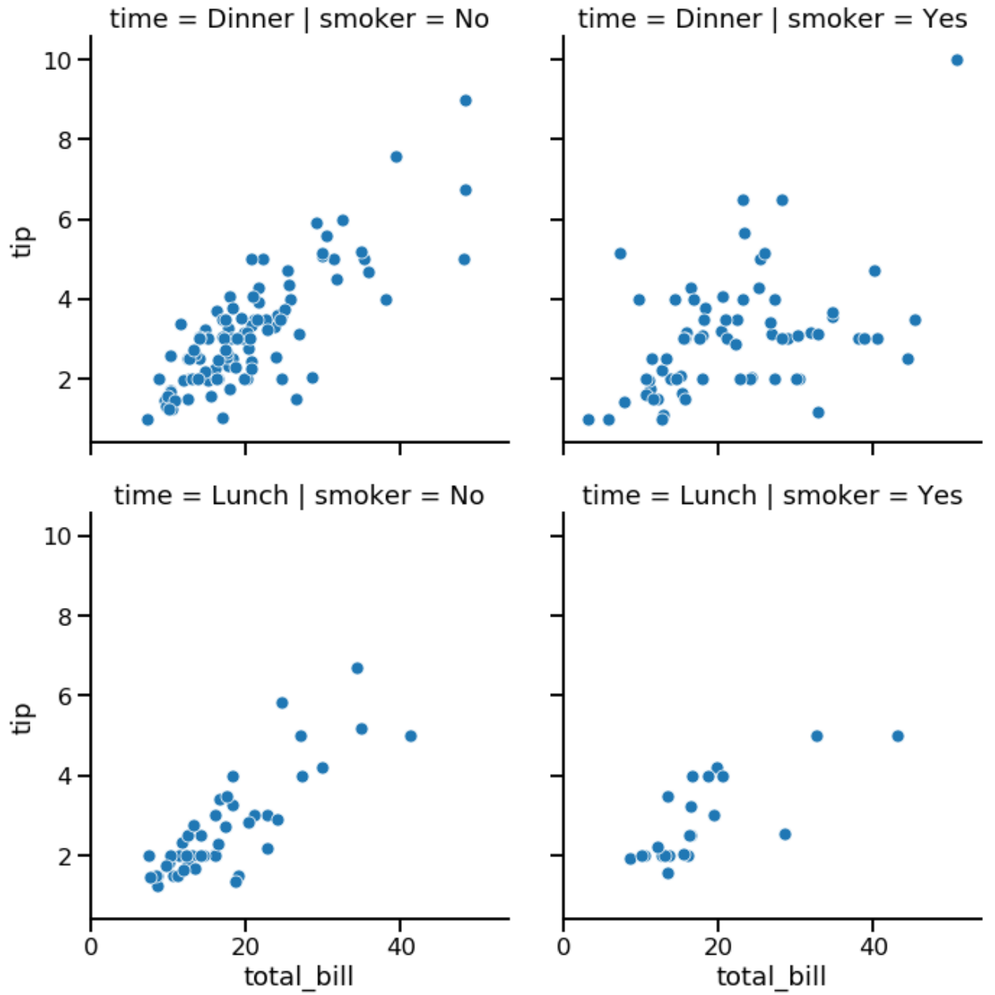
Subplots in rows

```
import seaborn as sns
import matplotlib.pyplot as plt

sns.relplot(x="total_bill",
            y="tip",
            data=tips,
            kind="scatter",
            row="smoker")
plt.show()
```

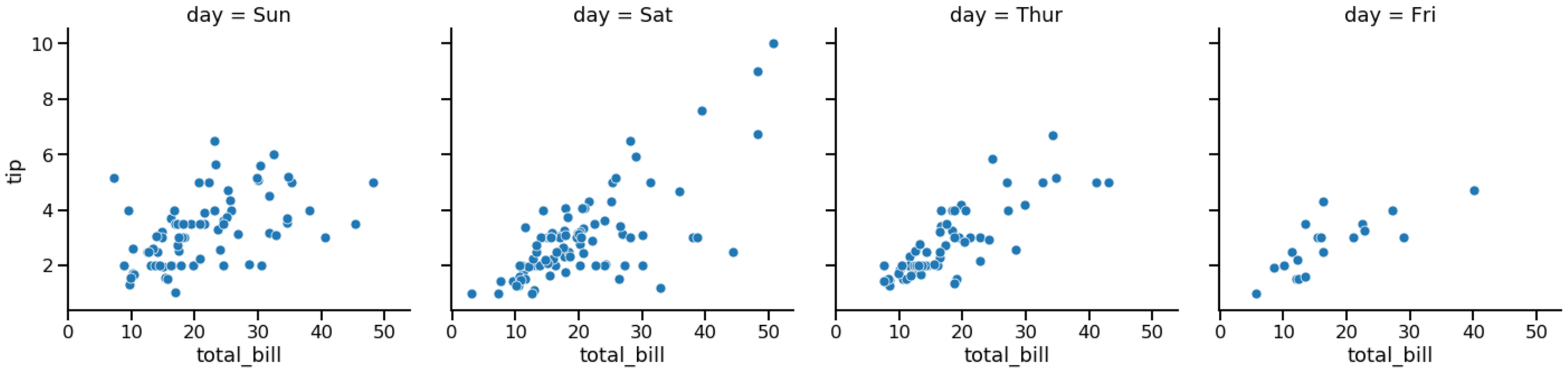


Subplots in rows and columns

```
import seaborn as sns
import matplotlib.pyplot as plt

sns.relplot(x="total_bill",
            y="tip",
            data=tips,
            kind="scatter",
            col="smoker",
            row="time")
plt.show()
```

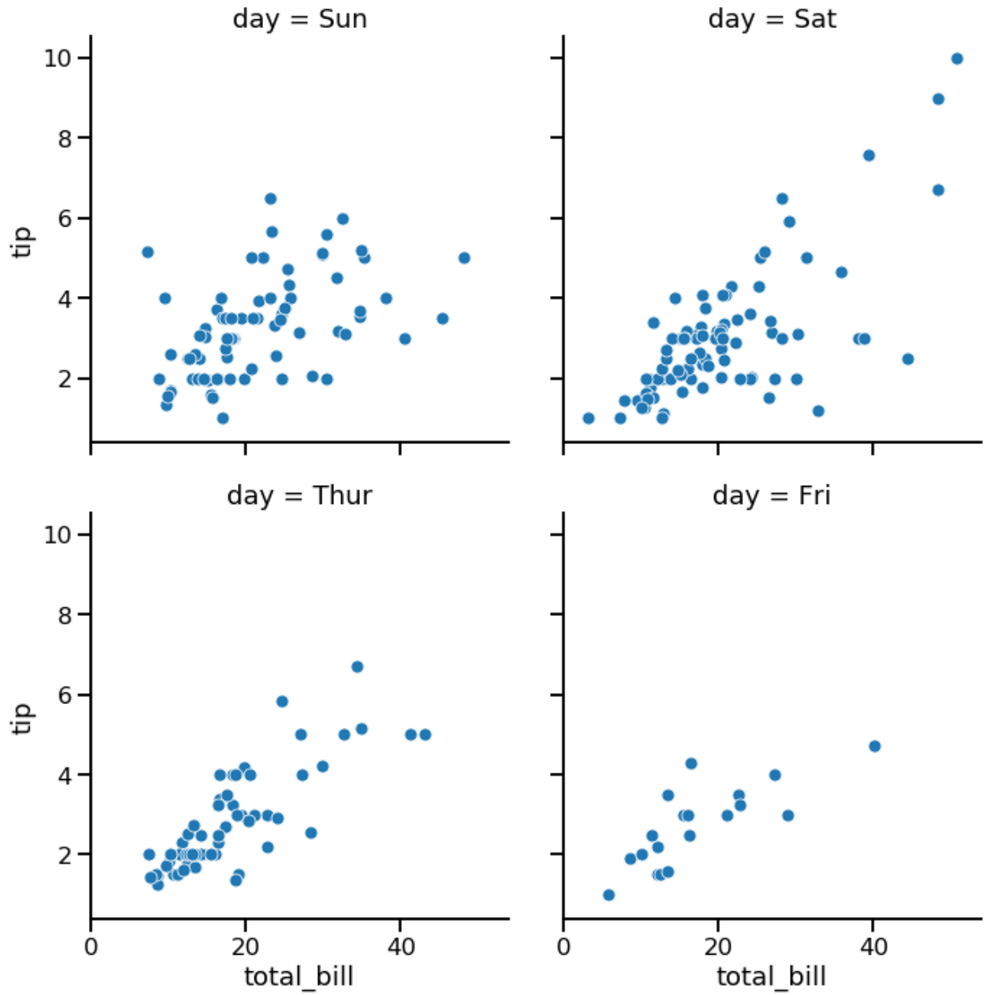


Subgroups for days of the week



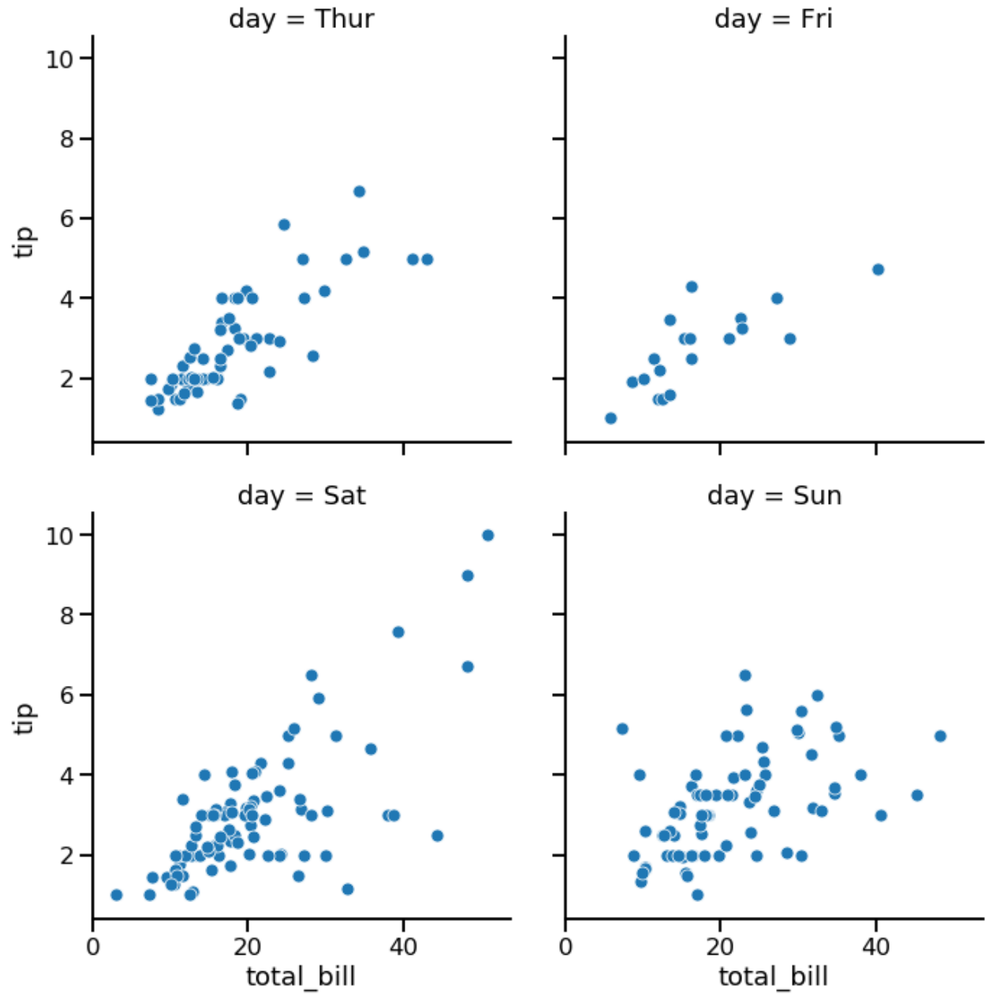
Wrapping columns

```
import seaborn as sns
import matplotlib.pyplot as plt

sns.relplot(x="total_bill",
            y="tip",
            data=tips,
            kind="scatter",
            col="day",
            col_wrap=2)
plt.show()
```



Ordering columns

```
import seaborn as sns
import matplotlib.pyplot as plt

sns.relplot(x="total_bill",
            y="tip",
            data=tips,
            kind="scatter",
            col="day",
            col_wrap=2,
            col_order=["Thur",
                       "Fri",
                       "Sat",
                       "Sun"])

plt.show()
```



Let's practice!

INTRODUCTION TO DATA VISUALIZATION WITH SEABORN

Customizing scatter plots

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Scatter plot overview

Show relationship between two quantitative variables

We've seen:

- Subplots (`col` and `row`)
- Subgroups with color (`hue`)

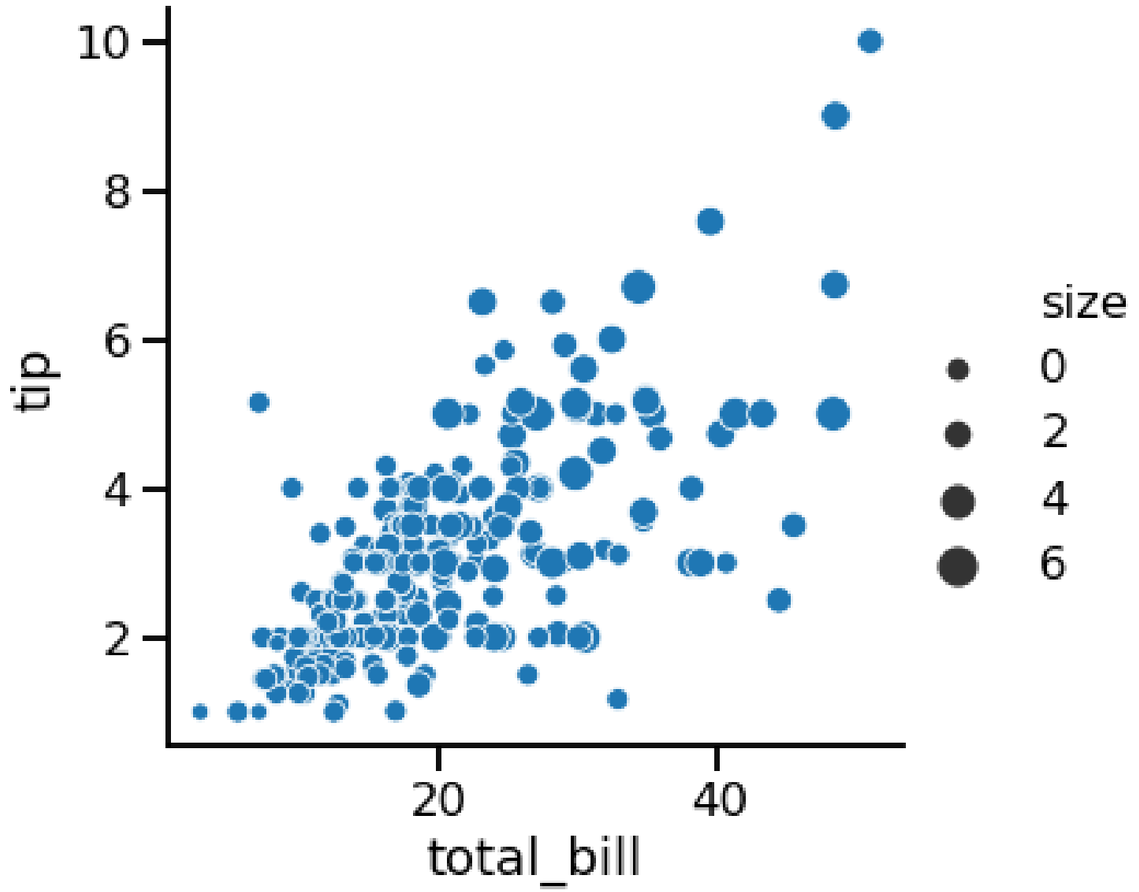
New Customizations:

- Subgroups with point size and style
- Changing point transparency

Use with both `scatterplot()` and `relplot()`

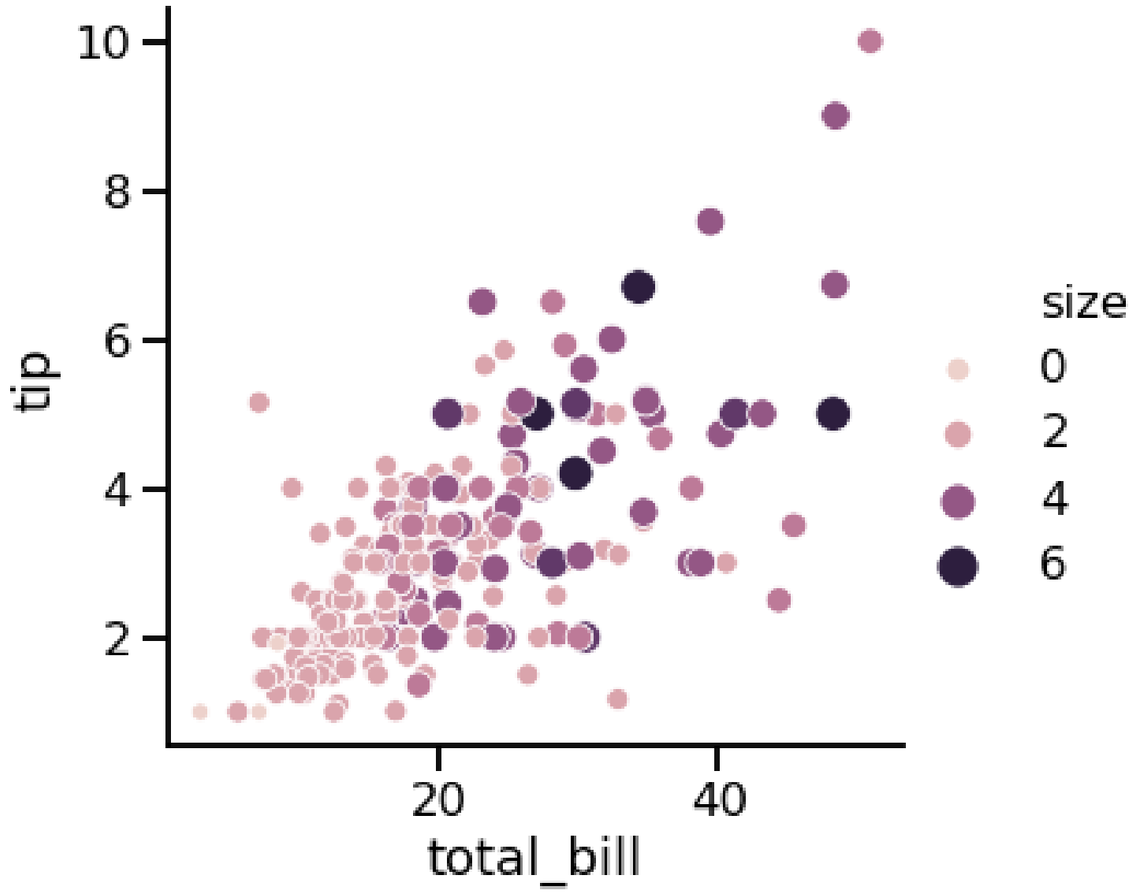
Subgroups with point size

```
import seaborn as sns
import matplotlib.pyplot as plt

sns.relplot(x="total_bill",
            y="tip",
            data=tips,
            kind="scatter",
            size="size")
plt.show()
```



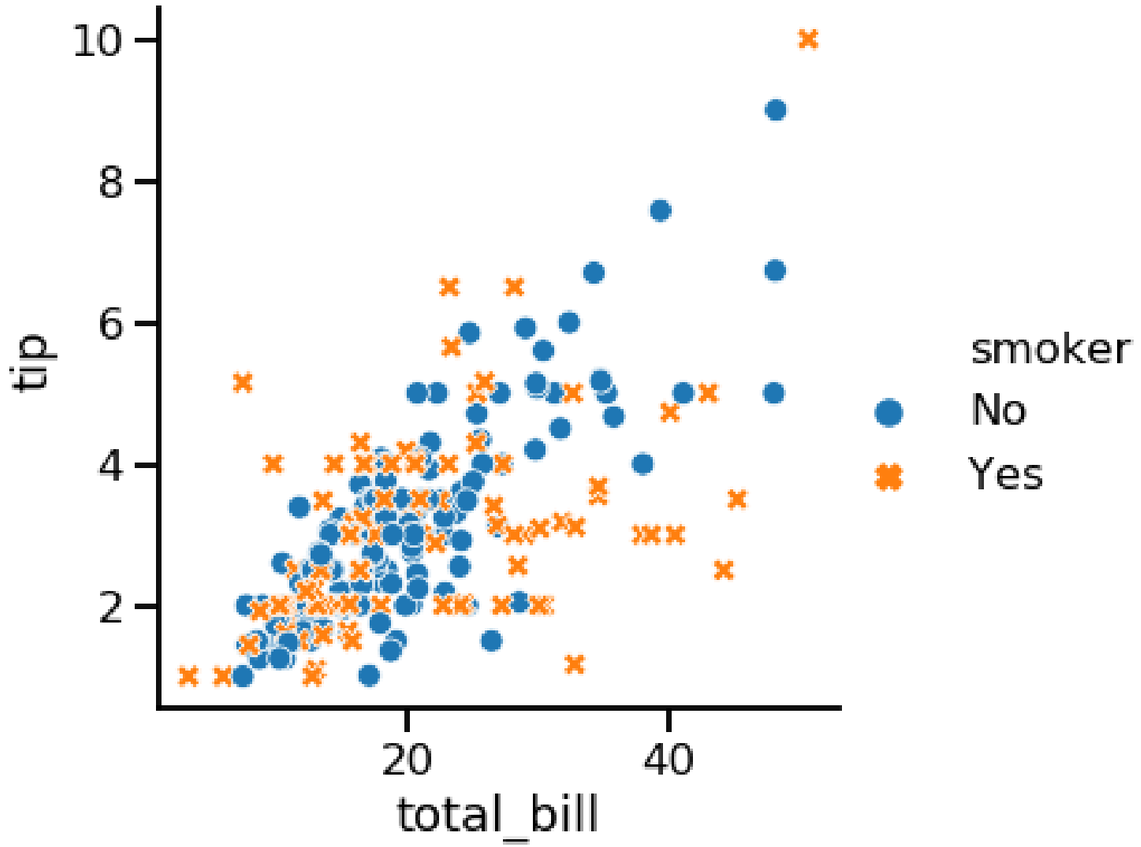
Point size and hue

```
import seaborn as sns
import matplotlib.pyplot as plt

sns.relplot(x="total_bill",
            y="tip",
            data=tips,
            kind="scatter",
            size="size",
            hue="size")
plt.show()
```



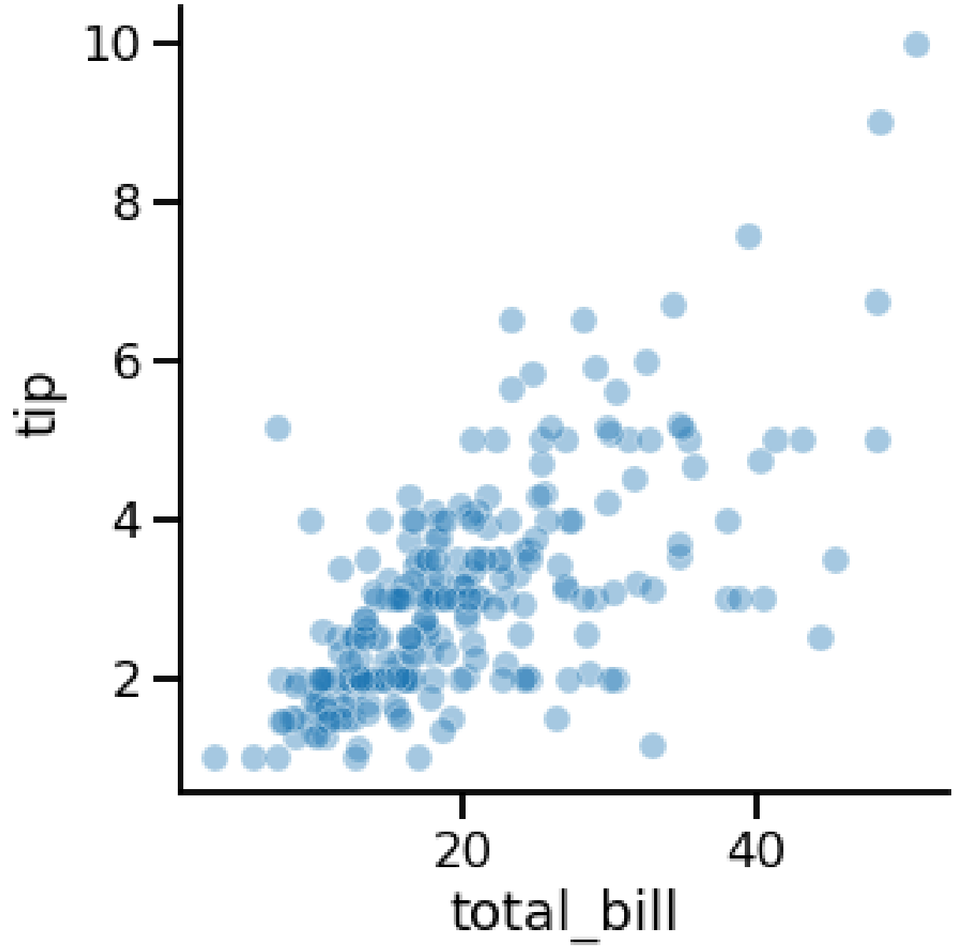
Subgroups with point style

```
import seaborn as sns
import matplotlib.pyplot as plt

sns.relplot(x="total_bill",
            y="tip",
            data=tips,
            kind="scatter",
            hue="smoker",
            style="smoker")
plt.show()
```



Changing point transparency

```
import seaborn as sns
import matplotlib.pyplot as plt

# Set alpha to be between 0 and 1
sns.relplot(x="total_bill",
            y="tip",
            data=tips,
            kind="scatter",
            alpha=0.4)
plt.show()
```



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Introduction to line plots

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What are line plots?

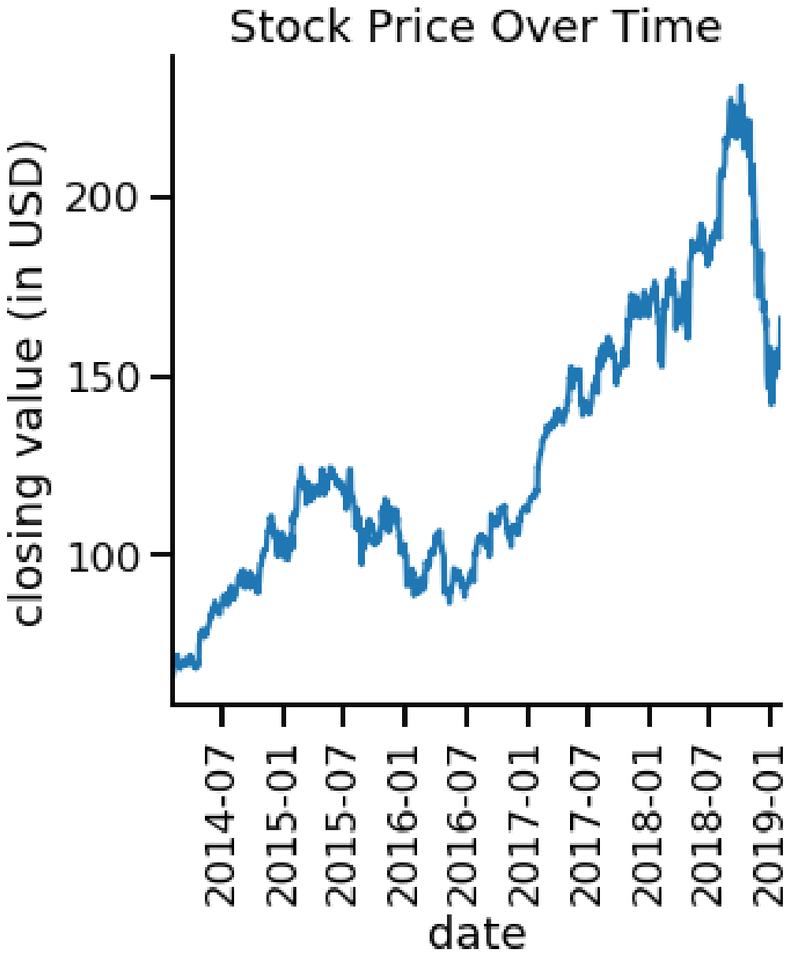
Two types of relational plots: scatter plots and line plots

Scatter plots

- Each plot point is an independent observation

Line plots

- Each plot point represents the same "thing", typically tracked over time



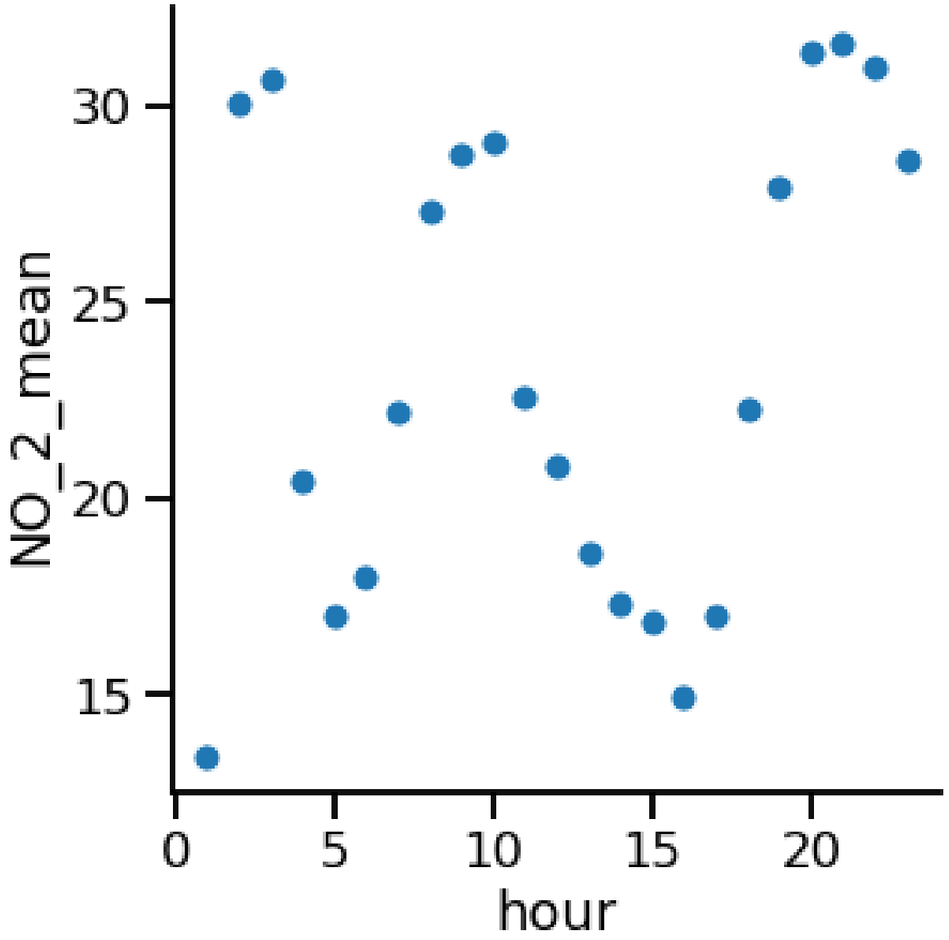
Air pollution data

- Collection stations throughout city
- Air samples of nitrogen dioxide levels

	hour	NO_2_mean
0	1	13.375000
1	2	30.041667
2	3	30.666667
3	4	20.416667
4	5	16.958333

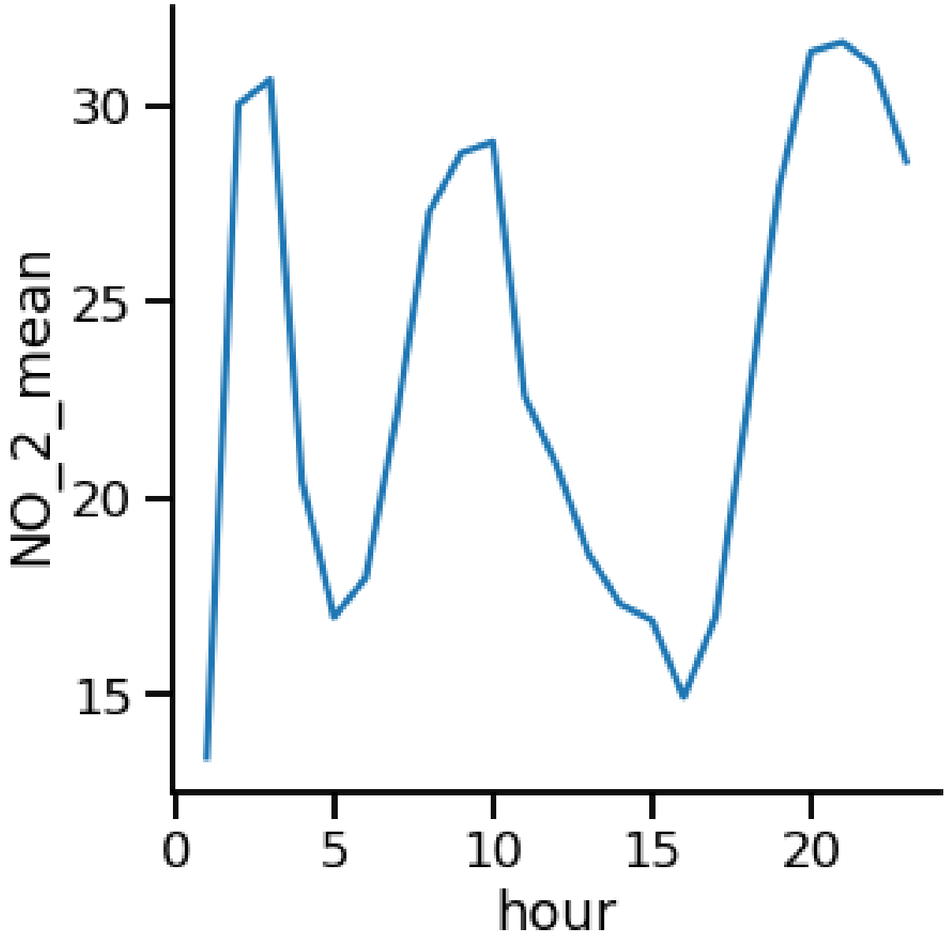
Scatter plot

```
import matplotlib.pyplot as plt
import seaborn as sns

sns.relplot(x="hour", y="NO_2_mean",
            data=air_df_mean,
            kind="scatter")

plt.show()
```



Line plot

```
import matplotlib.pyplot as plt
import seaborn as sns

sns.relplot(x="hour", y="NO_2_mean",
            data=air_df_mean,
            kind="line")

plt.show()
```

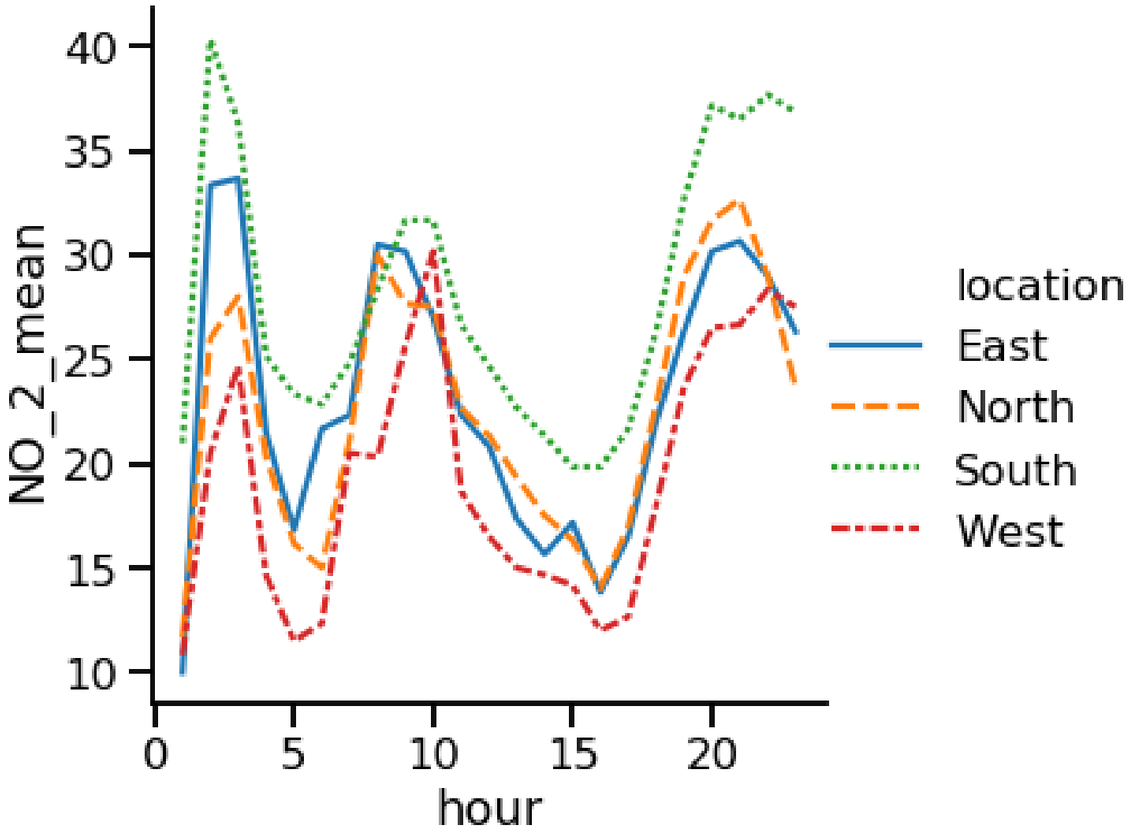


Subgroups by location

	hour	location	NO_2_mean
0	1	East	10.000000
1	1	North	11.666667
2	1	South	21.000000
3	1	West	10.833333
4	2	East	33.333333

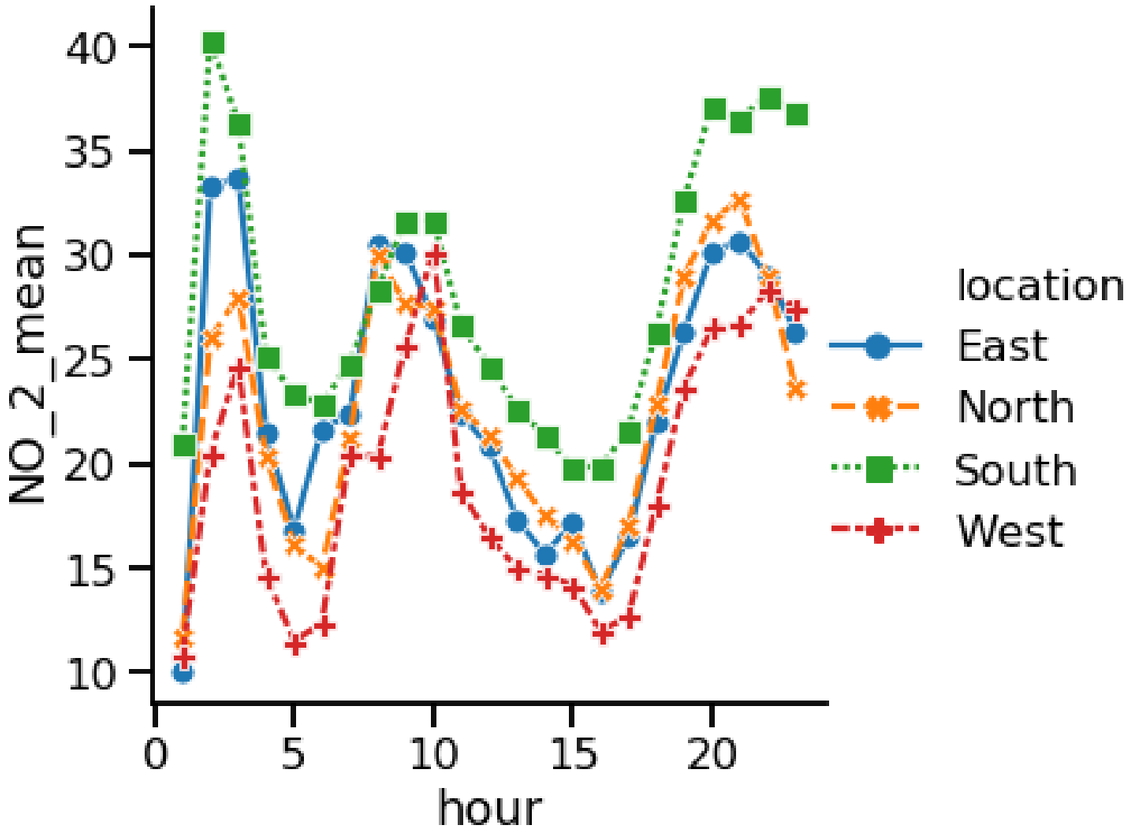
Subgroups by location

```
import matplotlib.pyplot as plt
import seaborn as sns

sns.relplot(x="hour", y="NO_2_mean",
            data=air_df_loc_mean,
            kind="line",
            style="location",
            hue="location")
plt.show()
```



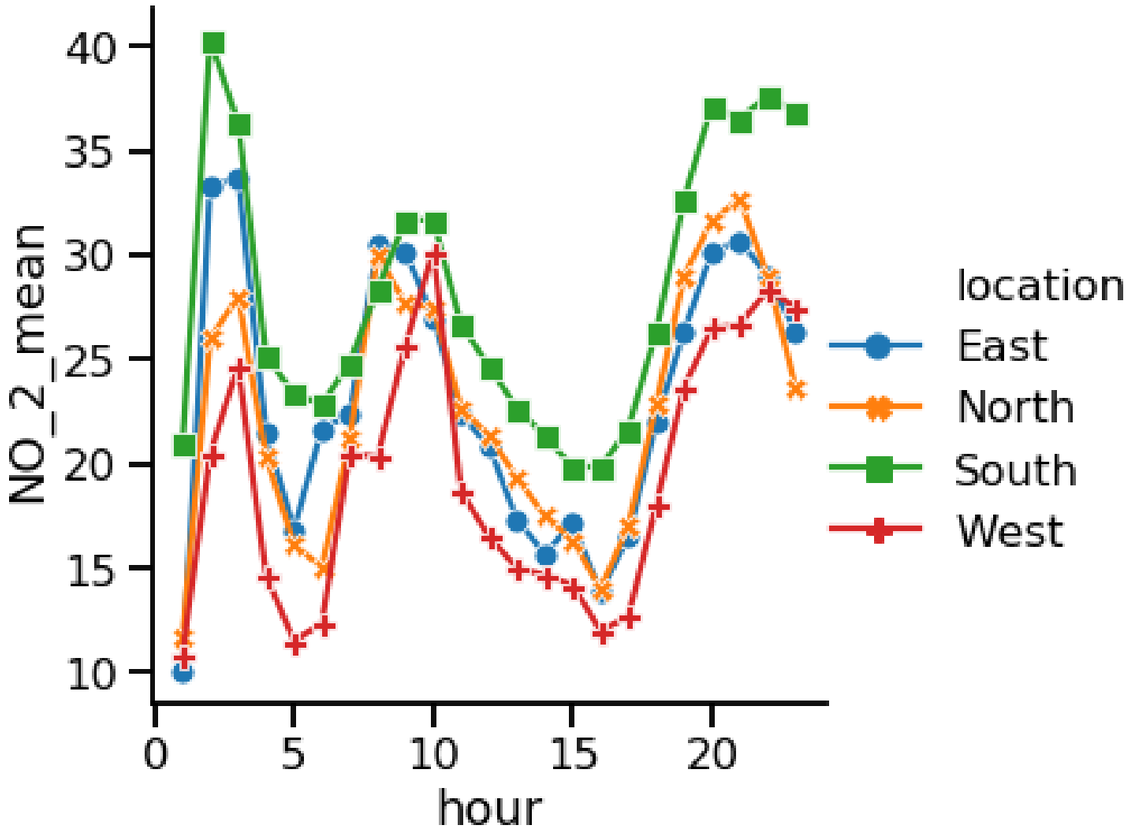
Adding markers

```
import matplotlib.pyplot as plt
import seaborn as sns

sns.relplot(x="hour", y="NO_2_mean",
            data=air_df_loc_mean,
            kind="line",
            style="location",
            hue="location",
            markers=True)
plt.show()
```



Turning off line style

```
import matplotlib.pyplot as plt
import seaborn as sns

sns.relplot(x="hour", y="NO_2_mean",
            data=air_df_loc_mean,
            kind="line",
            style="location",
            hue="location",
            markers=True,
            dashes=False)
plt.show()
```



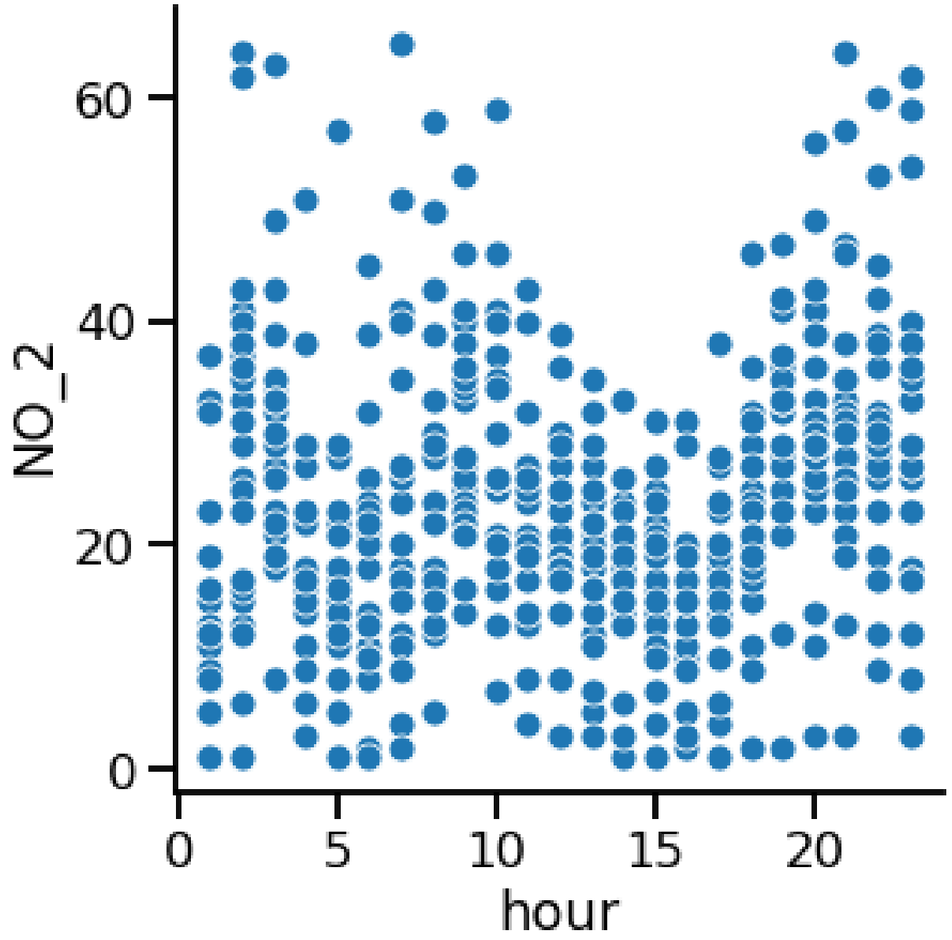
Multiple observations per x-value

	hour	NO_2	station	location
0	1	15.0	28079004	South
1	1	33.0	28079008	South
2	1	11.0	28079011	South
3	1	12.0	28079016	South
4	1	23.0	28079017	South

Multiple observations per x-value

Scatter plot

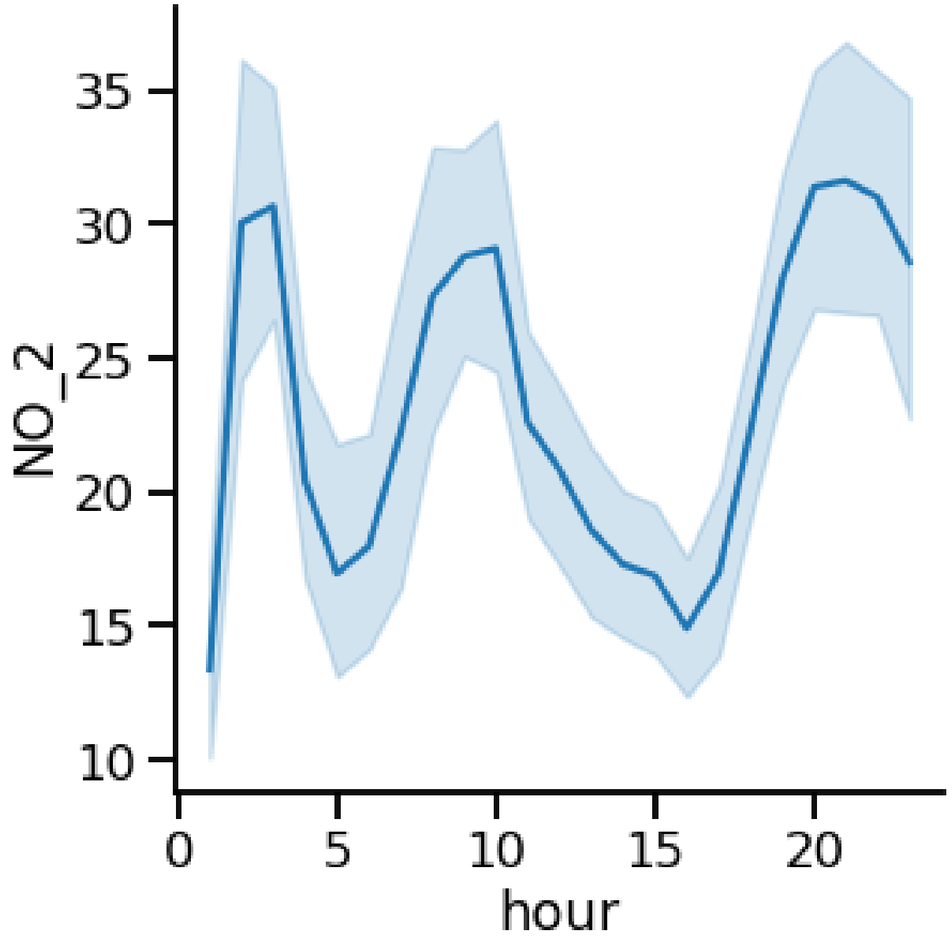
```
import matplotlib.pyplot as plt
import seaborn as sns

sns.relplot(x="hour", y="NO_2",
            data=air_df,
            kind="scatter")

plt.show()
```



Multiple observations per x-value

Line plot

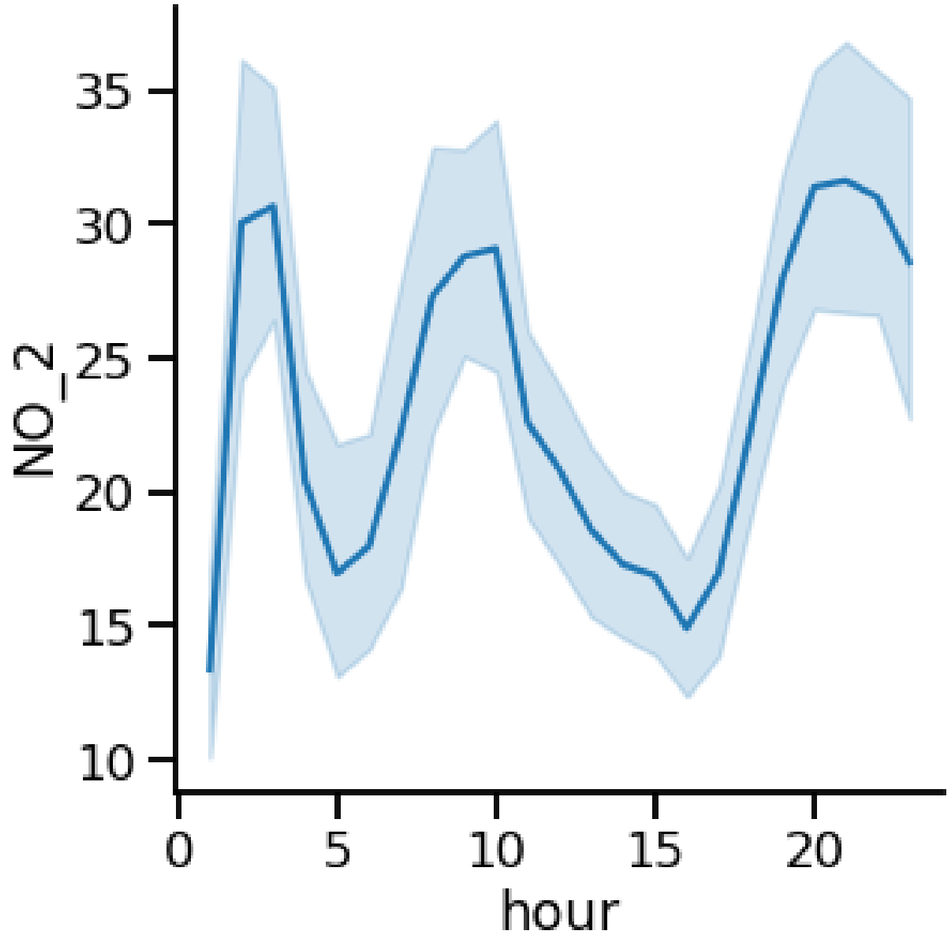
```
import matplotlib.pyplot as plt
import seaborn as sns

sns.relplot(x="hour", y="NO_2",
            data=air_df,
            kind="line")

plt.show()
```



Multiple observations per x-value

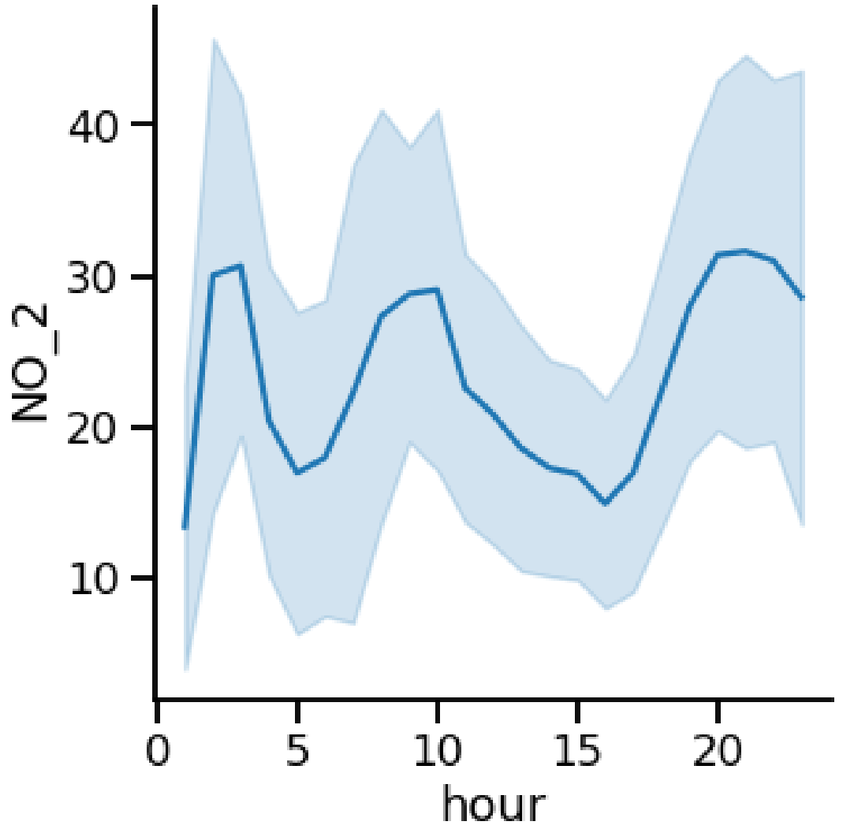
Shaded region is the confidence interval

- Assumes dataset is a random sample
- 95% confident that the mean is within this interval
- Indicates uncertainty in our estimate



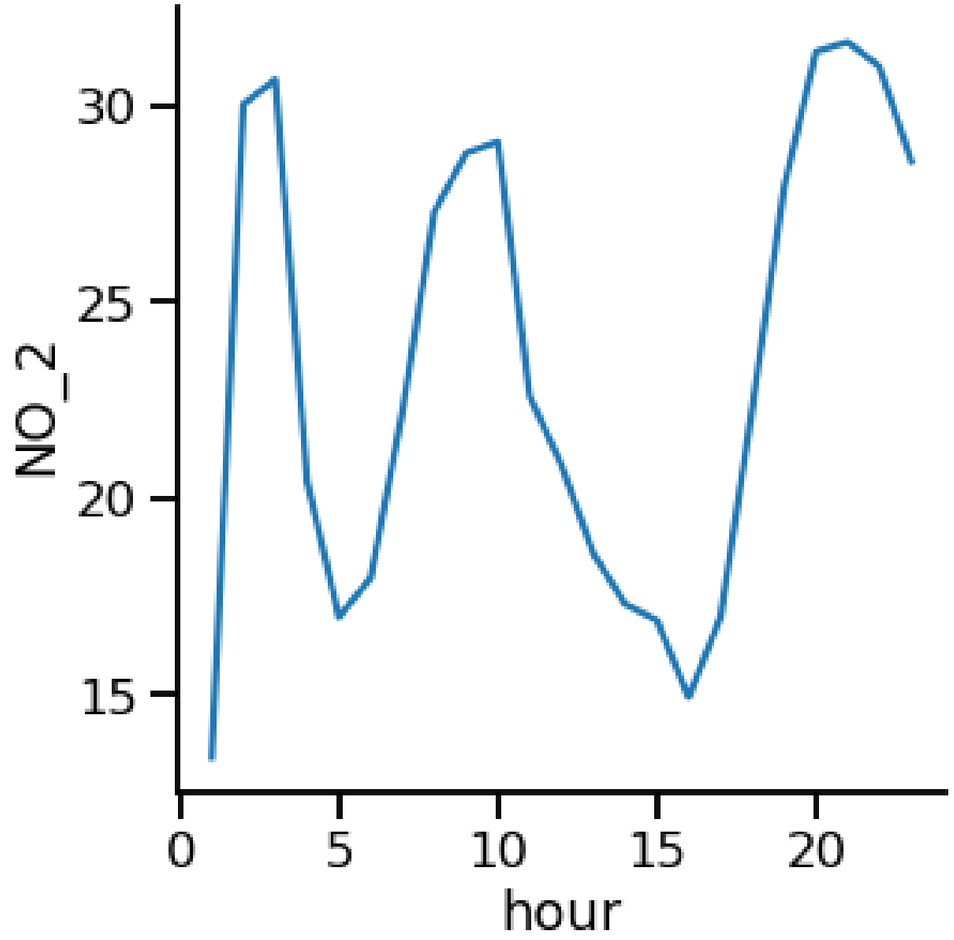
Replacing confidence interval with standard deviation

```
import matplotlib.pyplot as plt
import seaborn as sns

sns.relplot(x="hour", y="NO_2",
            data=air_df,
            kind="line",
            ci="sd")
plt.show()
```



Turning off confidence interval

```
import matplotlib.pyplot as plt
import seaborn as sns

sns.relplot(x="hour", y="NO_2",
            data=air_df,
            kind="line",
            ci=None)
plt.show()
```



Let's practice!

INTRODUCTION TO DATA VISUALIZATION WITH SEABORN

Count plots and bar plots

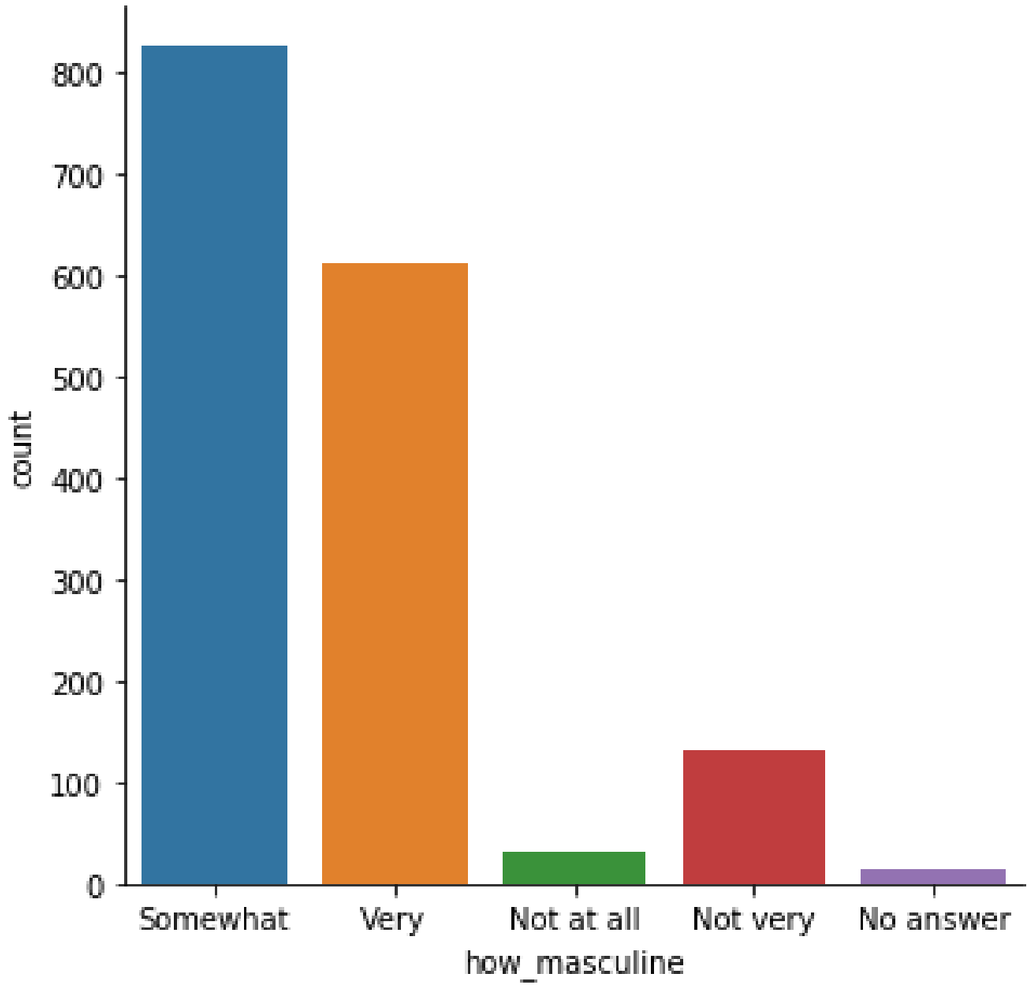
INTRODUCTION TO DATA VISUALIZATION WITH SEABORN

Erin Case
Data Scientist

datacamp

Categorical plots

- Examples: count plots, bar plots
- Involve a categorical variable
- Comparisons between groups

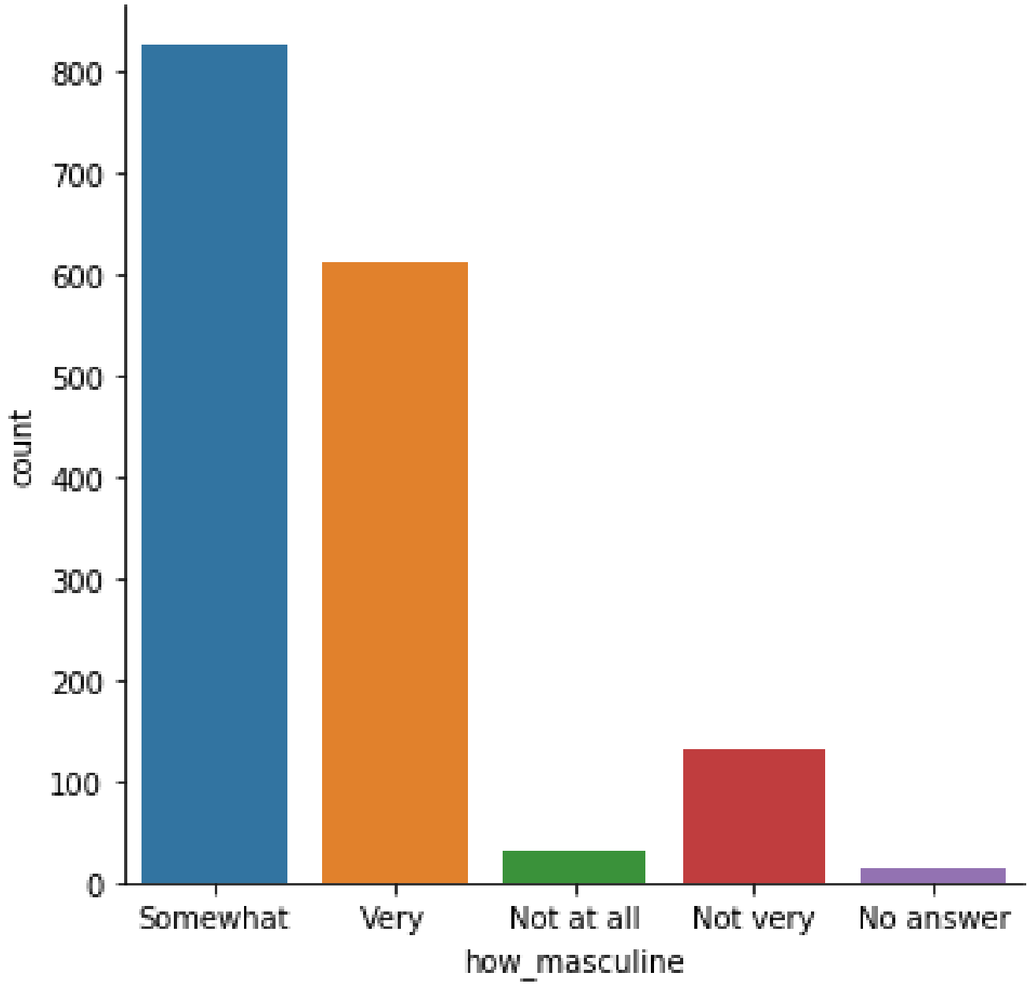


catplot()

- Used to create categorical plots
- Same advantages of `relplot()`
- Easily create subplots with `col=` and `row=`

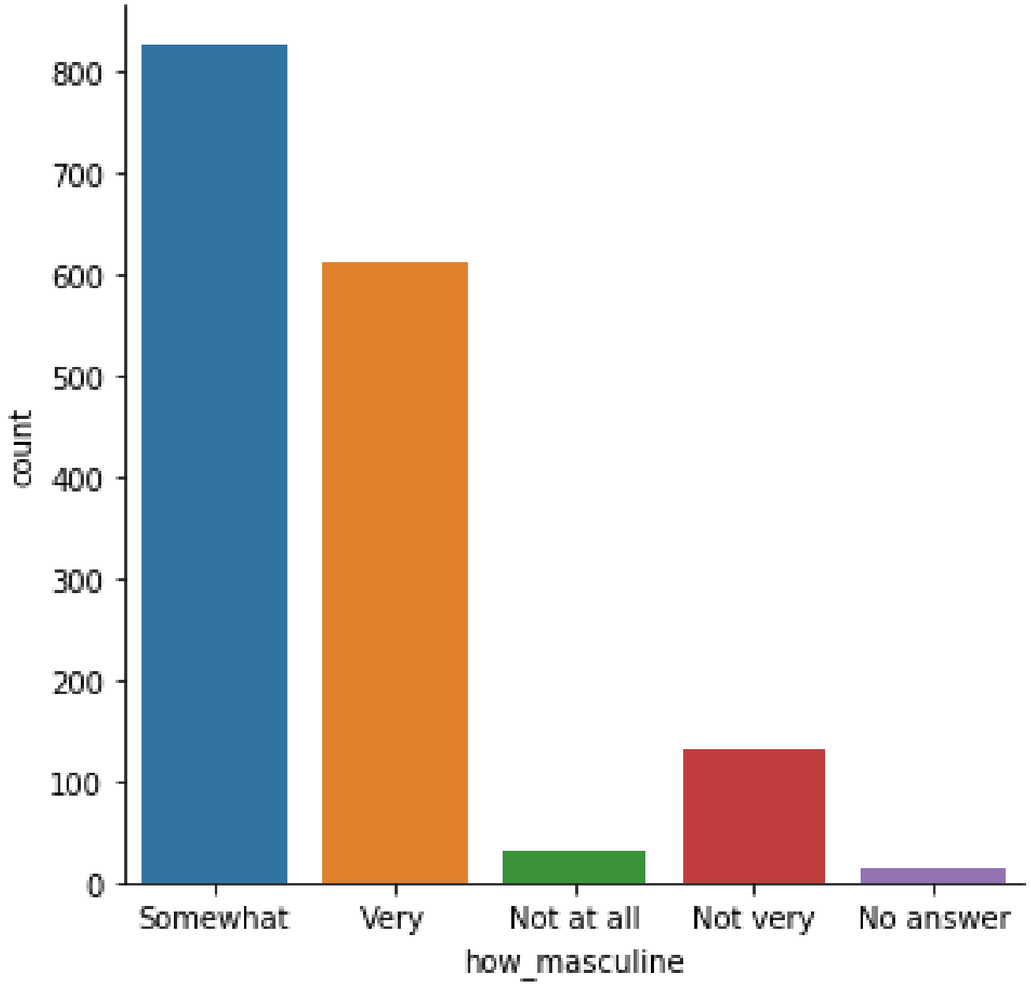
countplot() vs. catplot()

```
import matplotlib.pyplot as plt
import seaborn as sns

sns.countplot(x="how_masculine",
              data=masculinity_data)

plt.show()
```



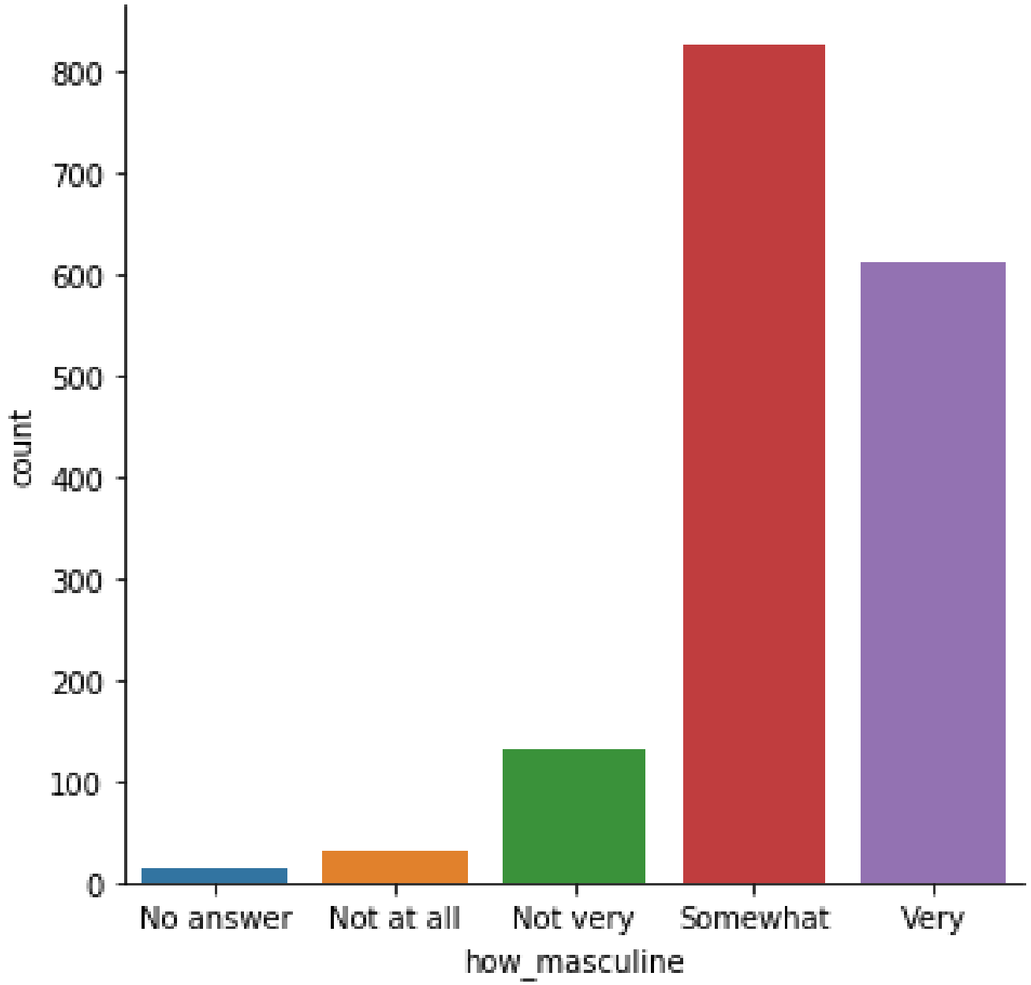
countplot() vs. catplot()

```
import matplotlib.pyplot as plt
import seaborn as sns

sns.catplot(x="how_masculine",
            data=masculinity_data,
            kind="count")

plt.show()
```



Changing the order

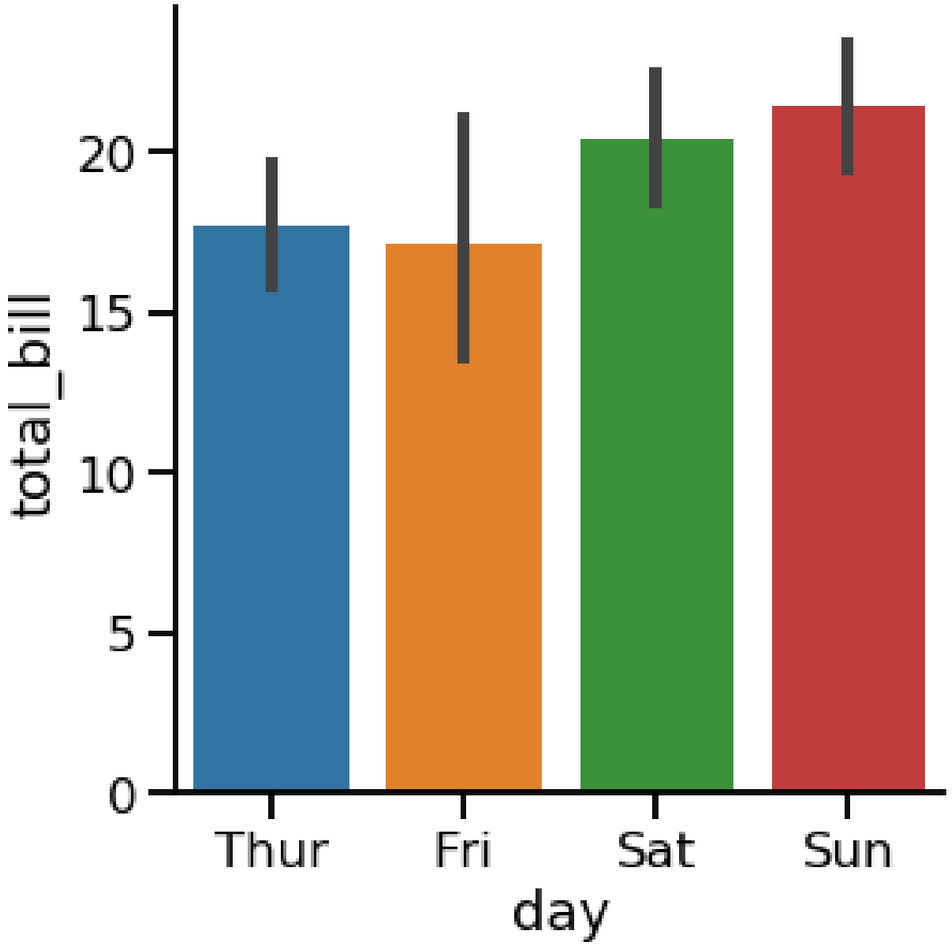
```
import matplotlib.pyplot as plt
import seaborn as sns
category_order = ["No answer",
                  "Not at all",
                  "Not very",
                  "Somewhat",
                  "Very"]
sns.catplot(x="how_masculine",
            data=masculinity_data,
            kind="count",
            order=category_order)
plt.show()
```



Bar plots

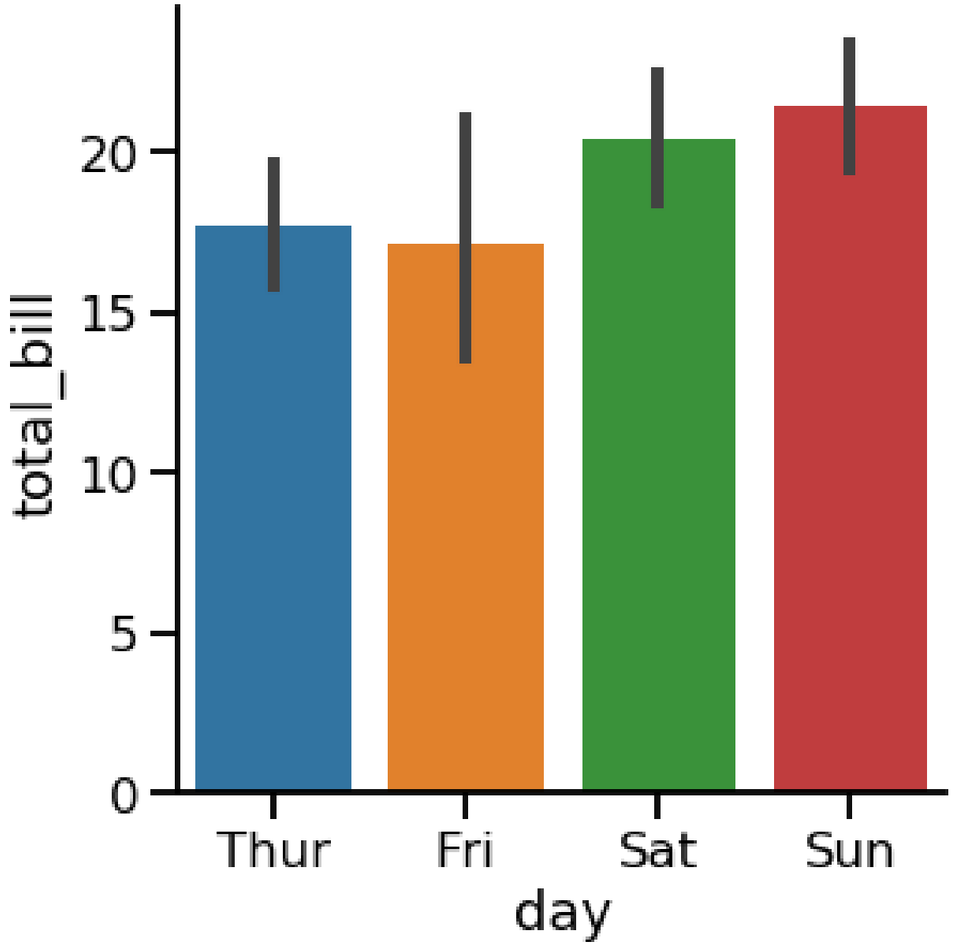
Displays mean of quantitative variable per category

```
import matplotlib.pyplot as plt
import seaborn as sns

sns.catplot(x="day",
            y="total_bill",
            data=tips,
            kind="bar")

plt.show()
```



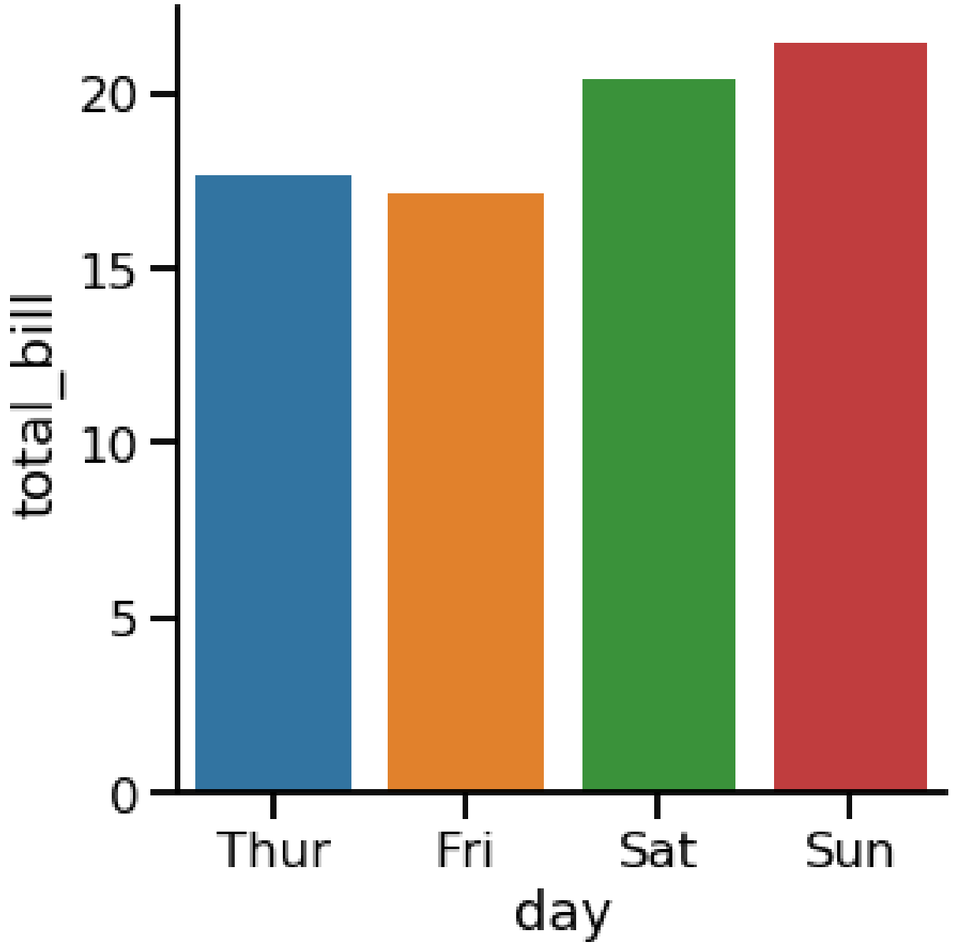
Confidence intervals

- Lines show 95% confidence intervals for the mean
- Shows uncertainty about our estimate
- Assumes our data is a random sample



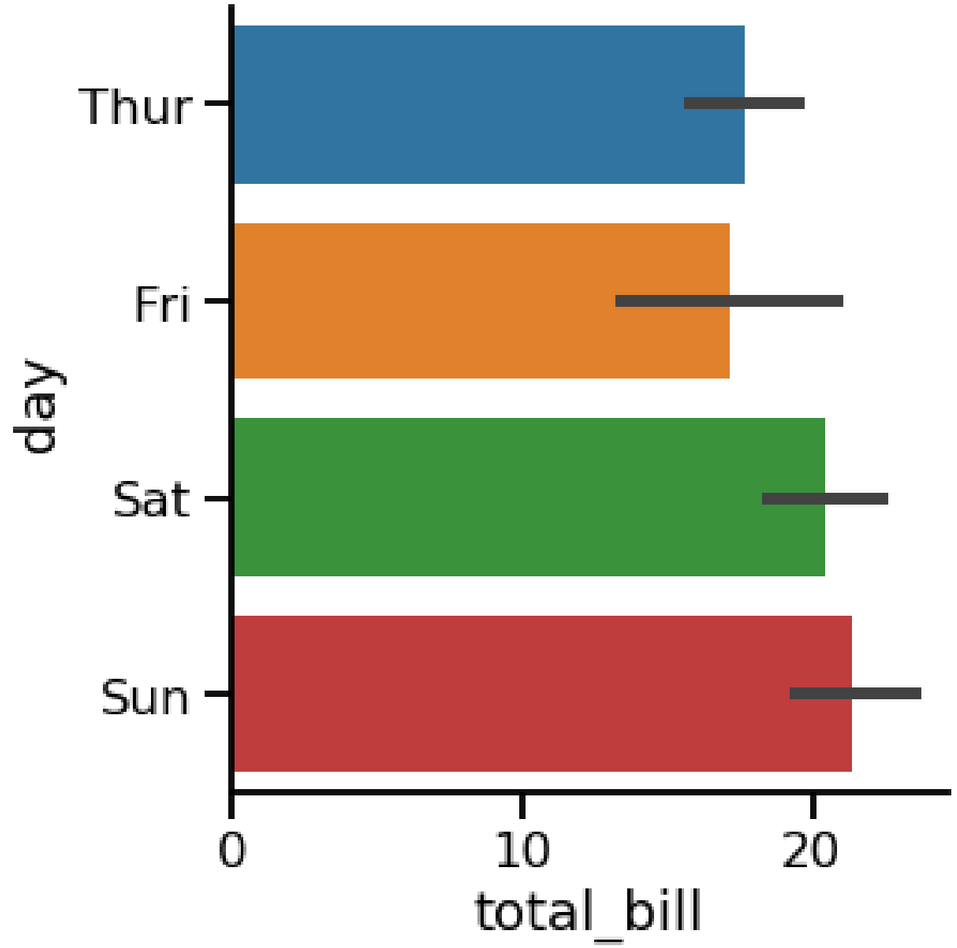
Turning off confidence intervals

```
import matplotlib.pyplot as plt
import seaborn as sns

sns.catplot(x="day",
            y="total_bill",
            data=tips,
            kind="bar",
            ci=None)
plt.show()
```



Changing the orientation

```
import matplotlib.pyplot as plt
import seaborn as sns

sns.catplot(x="total_bill",
            y="day",
            data=tips,
            kind="bar")
plt.show()
```



Let's practice!

INTRODUCTION TO DATA VISUALIZATION WITH SEABORN

Creating a box plot

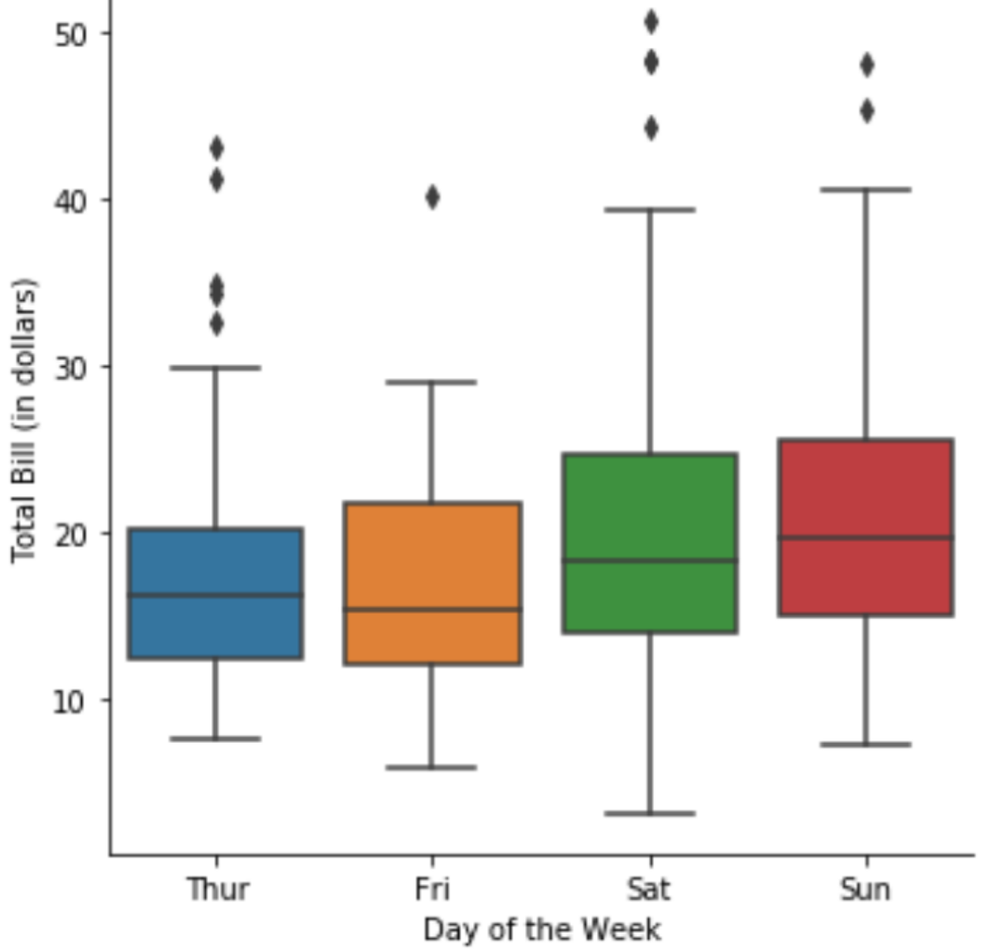
INTRODUCTION TO DATA VISUALIZATION WITH SEABORN

Erin Case
Data Scientist

datacamp

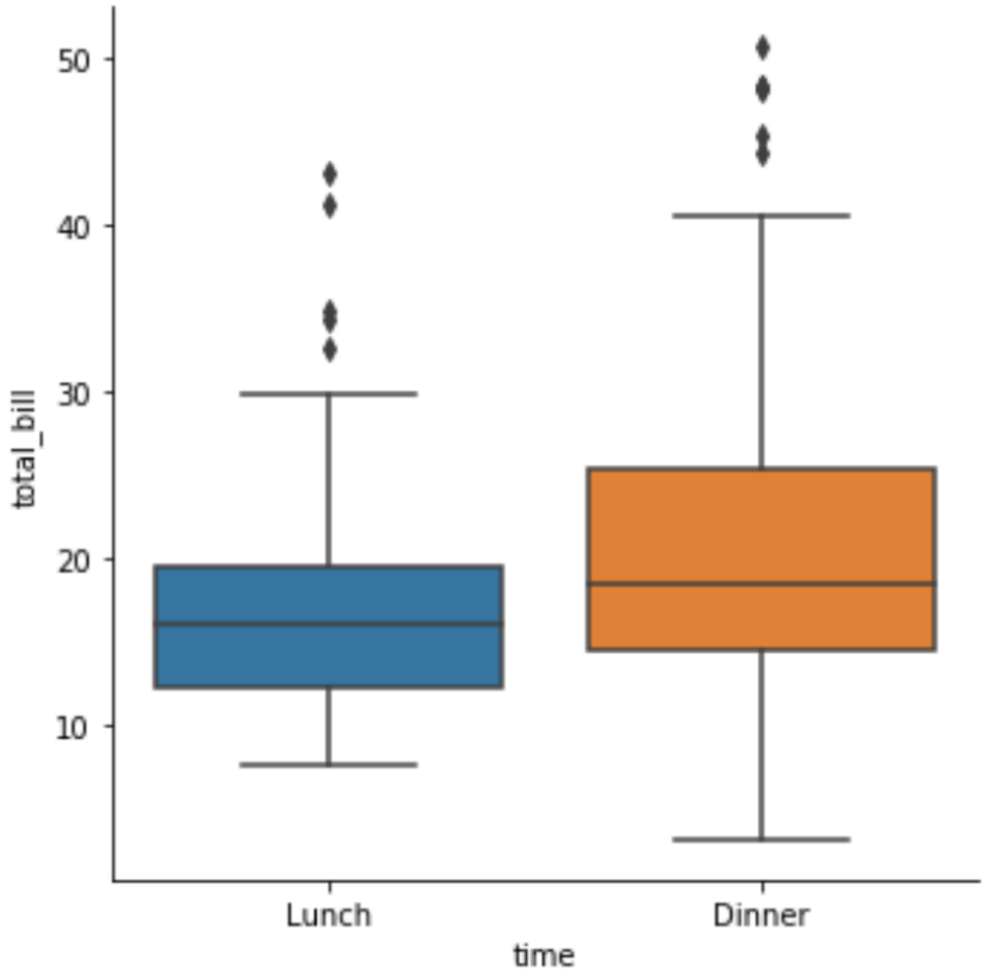
What is a box plot?

- Shows the distribution of quantitative data
- See median, spread, skewness, and outliers
- Facilitates comparisons between groups



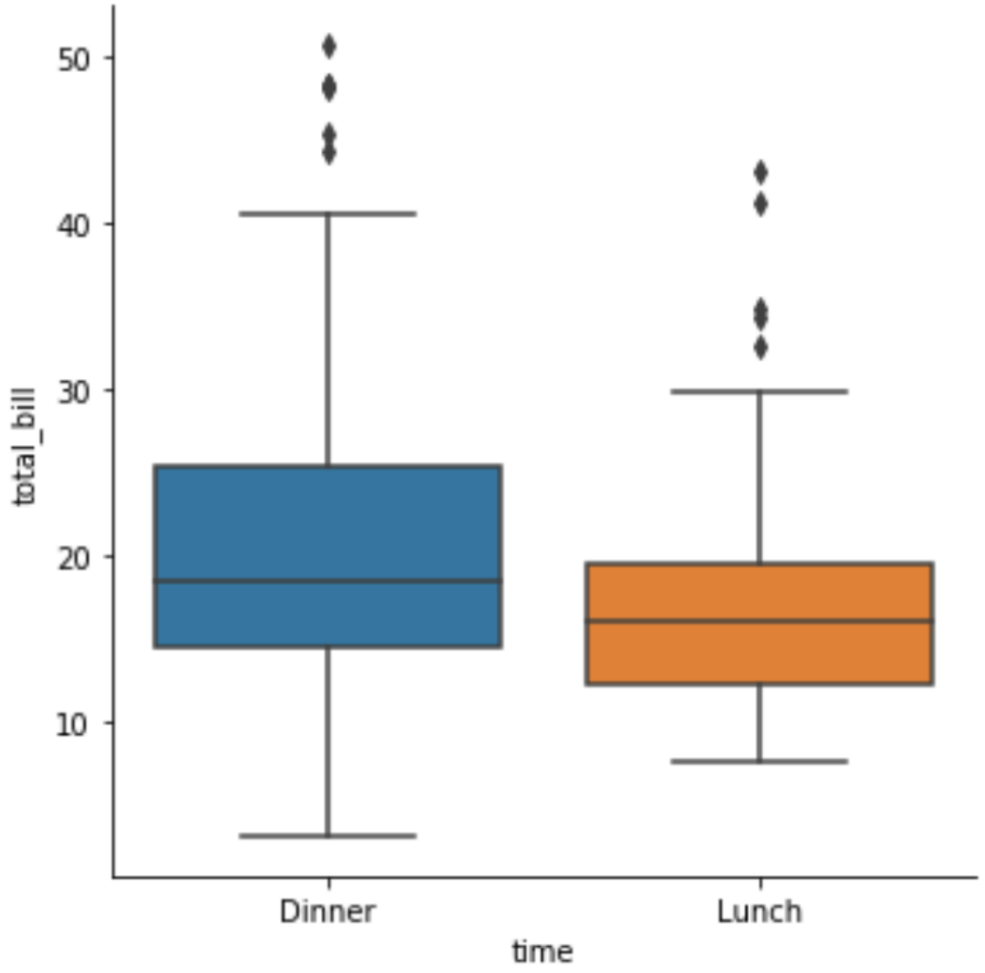
How to create a box plot

```
import matplotlib.pyplot as plt
import seaborn as sns

g = sns.catplot(x="time",
                y="total_bill",
                data=tips,
                kind="box")
plt.show()
```



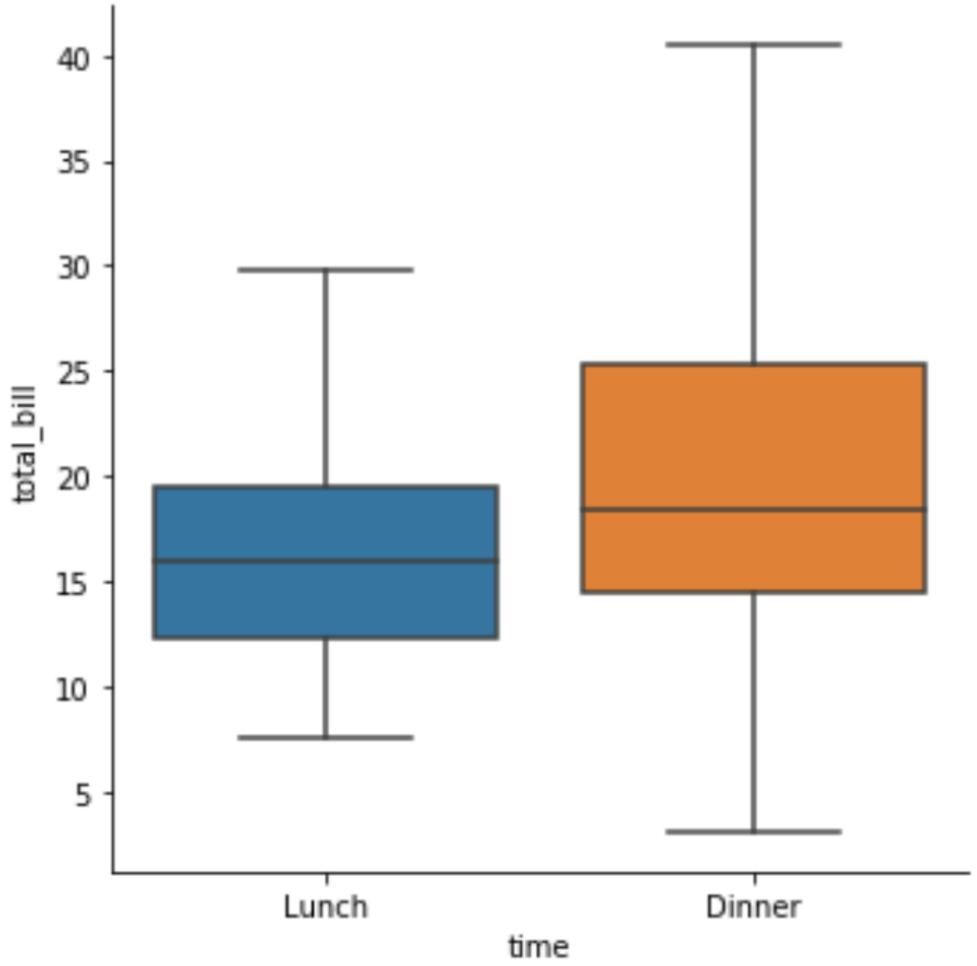
Change the order of categories

```
import matplotlib.pyplot as plt
import seaborn as sns

g = sns.catplot(x="time",
                y="total_bill",
                data=tips,
                kind="box",
                order=["Dinner",
                       "Lunch"])
plt.show()
```



Omitting the outliers using `sym`

```
import matplotlib.pyplot as plt
import seaborn as sns

g = sns.catplot(x="time",
                y="total_bill",
                data=tips,
                kind="box",
                sym="")
plt.show()
```

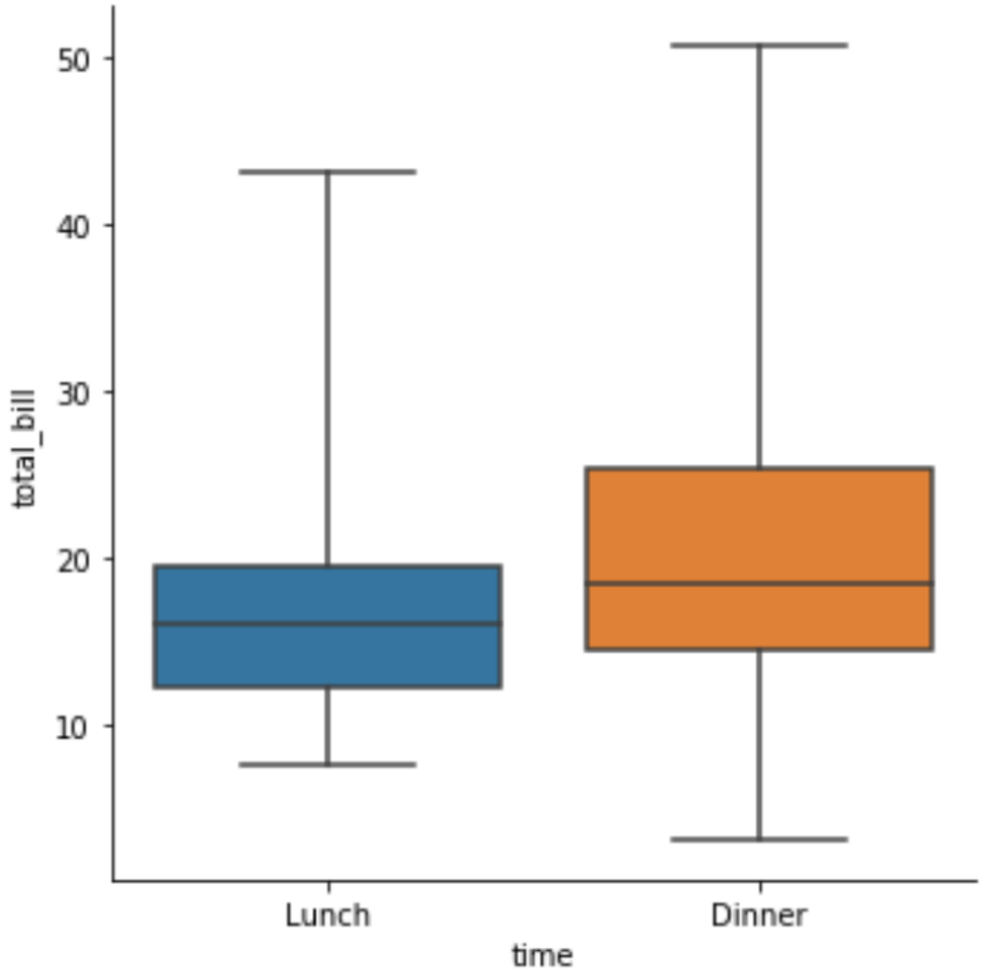


Changing the whiskers using `whis`

- By default, the whiskers extend to 1.5 * the interquartile range
- Make them extend to 2.0 * IQR: `whis=2.0`
- Show the 5th and 95th percentiles: `whis=[5, 95]`
- Show min and max values: `whis=[0, 100]`

Changing the whiskers using `whis`

```
import matplotlib.pyplot as plt
import seaborn as sns

g = sns.catplot(x="time",
                y="total_bill",
                data=tips,
                kind="box",
                whis=[0, 100])
plt.show()
```



Let's practice!

INTRODUCTION TO DATA VISUALIZATION WITH SEABORN

Point plots

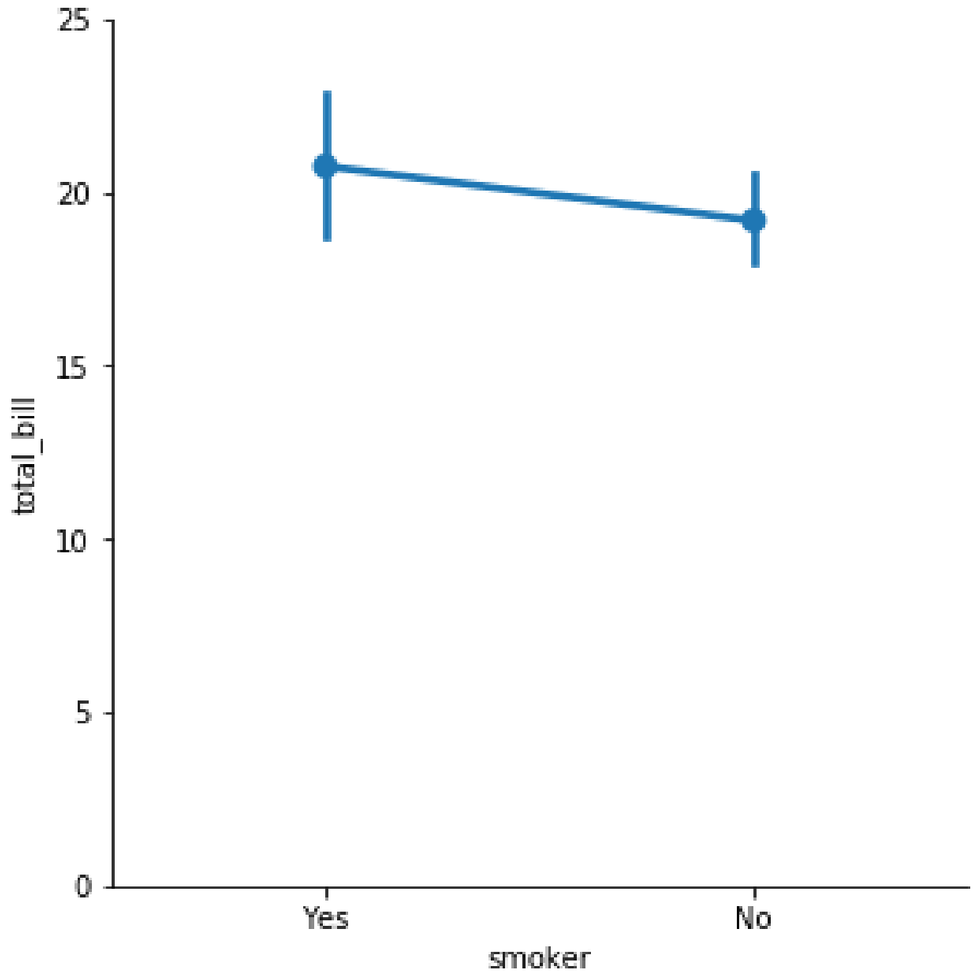
INTRODUCTION TO DATA VISUALIZATION WITH SEABORN

Erin Case
Data Scientist

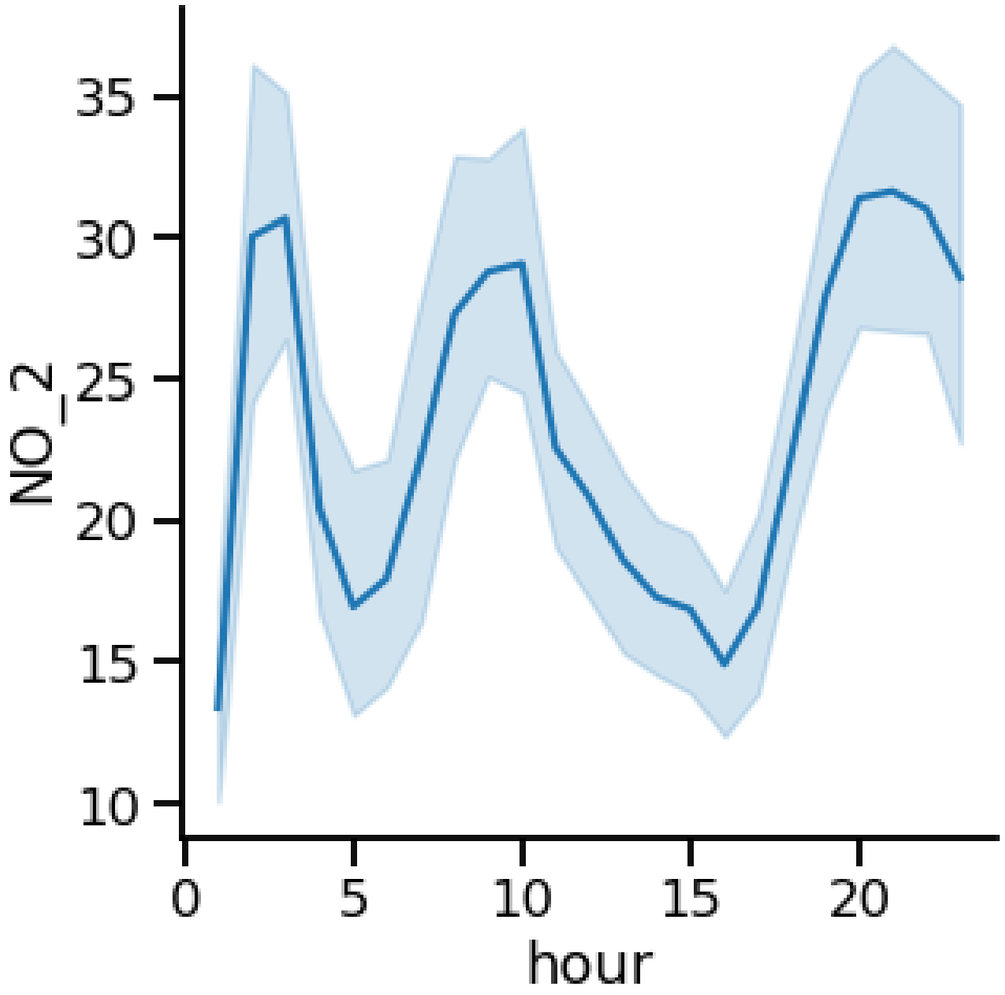
datacamp

What are point plots?

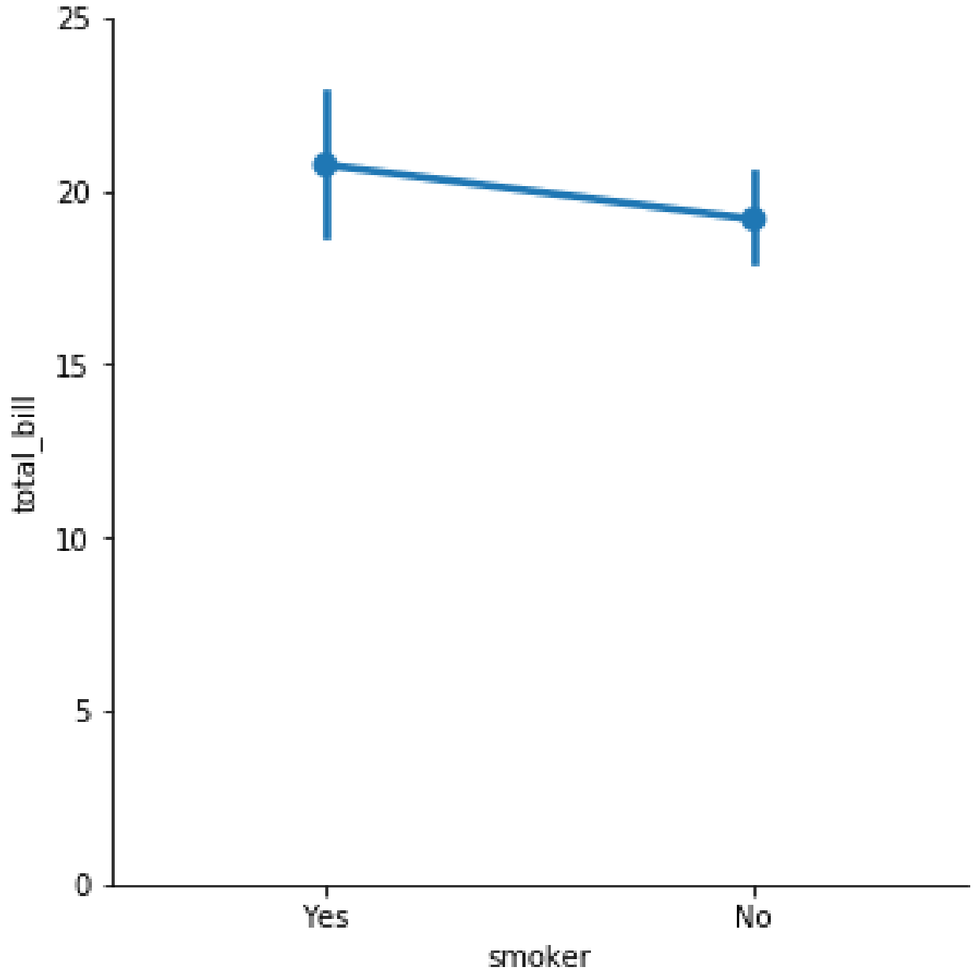
- Points show mean of quantitative variable
- Vertical lines show 95% confidence intervals



Line plot: average level of nitrogen dioxide over time



Point plot: average restaurant bill, smokers vs. non-smokers



Point plots vs. line plots

Both show:

- Mean of quantitative variable
- 95% confidence intervals for the mean

Differences:

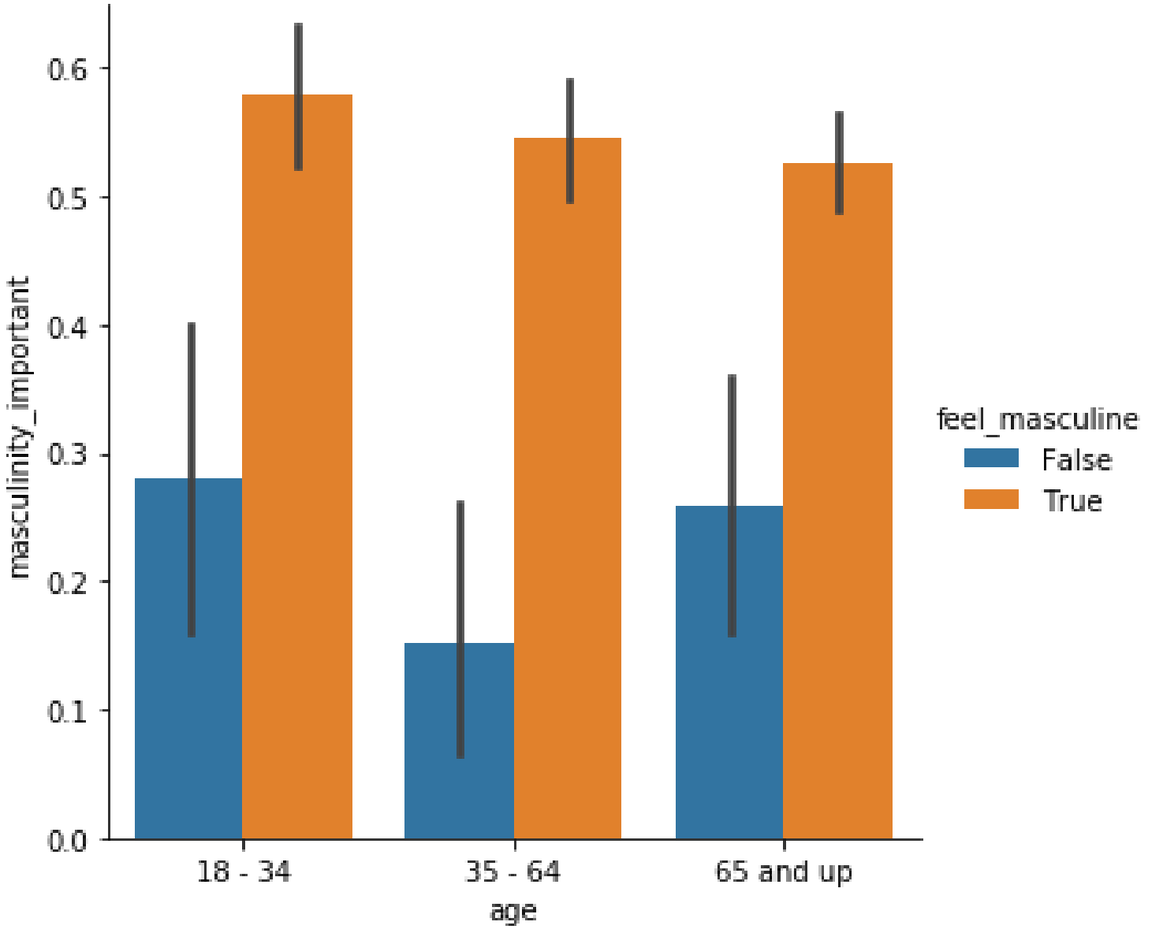
- Line plot has **quantitative** variable (usually time) on x-axis
- Point plot has **categorical** variable on x-axis

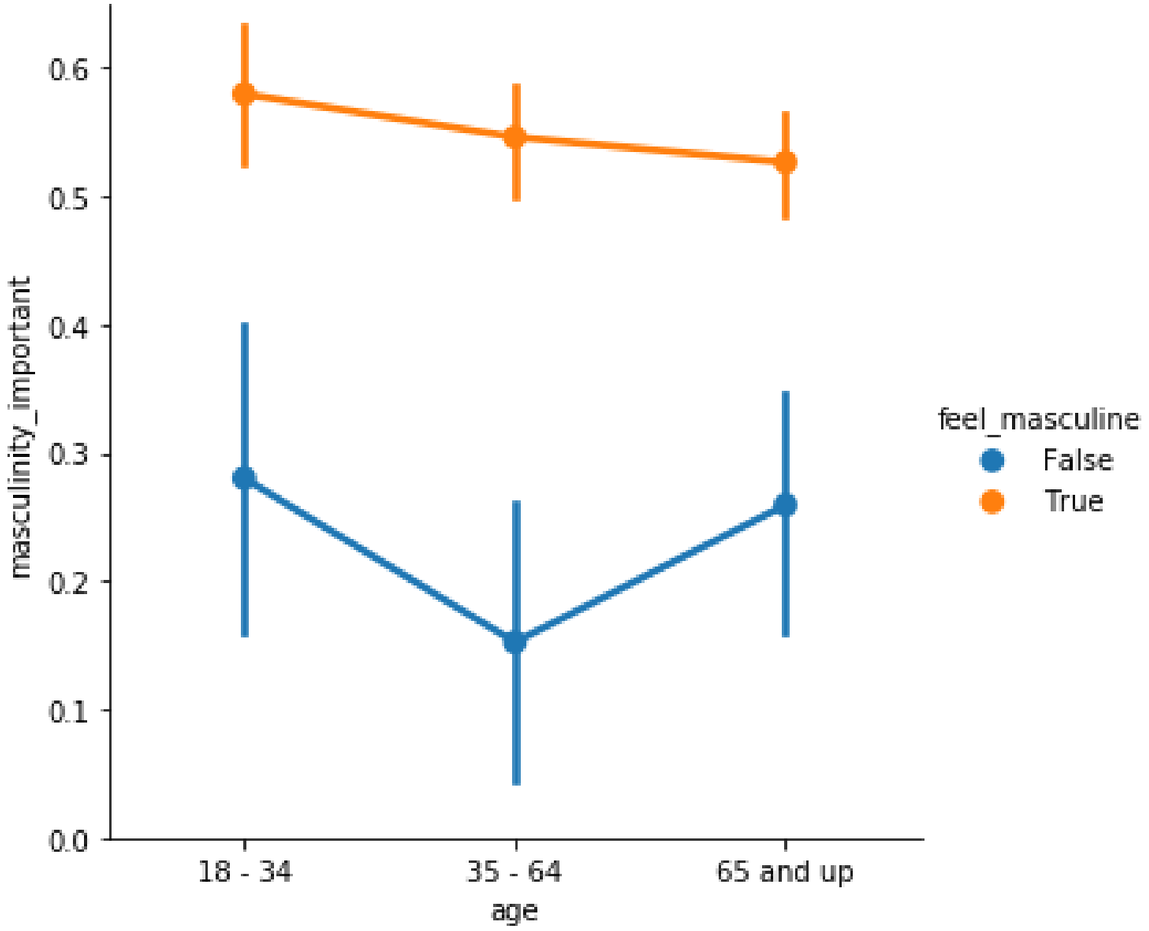
Point plots vs. bar plots

Both show:

- Mean of quantitative variable
- 95% confidence intervals for the mean

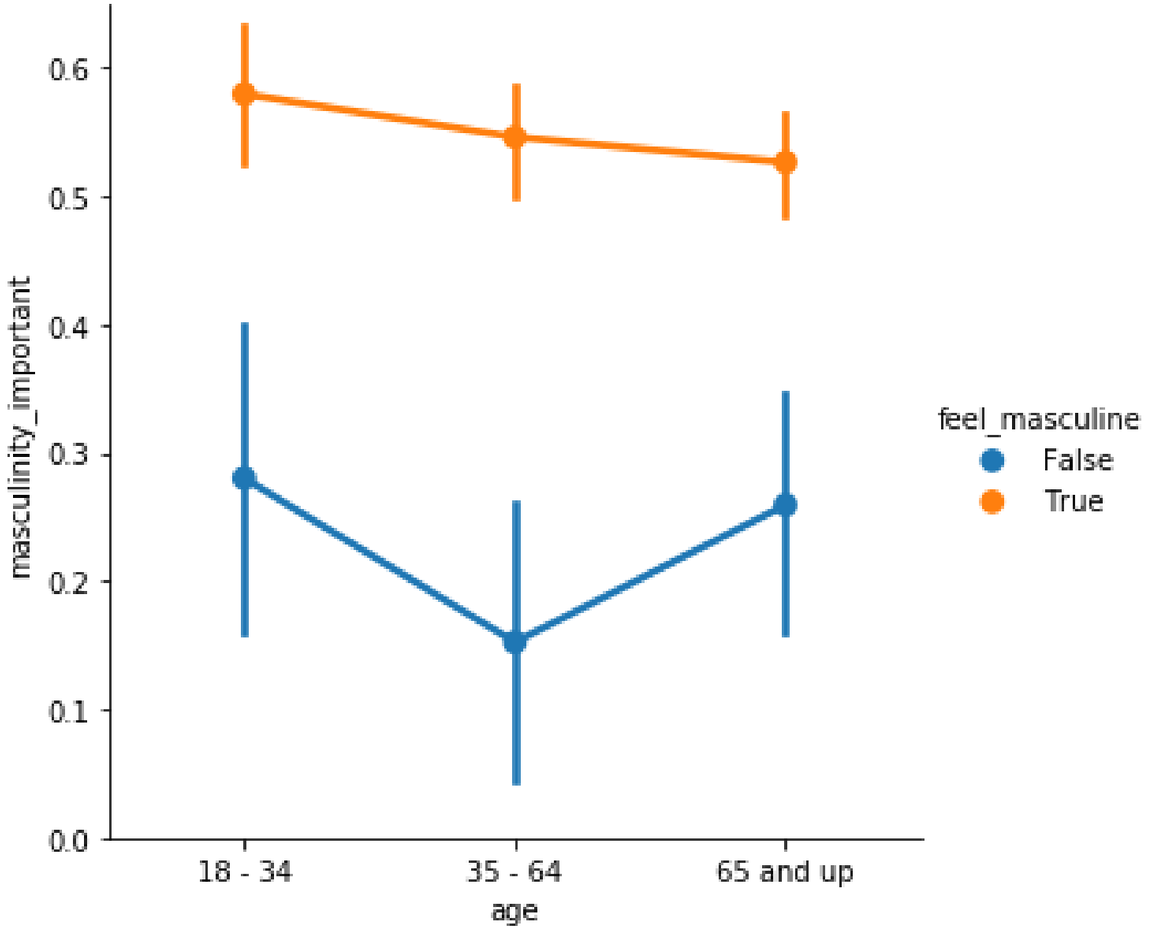
Point plots vs. bar plots





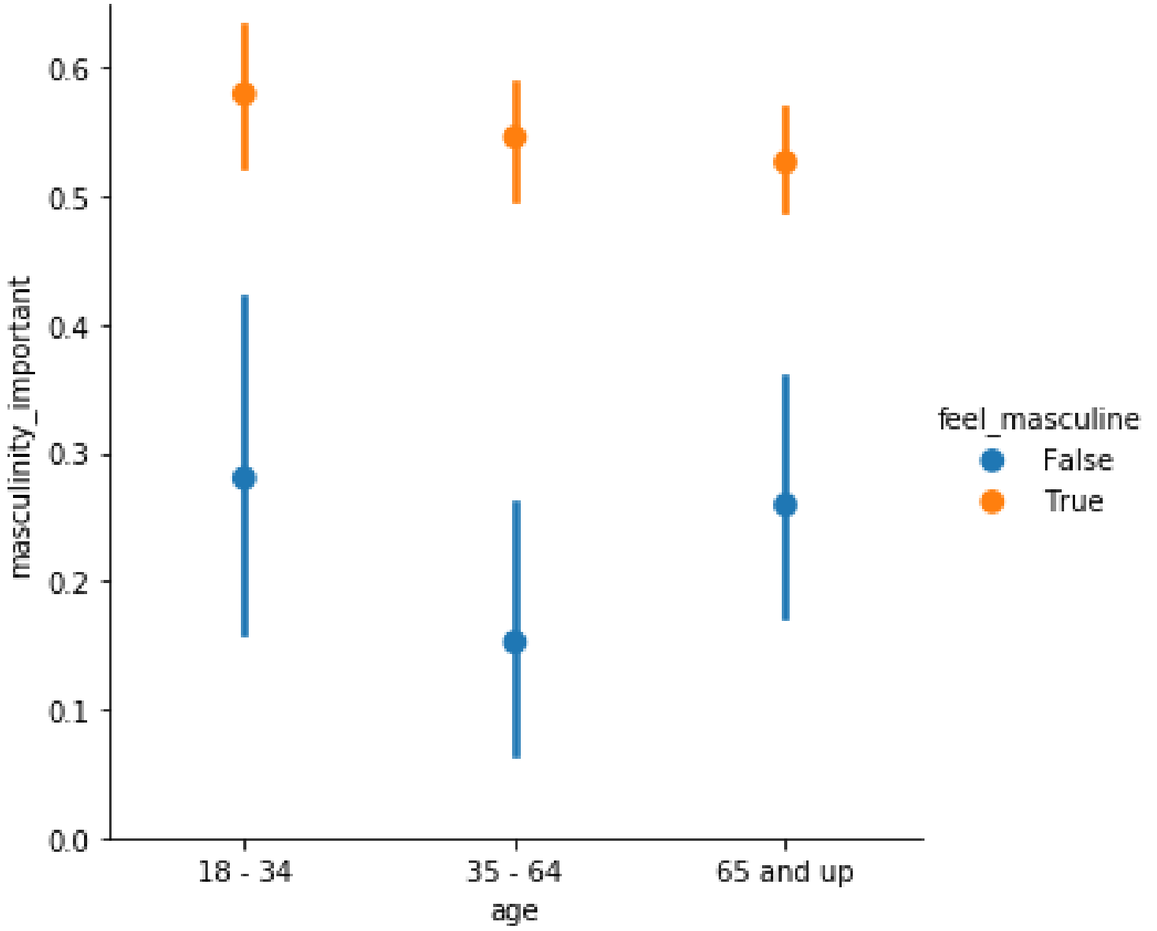
Creating a point plot

```
import matplotlib.pyplot as plt
import seaborn as sns

sns.catplot(x="age",
            y="masculinity_important",
            data=masculinity_data,
            hue="feel_masculine",
            kind="point")

plt.show()
```



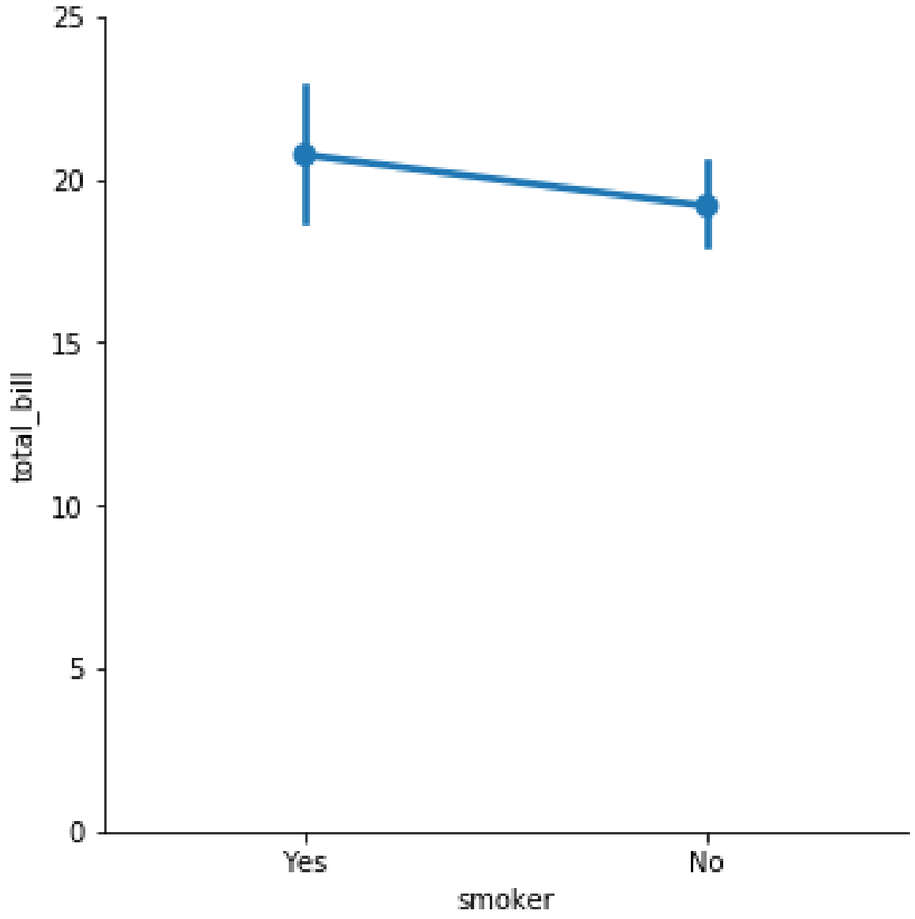
Disconnecting the points

```
import matplotlib.pyplot as plt
import seaborn as sns

sns.catplot(x="age",
            y="masculinity_important",
            data=masculinity_data,
            hue="feel_masculine",
            kind="point",
            join=False)
plt.show()
```



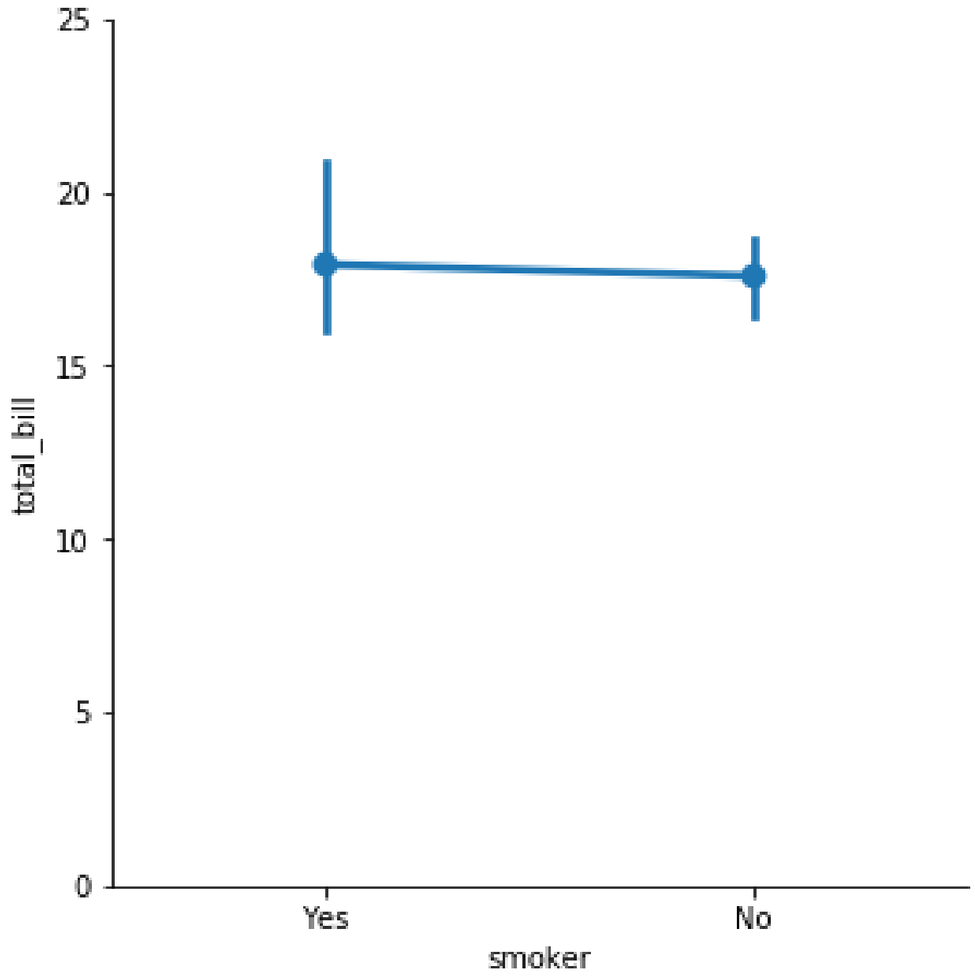
Displaying the median

```
import matplotlib.pyplot as plt
import seaborn as sns

sns.catplot(x="smoker",
            y="total_bill",
            data=tips,
            kind="point")

plt.show()
```



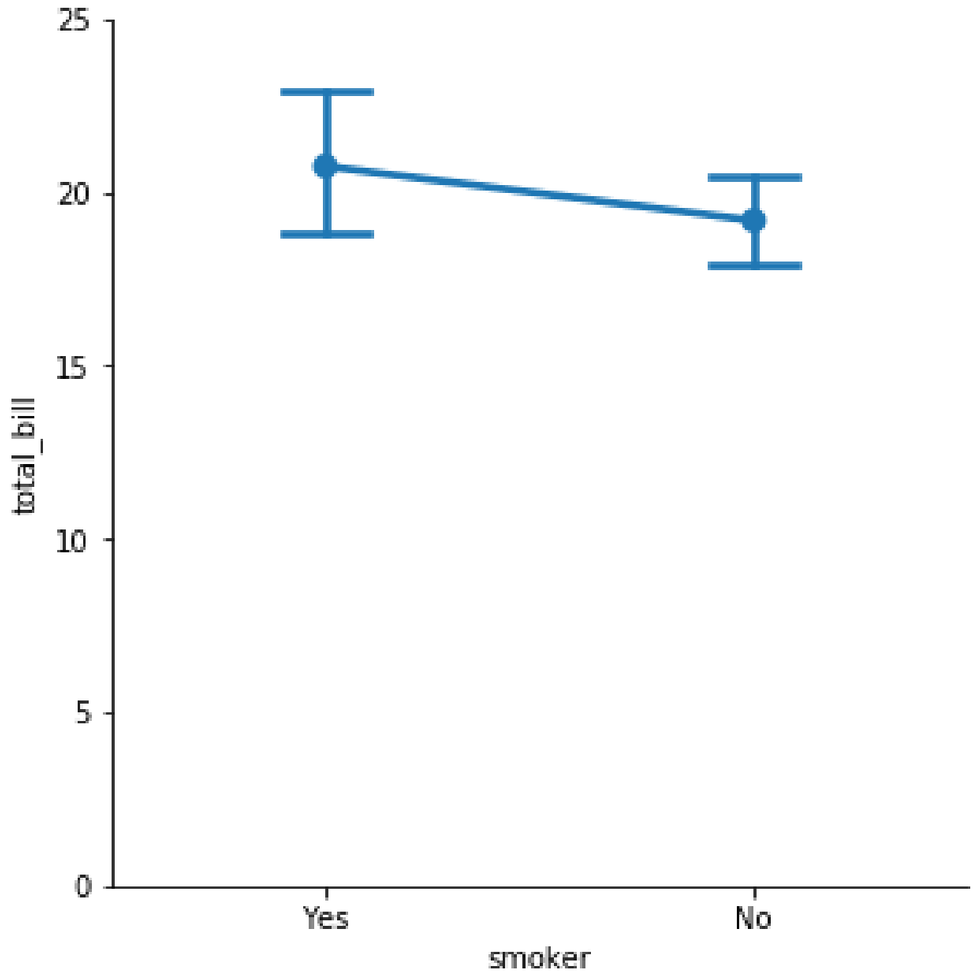
Displaying the median

```
import matplotlib.pyplot as plt
import seaborn as sns
from numpy import median

sns.catplot(x="smoker",
            y="total_bill",
            data=tips,
            kind="point",
            estimator=median)

plt.show()
```



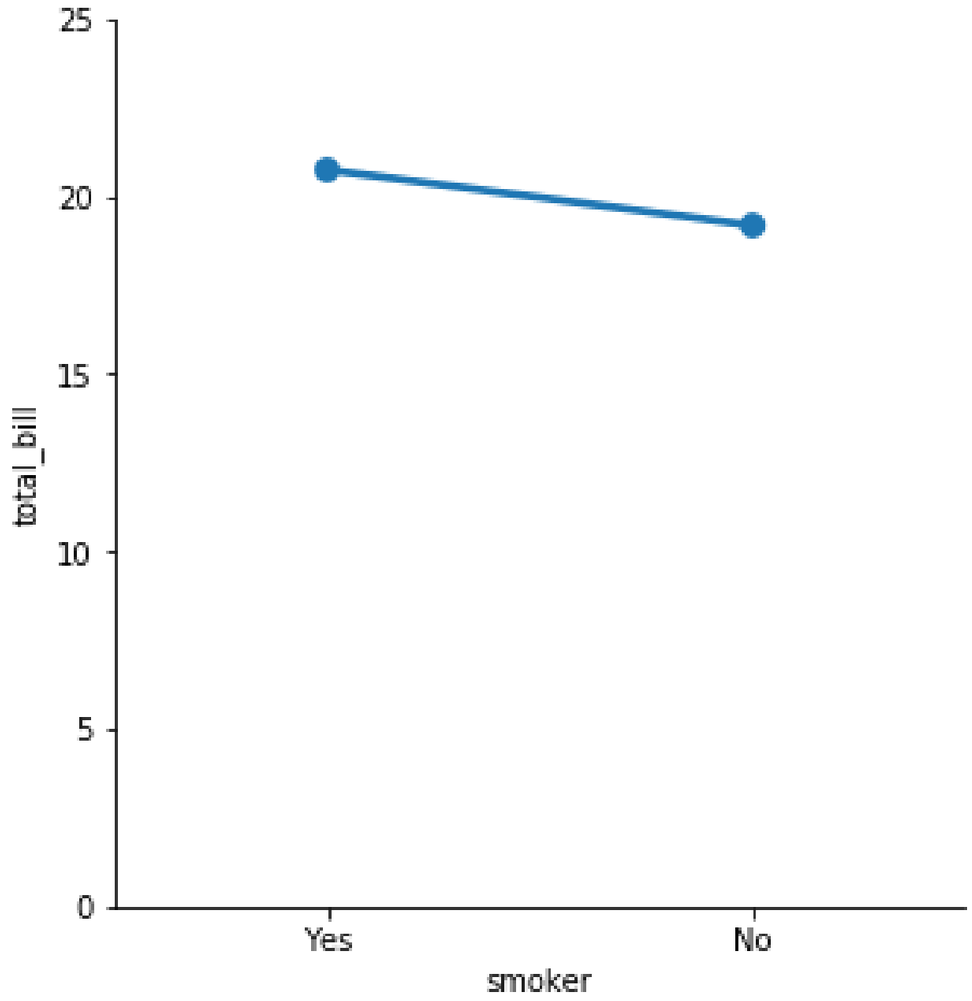
Customizing the confidence intervals

```
import matplotlib.pyplot as plt
import seaborn as sns

sns.catplot(x="smoker",
            y="total_bill",
            data=tips,
            kind="point",
            capsize=0.2)
plt.show()
```



Turning off confidence intervals

```
import matplotlib.pyplot as plt
import seaborn as sns

sns.catplot(x="smoker",
            y="total_bill",
            data=tips,
            kind="point",
            ci=None)
plt.show()
```



Let's practice!

INTRODUCTION TO DATA VISUALIZATION WITH SEABORN

datacamp

Changing plot style and color

INTRODUCTION TO DATA VISUALIZATION WITH SEABORN

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Data Scientist

datacamp

Why customize?

Reasons to change style:

- Personal preference
- Improve readability
- Guide interpretation

Changing the figure style

- Figure "style" includes background and axes
- Preset options: "white", "dark", "whitegrid", "darkgrid", "ticks"
- `sns.set_style()`

Default figure style ("white")

```
sns.catplot(x="age",
            y="masculinity_important",
            data=masculinity_data,
            hue="feel_masculine",
            kind="point")

plt.show()
```

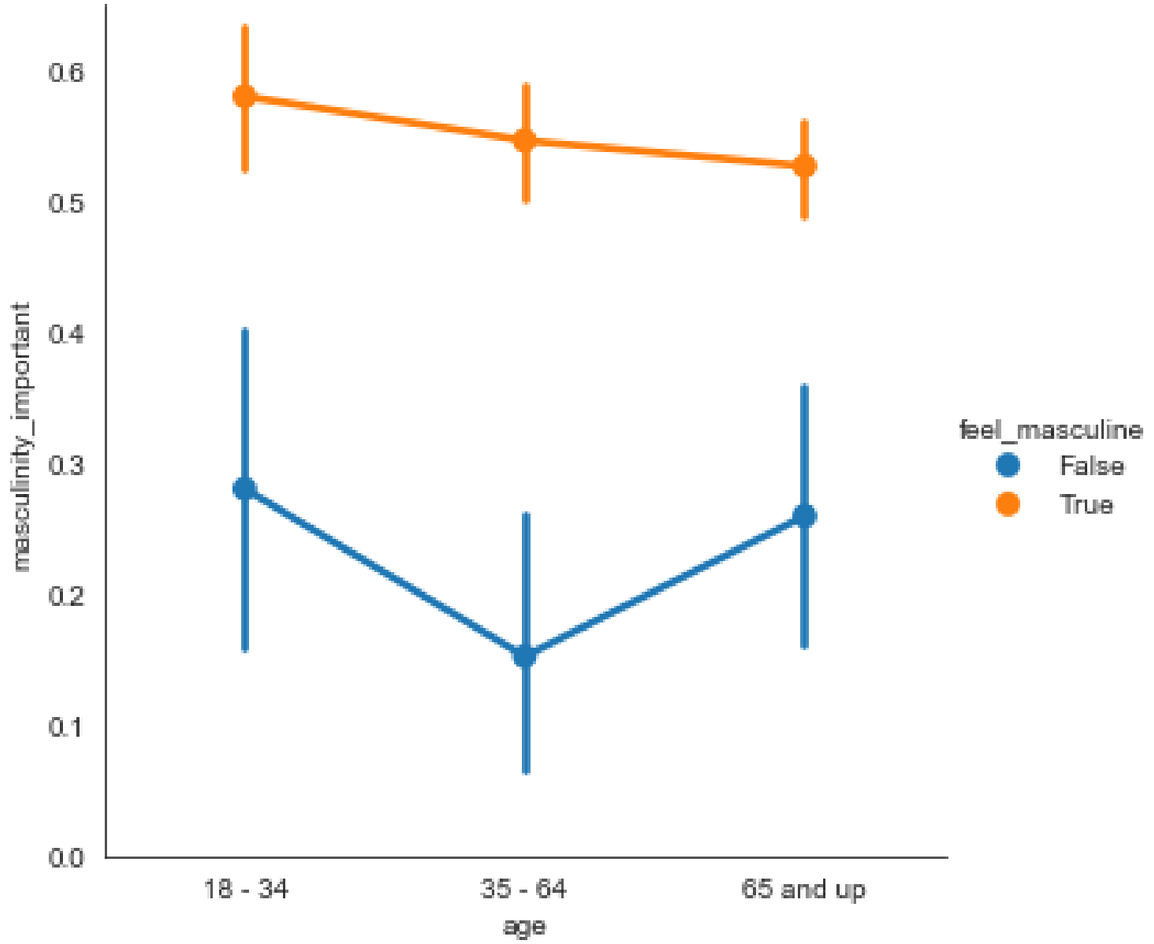
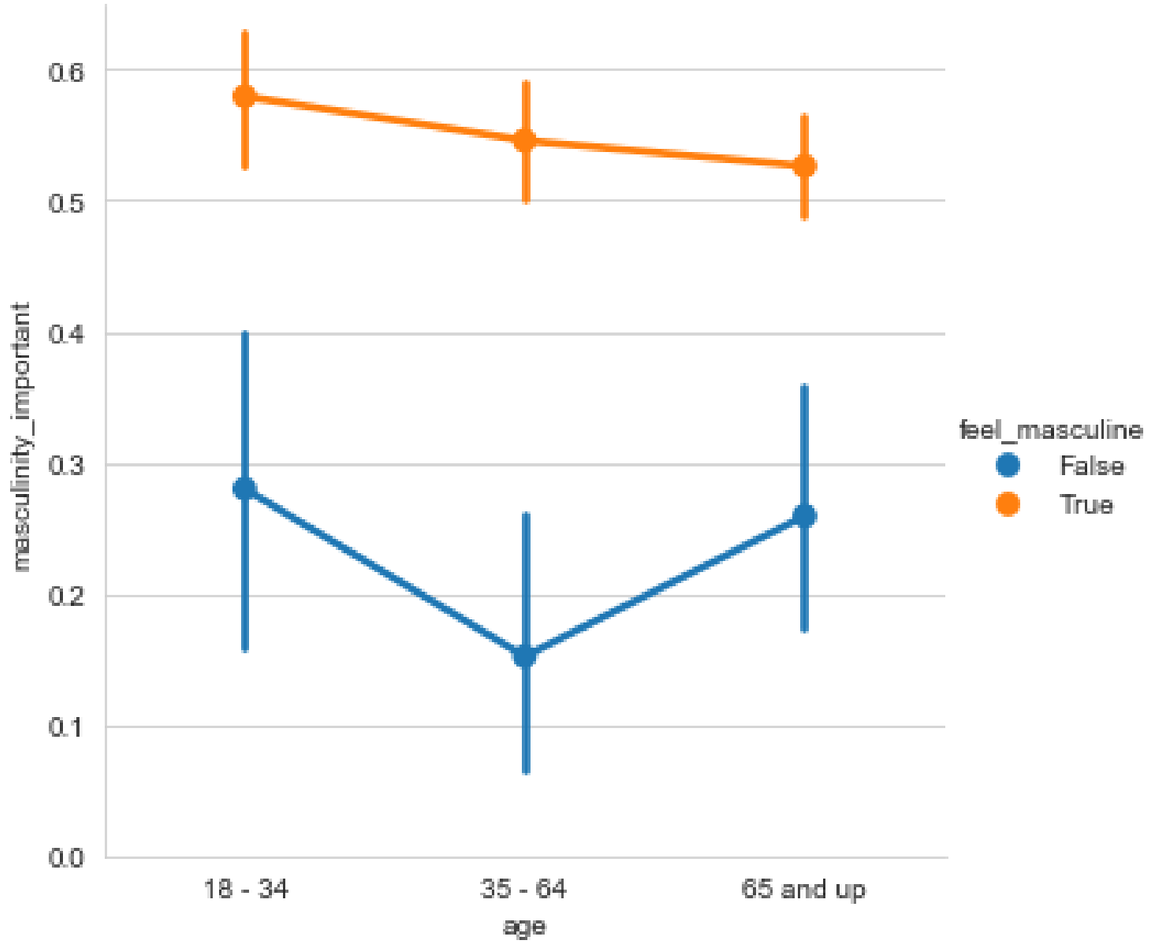


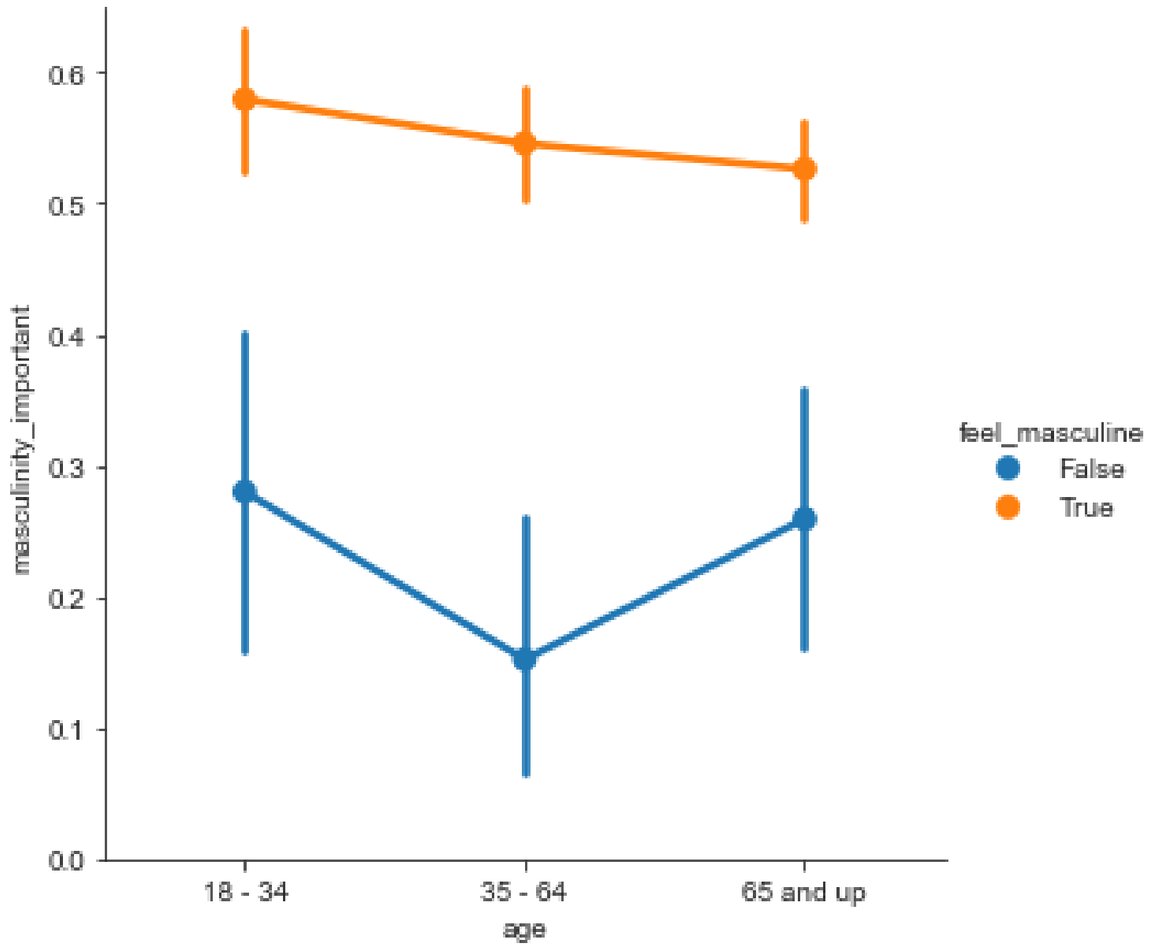
Figure style: "whitegrid"

```
sns.set_style("whitegrid")

sns.catplot(x="age",
            y="masculinity_important",
            data=masculinity_data,
            hue="feel_masculine",
            kind="point")

plt.show()
```



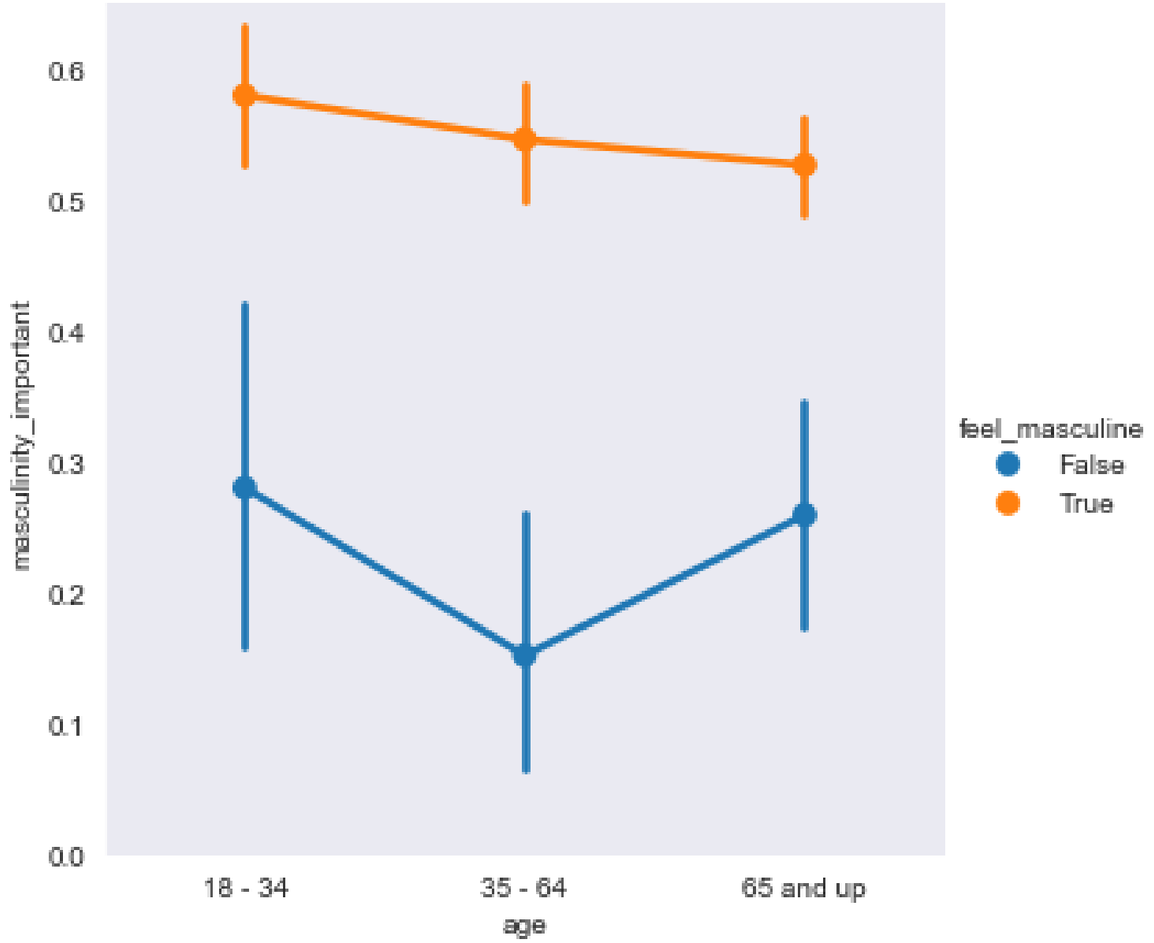
Other styles

```
sns.set_style("ticks")

sns.catplot(x="age",
            y="masculinity_important",
            data=masculinity_data,
            hue="feel_masculine",
            kind="point")

plt.show()
```



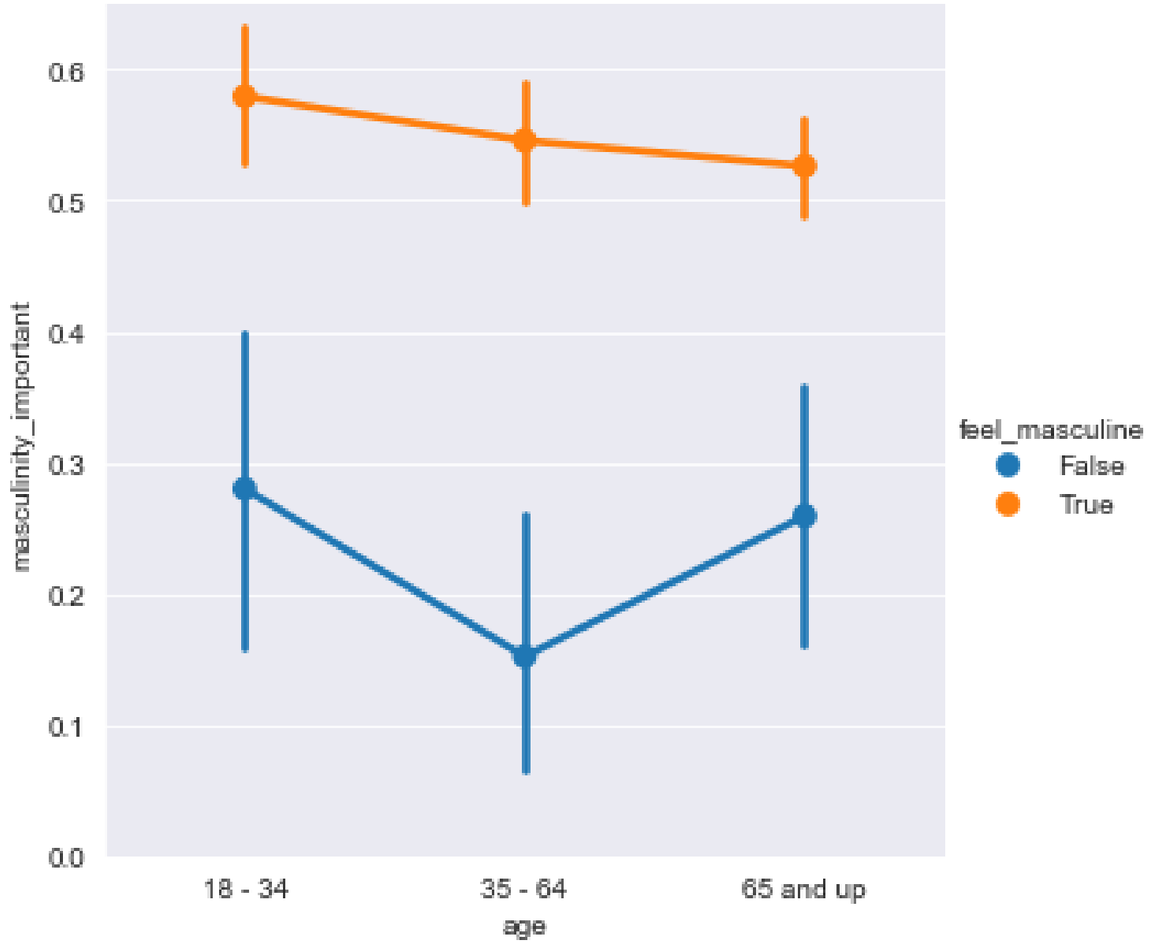
Other styles

```
sns.set_style("dark")

sns.catplot(x="age",
            y="masculinity_important",
            data=masculinity_data,
            hue="feel_masculine",
            kind="point")

plt.show()
```



Other styles

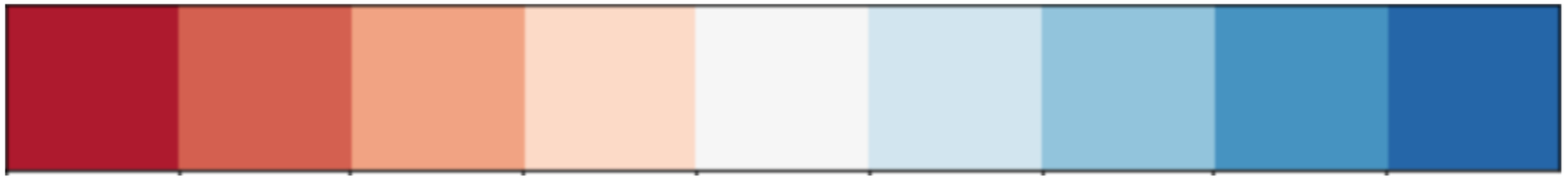
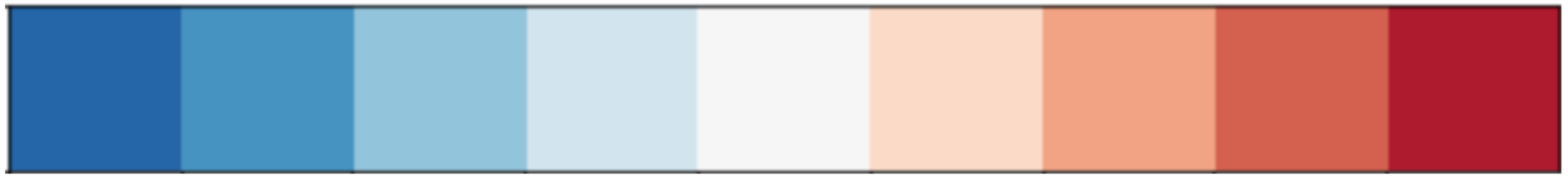
```
sns.set_style("darkgrid")

sns.catplot(x="age",
            y="masculinity_important",
            data=masculinity_data,
            hue="feel_masculine",
            kind="point")

plt.show()
```



Changing the palette

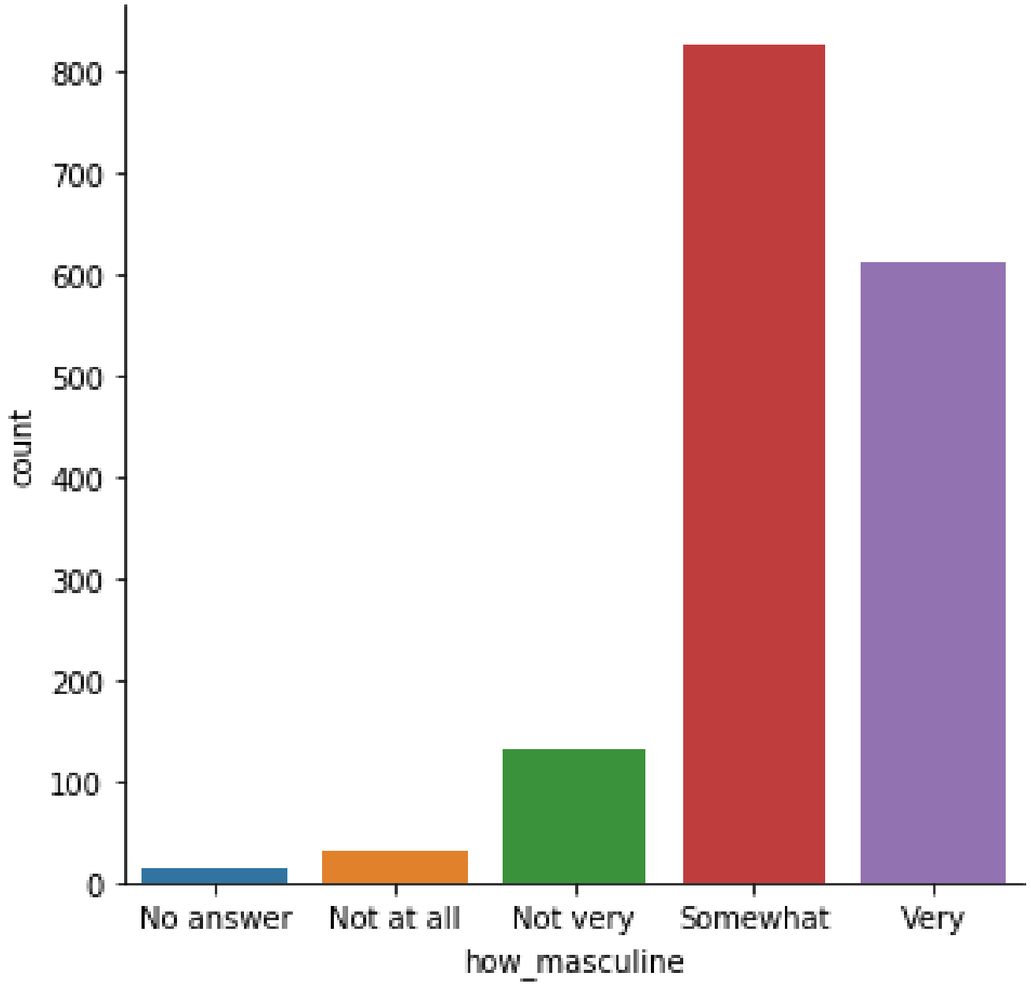
- Figure "palette" changes the color of the main elements of the plot
- `sns.set_palette()`
- Use preset palettes or create a custom palette

Diverging palettes

“RdBu”	
“PRGn”	
“RdBu_r”	
“PRGn_r”	

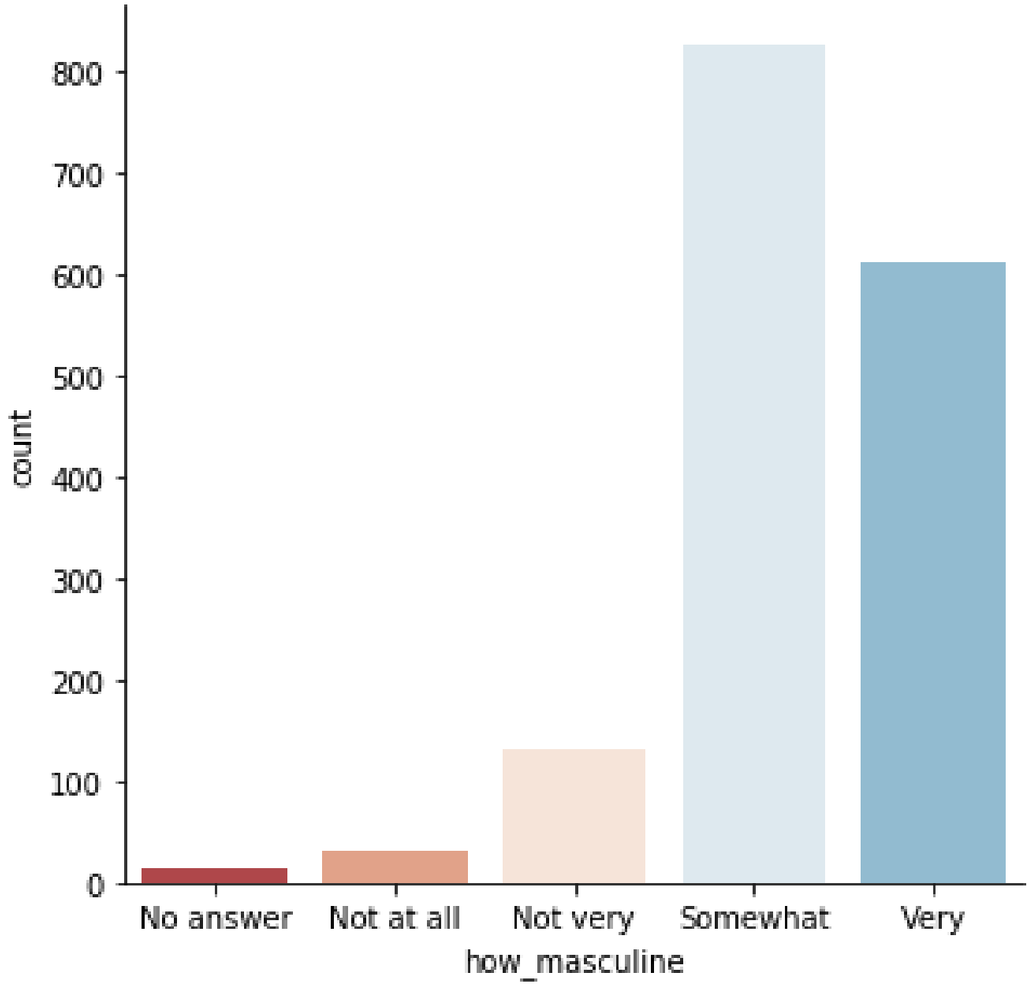
Example (default palette)

```
category_order = ["No answer",
                  "Not at all",
                  "Not very",
                  "Somewhat",
                  "Very"]

sns.catplot(x="how_masculine",
            data=masculinity_data,
            kind="count",
            order=category_order)

plt.show()
```

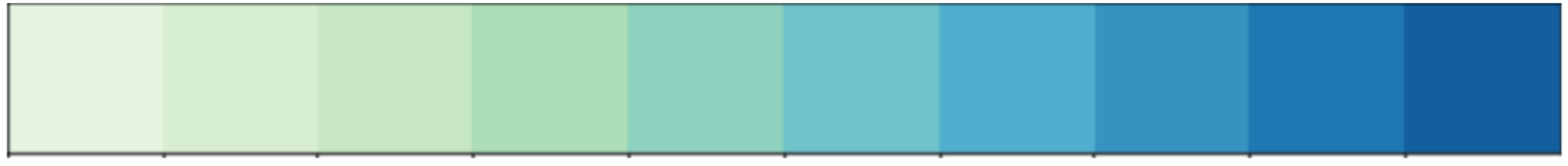


Example (diverging palette)

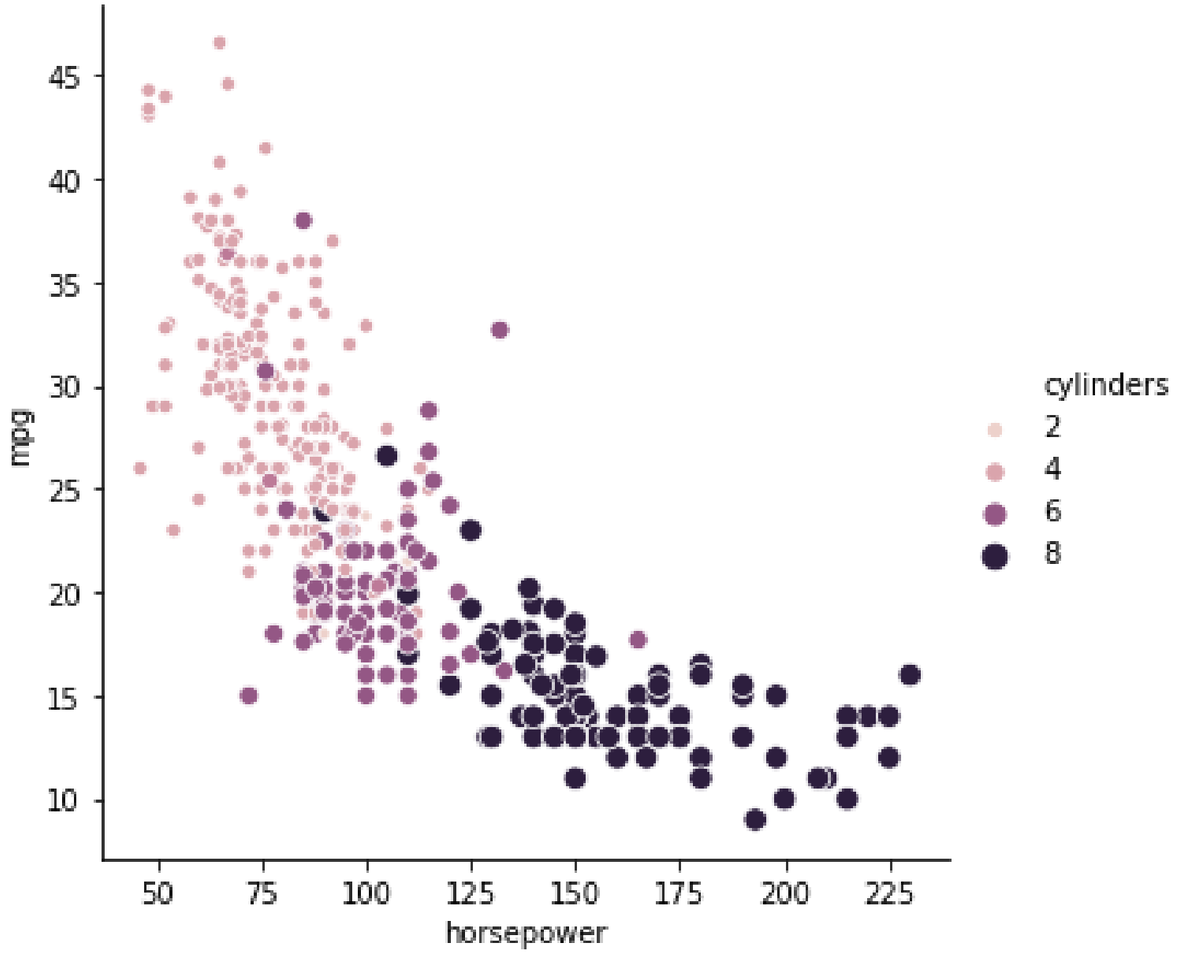
```
sns.set_palette("RdBu")

category_order = ["No answer",
                  "Not at all",
                  "Not very",
                  "Somewhat",
                  "Very"]

sns.catplot(x="how_masculine",
            data=masculinity_data,
            kind="count",
            order=category_order)

plt.show()
```



Sequential palettes

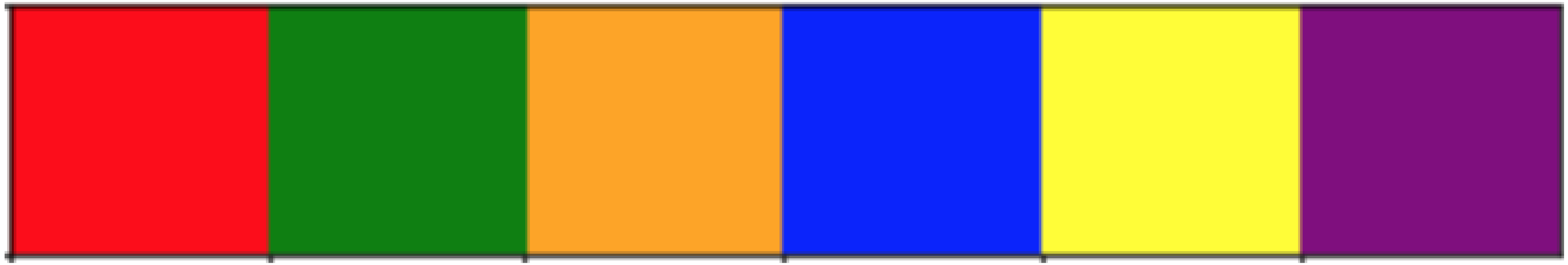
“Greys”	
“Blues”	
“PuRd”	
“GnBu”	

Sequential palette example



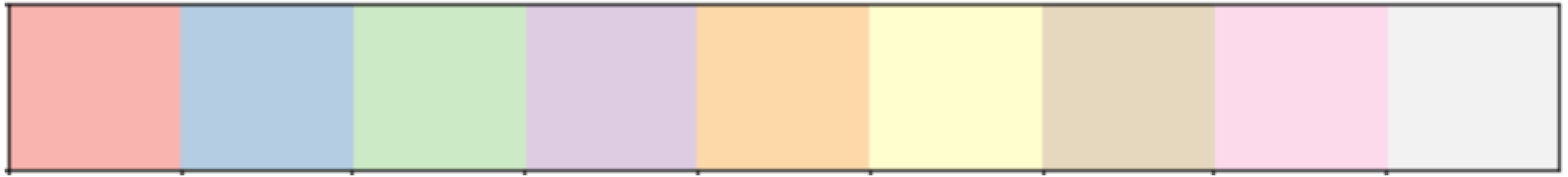
Custom palettes

```
custom_palette = ["red", "green", "orange", "blue",
                  "yellow", "purple"]


sns.set_palette(custom_palette)
```



Custom palettes

```
custom_palette = ['#FBB4AE', '#B3CDE3', '#CCEBC5',
                  '#DECBE4', '#FED9A6', '#FFFFCC',
                  '#E5D8BD', '#FDDAEC', '#F2F2F2']

sns.set_palette(custom_palette)
```

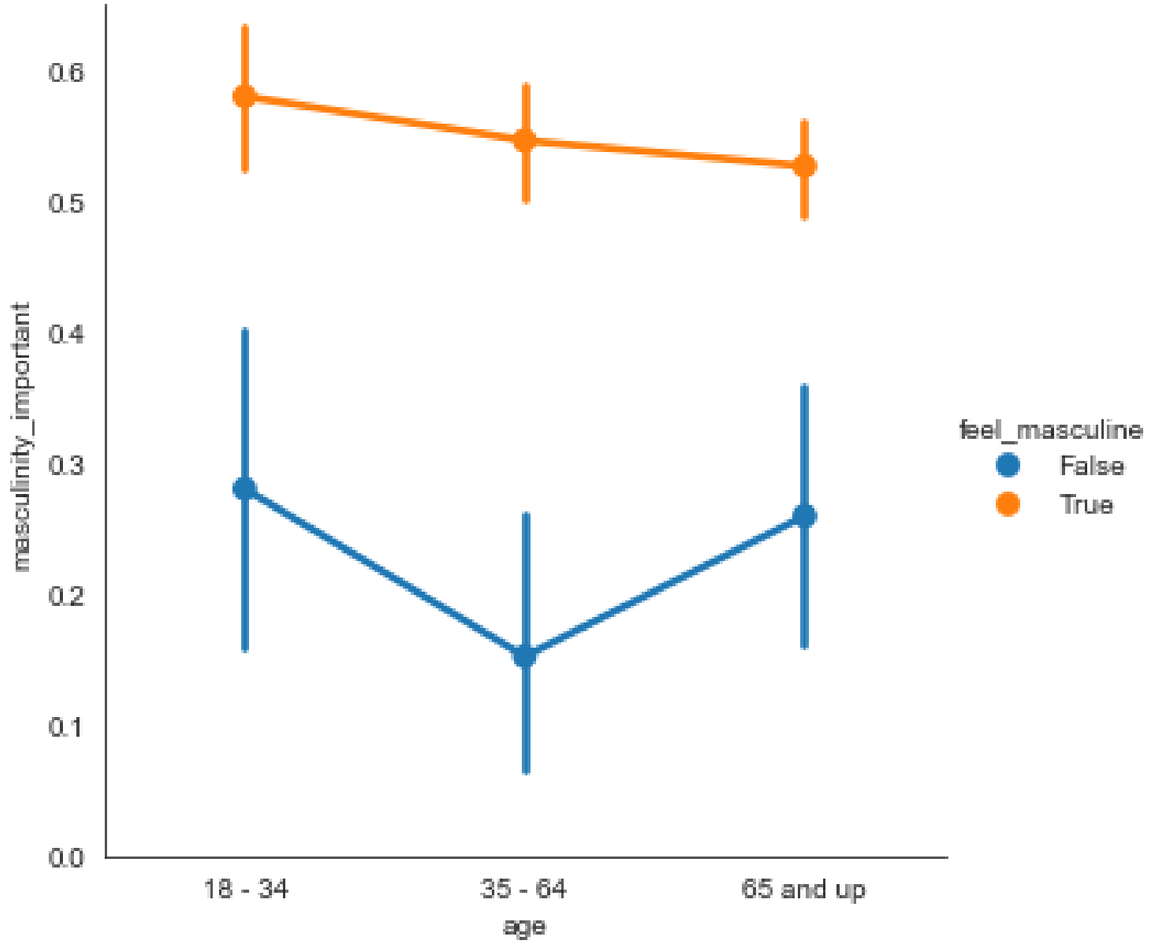


Changing the scale

- Figure "context" changes the scale of the plot elements and labels
- `sns.set_context()`
- Smallest to largest: "paper", "notebook", "talk", "poster"

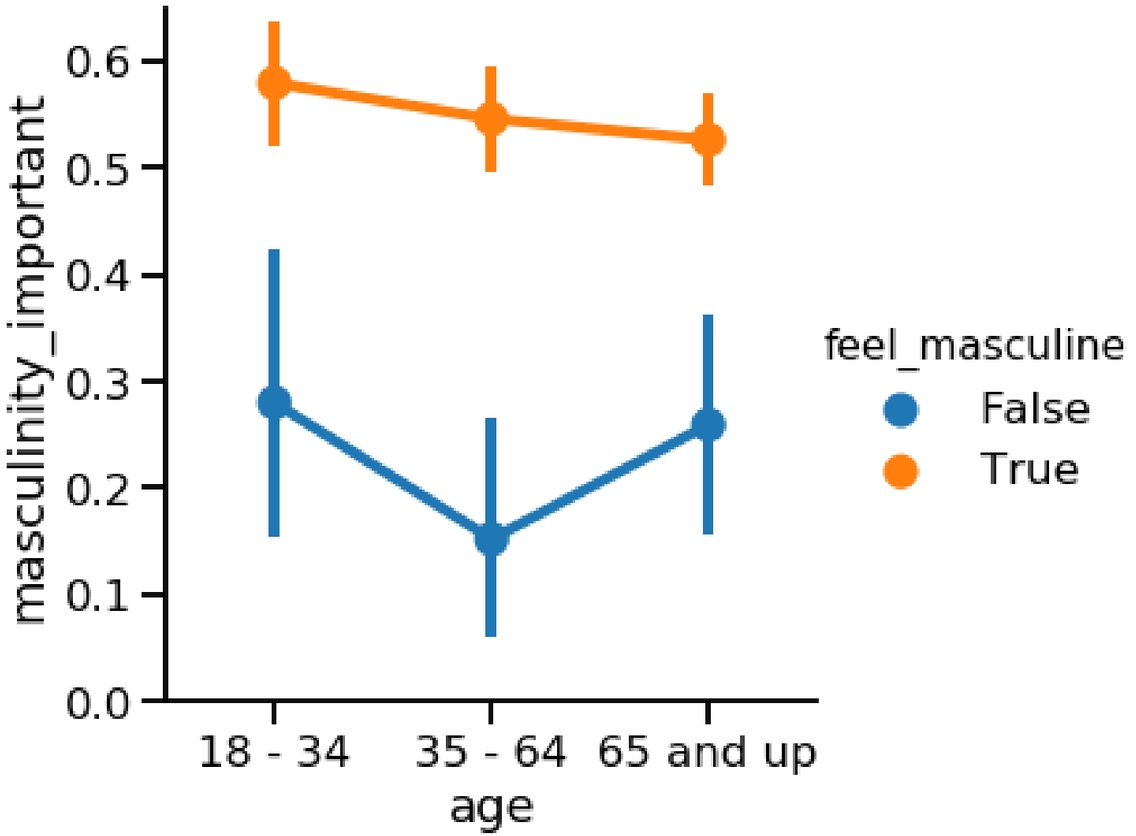
Default context: "paper"

```
sns.catplot(x="age",
            y="masculinity_important",
            data=masculinity_data,
            hue="feel_masculine",
            kind="point")

plt.show()
```



Larger context: "talk"

```
sns.set_context("talk")

sns.catplot(x="age",
            y="masculinity_important",
            data=masculinity_data,
            hue="feel_masculine",
            kind="point")

plt.show()
```



Let's practice!

INTRODUCTION TO DATA VISUALIZATION WITH SEABORN

Adding titles and labels: Part 1

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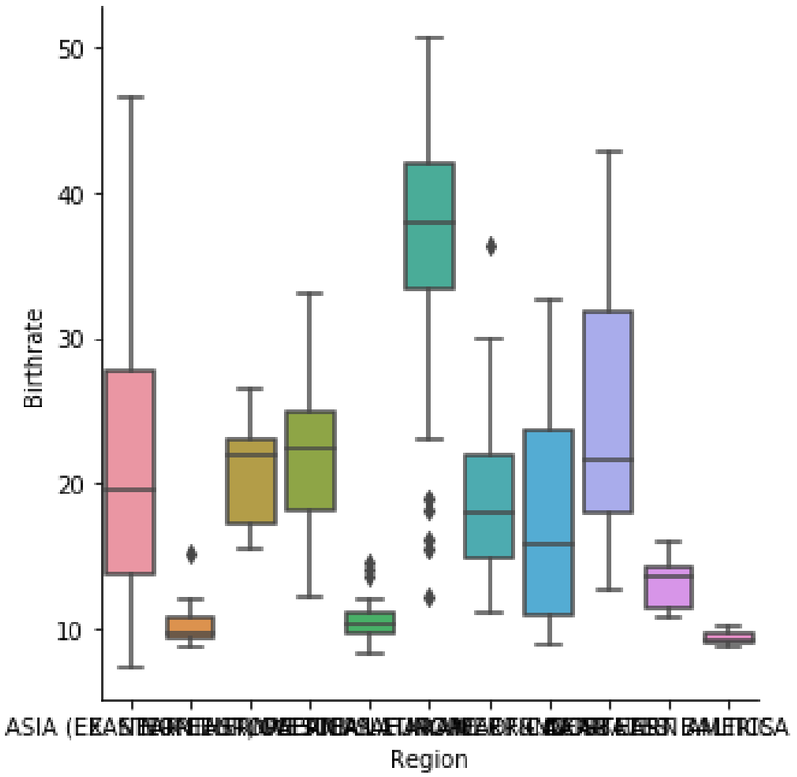
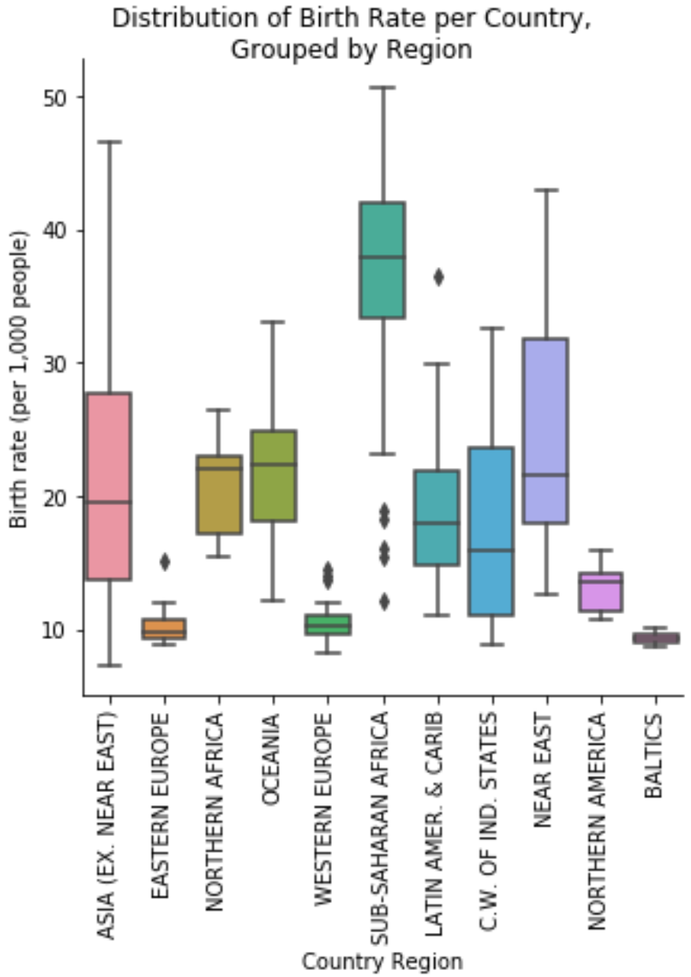
Creating informative visualizations





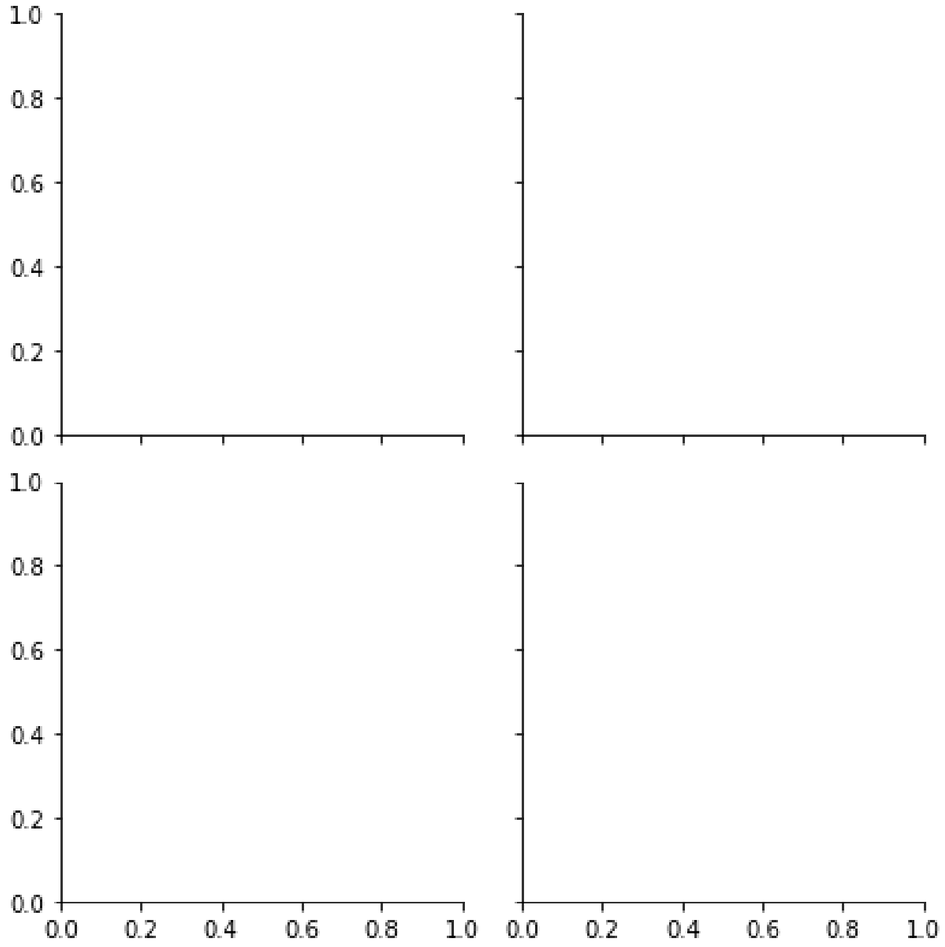
FacetGrid vs. AxesSubplot objects

Seaborn plots create two different types of objects: `FacetGrid` and `AxesSubplot`

```
g = sns.scatterplot(x="height", y="weight", data=df)
type(g)
```

```
> matplotlib.axes._subplots.AxesSubplot
```

An Empty FacetGrid

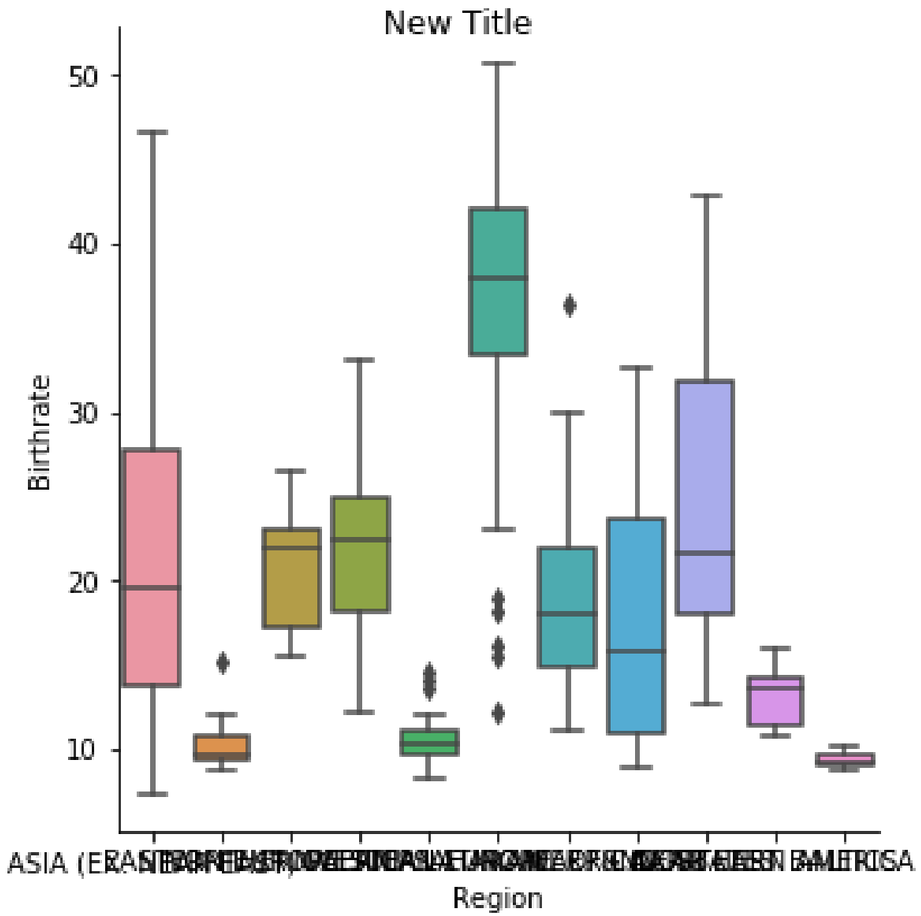


FacetGrid vs. AxesSubplot objects

Object Type	Plot Types	Characteristics
`FacetGrid`	`relplot()`, `catplot()`	Can create subplots
`AxesSubplot`	`scatterplot()`, `countplot()`, etc.	Only creates a single plot

Adding a title to FacetGrid

```
g = sns.catplot(x="Region",
                y="Birthrate",
                data=gdp_data,
                kind="box")
g.fig.suptitle("New Title")
plt.show()
```

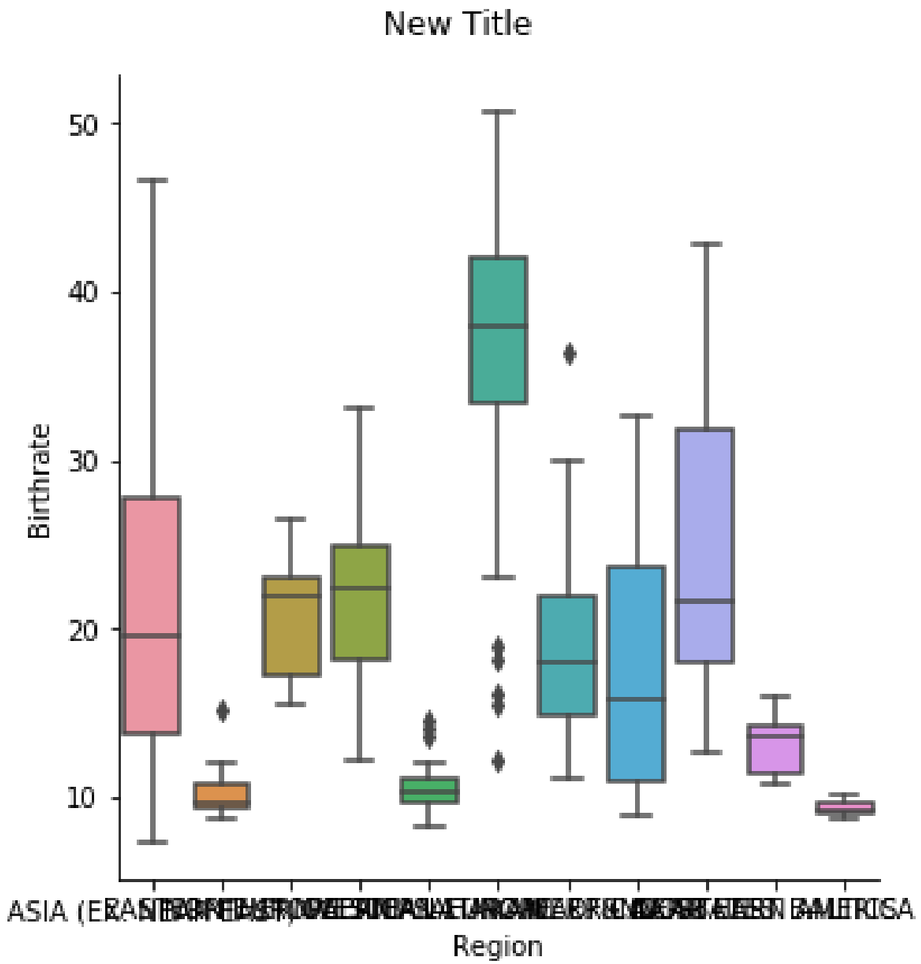


Adjusting height of title in FacetGrid

```
g = sns.catplot(x="Region",
                y="Birthrate",
                data=gdp_data,
                kind="box")

g.fig.suptitle("New Title",
               y=1.03)

plt.show()
```



Let's practice!

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Adding titles and labels: Part 2

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Adding a title to AxesSubplot

FacetGrid

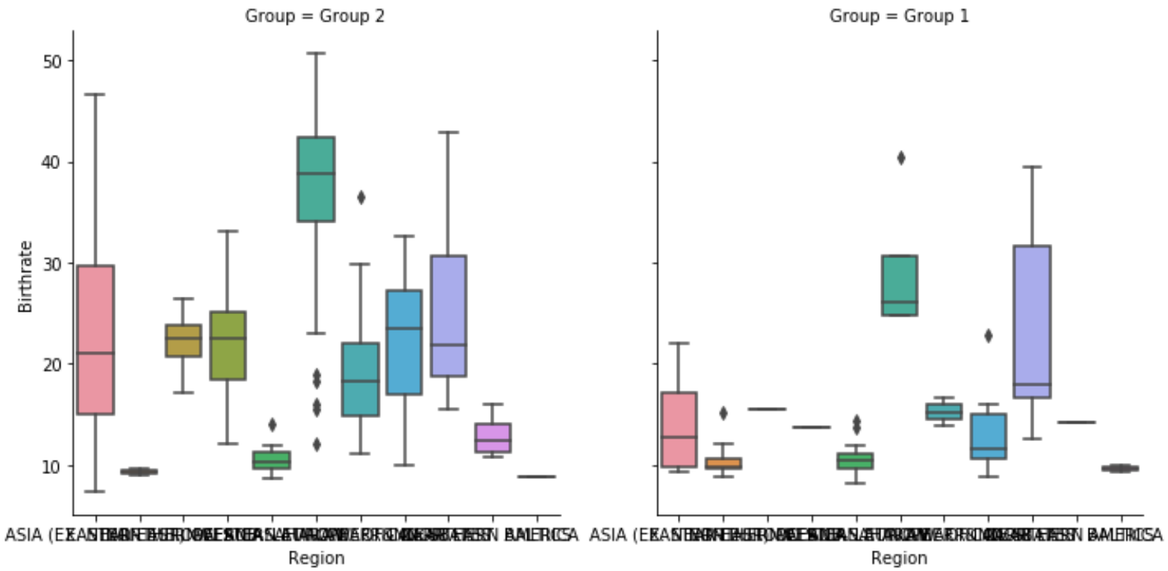
```
g = sns.catplot(x="Region",
                y="Birthrate",
                data=gdp_data,
                kind="box")

g.fig.suptitle("New Title",
               y=1.03)
```

AxesSubplot

```
g = sns.boxplot(x="Region",
                y="Birthrate",
                data=gdp_data)


g.set_title("New Title",
            y=1.03)
```

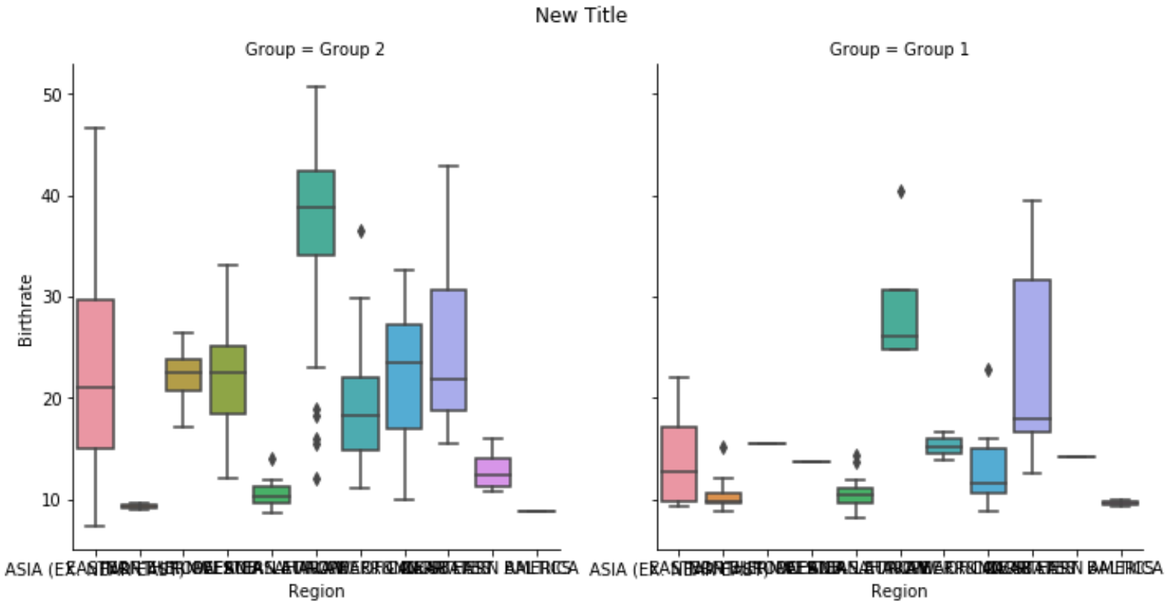
Titles for subplots

```
g = sns.catplot(x="Region",
                y="Birthrate",
                data=gdp_data,
                kind="box",
                col="Group")
```



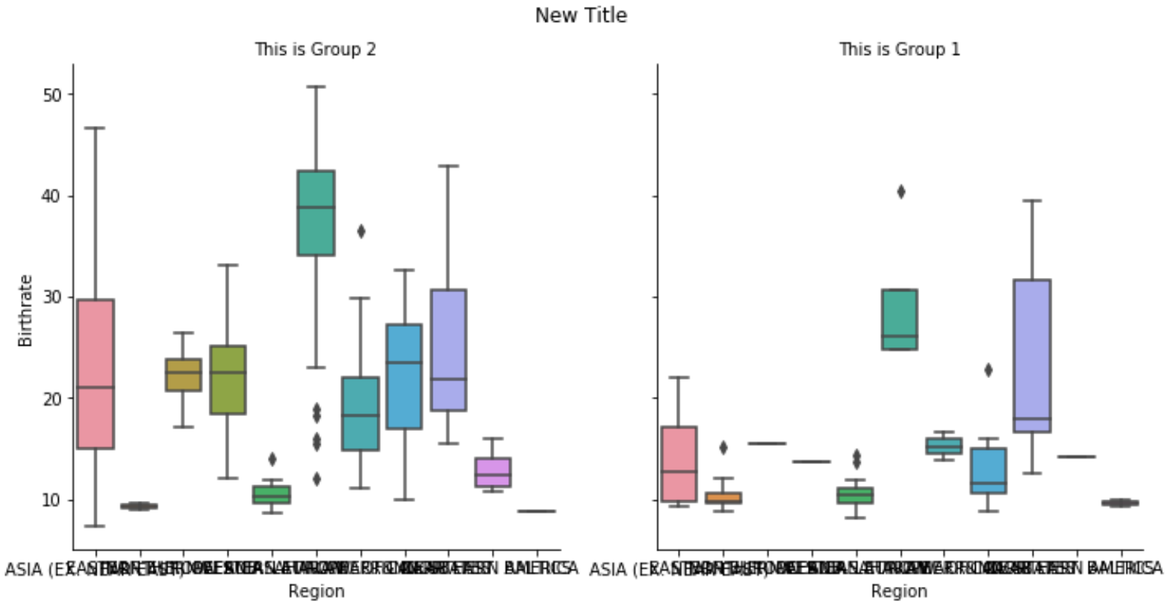
Titles for subplots

```
g = sns.catplot(x="Region",
                y="Birthrate",
                data=gdp_data,
                kind="box",
                col="Group")

g.fig.suptitle("New Title",
               y=1.03)
```



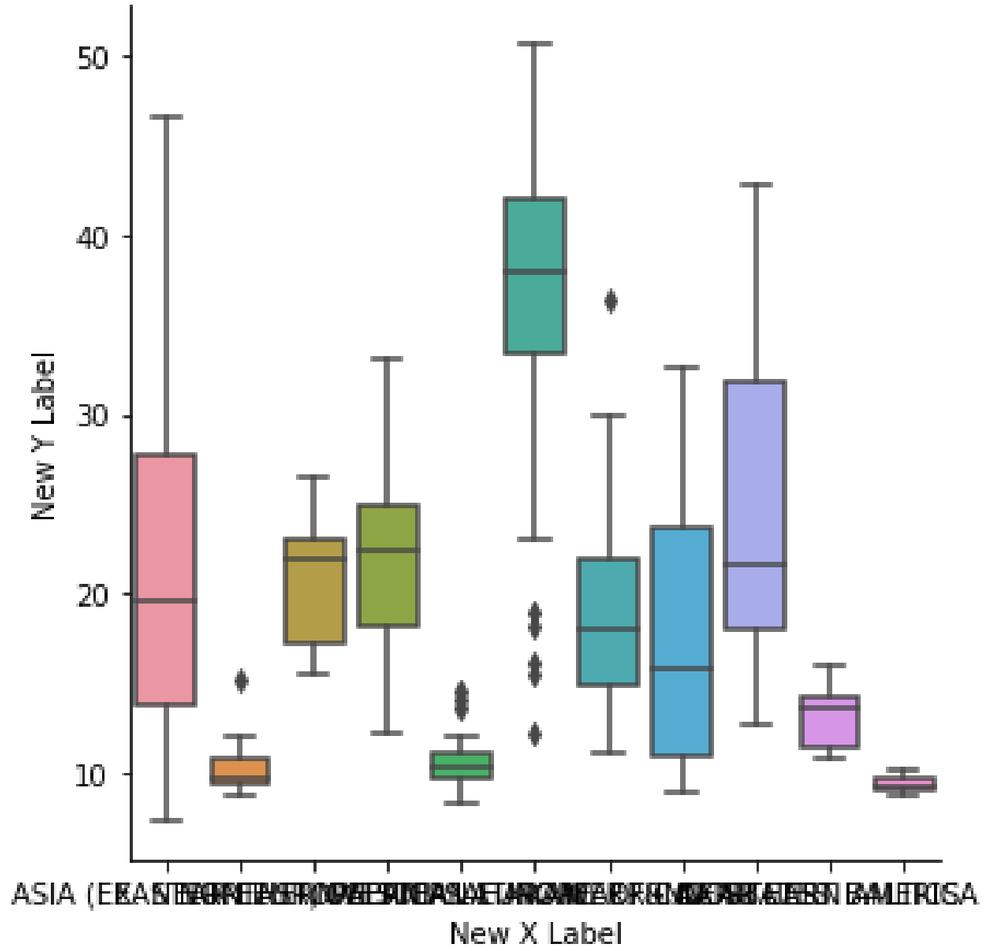
Titles for subplots

```
g = sns.catplot(x="Region",
                y="Birthrate",
                data=gdp_data,
                kind="box",
                col="Group")

g.fig.suptitle("New Title",
               y=1.03)

g.set_titles("This is {col_name}")
```



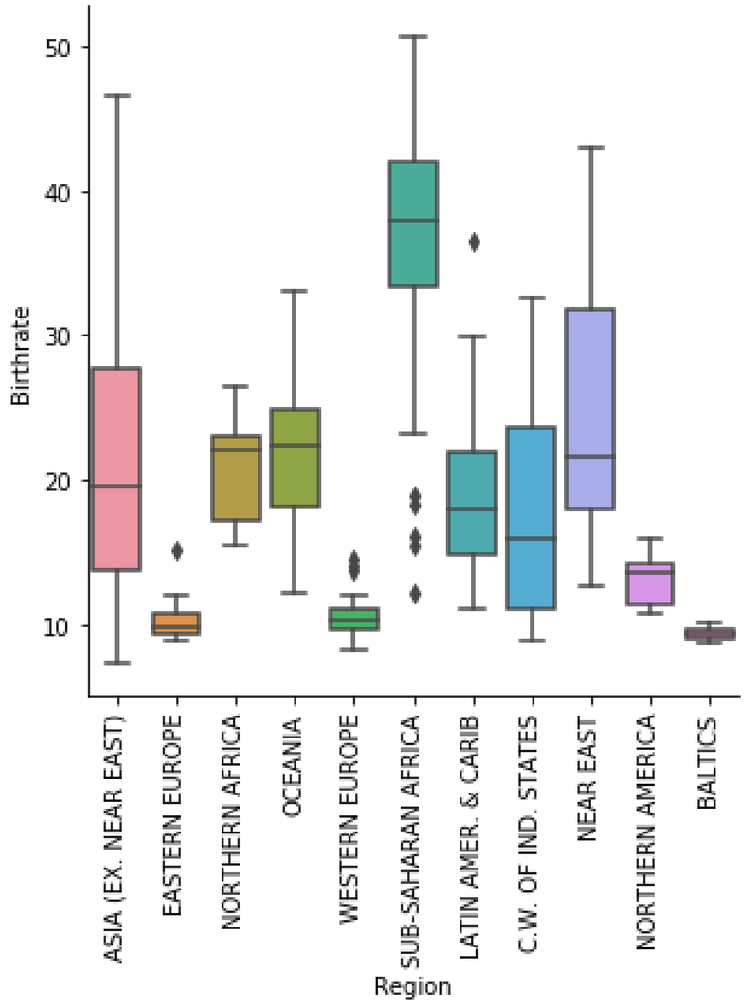
Adding axis labels

```
g = sns.catplot(x="Region",
                y="Birthrate",
                data=gdp_data,
                kind="box")
`

g.set(xlabel="New X Label",
      ylabel="New Y Label")

plt.show()
```



Rotating x-axis tick labels

```
g = sns.catplot(x="Region",
                y="Birthrate",
                data=gdp_data,
                kind="box")
plt.xticks(rotation=90)
plt.show()
```



Let's practice!

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Putting it all together

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Getting started

To import Seaborn:

```
import seaborn as sns
```

To import Matplotlib:

```
import matplotlib.pyplot as plt
```

To show a plot:

```
plt.show()
```

Relational plots

- Show the relationship between two quantitative variables
- Examples: scatter plots, line plots

```
sns.relplot(x="x_variable_name",
            y="y_variable_name",
            data=pandas_df,
            kind="scatter")
```

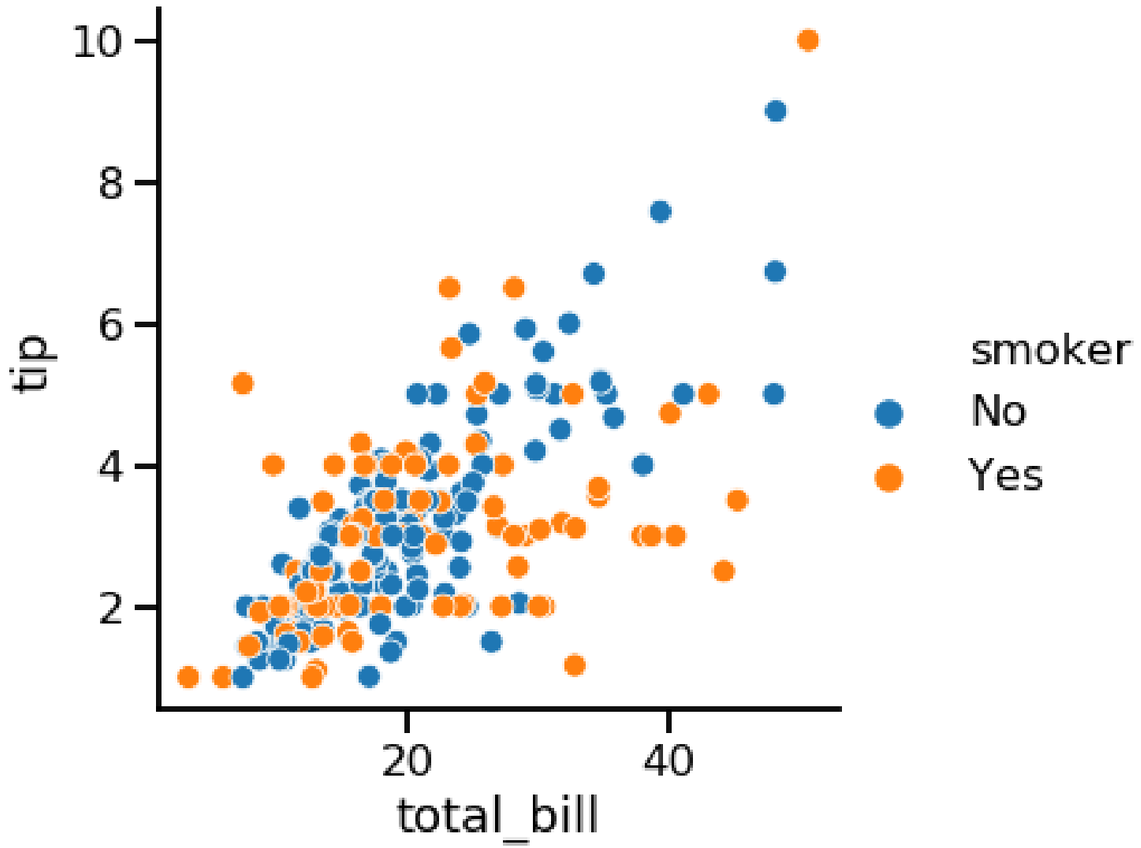
Categorical plots

- Show the distribution of a quantitative variable within categories defined by a categorical variable
- Examples: bar plots, count plots, box plots, point plots

```
sns.catplot(x="x_variable_name",
            y="y_variable_name",
            data=pandas_df,
            kind="bar")
```

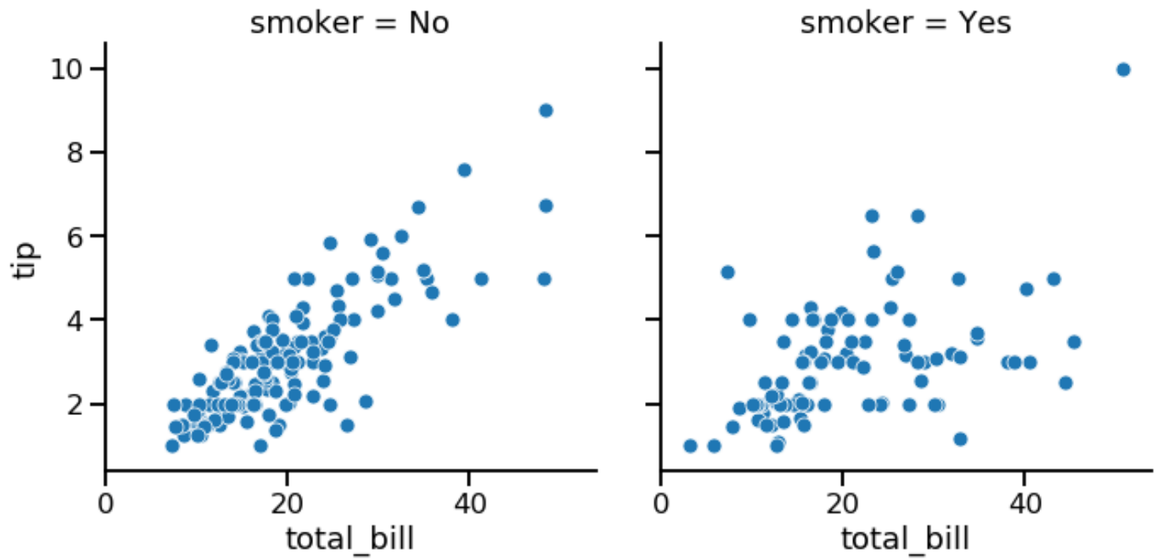
Adding a third variable (hue)

Setting `hue` will create subgroups that are displayed as different colors on a single plot.



Adding a third variable (row/col)

Setting `row` and/or `col` in `relplot()` or `catplot()` will create subgroups that are displayed on separate subplots.



Customization

- Change the background: `sns.set_style()`
- Change the main element colors: `sns.set_palette()`
- Change the scale: `sns.set_context()`

Adding a title

Object Type	Plot Types	How to Add Title
`FacetGrid`	`relplot()`, `catplot()`	`g.fig.suptitle()`
`AxesSubplot`	`scatterplot()`, `countplot()`, etc.	`g.set_title()`

Final touches

Add x- and y-axis labels:

```
g.set(xlabel="new x-axis label",
      ylabel="new y-axis label")
```

Rotate x-tick labels:

```
plt.xticks(rotation=90)
```

Let's practice!

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Well done! What's next?

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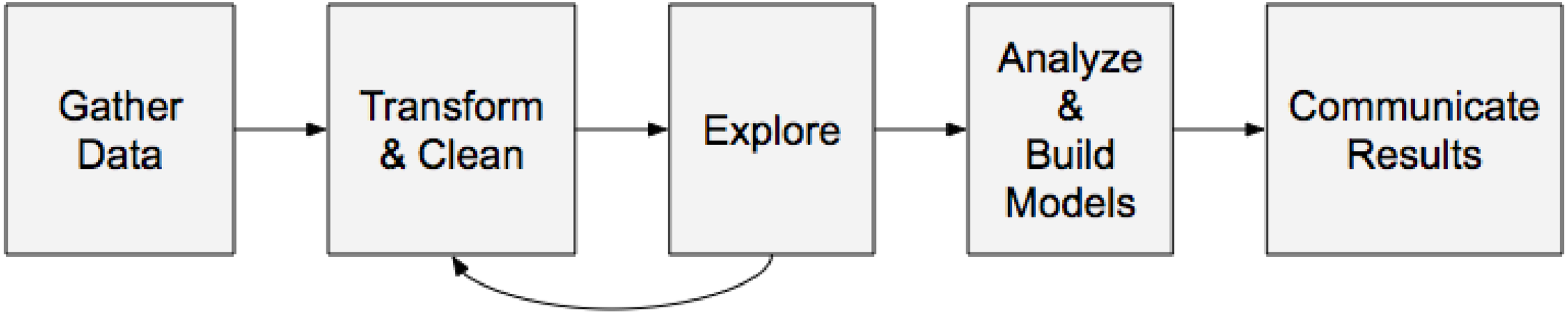
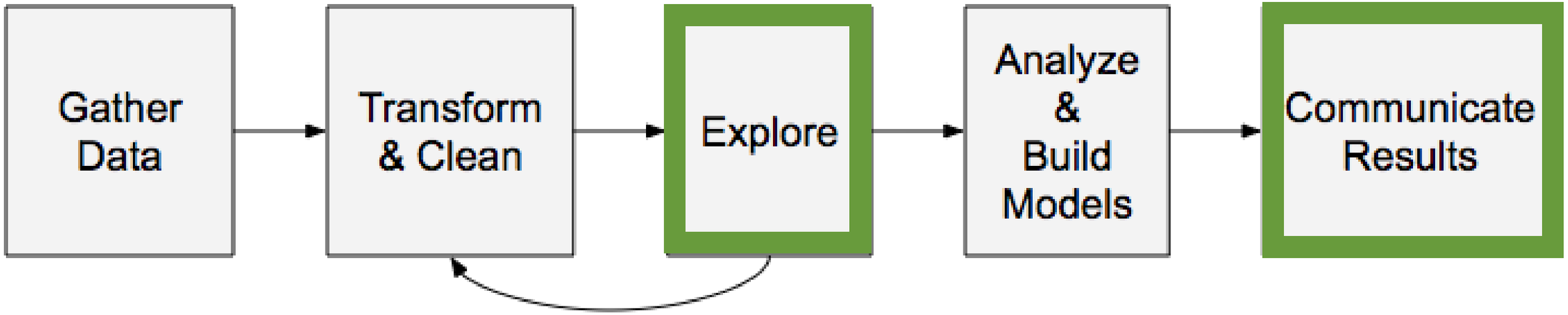
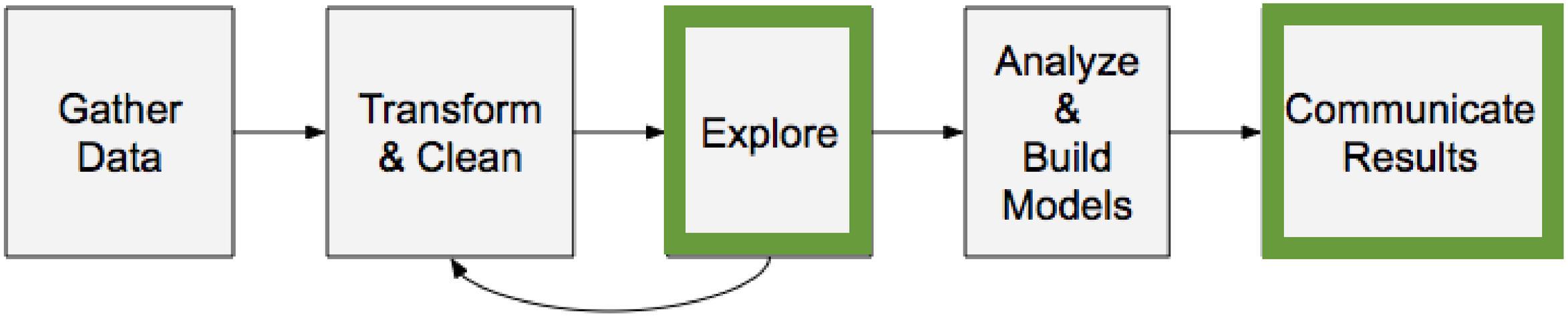
Where does Seaborn fit in?



Where does Seaborn fit in?



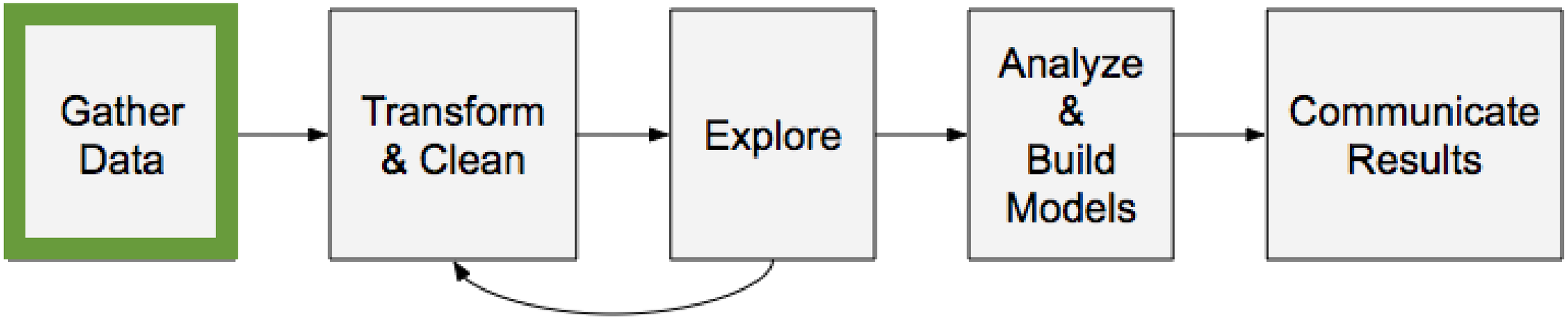
Next Steps: Explore and communicate results



Next steps:

- Seaborn advanced visualizations
- Matplotlib advanced customizations

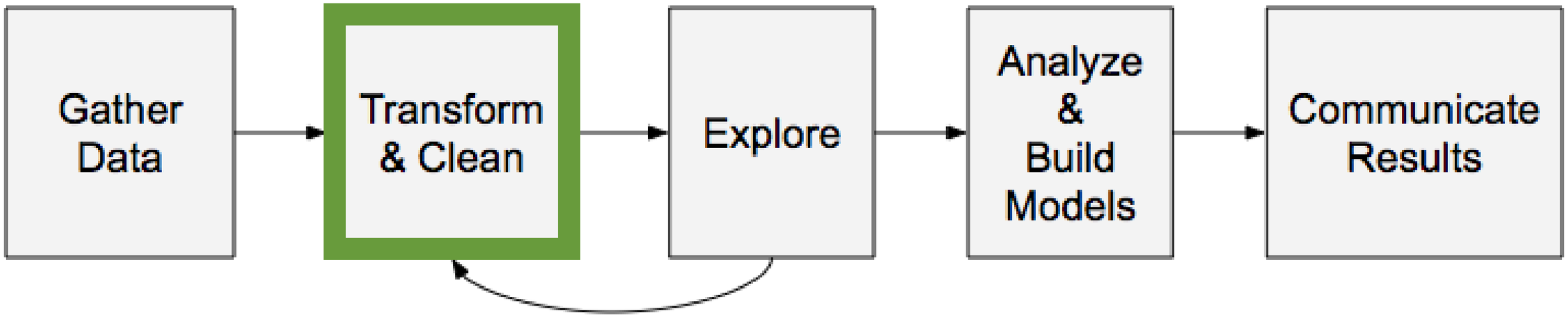
Next steps: Gather data



Next steps:

- Python
- SQL

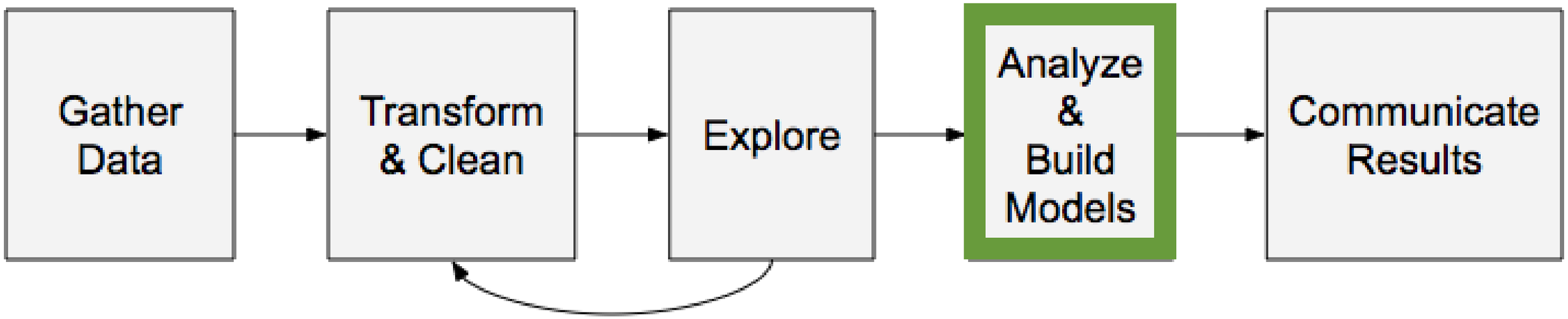
Next steps: Transform and clean



Next steps:

- Getting data into Pandas DataFrames
- Cleaning data
- Transforming into tidy format

Next steps: Analyze and build models



Next steps:

- Statistical analysis
- Calculating and interpreting confidence intervals

Congratulations!

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