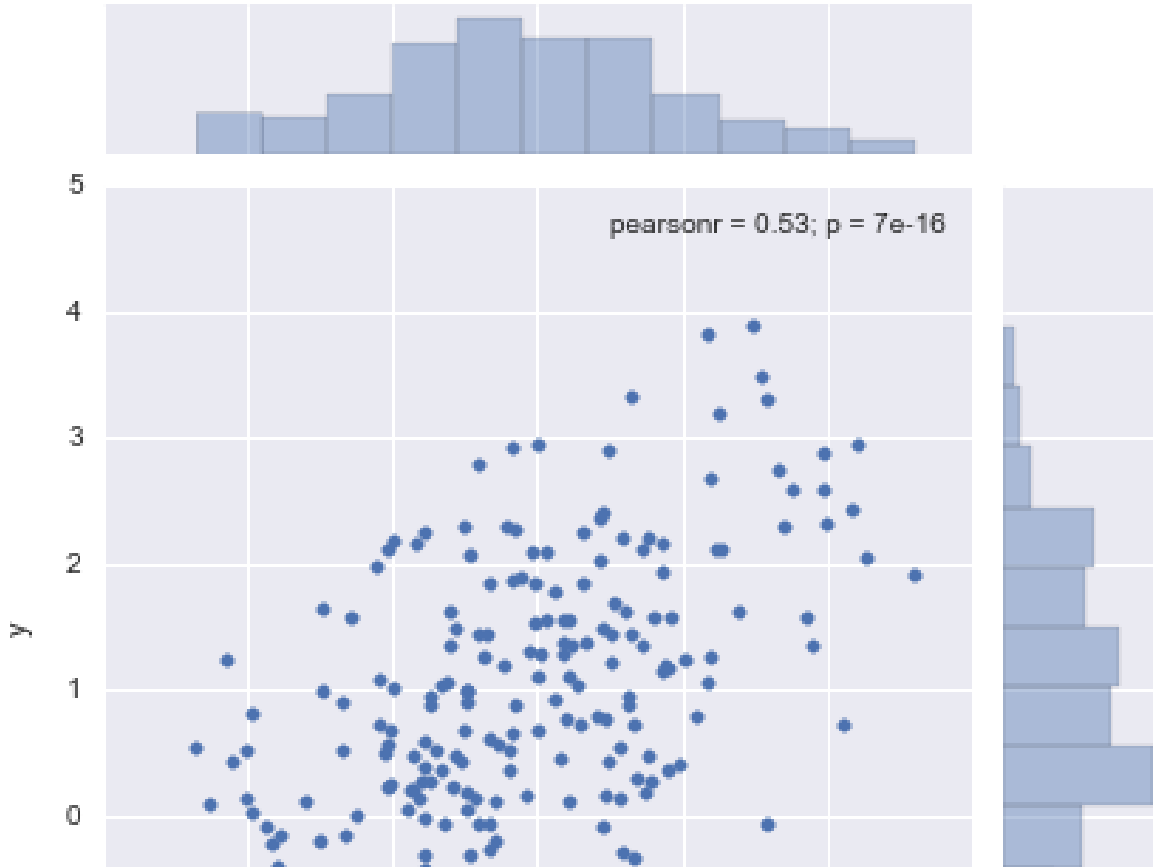
It can also be useful to visualize a bivariate distribution of two variables. The easiest way to do this in seaborn is to just the `jointplot()` function, which creates a multi-panel figure that shows both the bivariate (or joint) relationship between two variables along with the univariate (or marginal) distribution of each on separate axes.

```
mean, cov = [0, 1], [(1, .5), (.5, 1)]
data = np.random.multivariate_normal(mean, cov, 200)
df = pd.DataFrame(data, columns=["x", "y"])
```

The most familiar way to visualize a bivariate distribution is a scatterplot, where each observation is shown with point at the x and y values. This is analgous to a rug plot on two dimensions. You can draw a scatterplot with the matplotlib plt.scatter function, and it is also the default kind of plot shown by the `jointplot()` function:

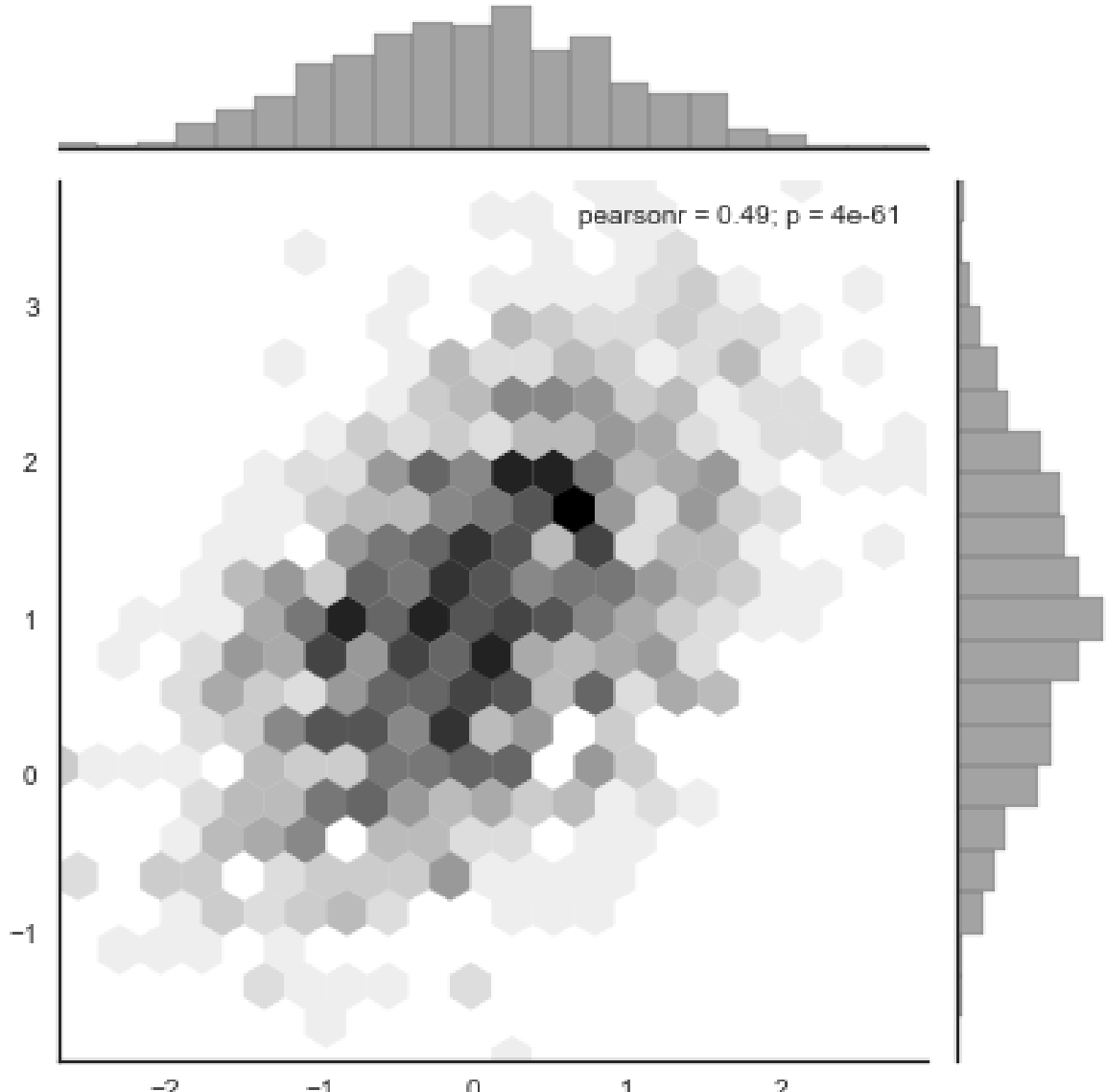
```
sns.jointplot(x="x", y="y", data=df);
```



Hexbin plots

- The bivariate analogue of a histogram is known as a hexbin plot, because it shows the counts of observations that fall within hexagonal bins.
- This plot works best with relatively large datasets.
- Its availible through the matplotlib `plt.hexbin` function and as a style in `jointplot()`. It looks best with a white background:

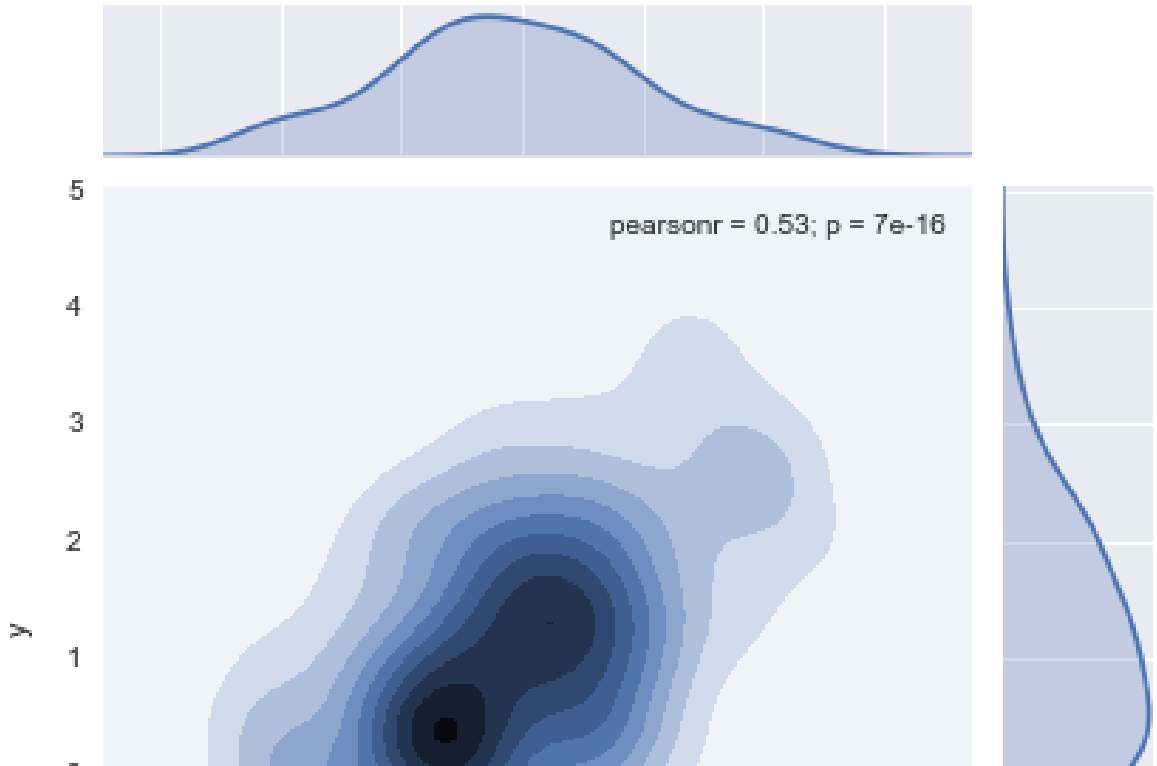
```
x, y = np.random.multivariate_normal(mean, cov, 1000).T
with sns.axes_style("white"):
sns.jointplot(x=x, y=y, kind="hex", color="k");
```



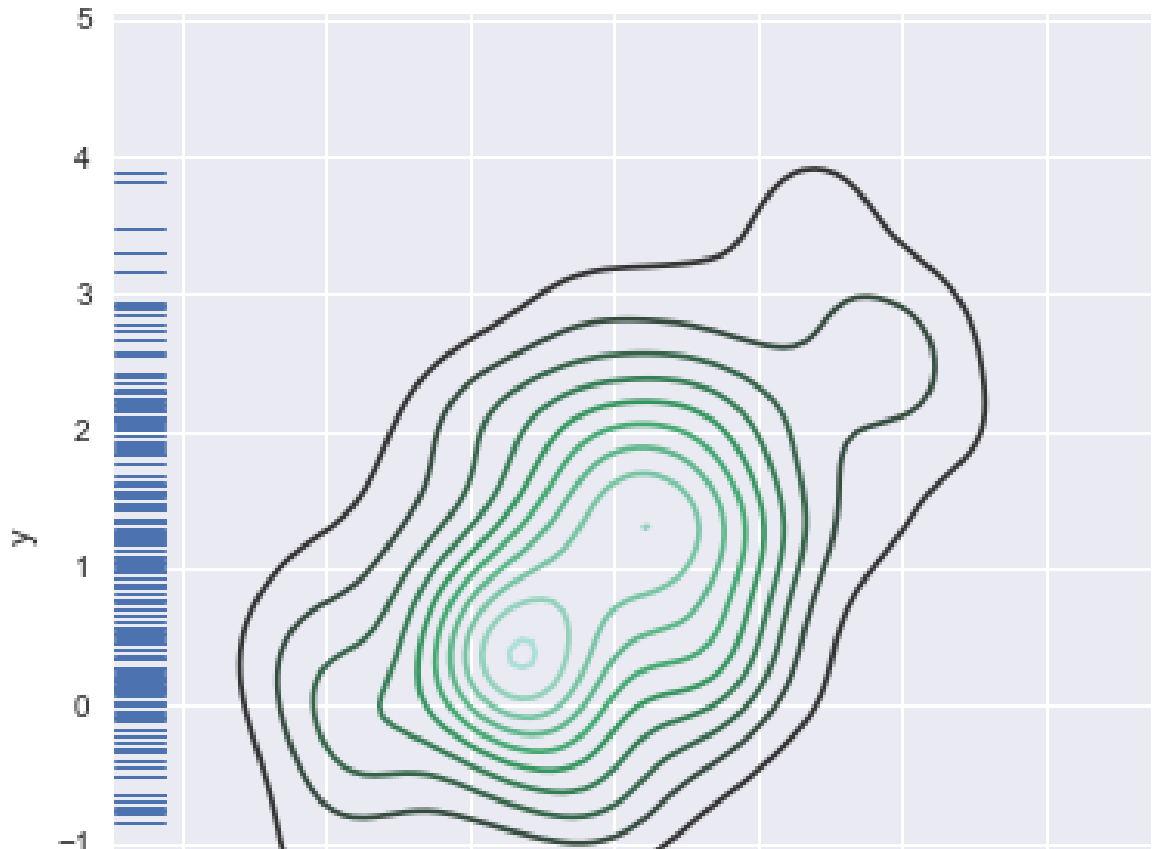
Kernel density estimation

- It is also posible to use the kernel density estimation procedure described above to visualize a bivariate distribution.
- In seaborn, this kind of plot is shown with a contour plot and is available as a style in jointplot():

```
sns.jointplot(x="x", y="y", data=df, kind="kde");
```



```
f, ax = plt.subplots(figsize=(6, 6))
sns.kdeplot(df.x, df.y, ax=ax)
sns.rugplot(df.x, color="g", ax=ax)
sns.rugplot(df.y, vertical=True, ax=ax);
```



If you wish to show the bivariate density more continuously, you can simply increase the number of contour levels:

```
f, ax = plt.subplots(figsize=(6, 6))
cmap = sns.cubehelix_palette(as_cmap=True, dark=0, ligh
sns.kdeplot(df.x, df.y, cmap=cmap, n_levels=60, shade=T
```

Hexbin Plots

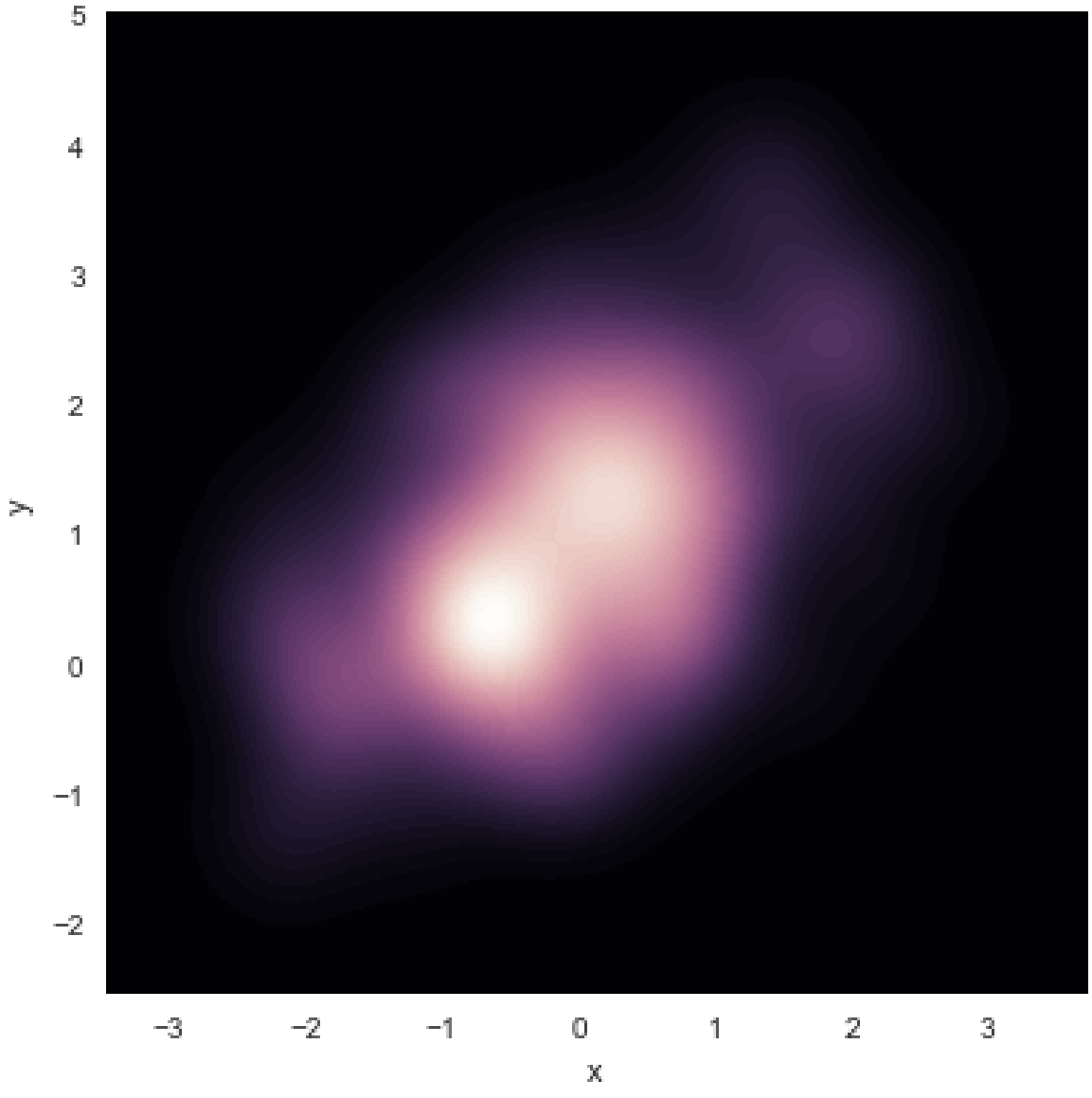


Figure:

The `jointplot()` function uses a `JointGrid` to manage the figure. For more flexibility, you may want to draw your figure by using JointGrid directly. `jointplot()` returns the JointGrid object after plotting, which you can use to add more layers or to tweak other aspects of the visualization:

```
g = sns.jointplot(x="x", y="y", data=df, kind="kde", co
g.plot_joint(plt.scatter, c="w", s=30, linewidth=1, mar
g.ax_joint.collections[0].set_alpha(0)
g.set_axis_labels("$X$", "$Y$");
```