Changing plot style and color

INTRODUCTION TO DATA VISUALIZATION WITH SEABORN

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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()
```

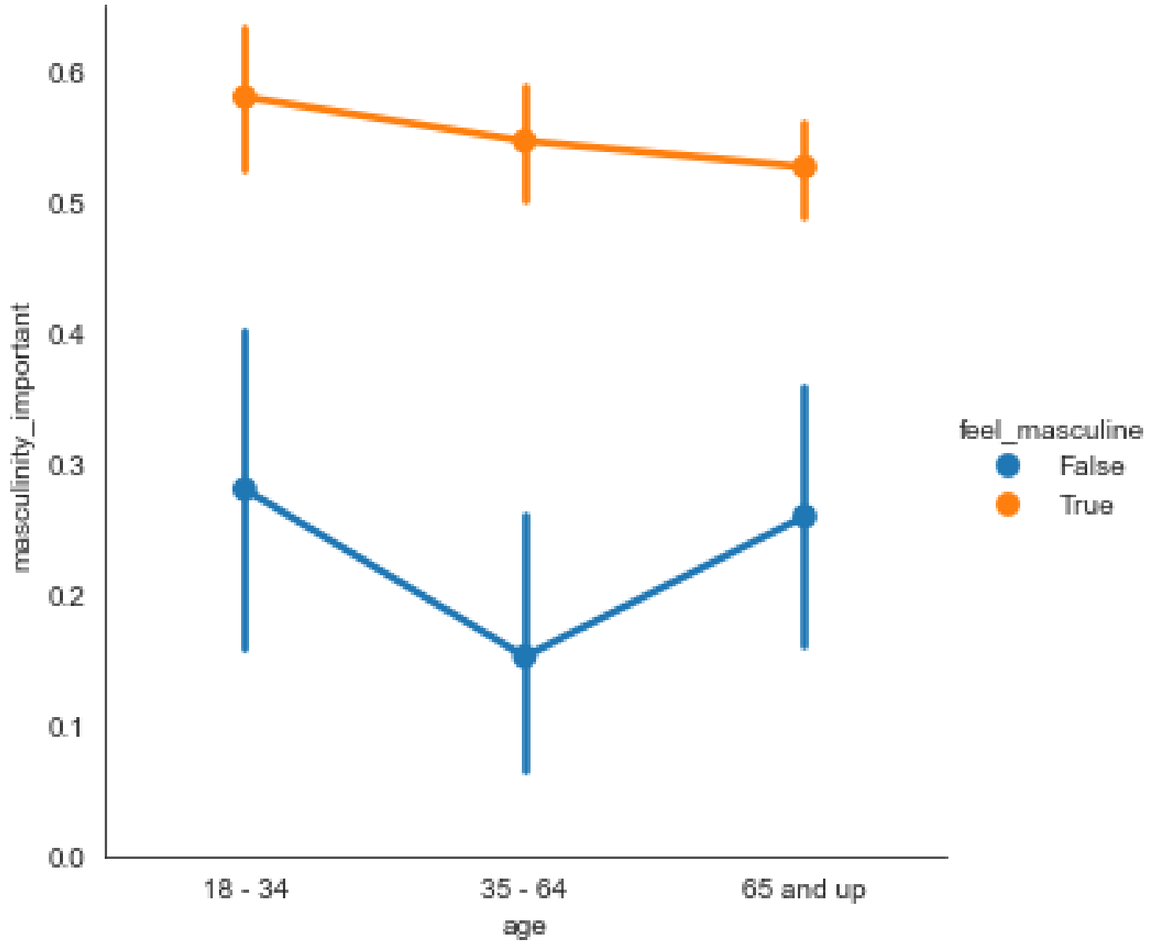
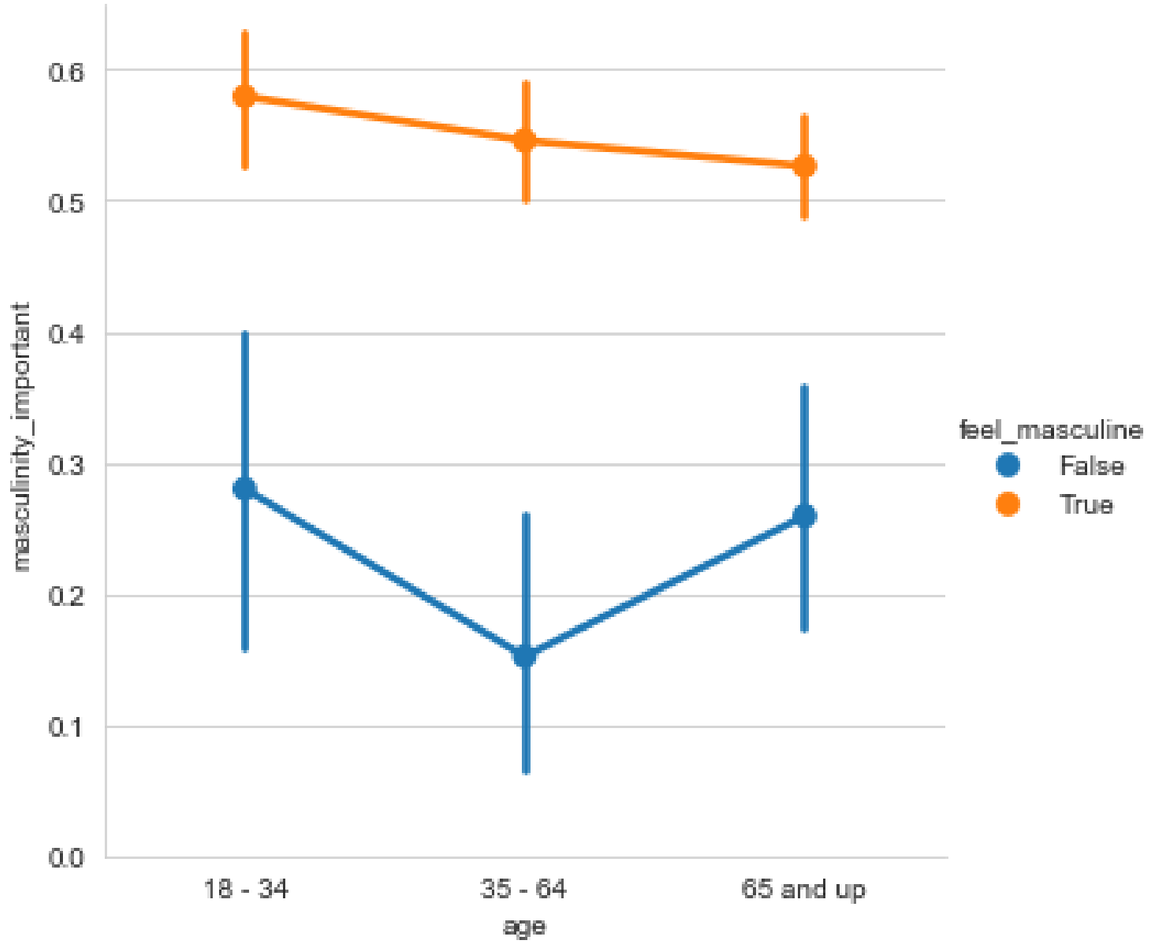


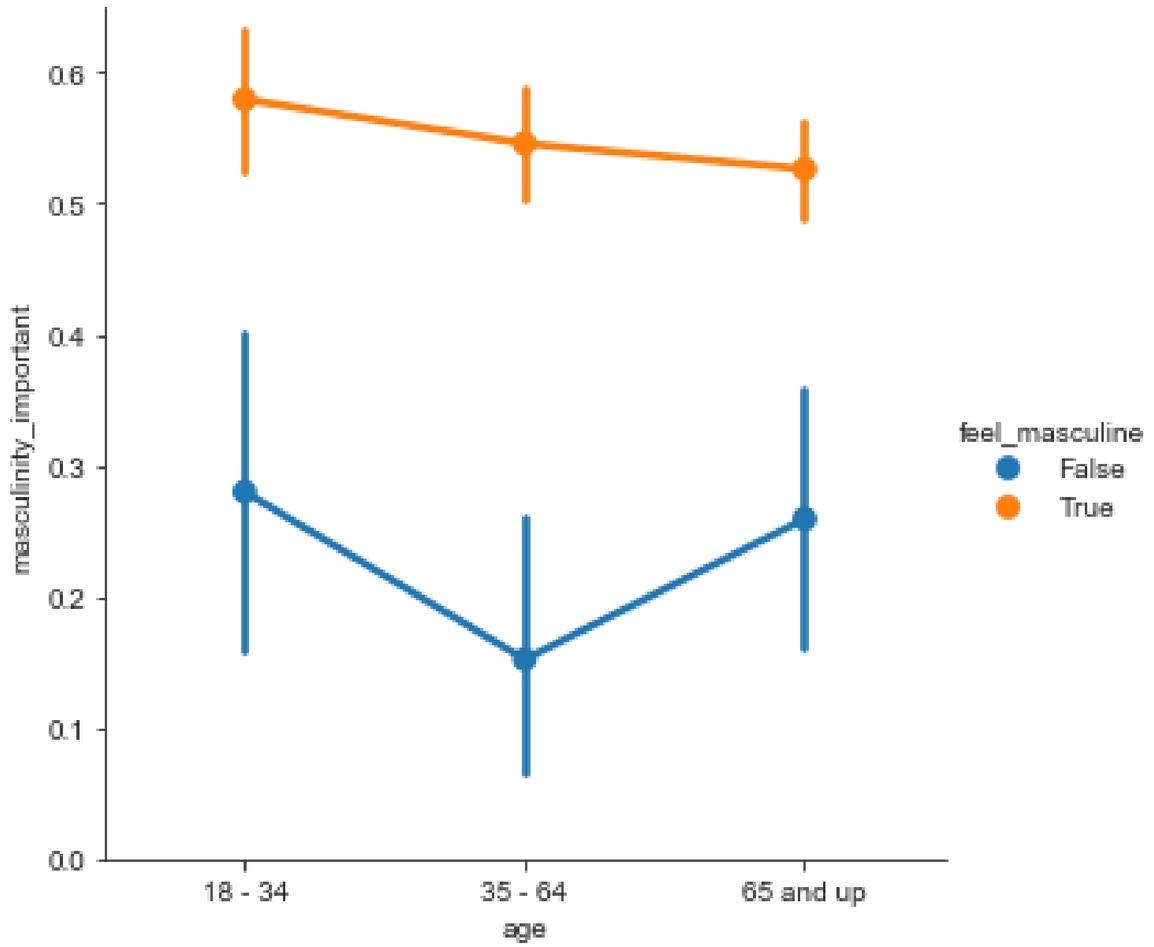
Figure style: "whitegrid"

```
sns.set_style("whitegrid")

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

plt.show()
```



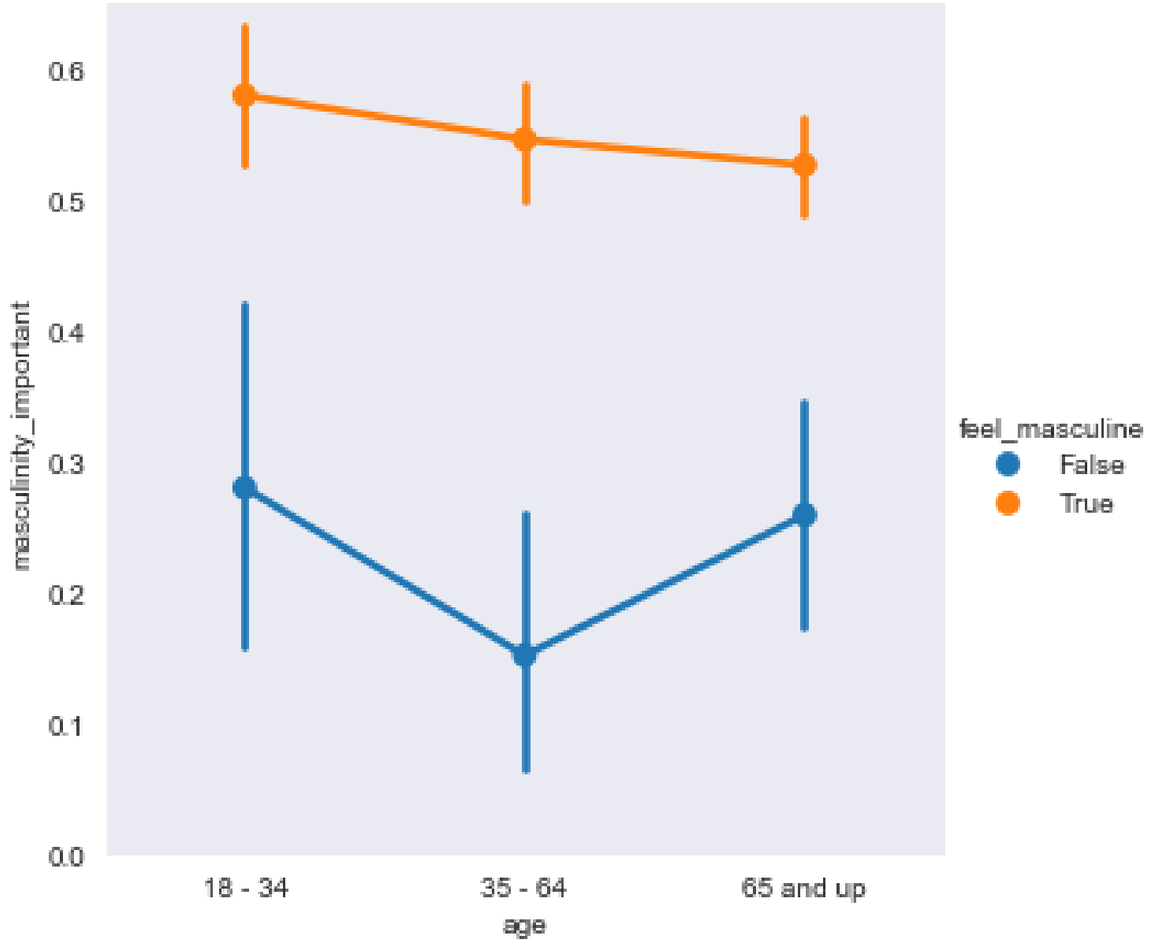
Other styles

```
sns.set_style("ticks")

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

plt.show()
```



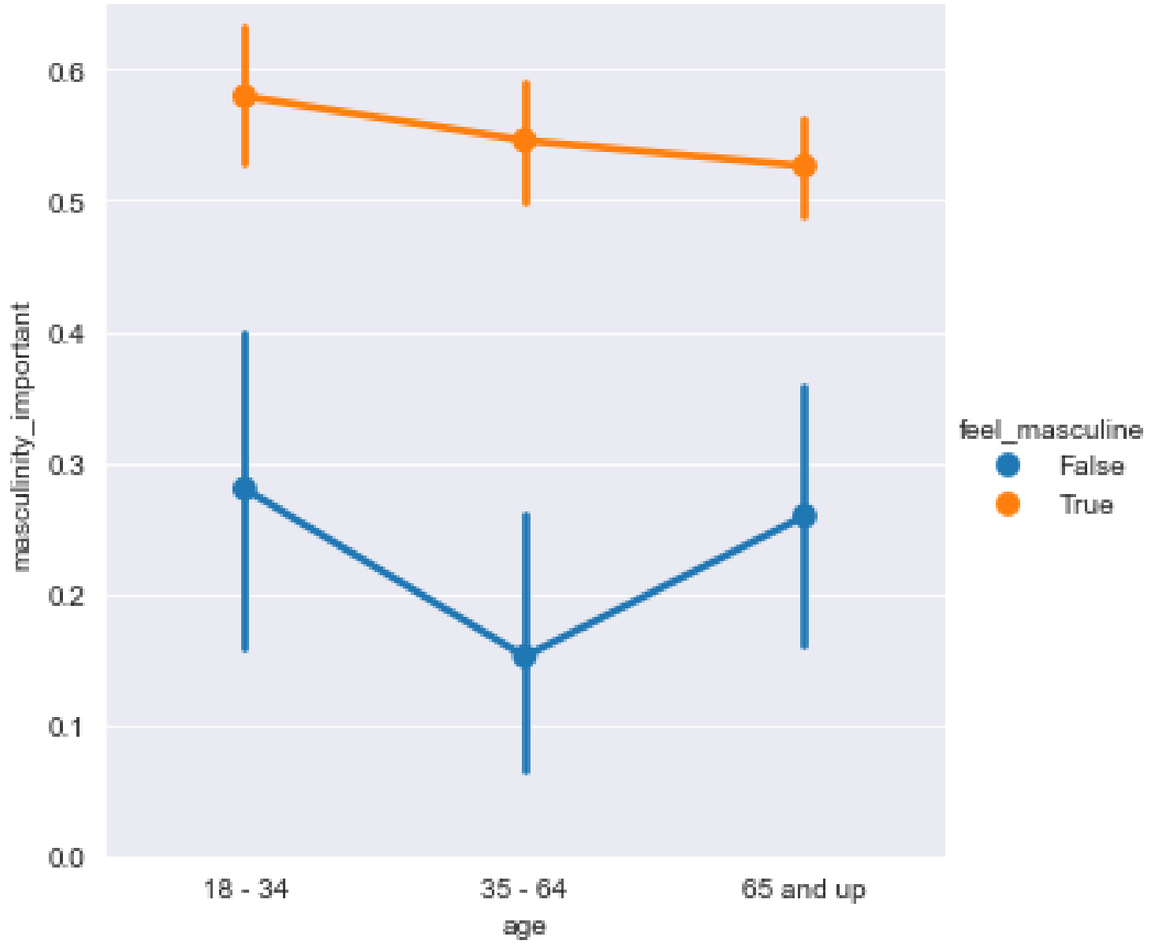
Other styles

```
sns.set_style("dark")

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

plt.show()
```



Other styles

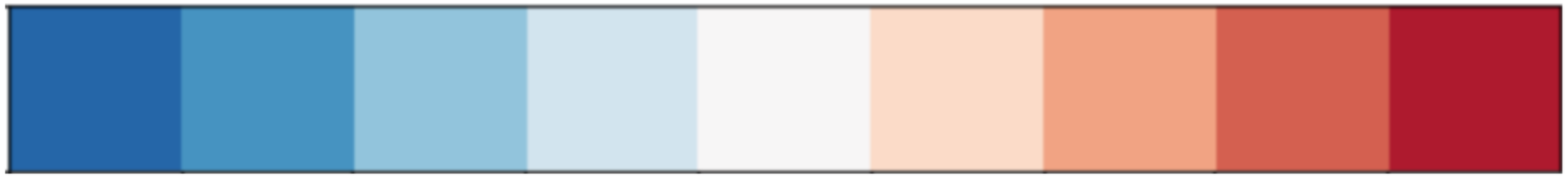
```
sns.set_style("darkgrid")

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

plt.show()
```



Changing the palette

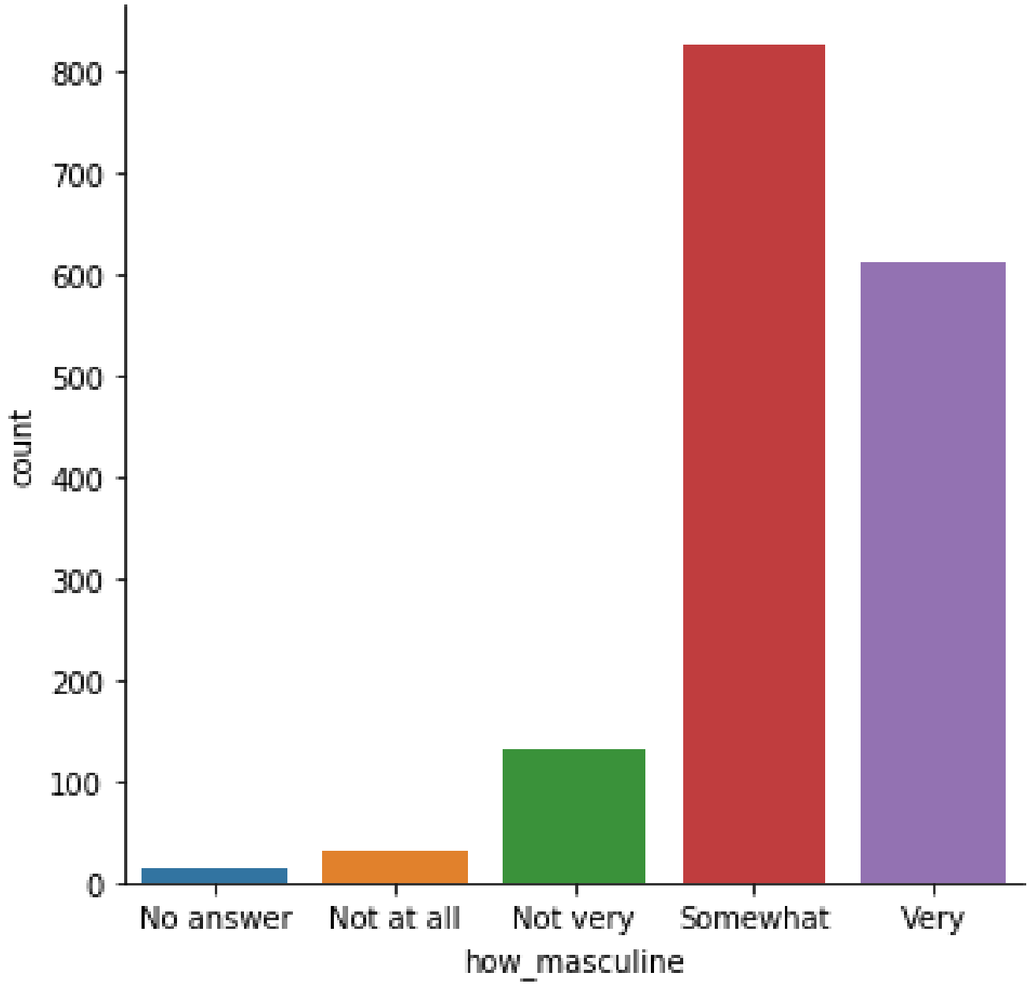
- Figure "palette" changes the color of the main elements of the plot
- `sns.set_palette()`
- Use preset palettes or create a custom palette

Diverging palettes

“RdBu”	
“PRGn”	
“RdBu_r”	
“PRGn_r”	

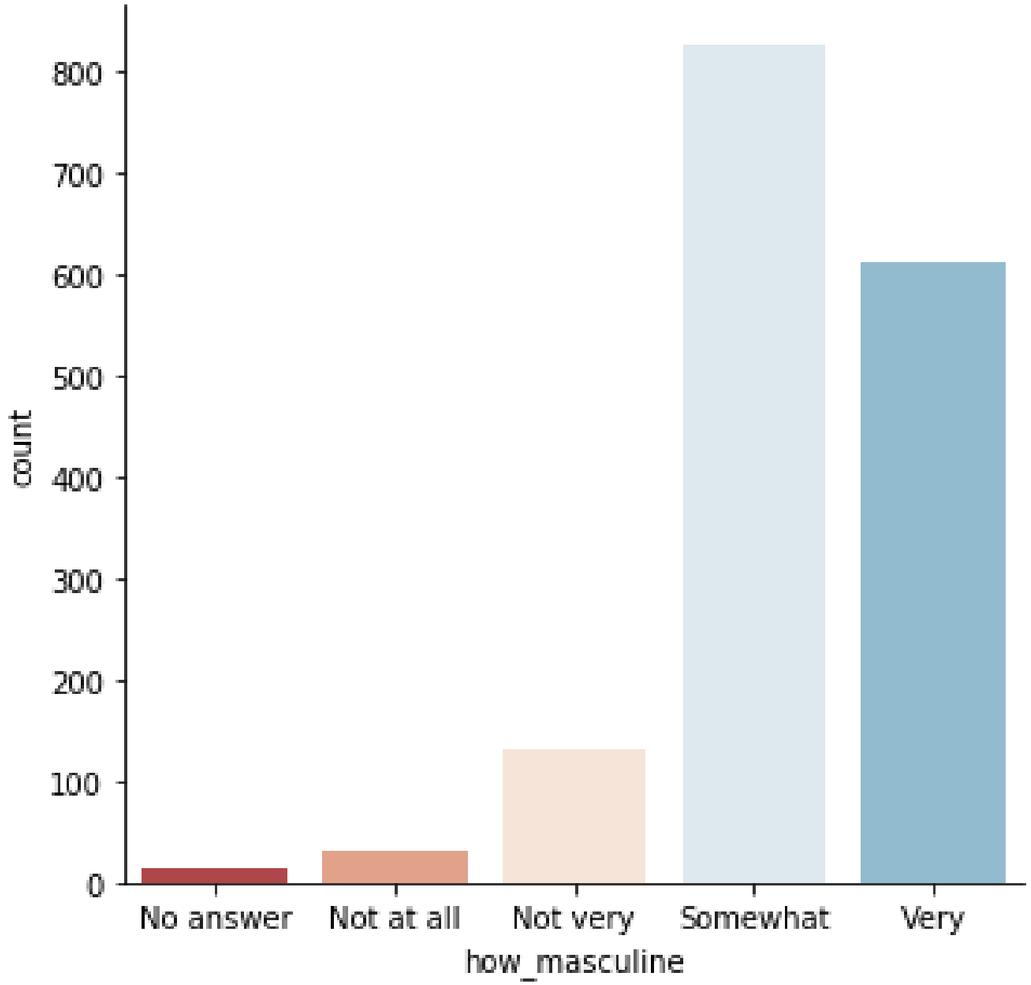
Example (default palette)

```
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()
```

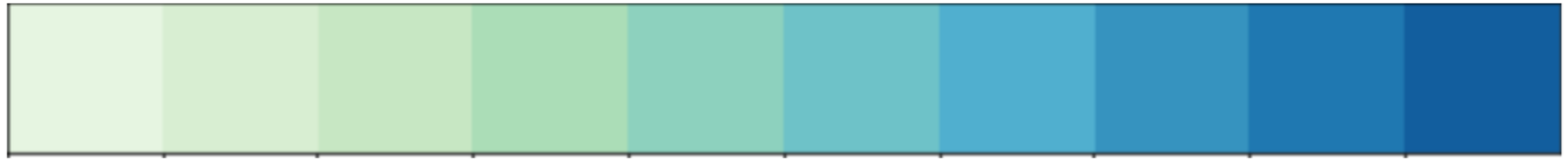


Example (diverging palette)

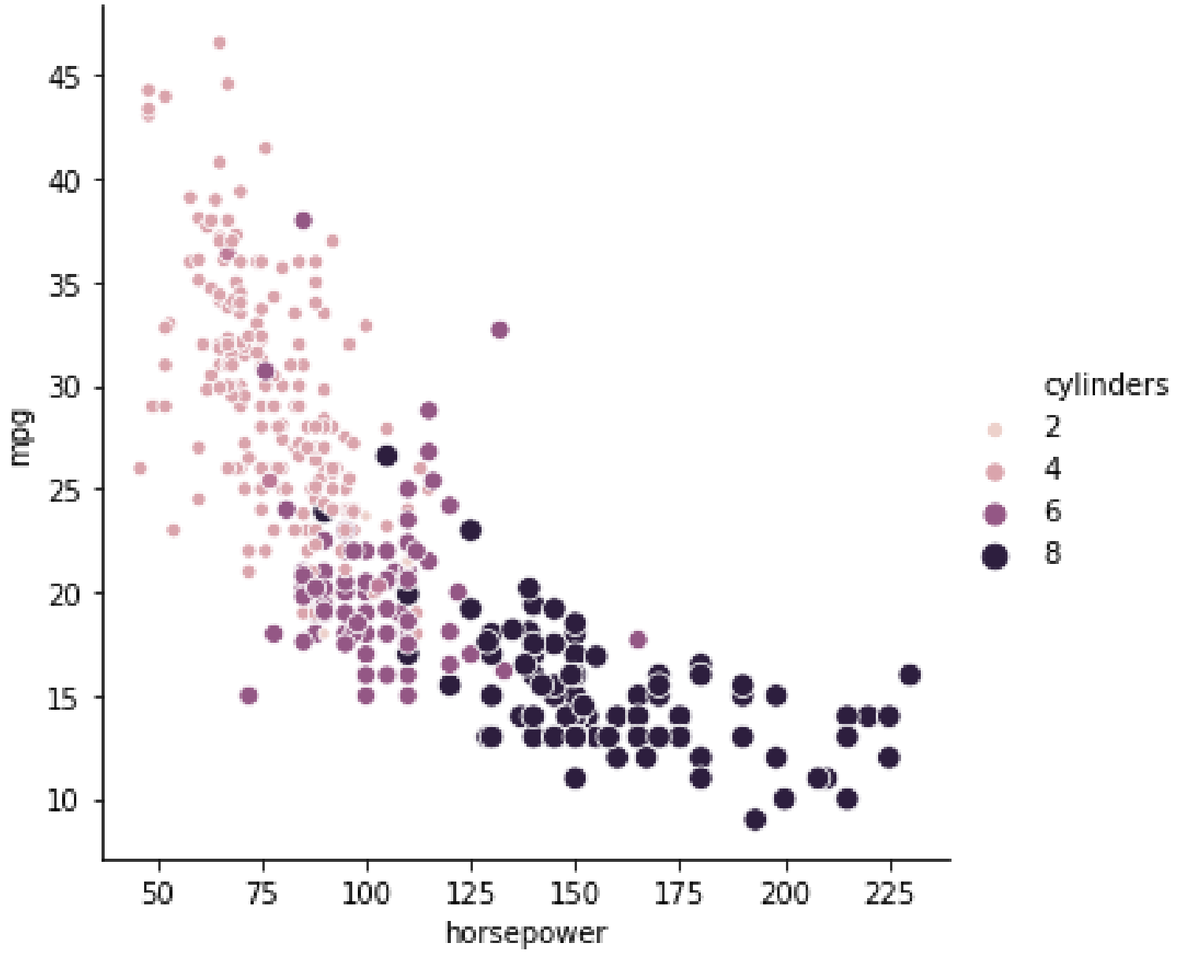
```
sns.set_palette("RdBu")

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”	

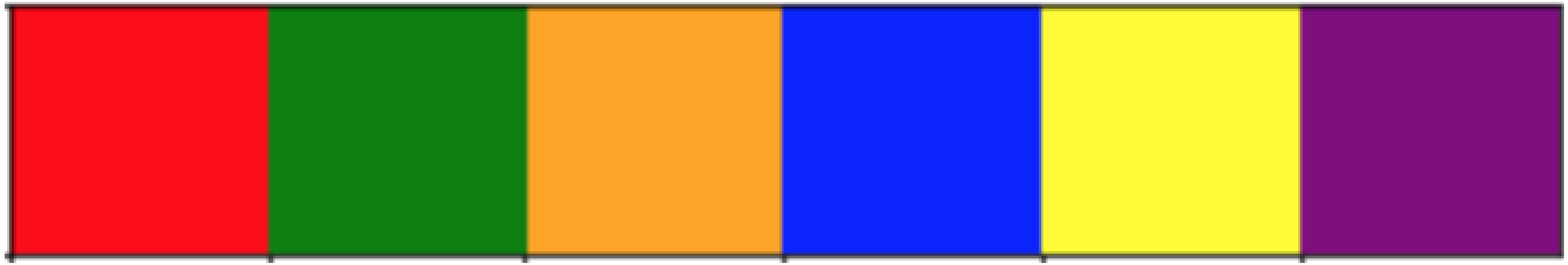
Sequential palette example



[1] Waskom, M. L. (2021). seaborn: statistical data visualization. https://seaborn.pydata.org/

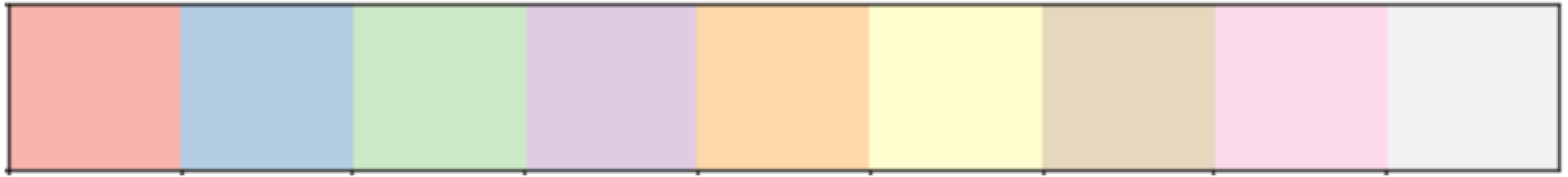
Custom palettes

```
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)
```

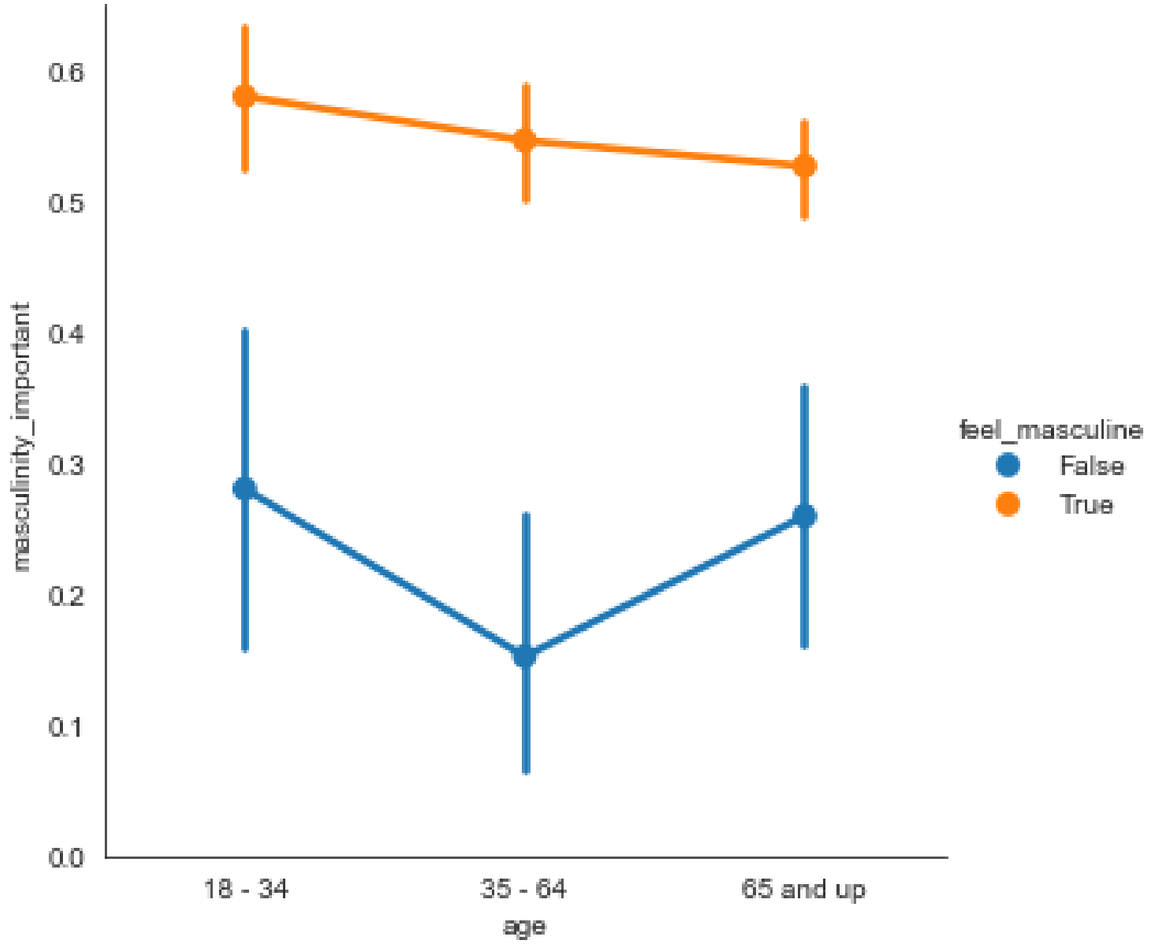


Changing the scale

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

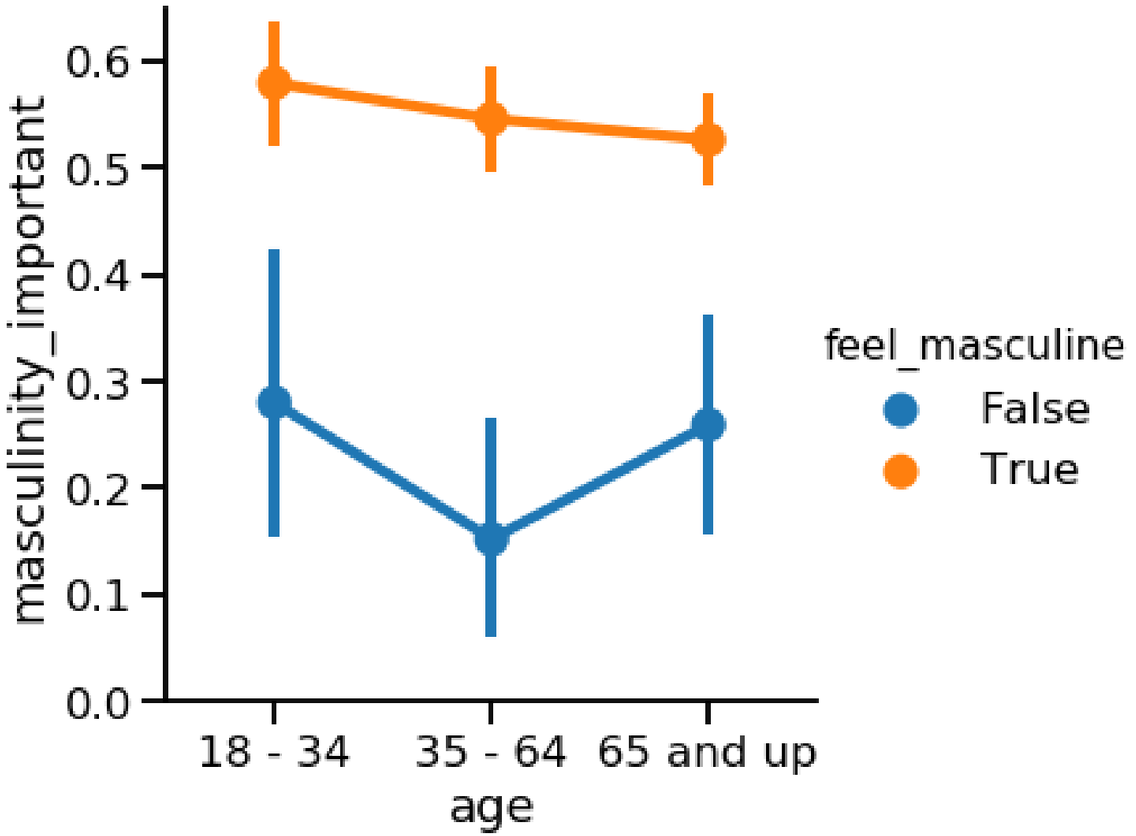
Default context: "paper"

```
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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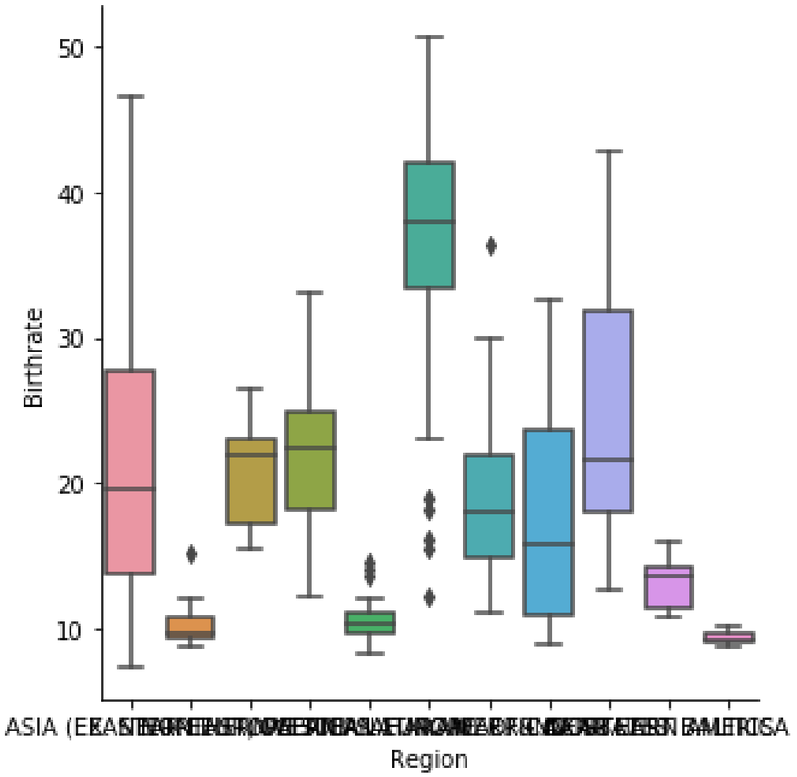
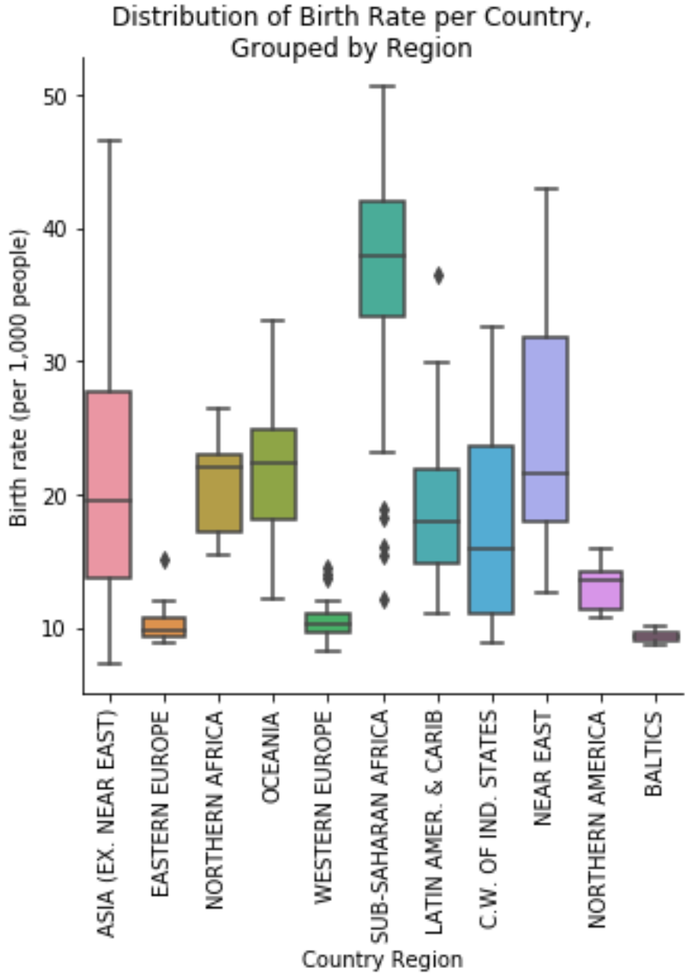
Creating informative visualizations





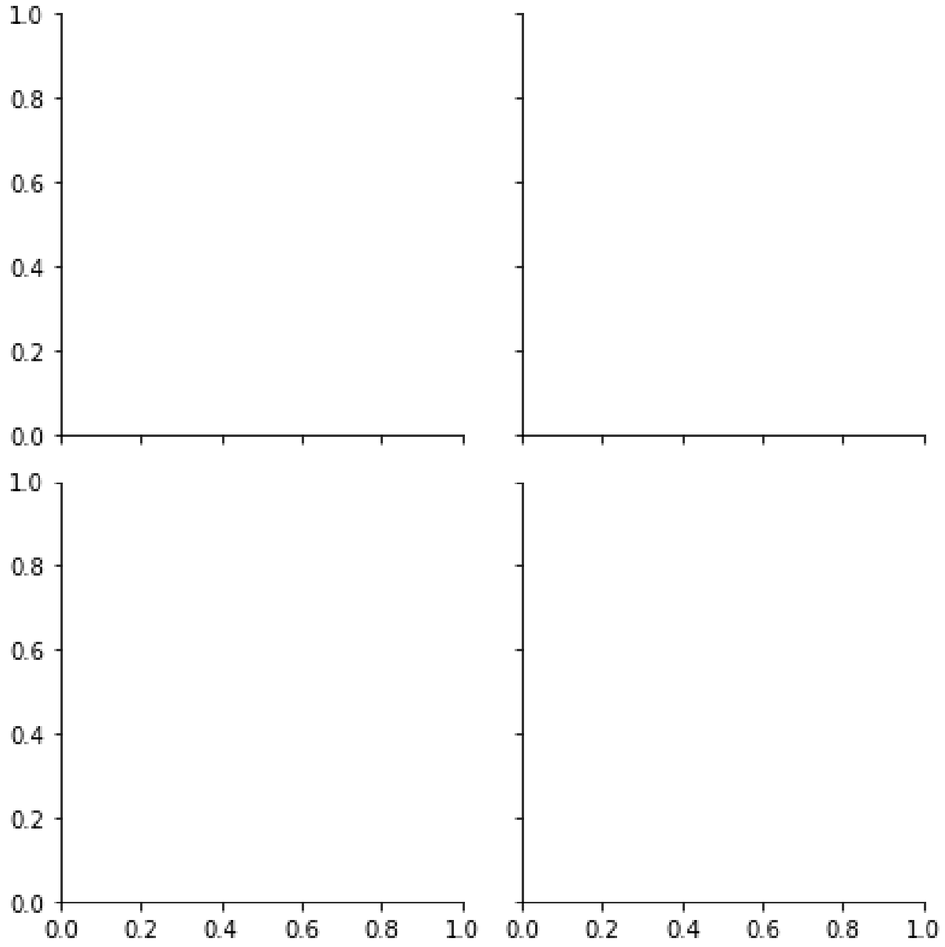
FacetGrid vs. AxesSubplot objects

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

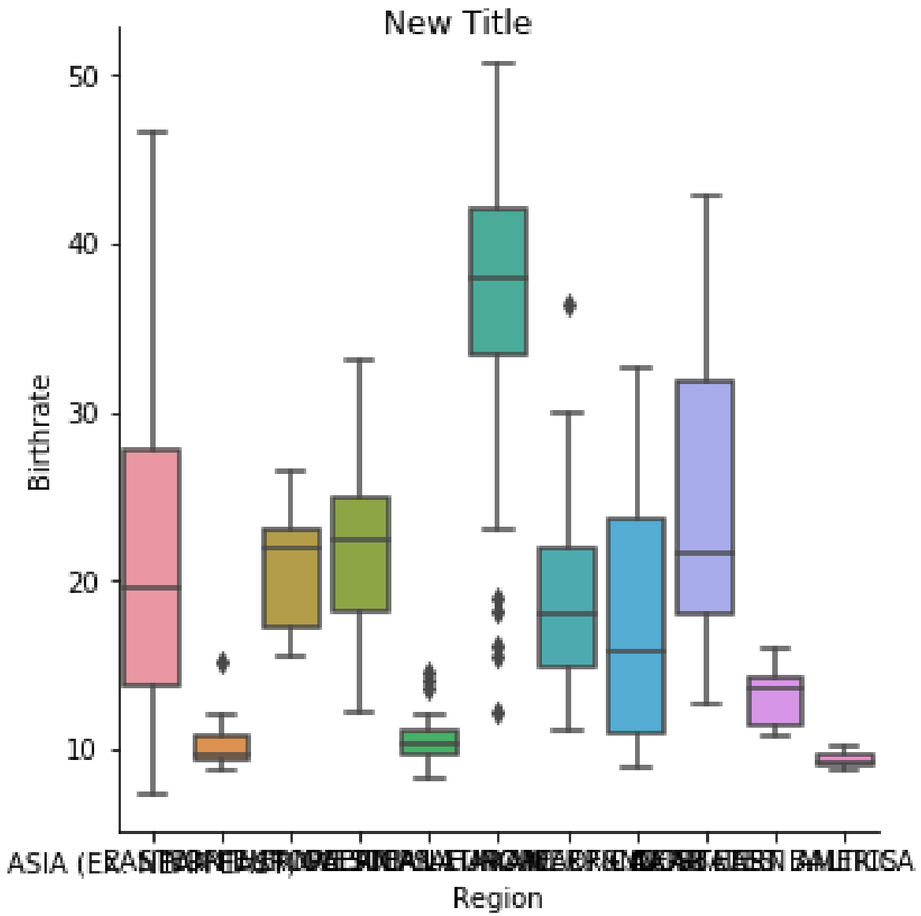


FacetGrid vs. AxesSubplot objects

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()
```

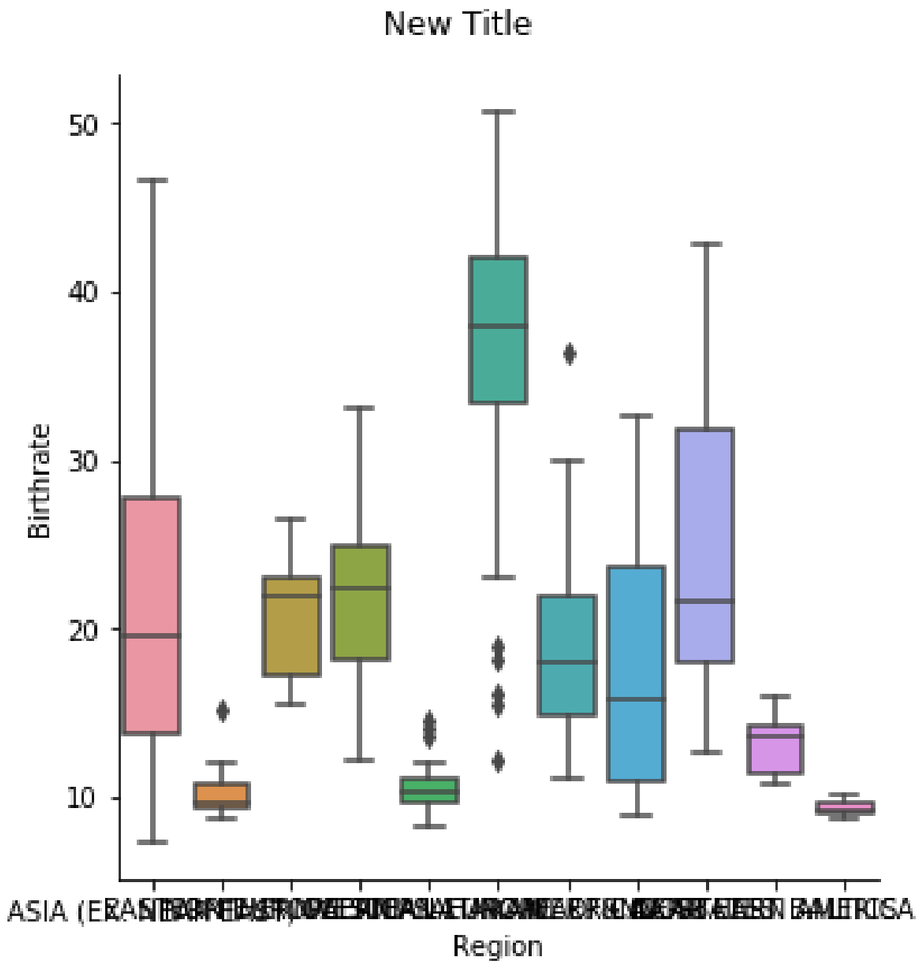


Adjusting height of title in FacetGrid

```
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!

INTRODUCTION TO DATA VISUALIZATION WITH SEABORN

Adding titles and labels: Part 2

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Adding a title to AxesSubplot

FacetGrid

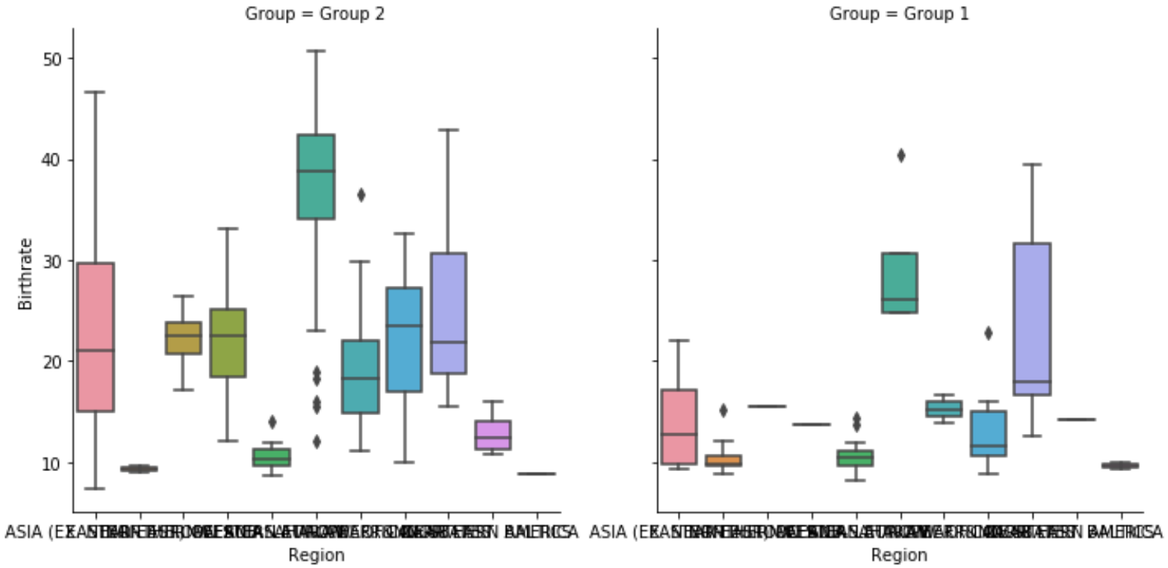
```
g = sns.catplot(x="Region",
                y="Birthrate",
                data=gdp_data,
                kind="box")

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)
```

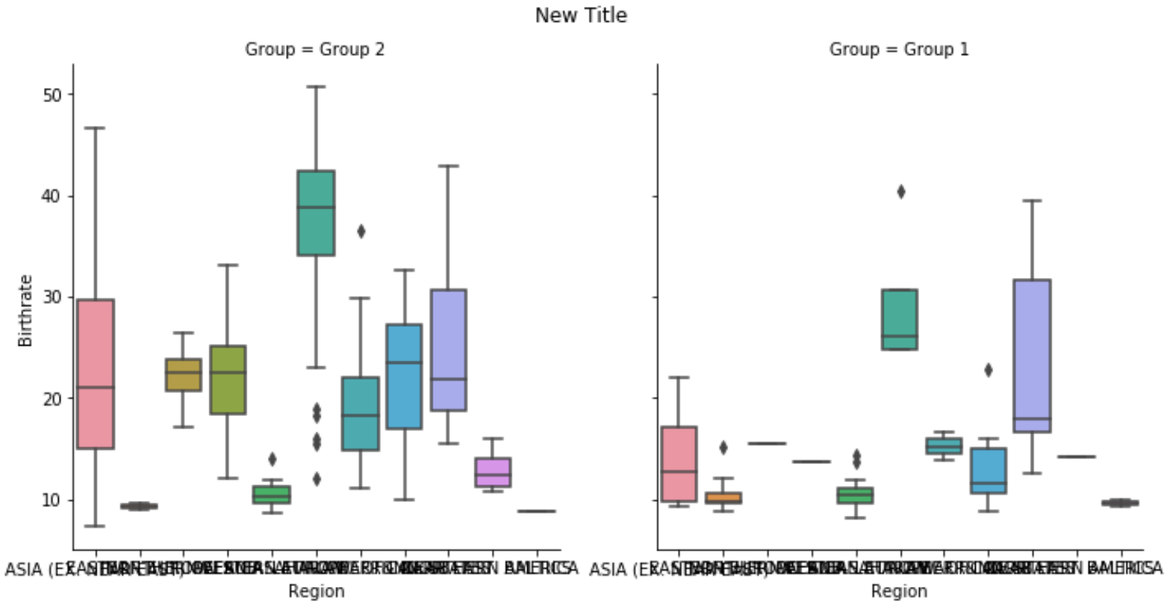
Titles for subplots

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



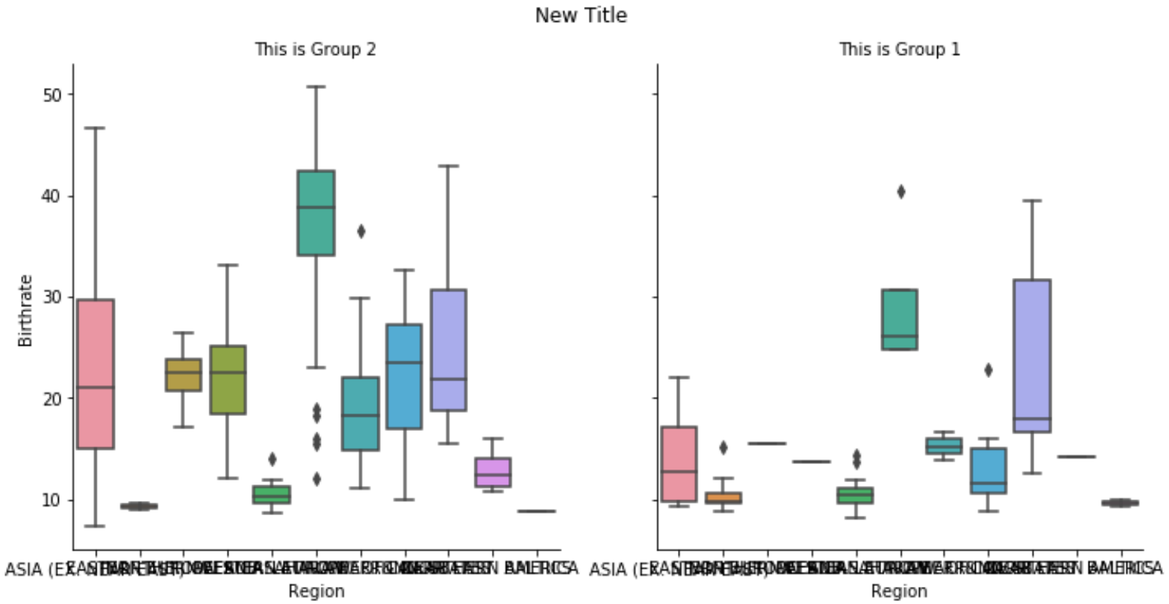
Titles for subplots

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

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



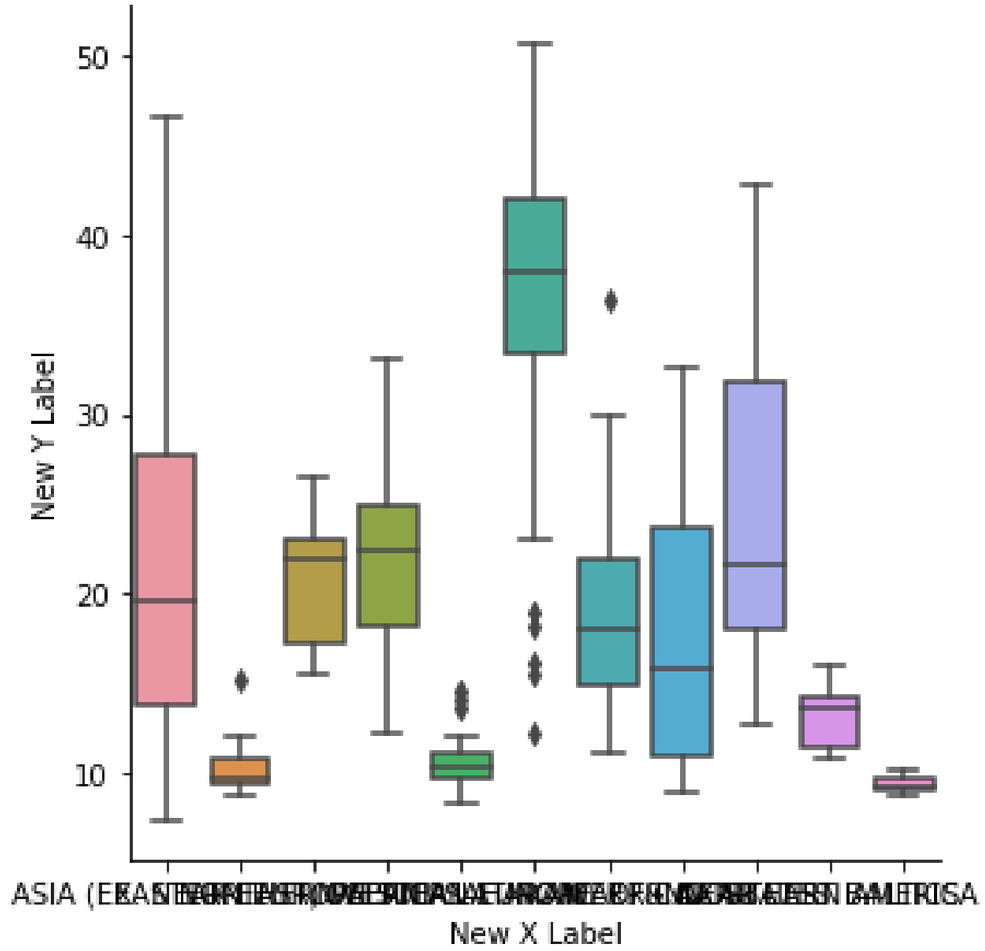
Titles for subplots

```
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}")
```



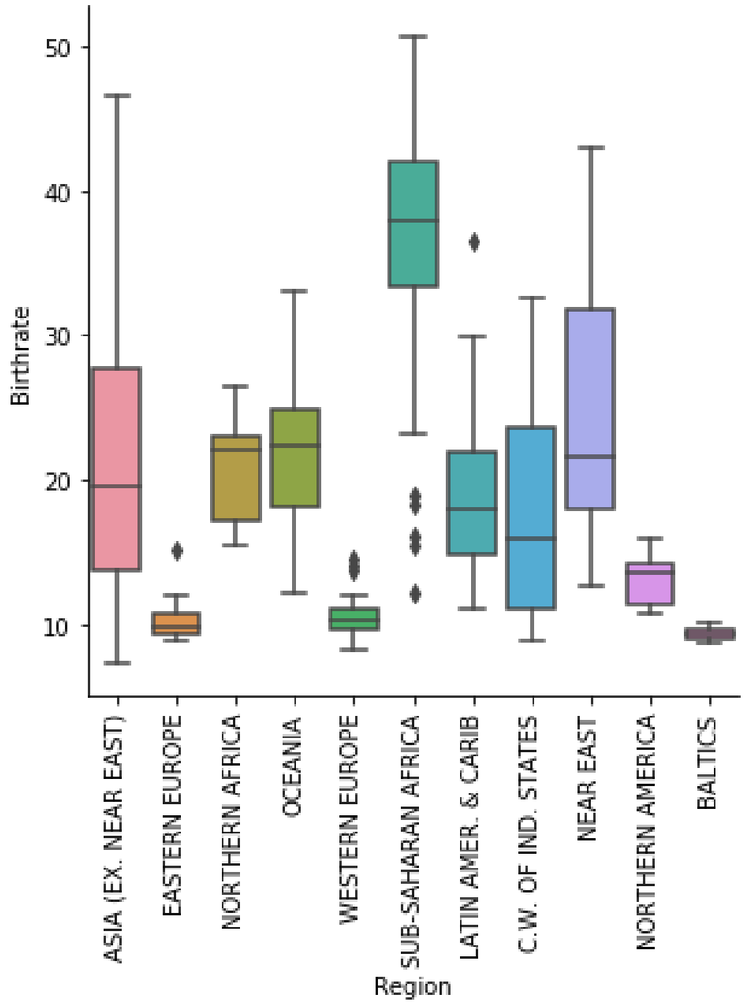
Adding axis labels

```
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!

INTRODUCTION TO DATA VISUALIZATION WITH SEABORN

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")
```

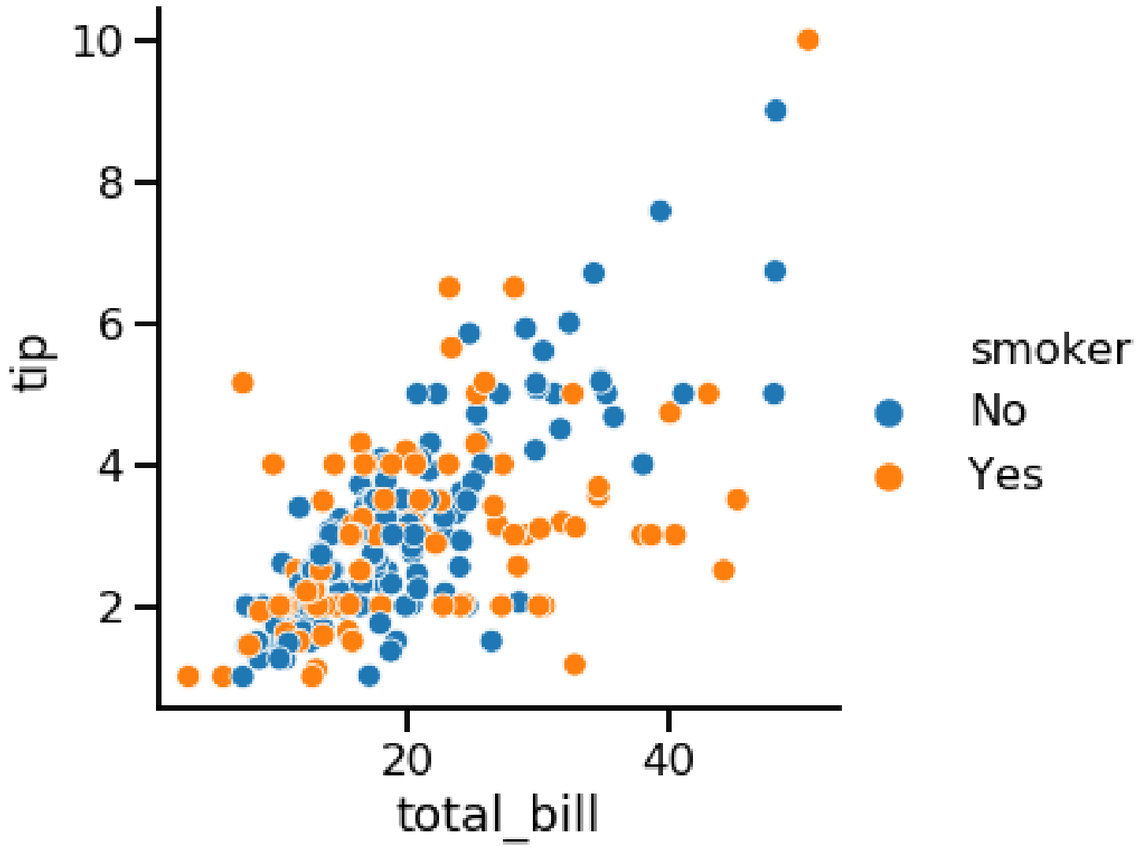
Categorical plots

- 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)

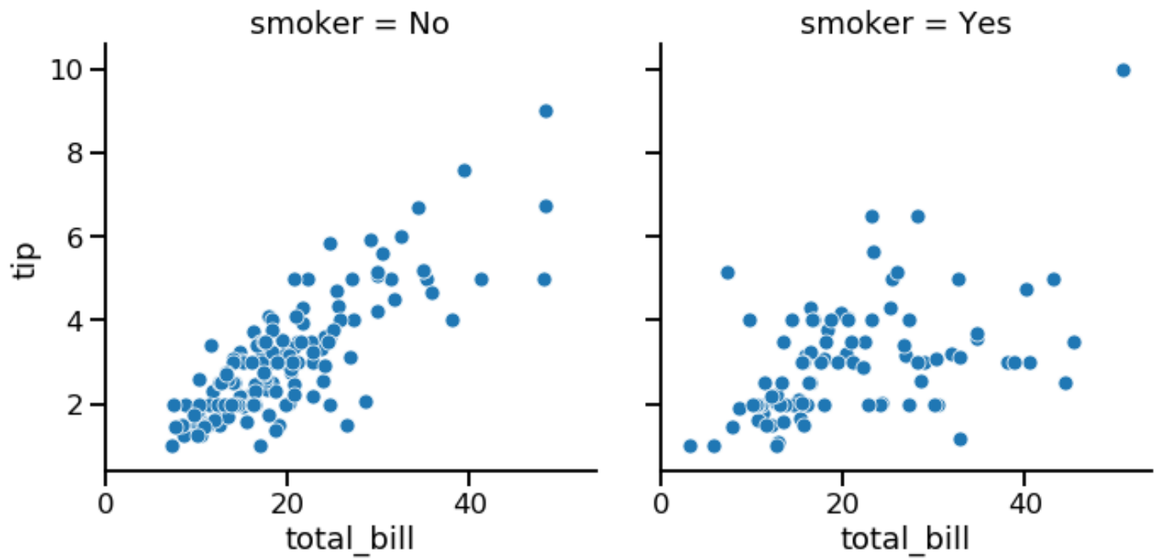
Setting `hue` will create subgroups that are displayed as different colors on a single plot.



[1] Waskom, M. L. (2021). seaborn: statistical data visualization. https://seaborn.pydata.org/

Adding a third variable (row/col)

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



[1] Waskom, M. L. (2021). seaborn: statistical data visualization. https://seaborn.pydata.org/

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!

INTRODUCTION TO DATA VISUALIZATION WITH SEABORN

Well done! What's next?

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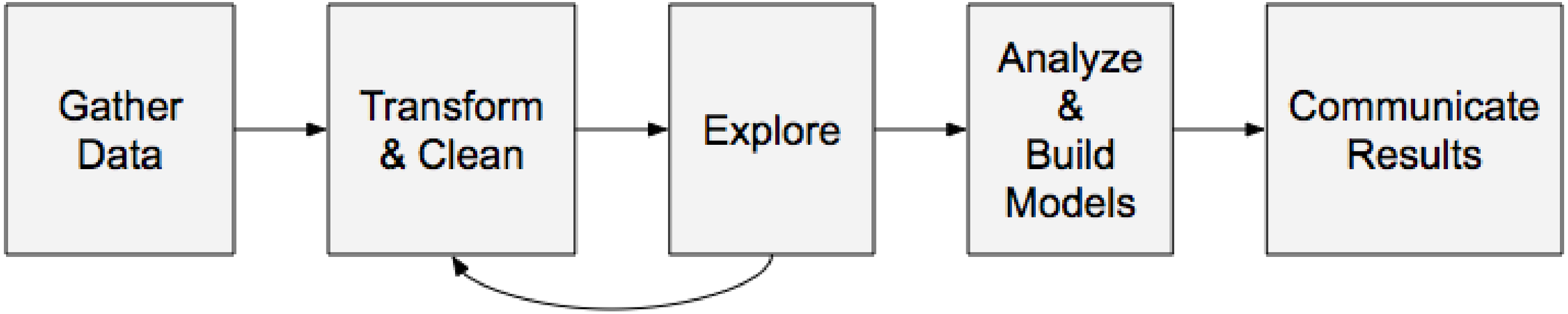
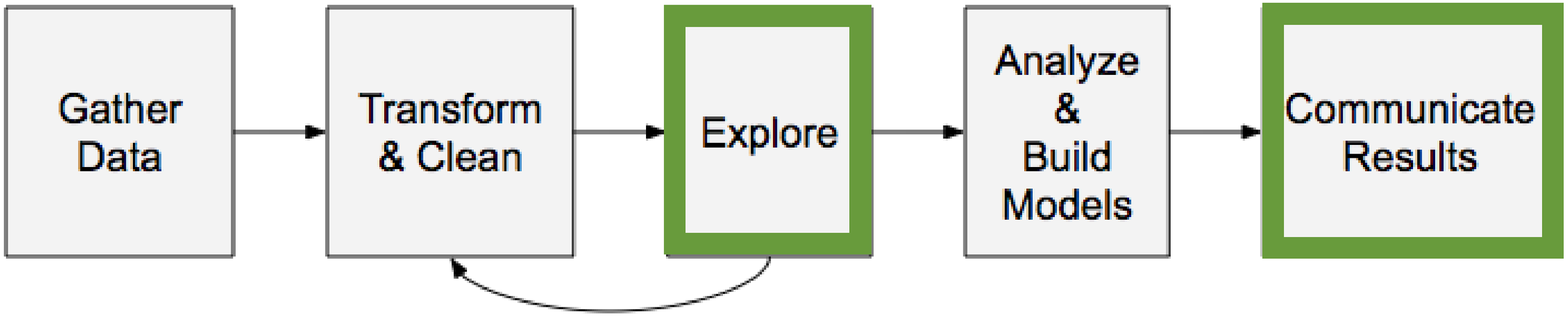
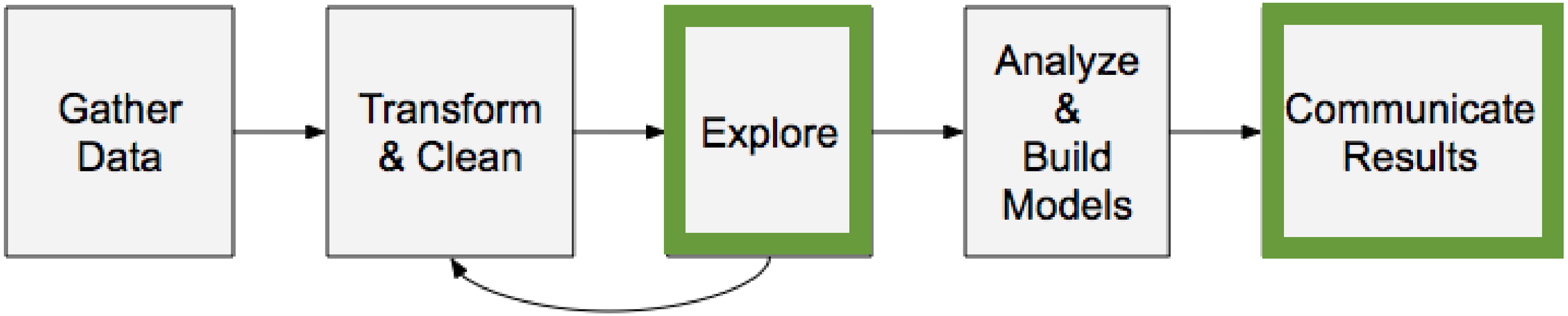
Where does Seaborn fit in?



Where does Seaborn fit in?



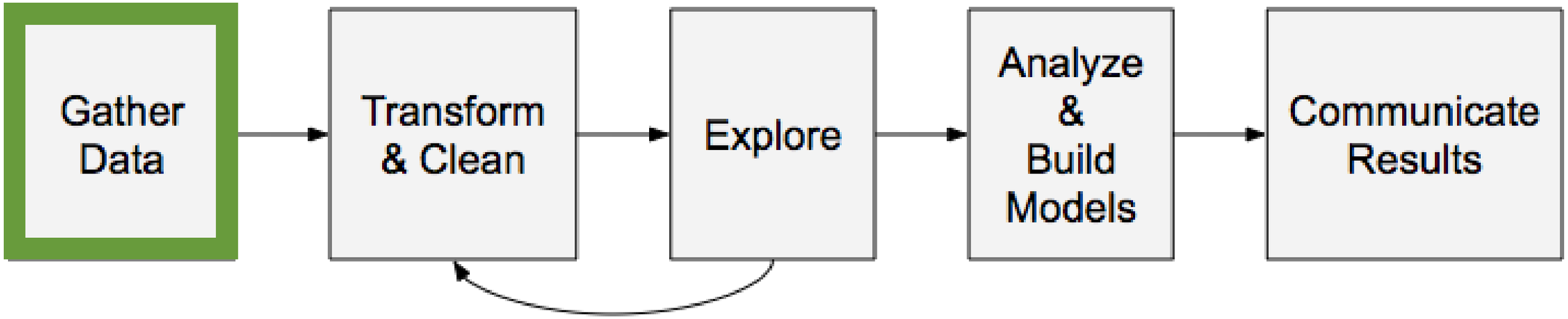
Next Steps: Explore and communicate results



Next steps:

- Seaborn advanced visualizations
- Matplotlib advanced customizations

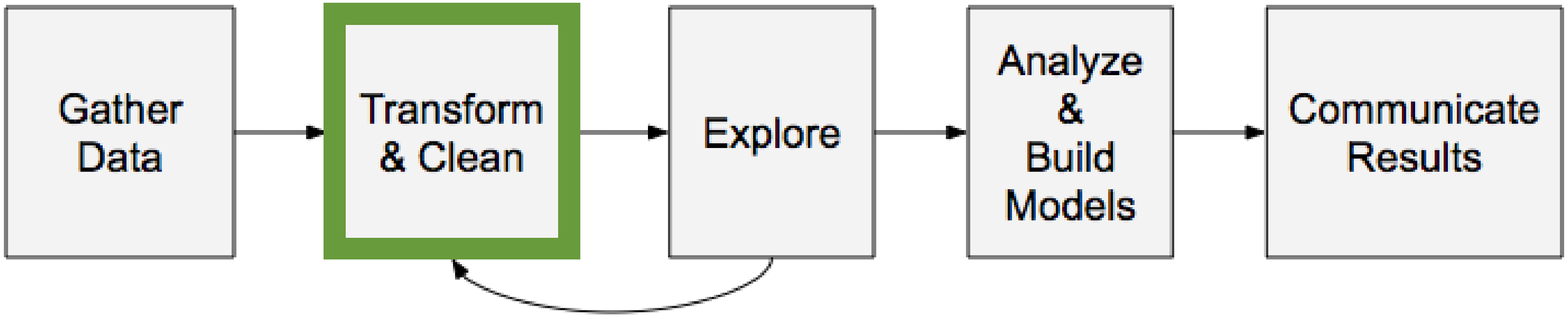
Next steps: Gather data



Next steps:

- Python
- SQL

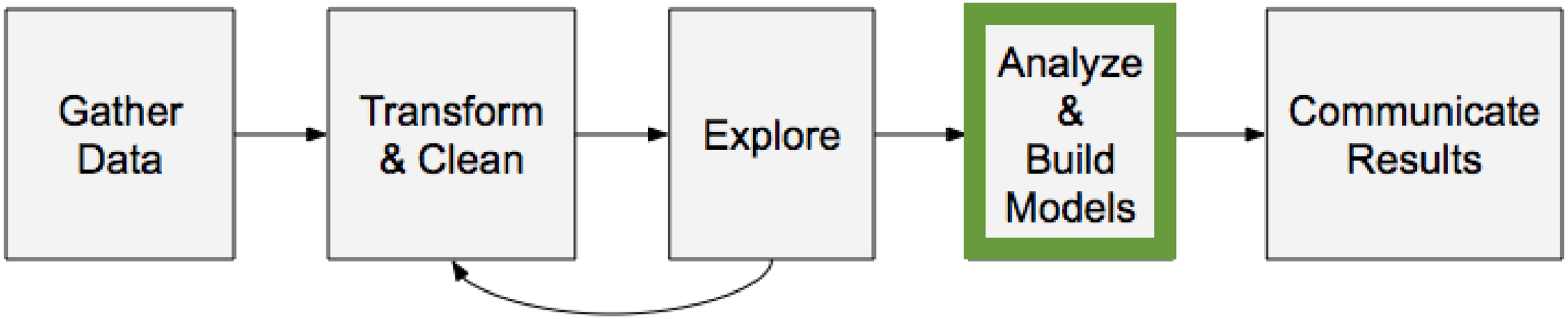
Next steps: Transform and clean



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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