Exercise5 Seaborn

April 14, 2018

1 Hochschule Bonn-Rhein-Sieg

2 Learning and Adaptivity, SS18

3 Assignment 01 (15-April-2018)

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4 Seaborn

Seaborn is a library for making attractive and informative statistical graphics in Python. It is built on top of matplotlib and tightly integrated with the PyData stack, including support for numpy and pandas data structures and statistical routines from scipy and statsmodels.

Library documentation: http://stanford.edu/~mwaskom/software/seaborn/

```
In [1]: import numpy as np
        import pandas as pd
        import matplotlib.pyplot as plt
        import seaborn as sb
        %matplotlib inline
```

4.0.1 Themes

```
In [2]: # global config settings to control things like style, font size, color palette etc.
        sb.set(context="notebook", style="darkgrid", palette="dark")
```

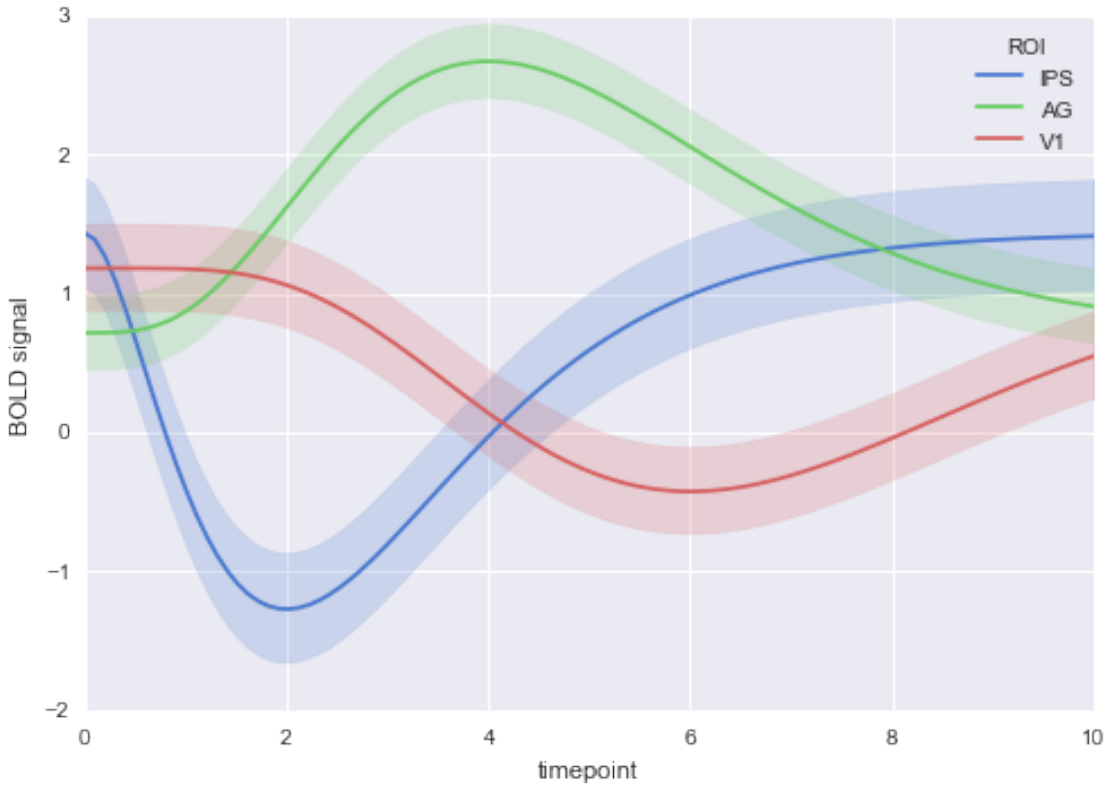
```
In [3]: # seaborn has some nice built-in color palette features
        sb.palplot(sb.color_palette())
        sb.palplot(sb.color_palette("husl", 8))
        sb.palplot(sb.color_palette("hls", 8))
```

In [4]:
```
# matplotlib colormap of evenly spaced colors
sb.palplot(sb.color_palette("coolwarm", 7))
```

In [5]:
```
# sequential palette with linear increase in brightness
sb.palplot(sb.cubehelix_palette(8))
```

In [6]:
```
# palettes are used in a plot via the color paramter
gammas = sb.load_dataset("gammas")
sb.tsplot(gammas, "timepoint", "subject", "ROI", "BOLD signal", color="muted")
```

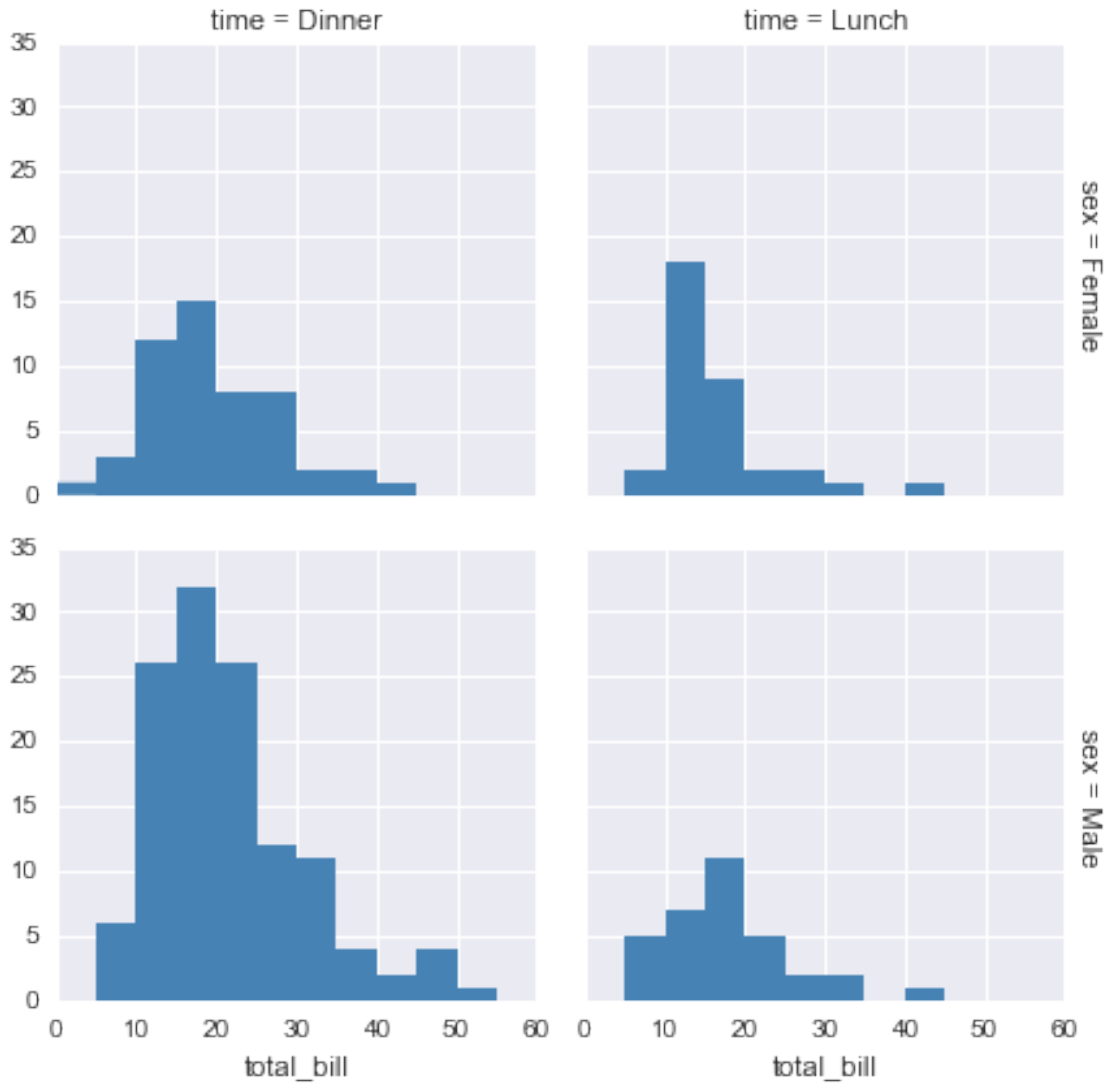
Out[6]: <matplotlib.axes._subplots.AxesSubplot at 0x1815b5f8>



4.0.2 Advanced Plots

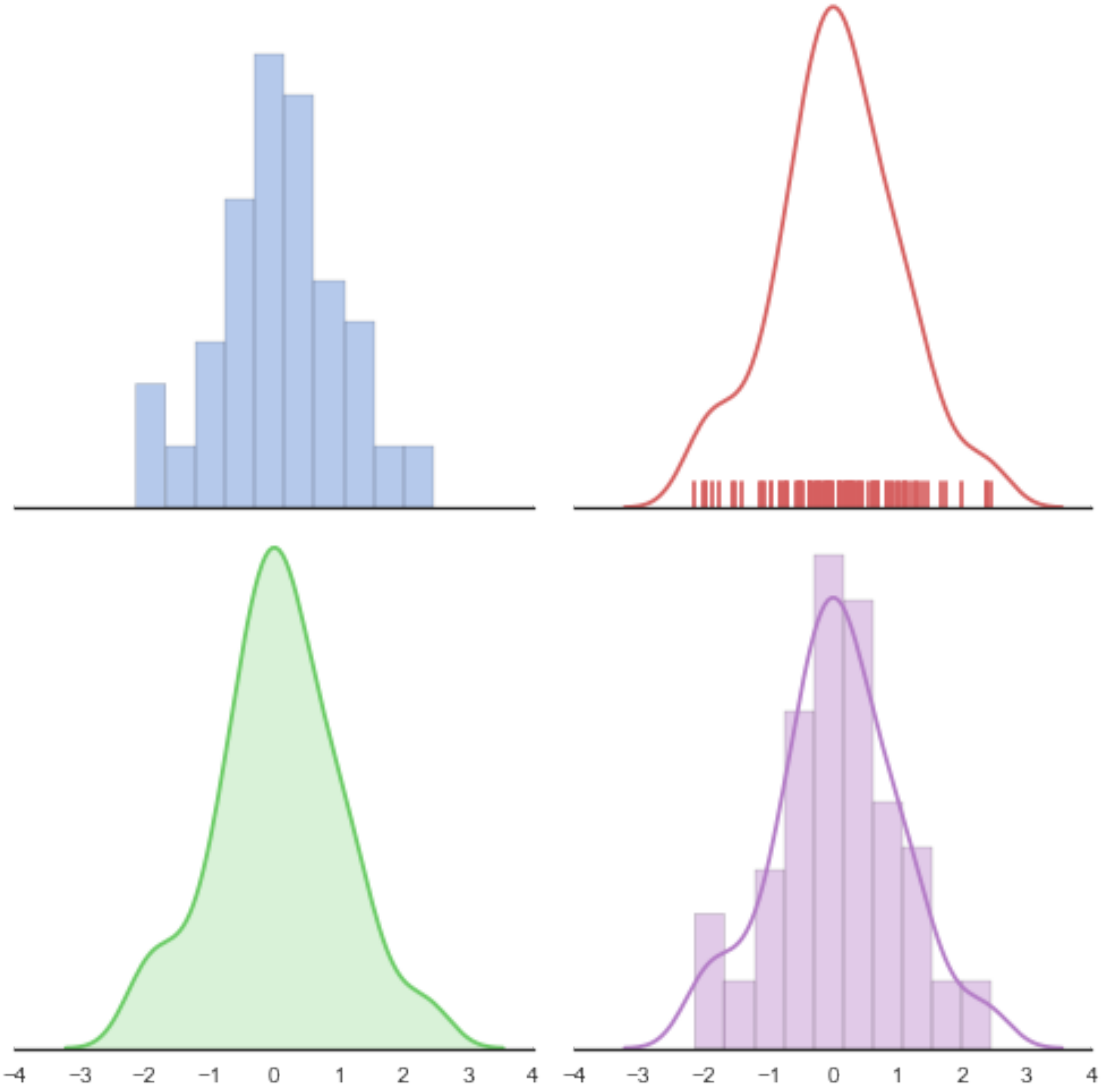
```
In [7]: # facetting histograms by subsets of data
        sb.set(style="darkgrid")

        tips = sb.load_dataset("tips")
        g = sb.FacetGrid(tips, row="sex", col="time", margin_titles=True)
        bins = np.linspace(0, 60, 13)
        g.map(plt.hist, "total_bill", color="steelblue", bins=bins, lw=0)
```

```
Out[7]: <seaborn.axisgrid.FacetGrid at 0x1816a2e8>
```



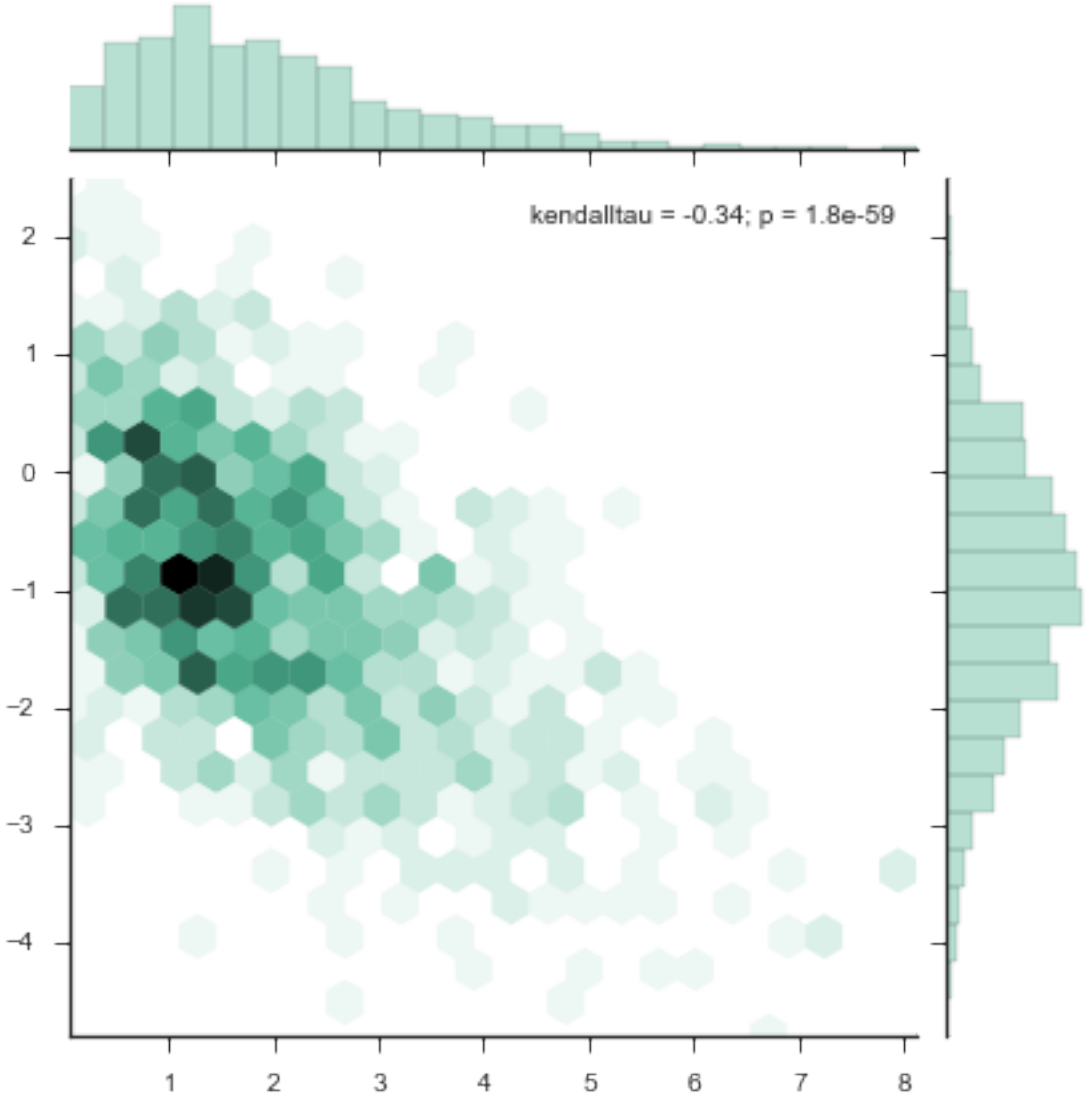

```
In [8]: # several distribution plot examples
        sb.set(style="white", palette="muted")
        f, axes = plt.subplots(2, 2, figsize=(7, 7), sharex=True)
        sb.despine(left=True)

        rs = np.random.RandomState(10)

        b, g, r, p = sb.color_palette("muted", 4)

        d = rs.normal(size=100)

        sb.distplot(d, kde=False, color=b, ax=axes[0, 0])
        sb.distplot(d, hist=False, rug=True, color=r, ax=axes[0, 1])
```

```
sb.distplot(d, hist=False, color=g, kde_kws={"shade": True}, ax=axes[1, 0])
sb.distplot(d, color=p, ax=axes[1, 1])

plt.setp(axes, yticks=[])
plt.tight_layout()
```



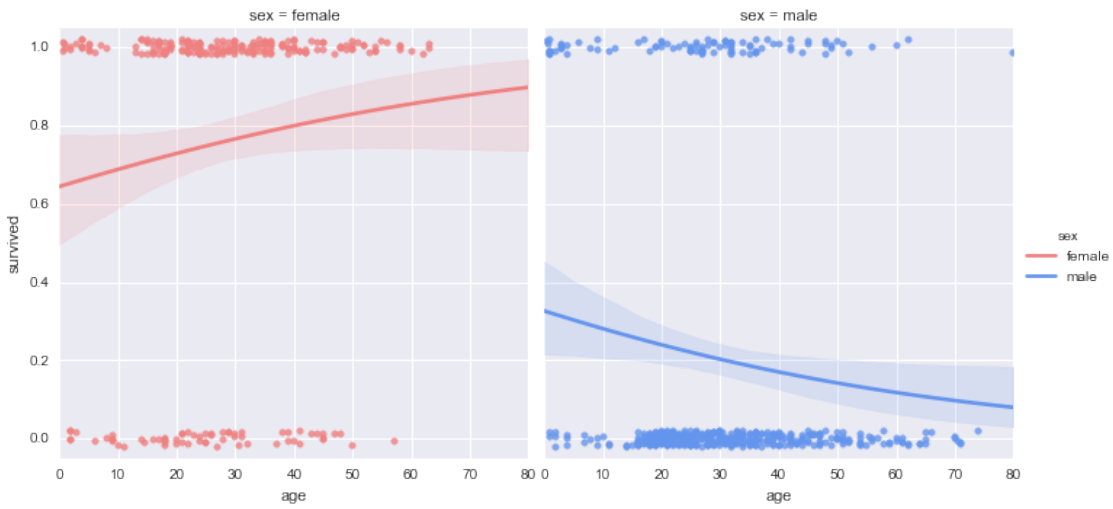
In [9]:
```
# hexbin plot with marginal distributions
from scipy.stats import kendalltau
sb.set(style="ticks")

rs = np.random.RandomState(11)
x = rs.gamma(2, size=1000)
y = -.5 * x + rs.normal(size=1000)
sb.jointplot(x, y, kind="hex", stat_func=kendalltau, color="#4CB391")
```

Out[9]: <seaborn.axisgrid.JointGrid at 0x19267550>

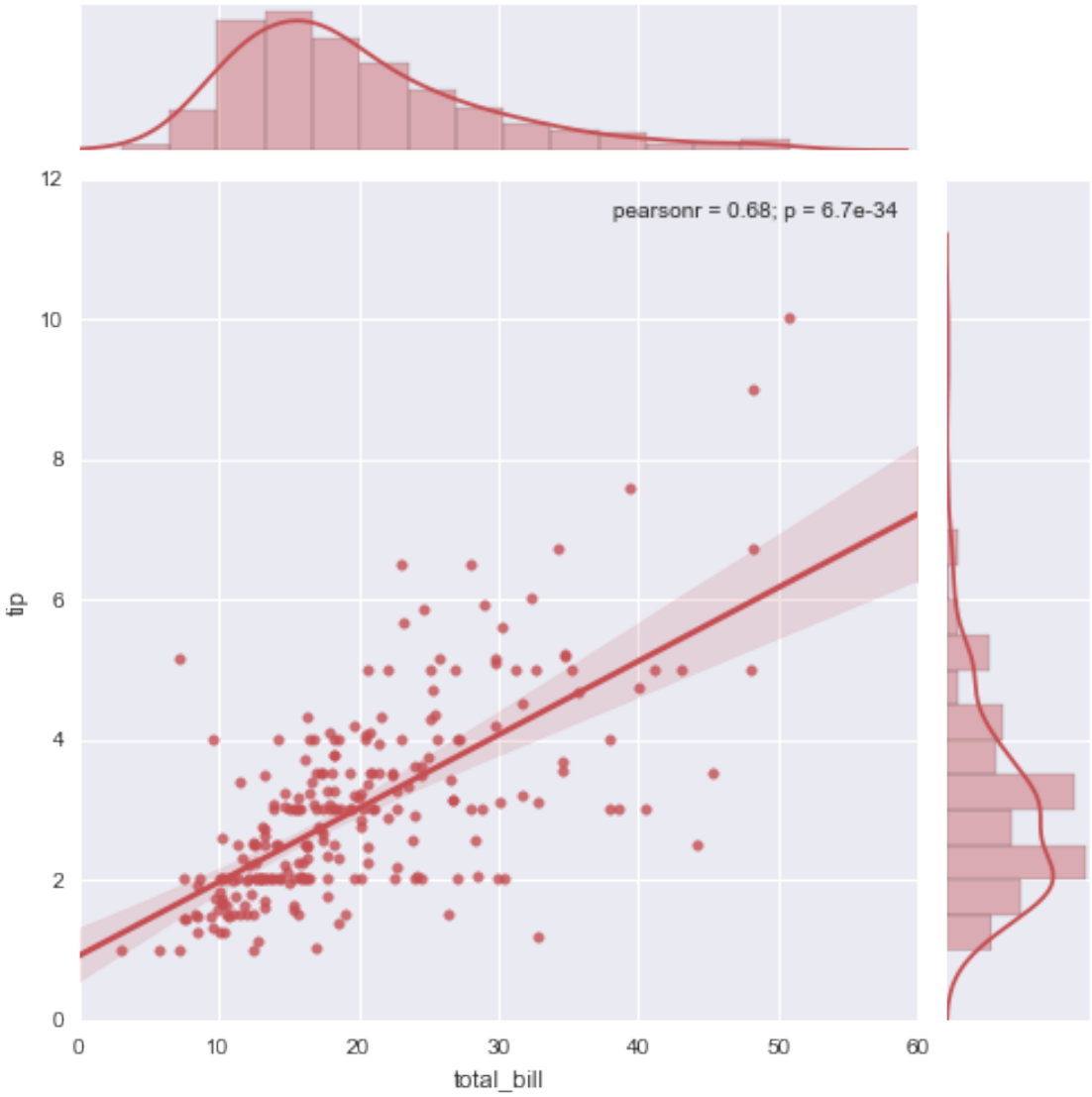


In [10]:
```
# faceted logistic regression
sb.set(style="darkgrid")
df = sb.load_dataset("titanic")

pal = dict(male="#6495ED", female="#F08080")
g = sb.lmplot("age", "survived", col="sex", hue="sex", data=df,
              palette=pal, y_jitter=.02, logistic=True)
g.set(xlim=(0, 80), ylim=(-.05, 1.05))
```

Out[10]: <seaborn.axisgrid.FacetGrid at 0x1a053f98>

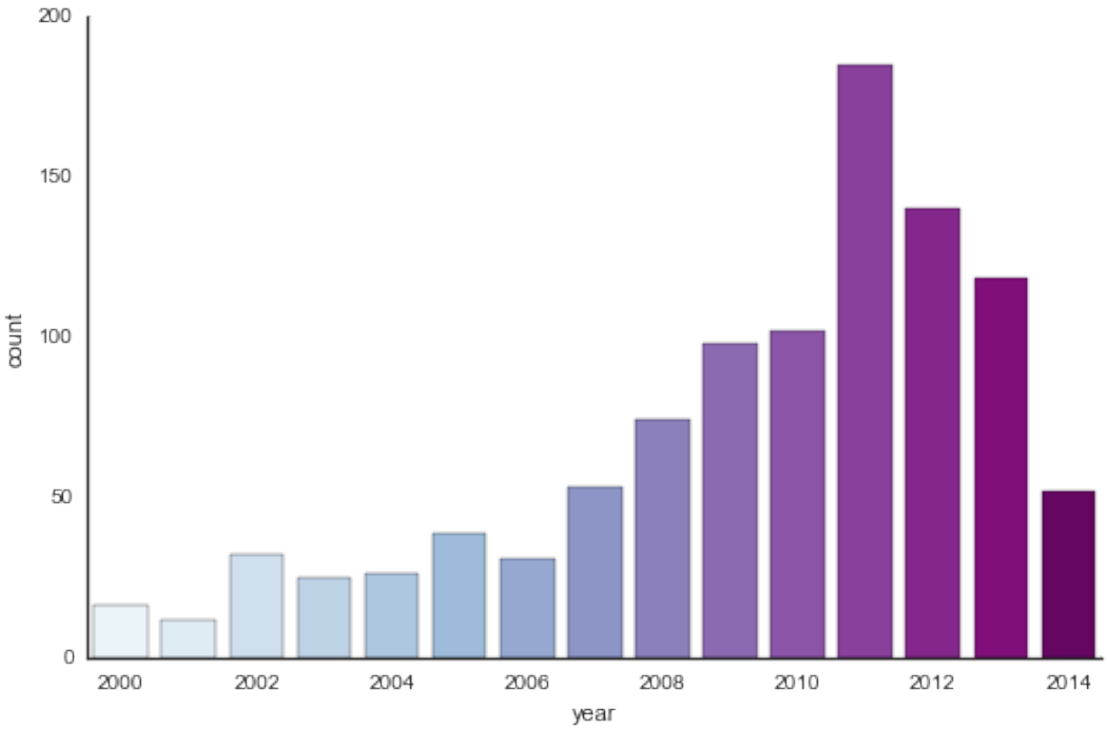


In [11]:
```
# linear regression with marginal distributions
sb.set(style="darkgrid")
tips = sb.load_dataset("tips")
color = sb.color_palette()[2]
g = sb.jointplot("total_bill", "tip", data=tips, kind="reg",
                 xlim=(0, 60), ylim=(0, 12), color=color, size=7)
```

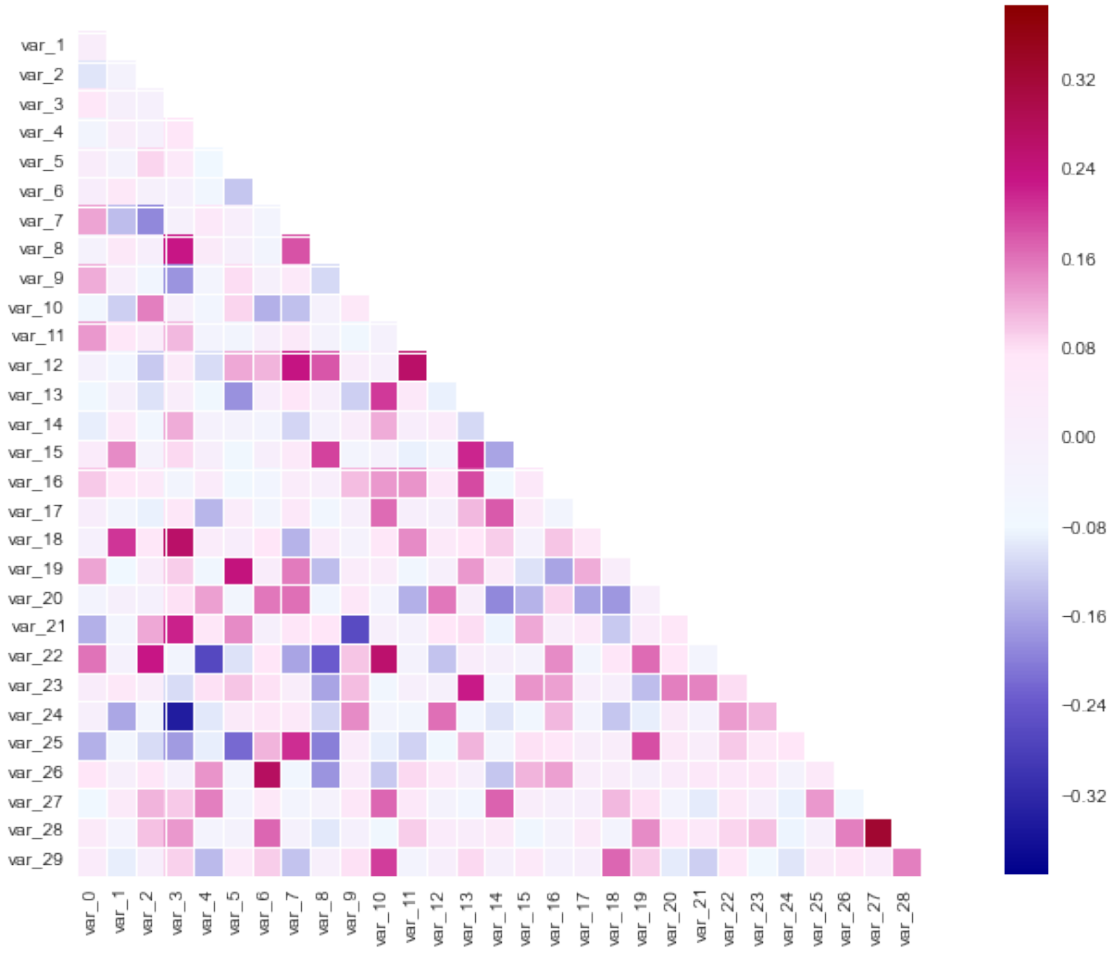



```
In [12]: # time series factor plot
         sb.set(style="white")
         planets = sb.load_dataset("planets")
         years = np.arange(2000, 2015)
         g = sb.factorplot("year", data=planets, palette="BuPu",
                           aspect=1.5, x_order=years)
         g.set_xticklabels(step=2)
```

```
Out[12]: <seaborn.axisgrid.FacetGrid at 0x1ab42518>
```

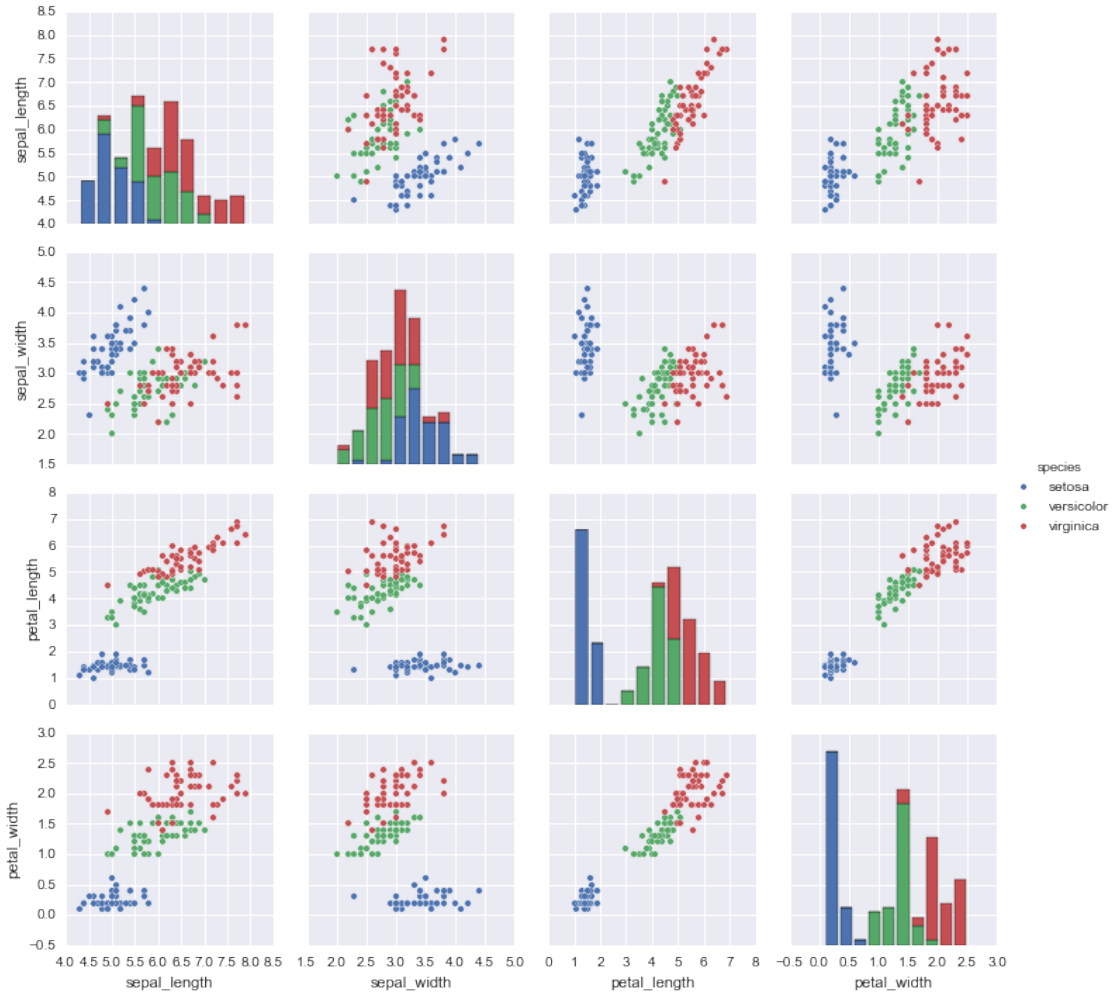


In [13]:
```
# correlation matrix
sb.set(style="darkgrid")

rs = np.random.RandomState(33)
d = rs.normal(size=(100, 30))

f, ax = plt.subplots(figsize=(9, 9))
cmap = sb.blend_palette(["#00008B", "#6A5ACD", "#F0F8FF",
                         "#FFE6F8", "#C71585", "#8B0000"], as_cmap=True)
sb.corrplot(d, annot=False, sig_stars=False,
            diag_names=False, cmap=cmap, ax=ax)
f.tight_layout()
```



In [14]:
```
# pair plot example
sb.set(style="darkgrid")
df = sb.load_dataset("iris")
sb.pairplot(df, hue="species", size=2.5)
```

Out[14]: <seaborn.axisgrid.PairGrid at 0x1a7cd4e0>


sepal_length
sepal_width
petal_length
petal_width
species
setosa
versicolor
virginica