In [1]:
```python
import numpy as np
import pandas as pd
import seaborn as sns
sns.set(style="whitegrid")
import matplotlib.pyplot as plt
from collections import Counter
%matplotlib inline
import os
for dirname, _, filenames in os.walk('/kaggle/input'):
    for filename in filenames:
        print(os.path.join(dirname, filename))
```

In [3]:
```python
import warnings
warnings.filterwarnings('ignore')
```

Read Dataset

In [6]:
```python
fifa19 = pd.read_csv(r"D:\NIT Resume Project\FIFA.csv")
```

In [8]:
```python
fifa19
```

Out[8]:

|	Unnamed: 0	ID	Name	Age	Pho
0	0	158023	L. Messi	31	https://cdn.sofifa.org/players/4/19/158023.p
1	1	20801	Cristiano Ronaldo	33	https://cdn.sofifa.org/players/4/19/20801.p
2	2	190871	Neymar Jr	26	https://cdn.sofifa.org/players/4/19/190871.p
3	3	193080	De Gea	27	https://cdn.sofifa.org/players/4/19/193080.p
4	4	192985	K. De Bruyne	27	https://cdn.sofifa.org/players/4/19/192985.p
...	...	...	...	...	
18202	18202	238813	J. Lundstram	19	https://cdn.sofifa.org/players/4/19/238813.p
18203	18203	243165	N. Christoffersson	19	https://cdn.sofifa.org/players/4/19/243165.p
18204	18204	241638	B. Worman	16	https://cdn.sofifa.org/players/4/19/241638.p
18205	18205	246268	D. Walker-Rice	17	https://cdn.sofifa.org/players/4/19/246268.p
18206	18206	246269	G. Nugent	16	https://cdn.sofifa.org/players/4/19/246269.p

18207 rows × 89 columns
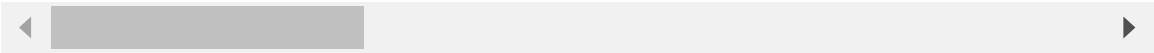
Exploratory Data Analysis

In [11]:
```
fifa19.head()
```

Out[11]:

	Unnamed: 0	ID	Name	Age	Photo	Natio
0	0	158023	L. Messi	31	https://cdn.sofifa.org/players/4/19/158023.png	Arge
1	1	20801	Cristiano Ronaldo	33	https://cdn.sofifa.org/players/4/19/20801.png	Po
2	2	190871	Neymar Jr	26	https://cdn.sofifa.org/players/4/19/190871.png	
3	3	193080	De Gea	27	https://cdn.sofifa.org/players/4/19/193080.png	
4	4	192985	K. De Bruyne	27	https://cdn.sofifa.org/players/4/19/192985.png	Be

5 rows × 89 columns
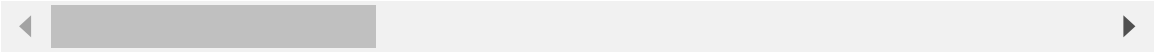
In [13]:

```
fifa19.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 18207 entries, 0 to 18206
Data columns (total 89 columns):
 #   Column                   Non-Null Count    Dtype
---  ------                   --------------    -----
 0   Unnamed: 0               18207 non-null    int64
 1   ID                       18207 non-null    int64
 2   Name                     18207 non-null    object
 3   Age                      18207 non-null    int64
 4   Photo                    18207 non-null    object
 5   Nationality              18207 non-null    object
 6   Flag                     18207 non-null    object
 7   Overall                  18207 non-null    int64
 8   Potential                18207 non-null    int64
 9   Club                     17966 non-null    object
 10  Club Logo                18207 non-null    object
 11  Value                    18207 non-null    object
 12  Wage                     18207 non-null    object
 13  Special                  18207 non-null    int64
 14  Preferred Foot           18159 non-null    object
 15  International Reputation  18159 non-null    float64
 16  Weak Foot                18159 non-null    float64
 17  Skill Moves              18159 non-null    float64
 18  Work Rate                18159 non-null    object
 19  Body Type                18159 non-null    object
 20  Real Face                18159 non-null    object
 21  Position                 18147 non-null    object
 22  Jersey Number            18147 non-null    float64
 23  Joined                   16654 non-null    object
 24  Loaned From              1264 non-null     object
 25  Contract Valid Until     17918 non-null    object
 26  Height                   18159 non-null    object
 27  Weight                   18159 non-null    object
 28  LS                       16122 non-null    object
 29  ST                       16122 non-null    object
 30  RS                       16122 non-null    object
 31  LW                       16122 non-null    object
 32  LF                       16122 non-null    object
 33  CF                       16122 non-null    object
 34  RF                       16122 non-null    object
 35  RW                       16122 non-null    object
 36  LAM                      16122 non-null    object
 37  CAM                      16122 non-null    object
 38  RAM                      16122 non-null    object
 39  LM                       16122 non-null    object
 40  LCM                      16122 non-null    object
 41  CM                       16122 non-null    object
 42  RCM                      16122 non-null    object
 43  RM                       16122 non-null    object
 44  LWB                      16122 non-null    object
 45  LDM                      16122 non-null    object
 46  CDM                      16122 non-null    object
 47  RDM                      16122 non-null    object
 48  RWB                      16122 non-null    object
 49  LB                       16122 non-null    object
 50  LCB                      16122 non-null    object
 51  CB                       16122 non-null    object
 52  RCB                      16122 non-null    object
 53  RB                       16122 non-null    object
 54  Crossing                 18159 non-null    float64
```

```
 55   Finishing                  18159 non-null   float64
 56   HeadingAccuracy            18159 non-null   float64
 57   ShortPassing               18159 non-null   float64
 58   Volleys                    18159 non-null   float64
 59   Dribbling                  18159 non-null   float64
 60   Curve                      18159 non-null   float64
 61   FKAccuracy                 18159 non-null   float64
 62   LongPassing                18159 non-null   float64
 63   BallControl                18159 non-null   float64
 64   Acceleration               18159 non-null   float64
 65   SprintSpeed                18159 non-null   float64
 66   Agility                    18159 non-null   float64
 67   Reactions                  18159 non-null   float64
 68   Balance                    18159 non-null   float64
 69   ShotPower                  18159 non-null   float64
 70   Jumping                    18159 non-null   float64
 71   Stamina                    18159 non-null   float64
 72   Strength                   18159 non-null   float64
 73   LongShots                  18159 non-null   float64
 74   Aggression                 18159 non-null   float64
 75   Interceptions              18159 non-null   float64
 76   Positioning                18159 non-null   float64
 77   Vision                     18159 non-null   float64
 78   Penalties                  18159 non-null   float64
 79   Composure                  18159 non-null   float64
 80   Marking                    18159 non-null   float64
 81   StandingTackle             18159 non-null   float64
 82   SlidingTackle              18159 non-null   float64
 83   GKDiving                   18159 non-null   float64
 84   GKHandling                 18159 non-null   float64
 85   GKKicking                  18159 non-null   float64
 86   GKPositioning              18159 non-null   float64
 87   GKReflexes                 18159 non-null   float64
 88   Release Clause             16643 non-null   object
dtypes: float64(38), int64(6), object(45)
memory usage: 12.4+ MB
```

In [15]: `fifa19['Body Type'].value_counts()`

Out[15]:
```
Body Type
Normal                 10595
Lean                    6417
Stocky                  1140
Messi                      1
C. Ronaldo                 1
Neymar                     1
Courtois                   1
PLAYER_BODY_TYPE_25        1
Shaqiri                    1
Akinfenwa                  1
Name: count, dtype: int64
```

Visualize distribution of `Age` variable with Seaborn `distplot()` function

In [18]:
```python
f, ax = plt.subplots(figsize=(8,6))
x = fifa19['Age']
```

```
ax = sns.distplot(x, bins=10)
plt.show()
```
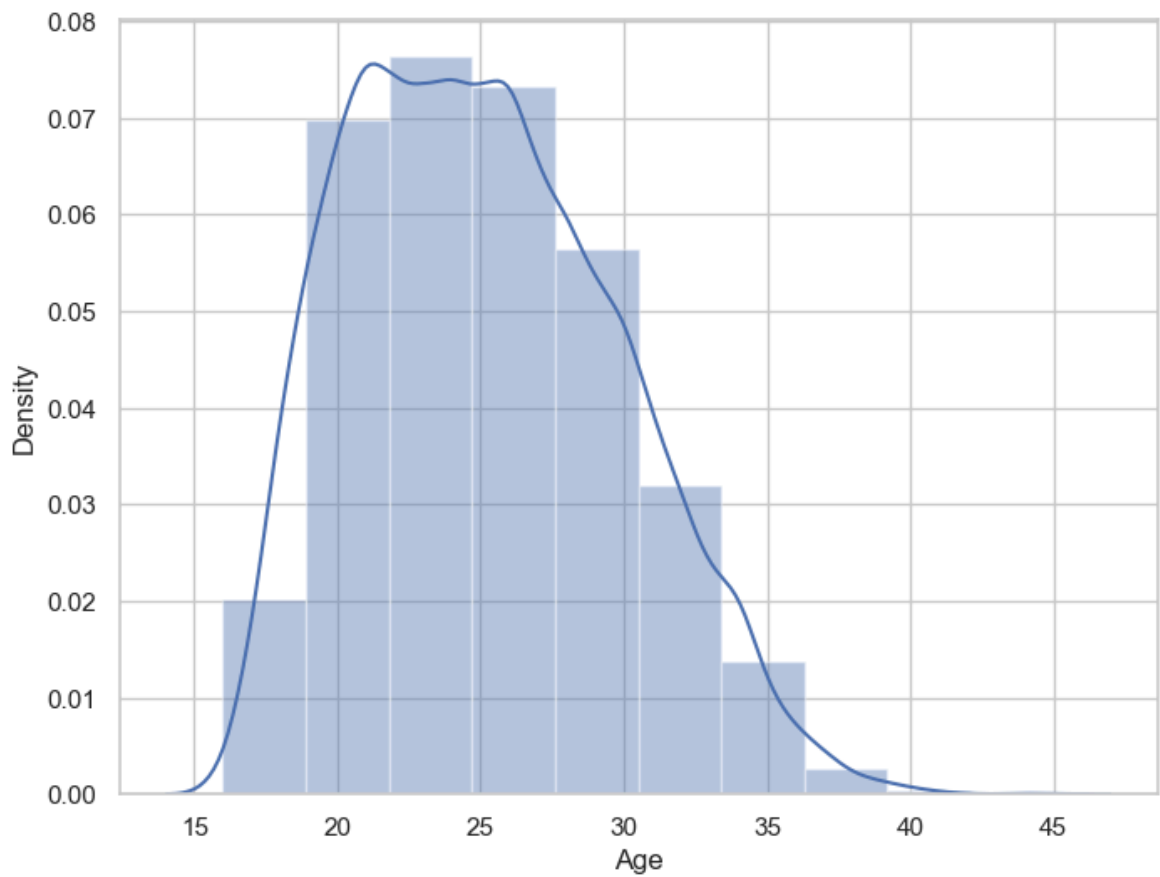


```
In [20]:  f, ax = plt.subplots(figsize=(8,6))
          x = fifa19['Age']
          x = pd.Series(x, name="Age variable")
          ax = sns.distplot(x, bins=10)
          plt.show()
```
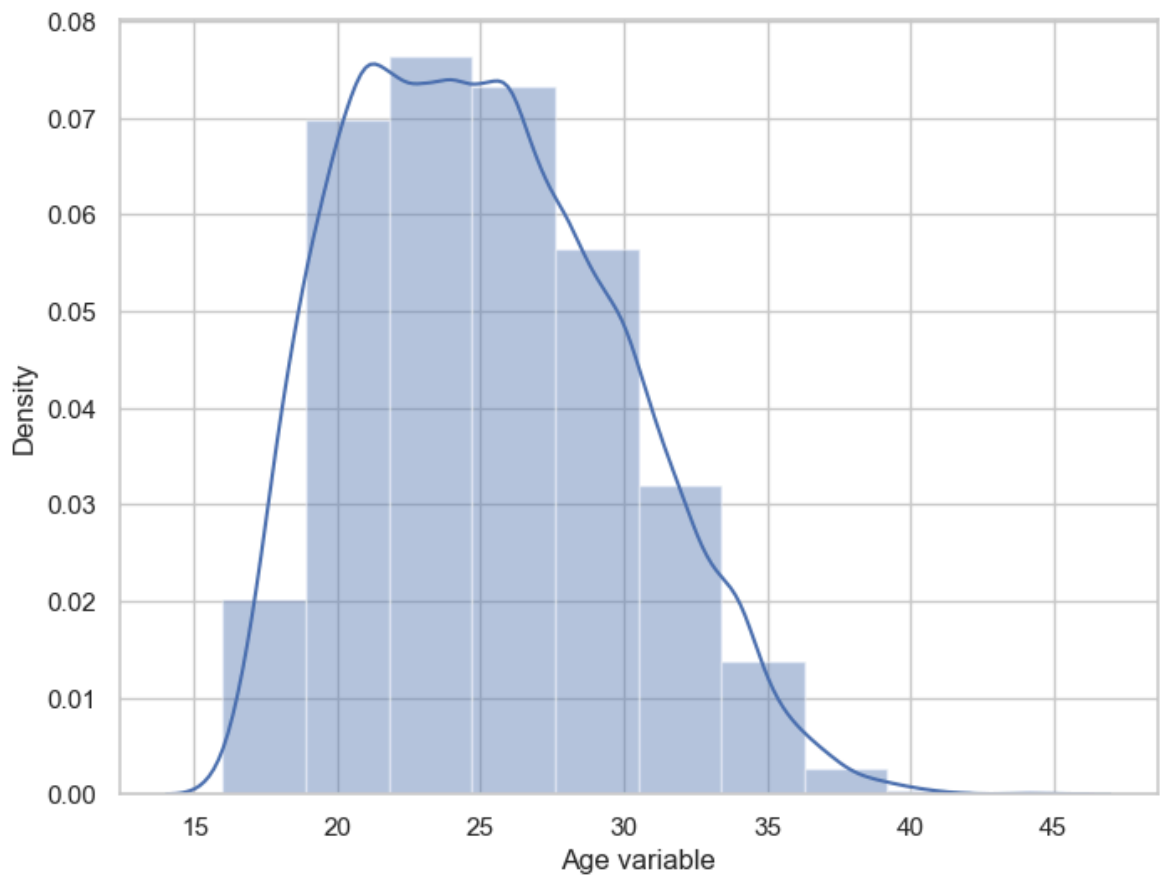
```
In [22]: f, ax = plt.subplots(figsize=(8,6))
         x = fifa19['Age']
         ax = sns.distplot(x, bins=10, vertical = True)
         plt.show()
```
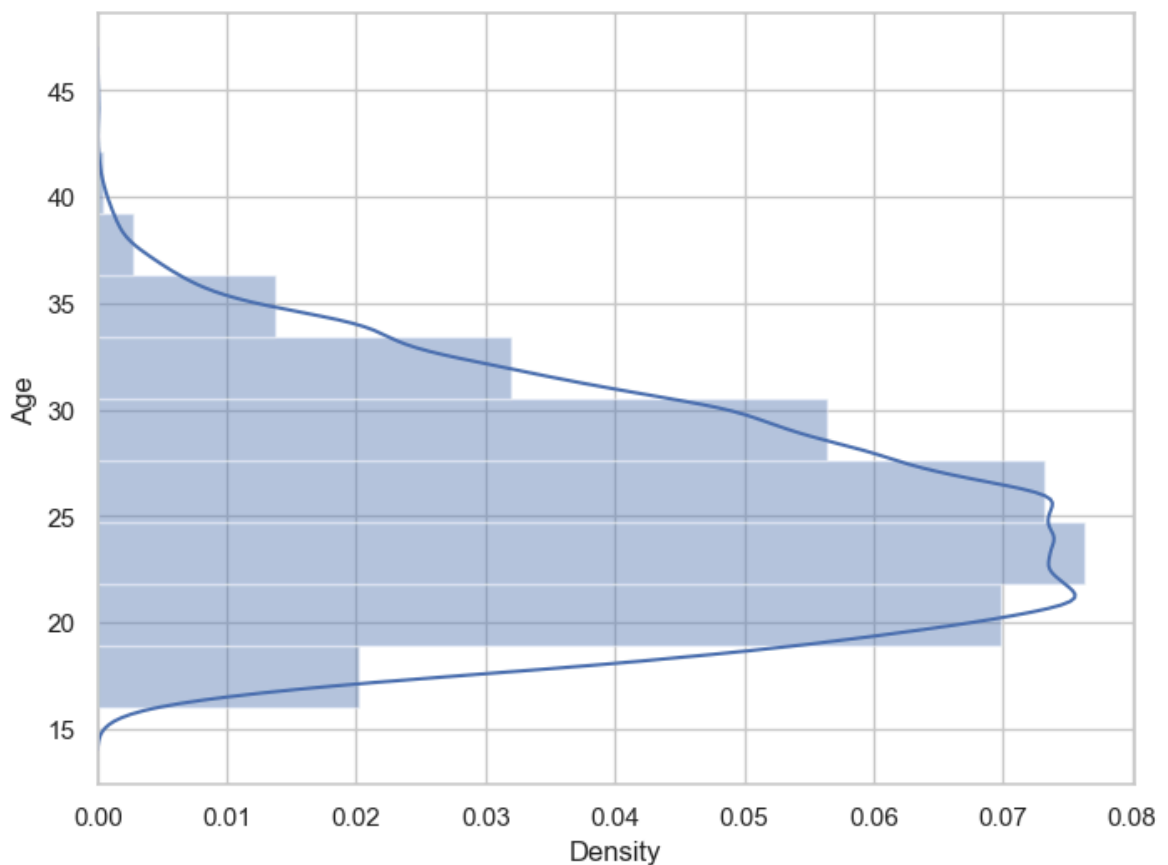
Seaborn Kernel Density Estimation (KDE) Plot

In [25]:
```python
f, ax = plt.subplots(figsize=(8,6))
x = fifa19['Age']
x = pd.Series(x, name="Age variable")
ax = sns.kdeplot(x)
plt.show()
```
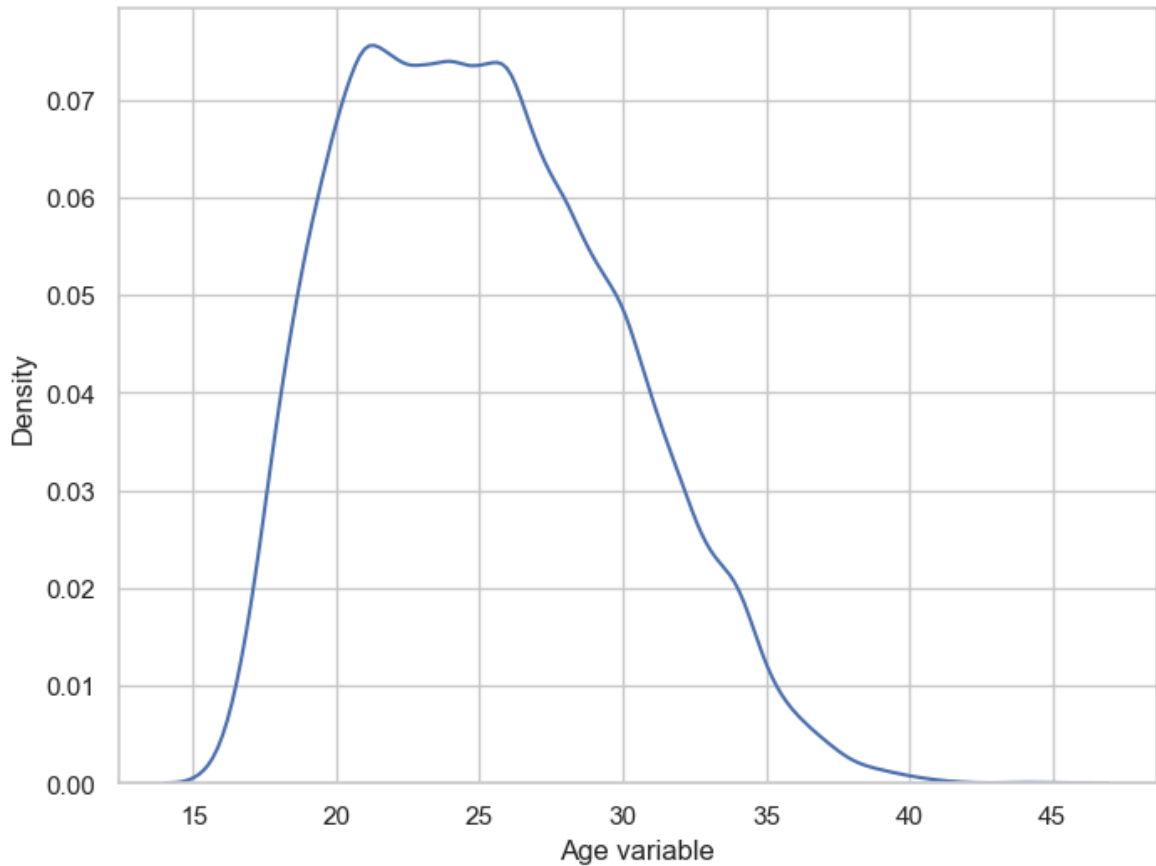

In [27]:
```python
f, ax = plt.subplots(figsize=(8,6))
x = fifa19['Age']
x = pd.Series(x, name="Age variable")
ax = sns.kdeplot(x)
plt.show()
```
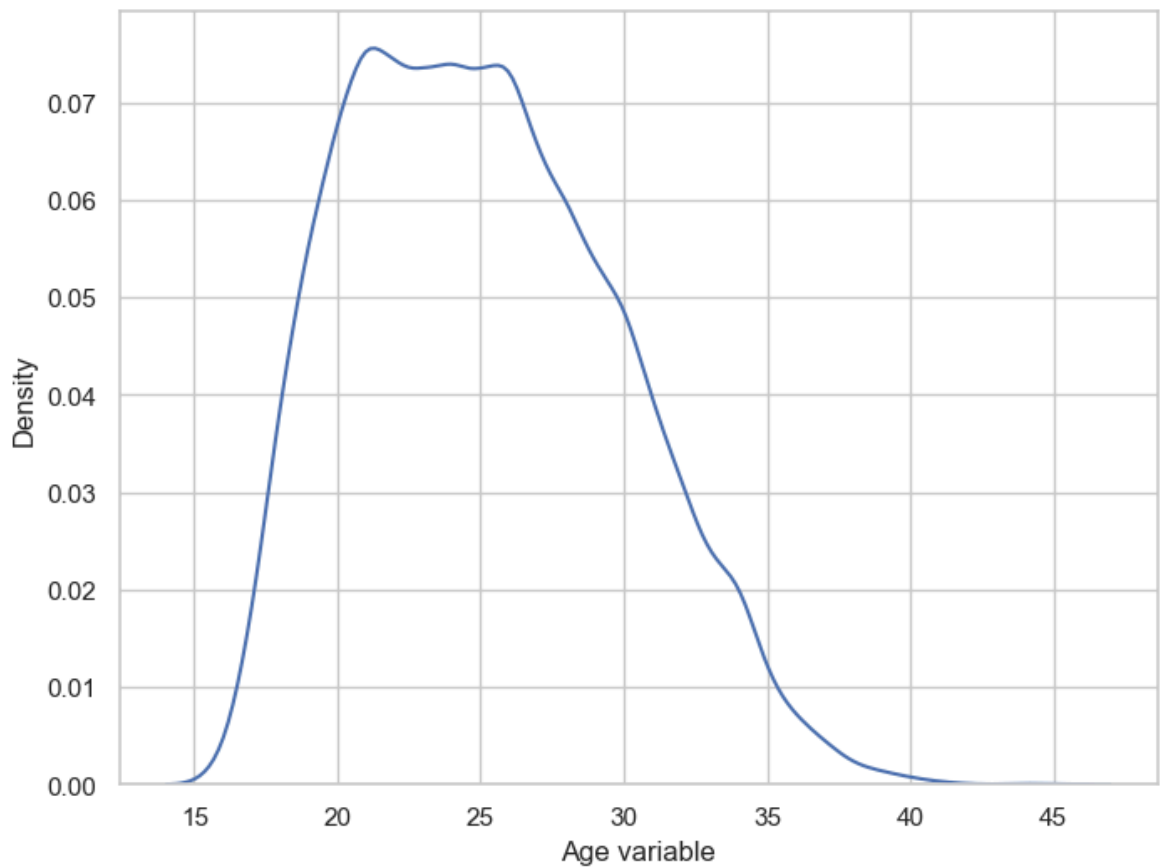
```
In [29]: f, ax = plt.subplots(figsize=(8,6))
         x = fifa19['Age']
         x = pd.Series(x, name="Age variable")
         ax = sns.kdeplot(x, shade=True, color='r')
         plt.show()
```
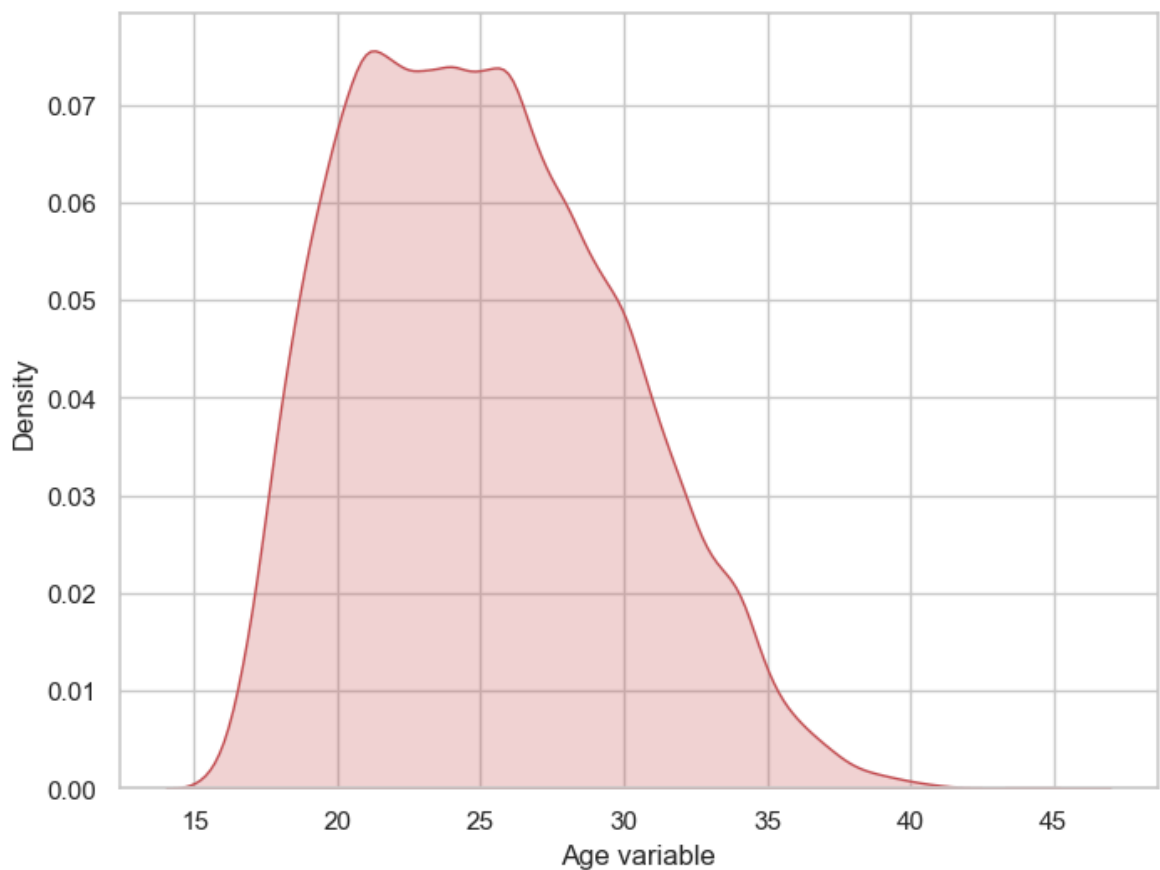
Histogram

```
In [32]:  f, ax = plt.subplots(figsize=(8,6))
          x = fifa19['Age']
          ax = sns.distplot(x, kde=False, rug=True, bins=10)
          plt.show()
```
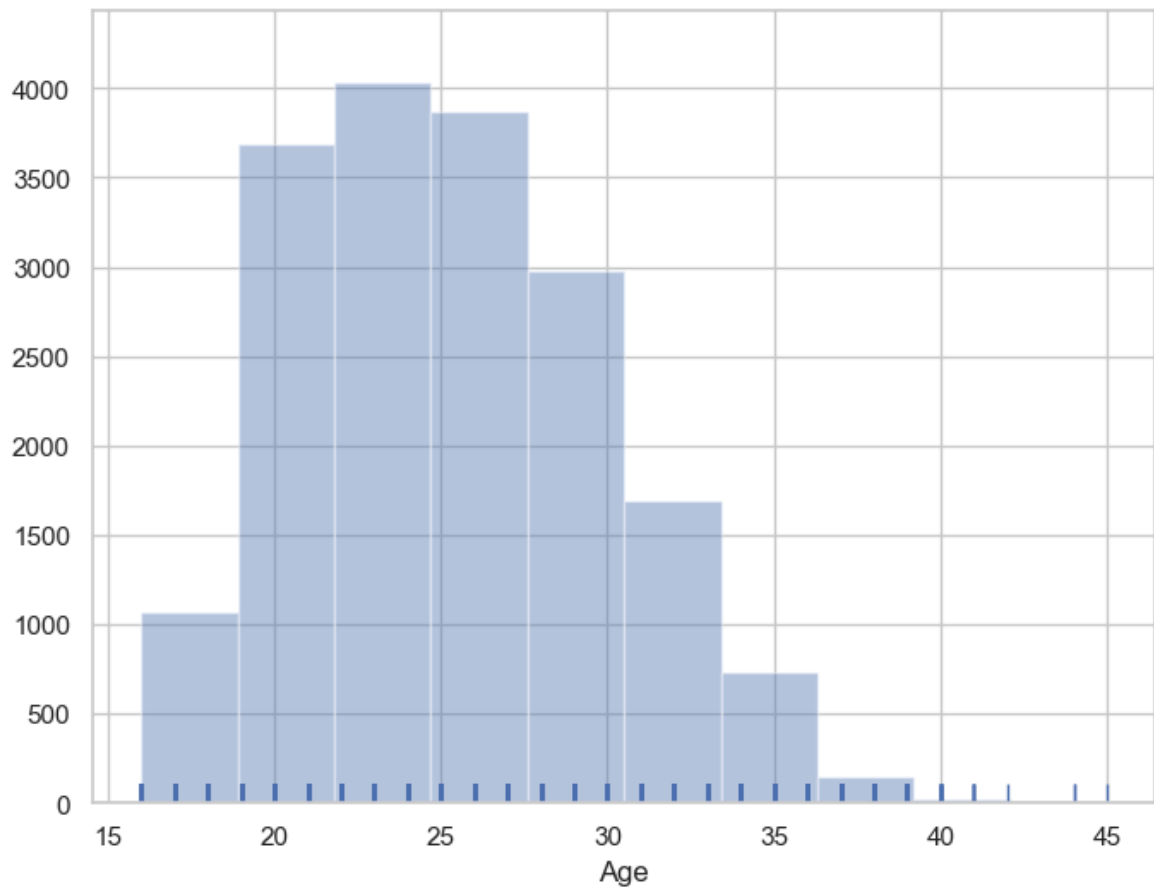


```
In [34]:  f, ax = plt.subplots(figsize=(8,6))
          x = fifa19['Age']
          ax = sns.distplot(x, hist=False, rug=True, bins=10)
          plt.show()
```
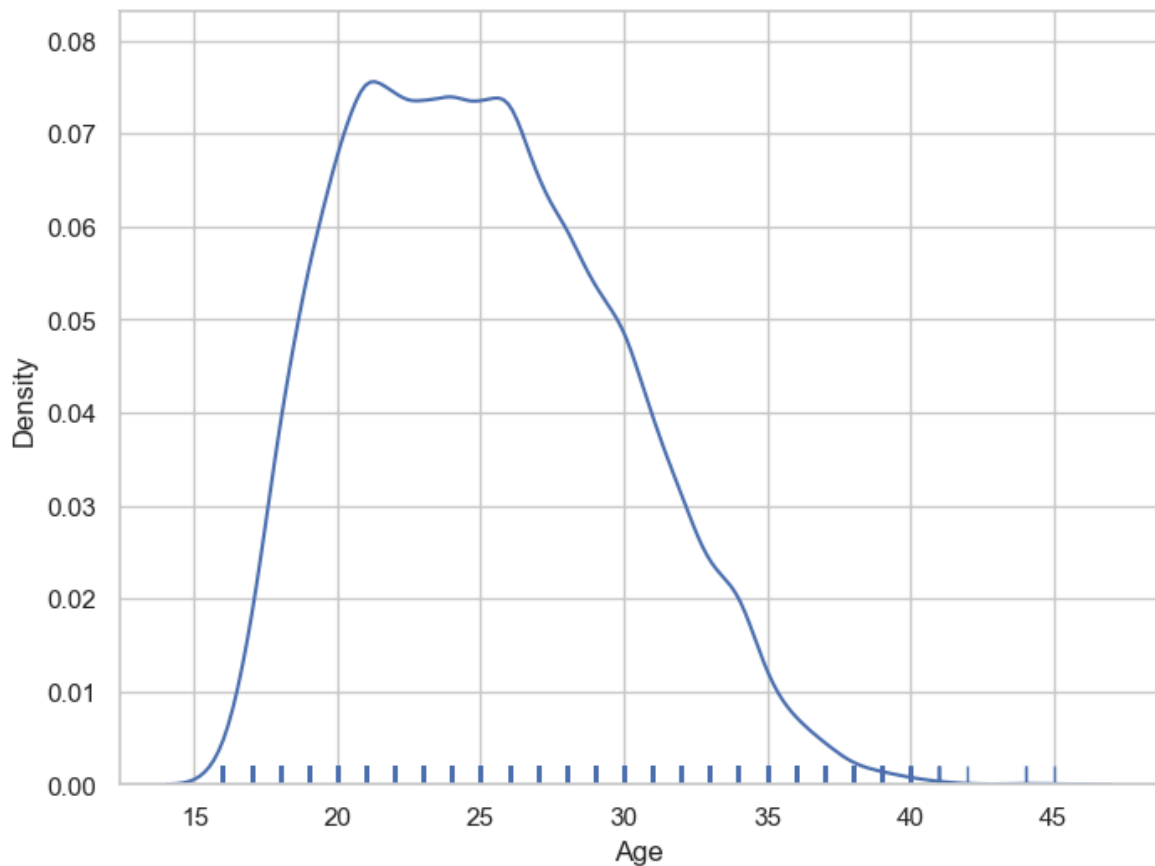
Check number of unique values in `Preferred Foot` variable

```
In [37]:  fifa19['Preferred Foot'].nunique()
```

```
Out[37]:  2
```

Check frequency distribution of values in `Preferred Foot` variable

```
In [40]:  fifa19['Preferred Foot'].value_counts()
```

```
Out[40]:  Preferred Foot
          Right     13948
          Left       4211
          Name: count, dtype: int64
```

Visualize distribution of values with Seaborn `countplot()` function.

```
In [47]:  f, ax = plt.subplots(figsize=(8, 6))
          sns.countplot(x="Preferred Foot",hue='Preferred Foot', data=fifa19, color="c")
          plt.show()
```
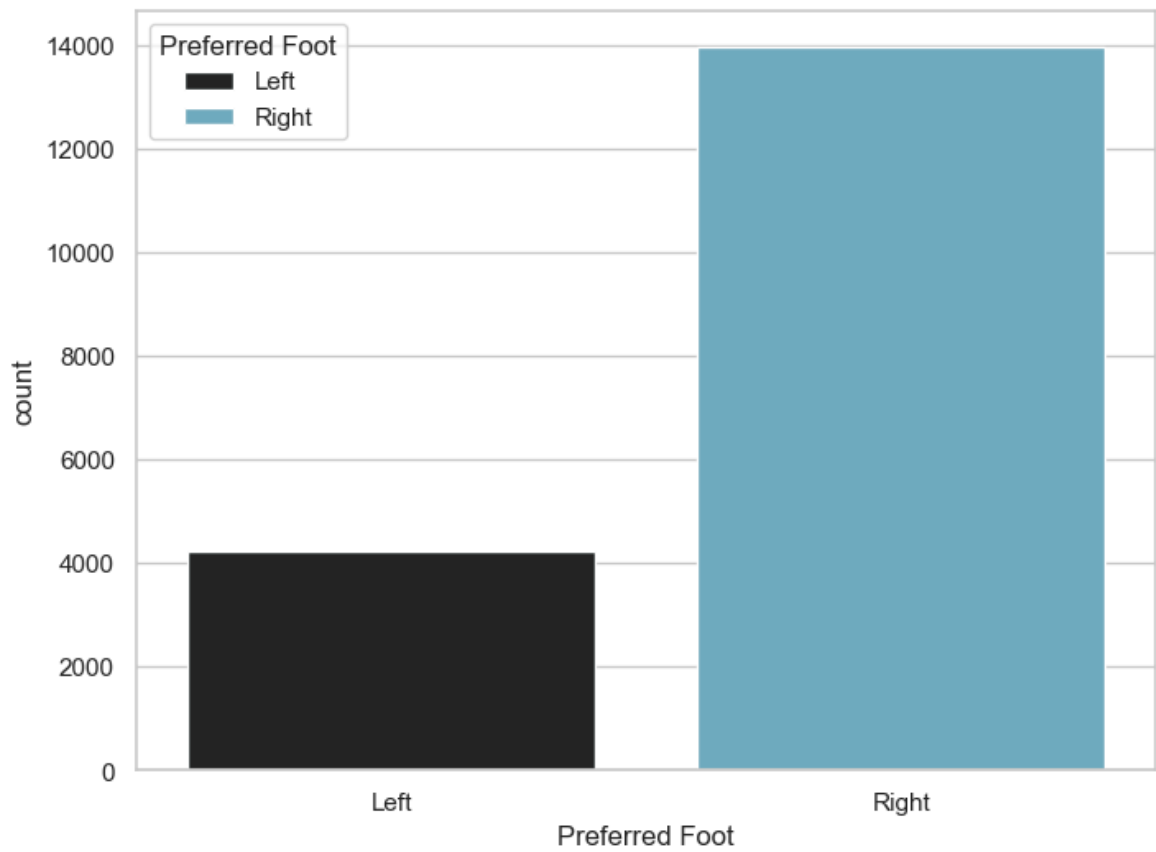
```
In [49]:  f, ax = plt.subplots(figsize=(8, 6))
          sns.countplot(x="Preferred Foot", hue="Real Face", data=fifa19)
          plt.show()
```
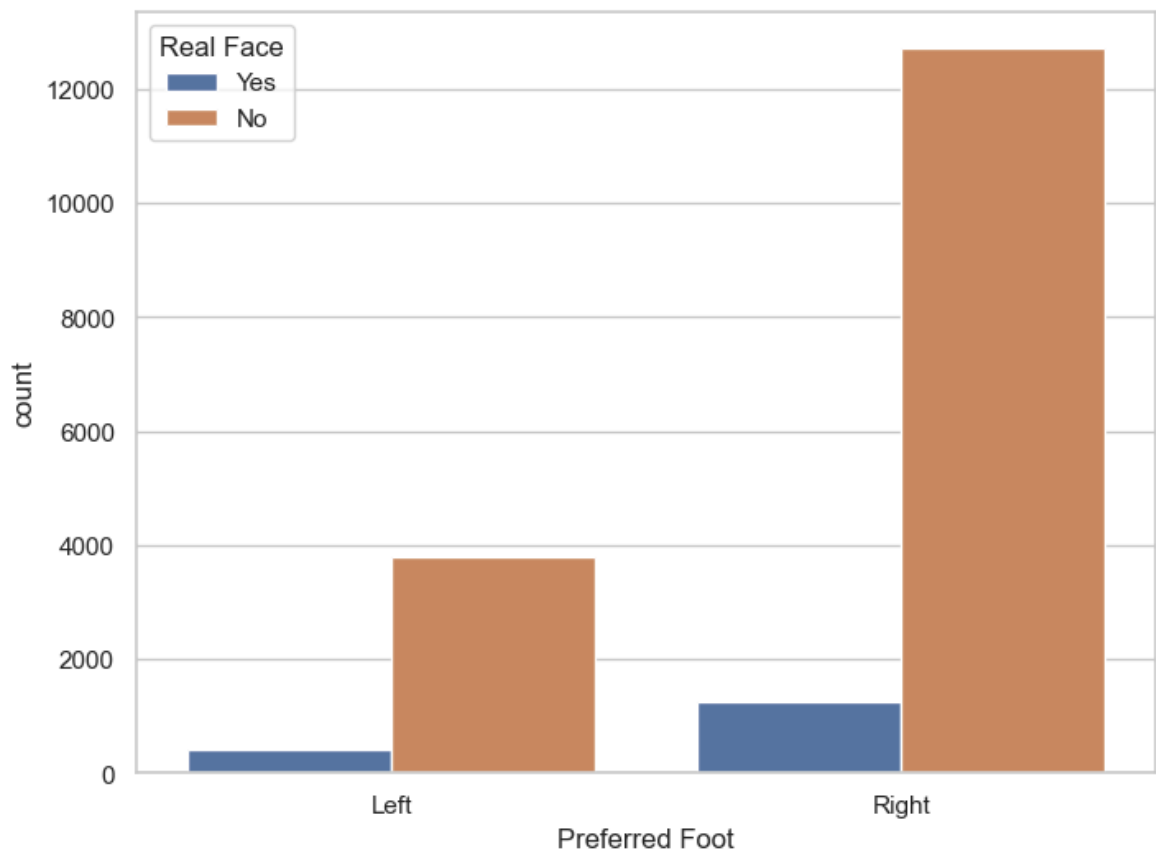
In [51]:
```python
f, ax = plt.subplots(figsize=(8, 6))
sns.countplot(y="Preferred Foot", data=fifa19, color="c")
plt.show()
```
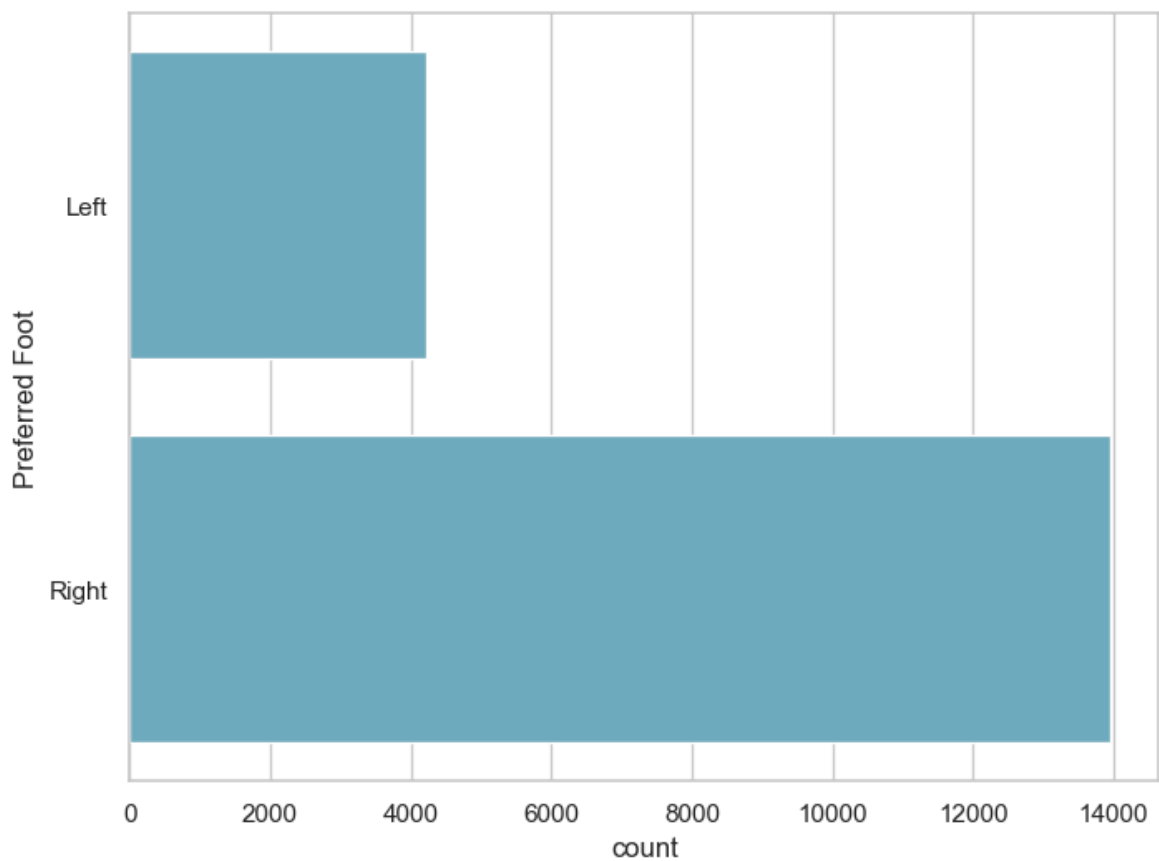

Seaborn `Catplot()` function

In [54]:
```python
g = sns.catplot(x="Preferred Foot", kind="count", palette="ch:.25", data=fifa19)
```
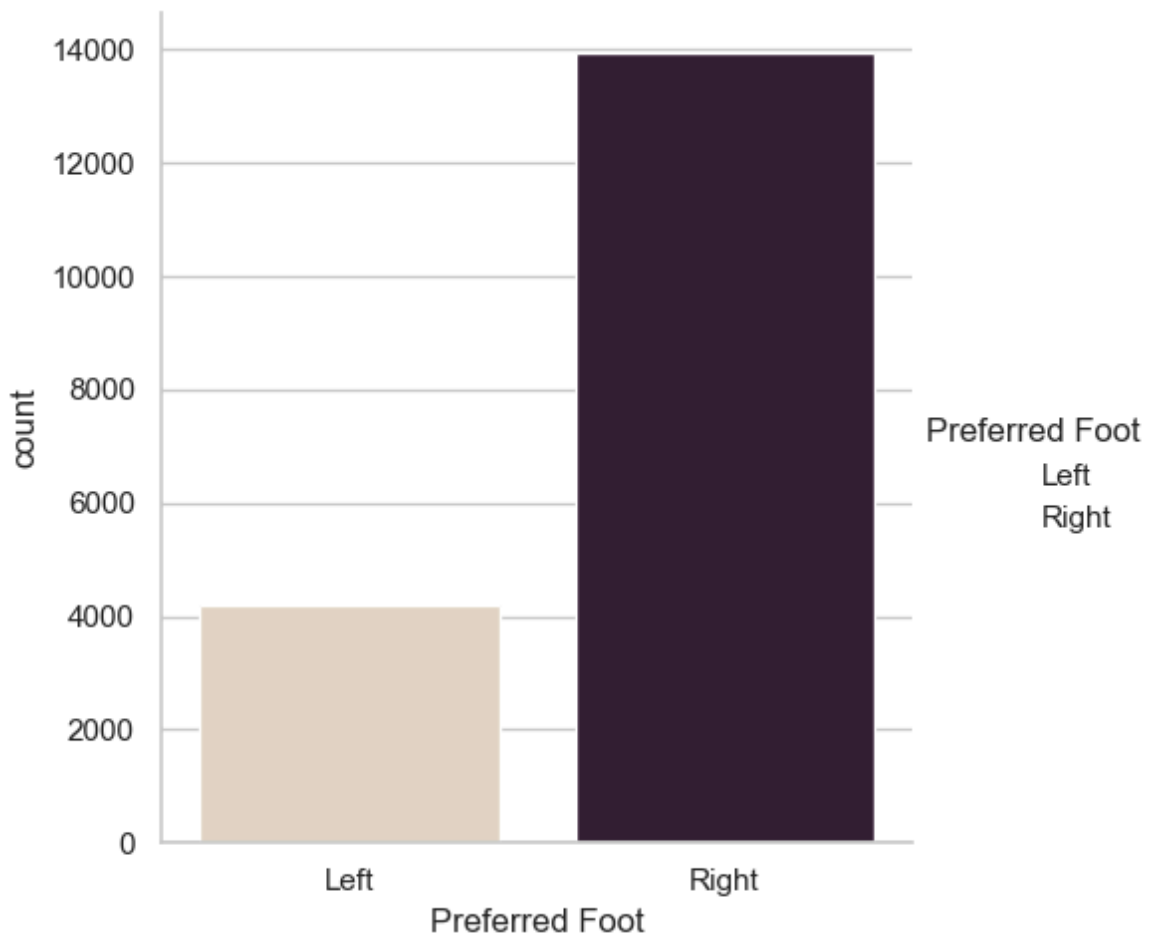
Check the number of unique values in `International Reputation` variable

```
In [57]: fifa19['International Reputation'].nunique()
```

```
Out[57]: 5
```

```
In [59]: ### Check the distribution of values in `International Reputation` variable
```

```
In [61]: fifa19['International Reputation'].value_counts()
```

```
Out[61]: International Reputation
         1.0     16532
         2.0      1261
         3.0       309
         4.0        51
         5.0         6
         Name: count, dtype: int64
```

Seaborn `Stripplot()` function

```
In [66]: f, ax = plt.subplots(figsize=(8, 6))
         sns.stripplot(x="International Reputation",hue='International Reputation', y="Po
         plt.show()
```
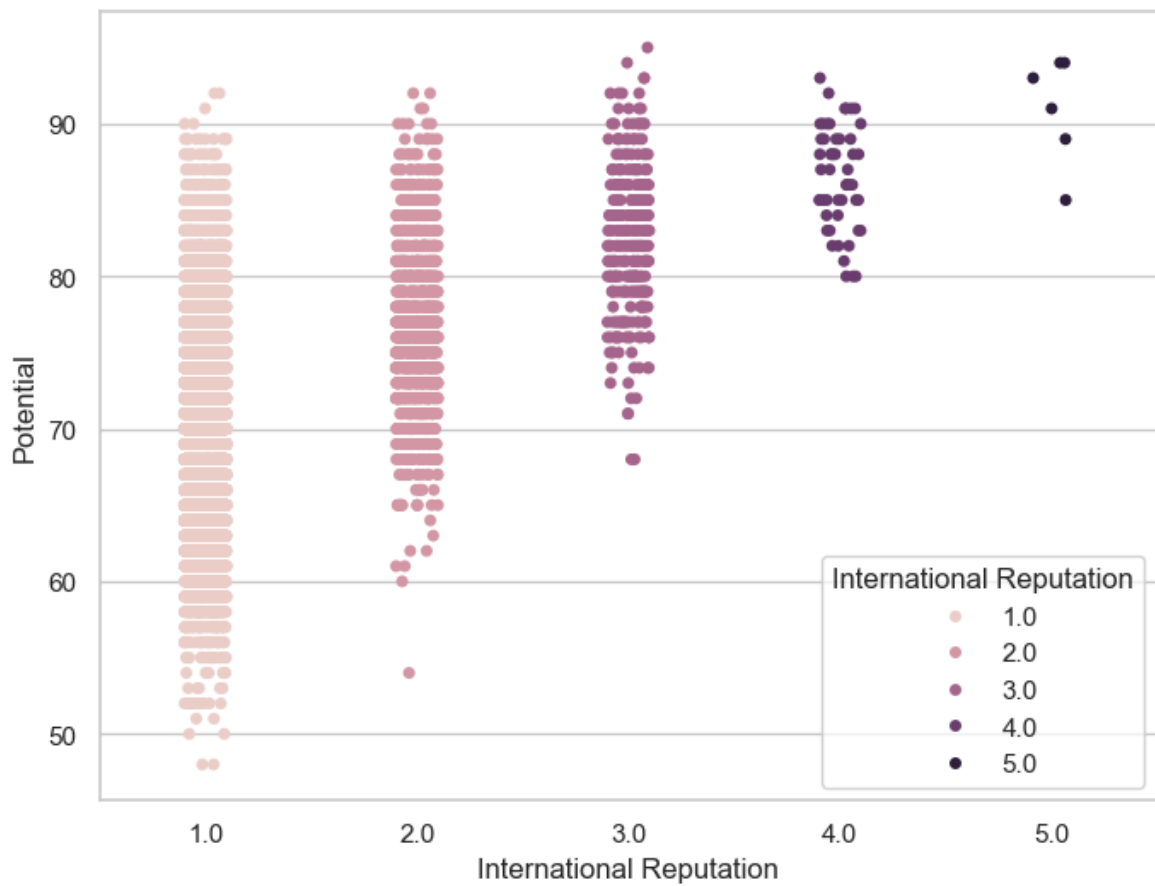
```
In [70]: f, ax = plt.subplots(figsize=(8, 6))
         sns.stripplot(x="International Reputation", y="Potential",hue='Potential', data=
         plt.show()
```
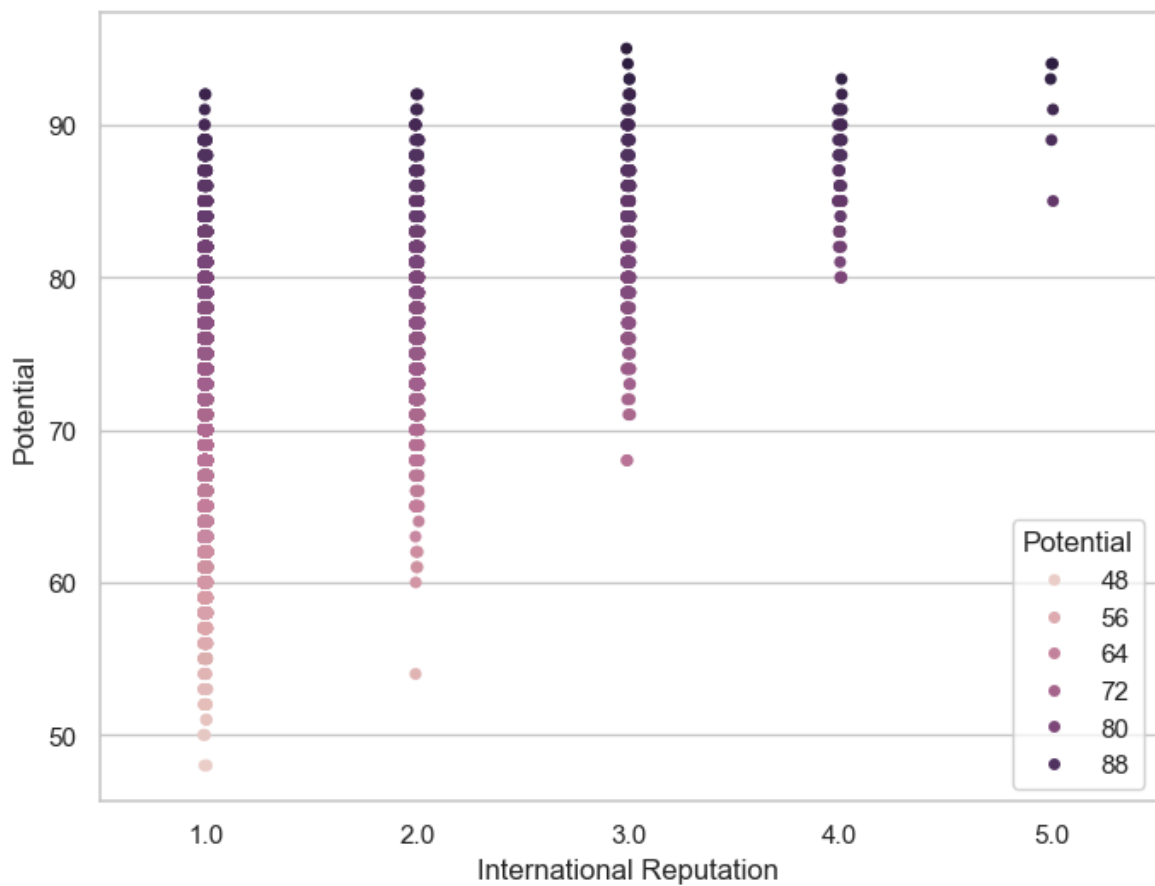
In [72]:
```python
f, ax = plt.subplots(figsize=(8, 6))
sns.stripplot(x="International Reputation", y="Potential", hue="Preferred Foot",
              data=fifa19, jitter=0.2, palette="Set2", dodge=True)
plt.show()
```
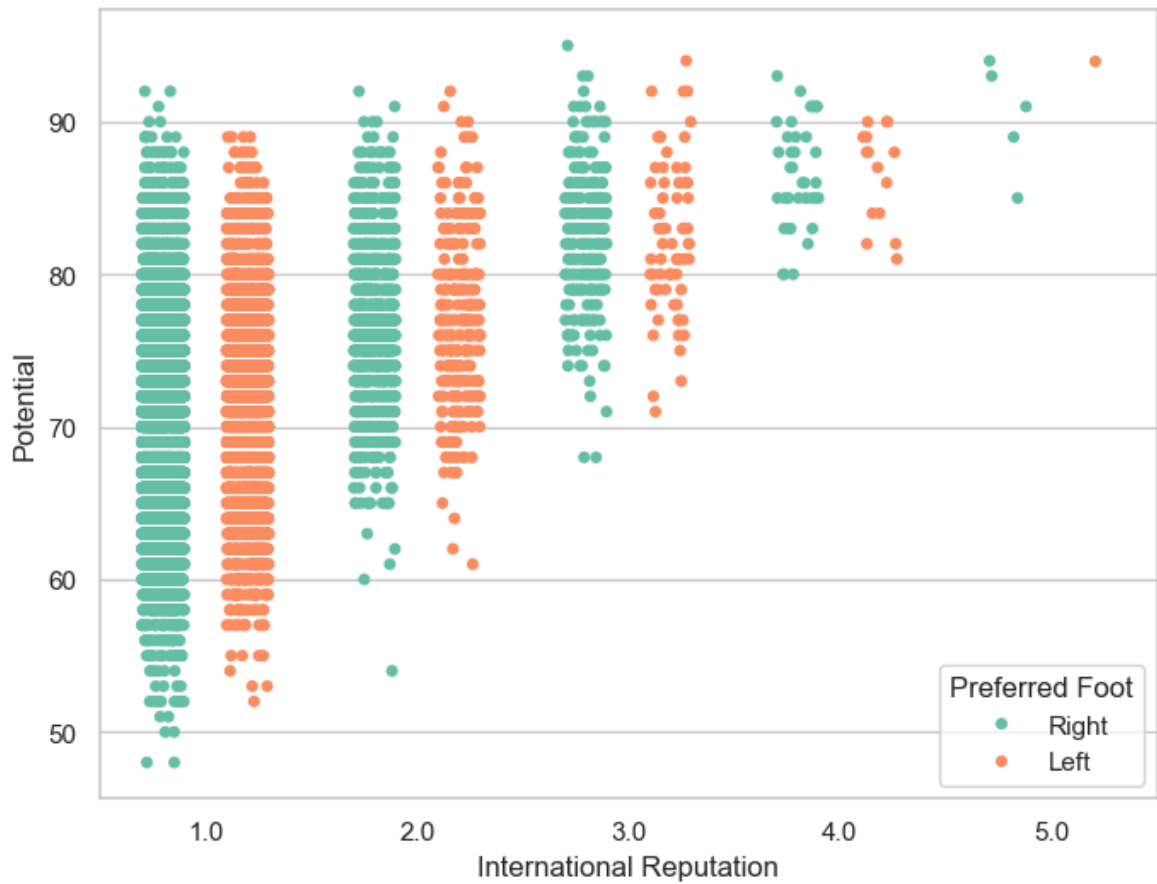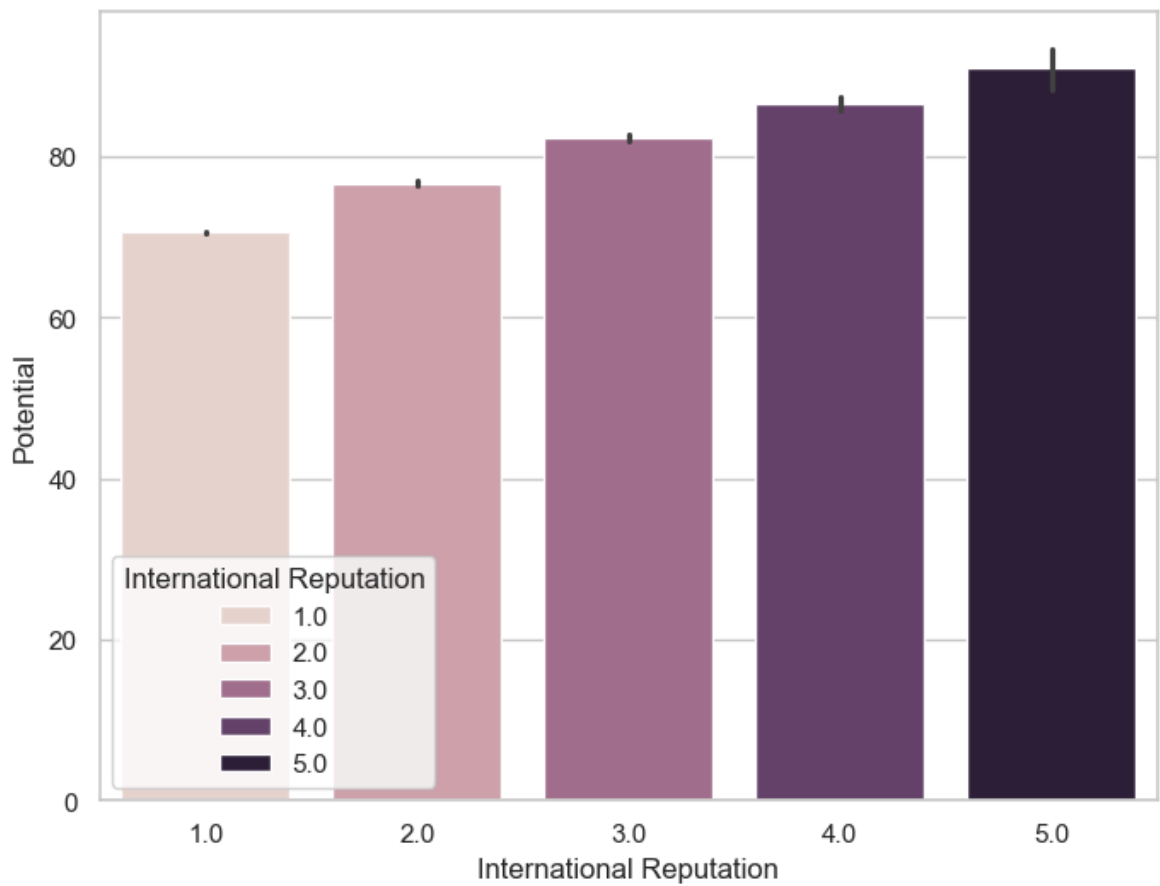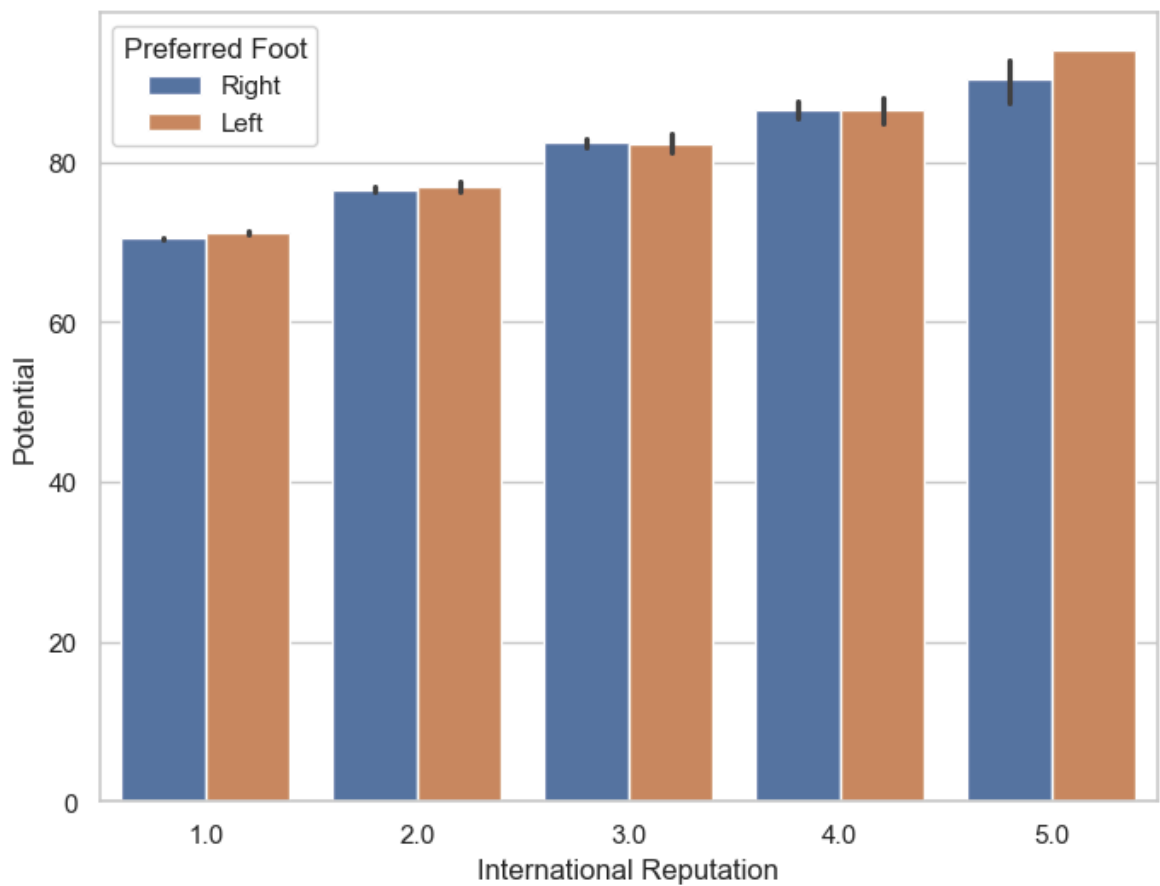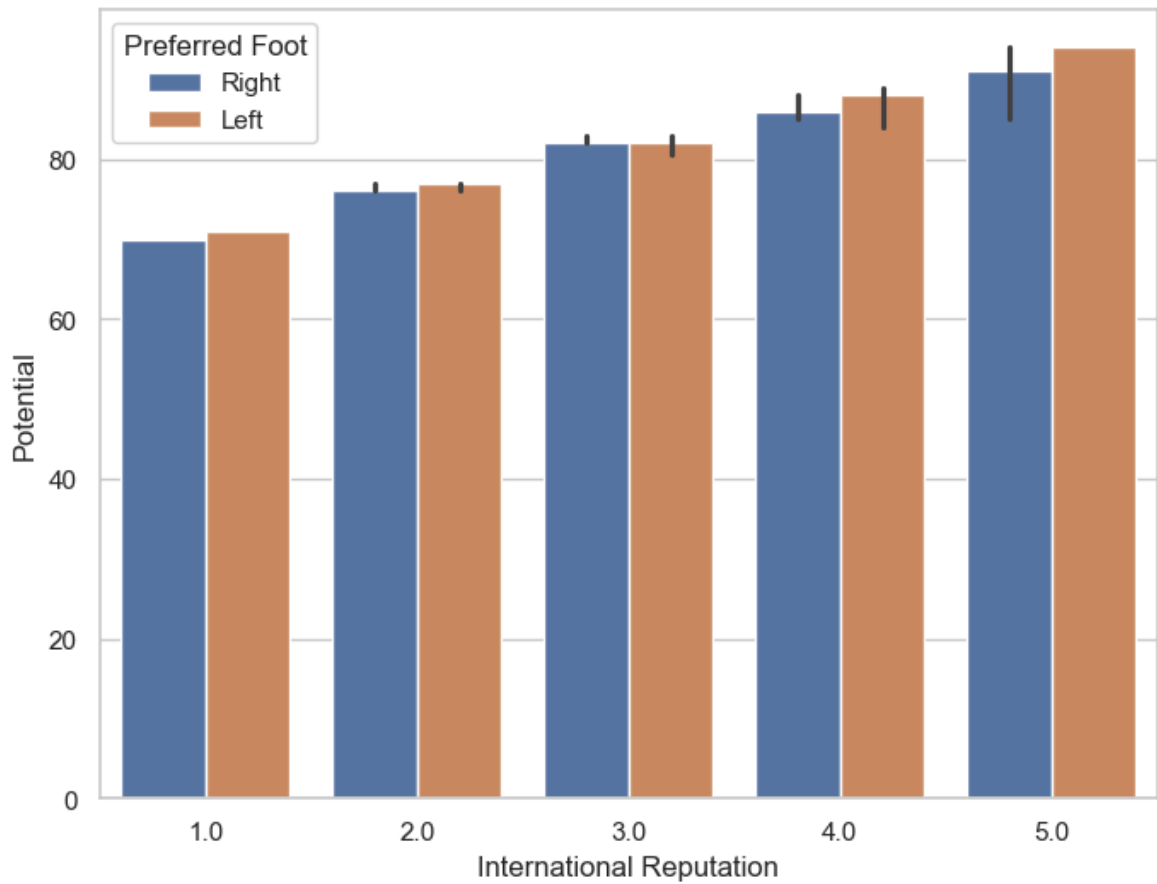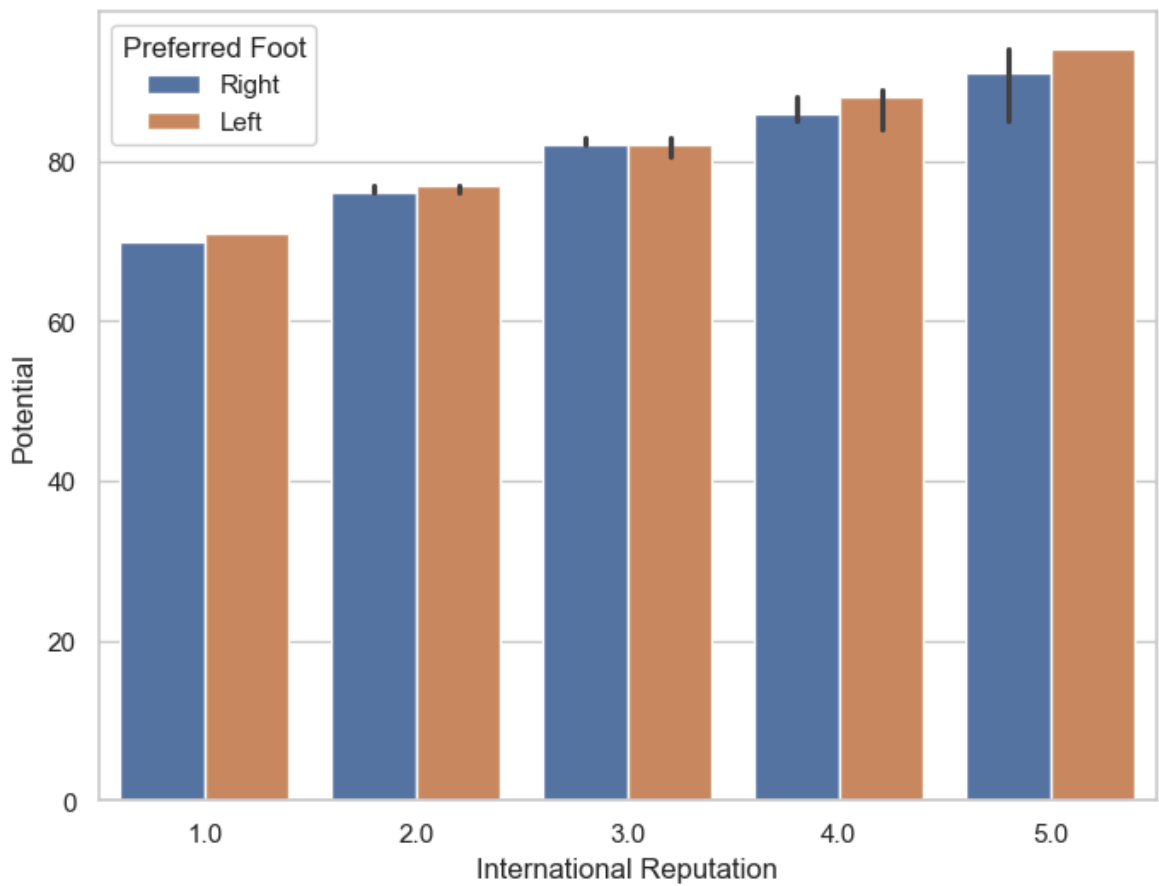

In [74]:
```python
f, ax = plt.subplots(figsize=(8, 6))
sns.stripplot(x="International Reputation", y="Potential", hue="Preferred Foot",
              data=fifa19, palette="Set2", size=20, marker="D",
              edgecolor="gray", alpha=.25)
plt.show()
```
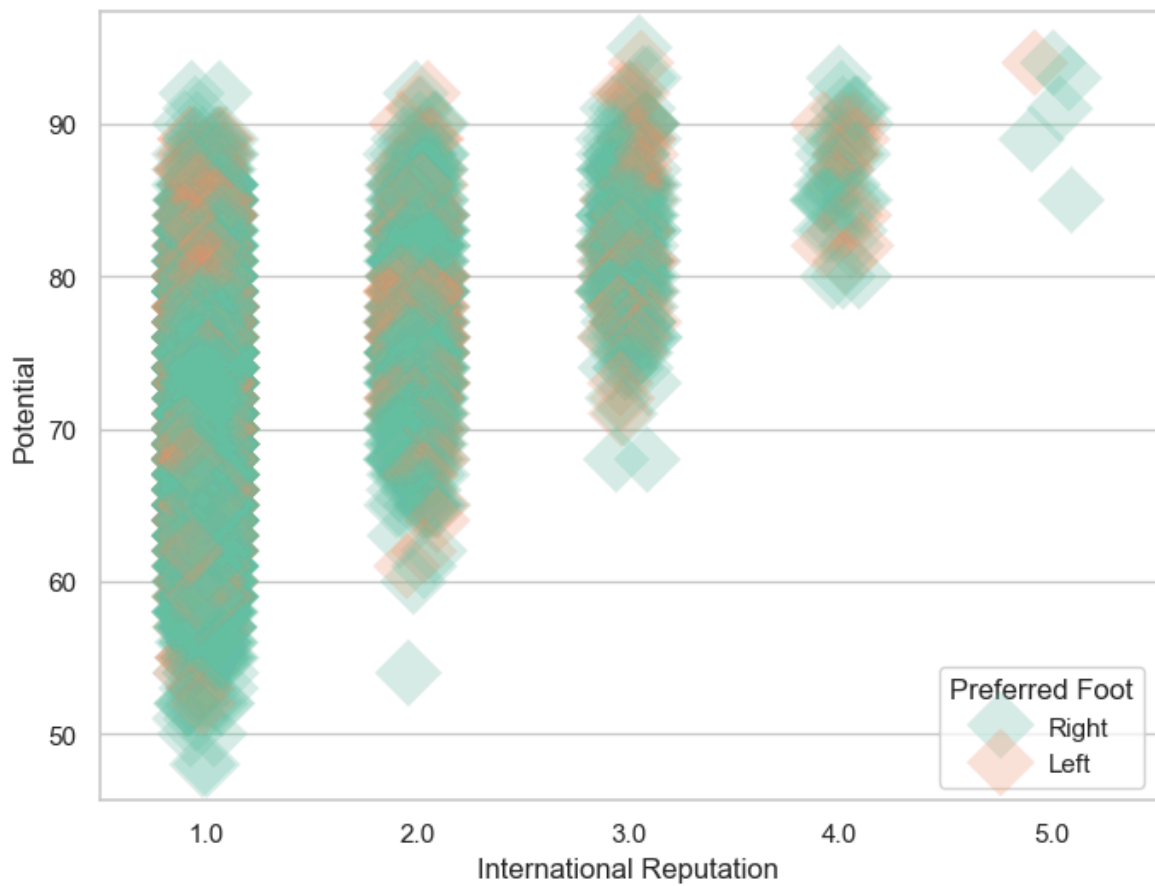
Seaborn `boxplot()` function

```
In [77]:  f, ax = plt.subplots(figsize=(8, 6))
          sns.boxplot(x=fifa19["Potential"])
          plt.show()
```
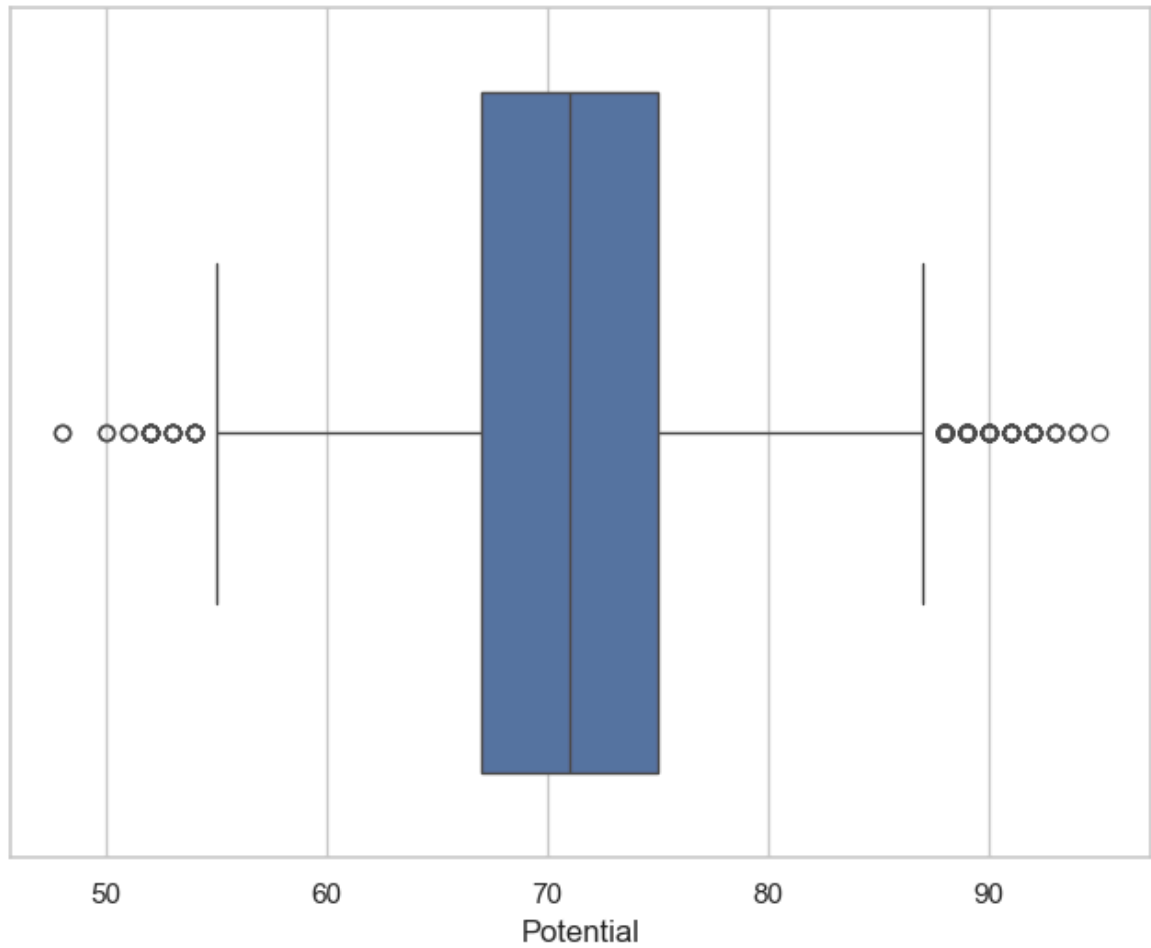
```
In [83]:  f, ax = plt.subplots(figsize=(8, 6))
          sns.boxplot(x="International Reputation", y="Potential",hue='International Reput
          plt.show()
```
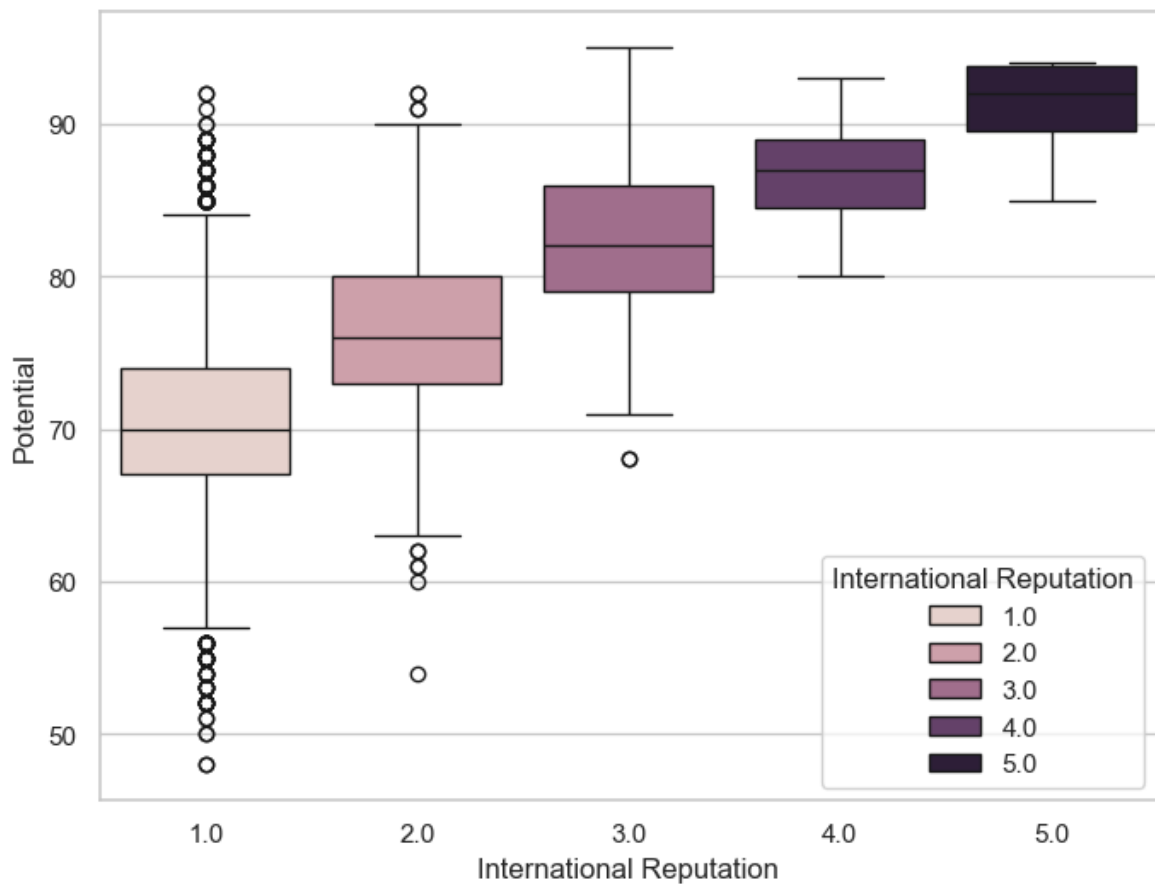
```
In [85]:  f, ax = plt.subplots(figsize=(8, 6))
          sns.boxplot(x="International Reputation", y="Potential", hue="Preferred Foot", d
          plt.show()
```
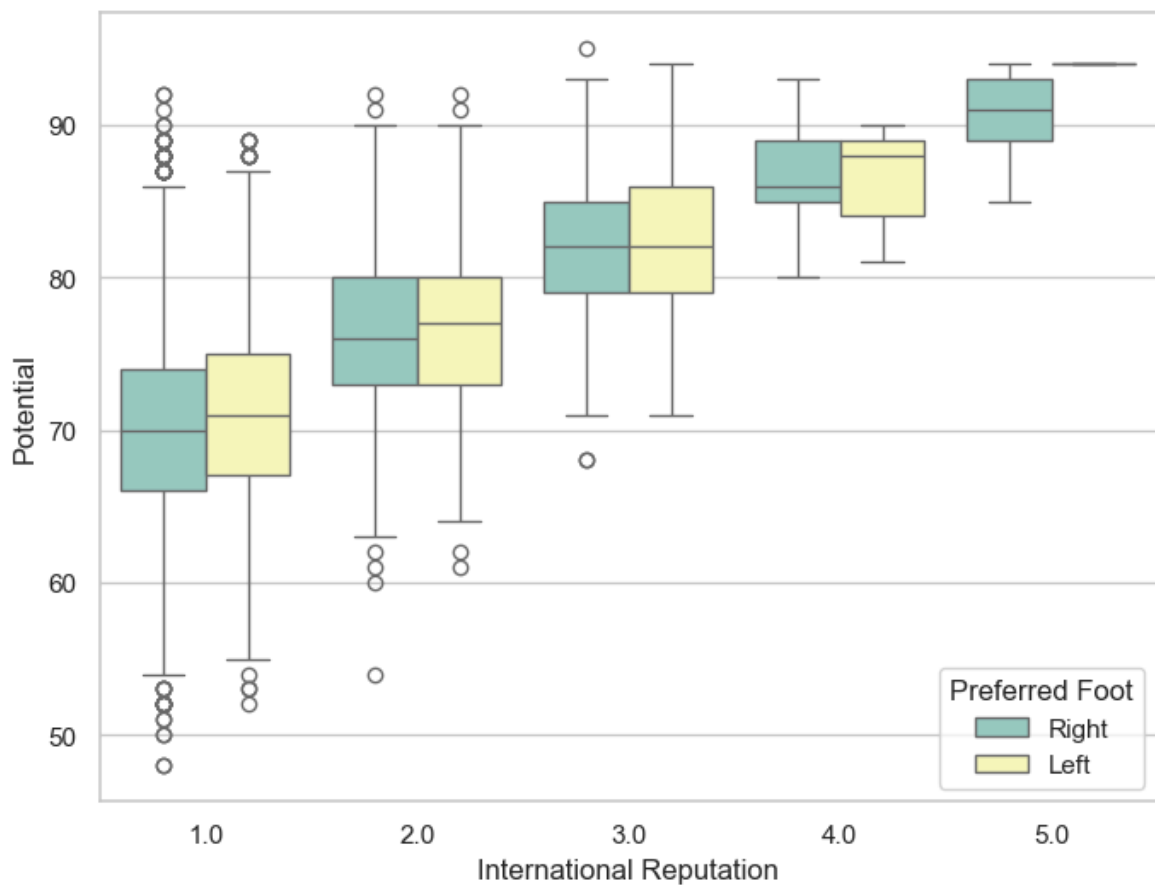
Seaborn `violinplot()` function

In [88]:
```python
f, ax = plt.subplots(figsize=(8, 6))
sns.violinplot(x=fifa19["Potential"])
plt.show()
```
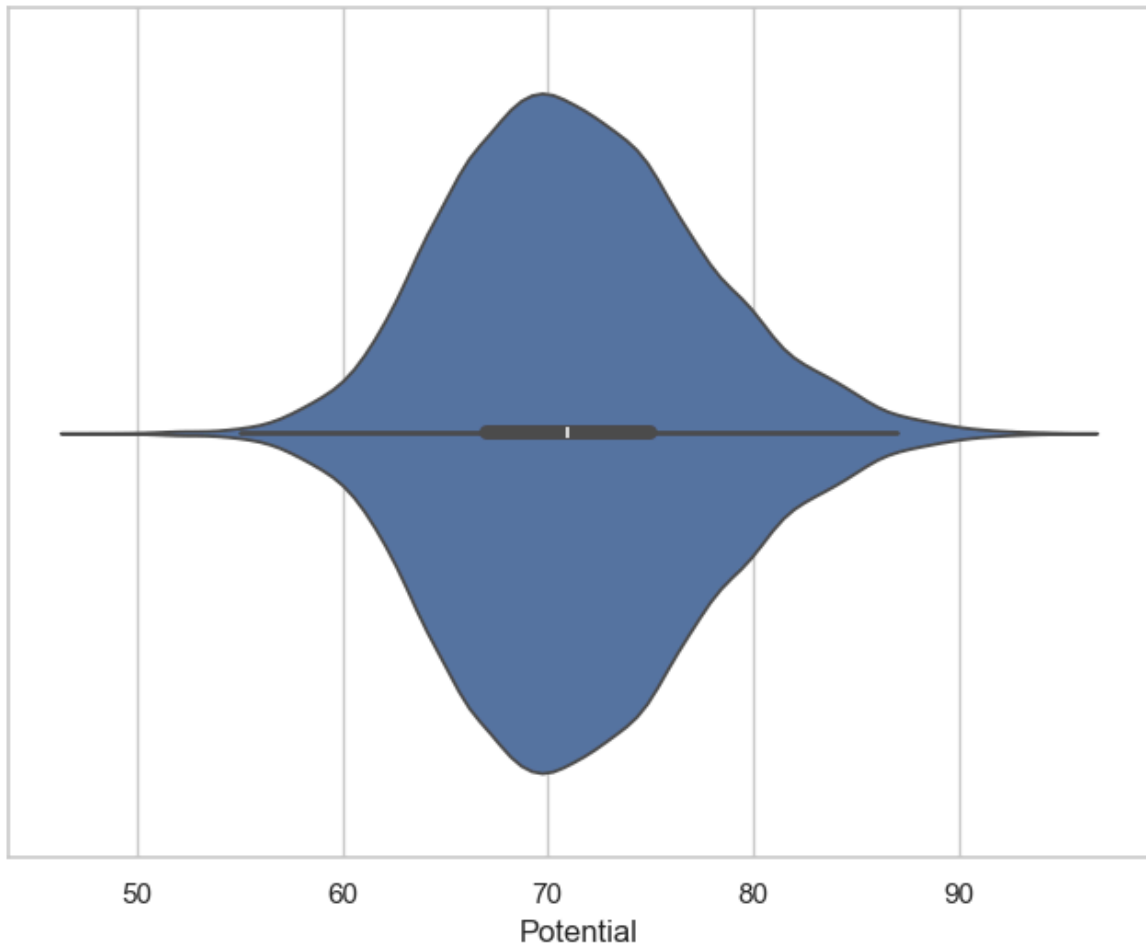

In [90]:
```python
f, ax = plt.subplots(figsize=(8, 6))
sns.violinplot(x="International Reputation", y="Potential", data=fifa19)
plt.show()
```
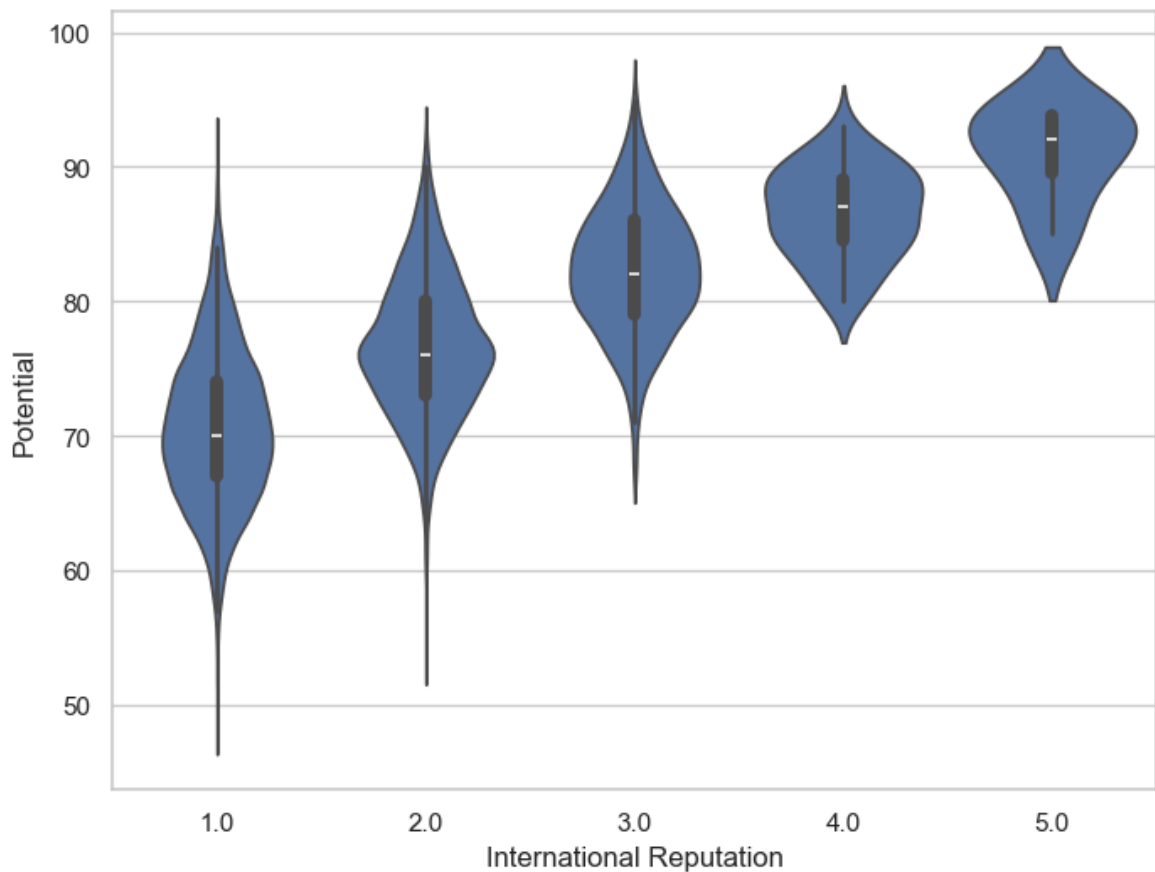
```
In [92]: f, ax = plt.subplots(figsize=(8, 6))
         sns.violinplot(x="International Reputation", y="Potential", hue="Preferred Foot"
         plt.show()
```
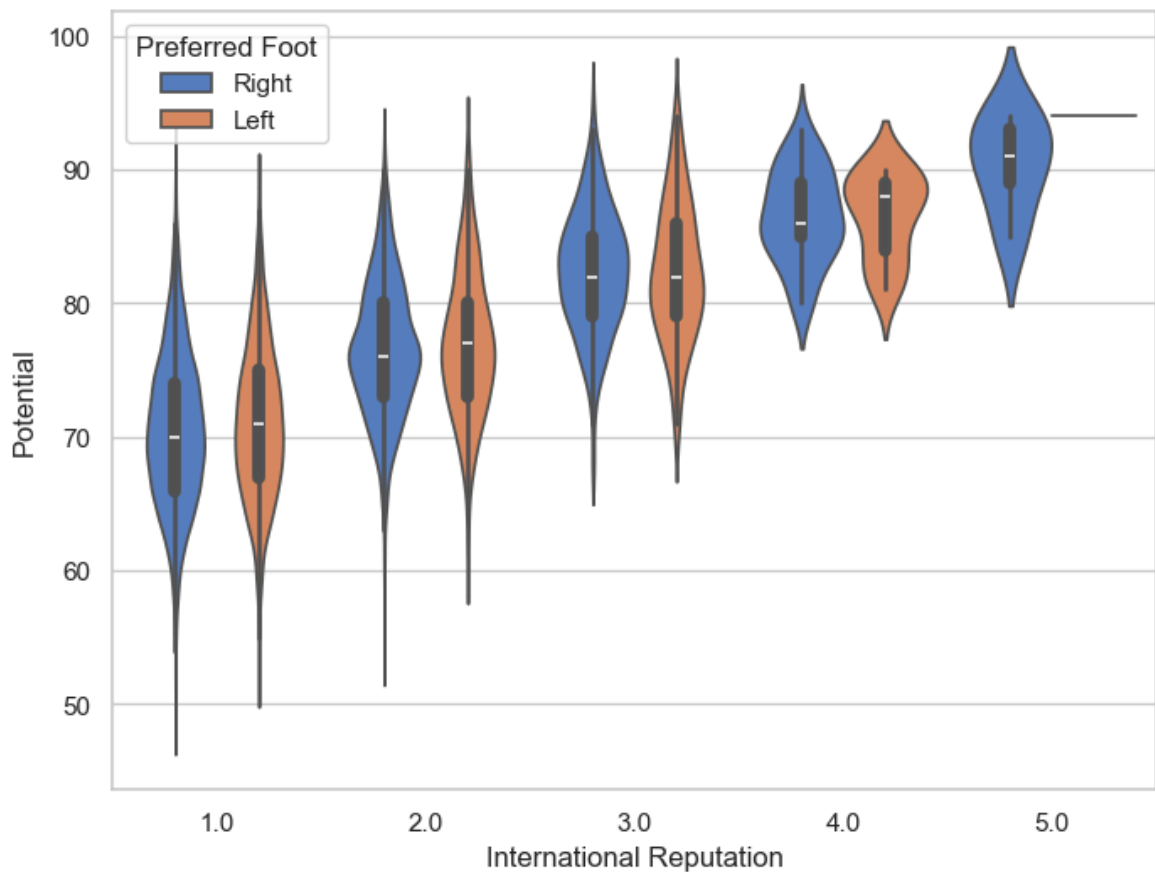


```
In [94]: f, ax = plt.subplots(figsize=(8, 6))
         sns.violinplot(x="International Reputation", y="Potential", hue="Preferred Foot"
```

```
                    data=fifa19, palette="muted", split=True)
plt.show()
```
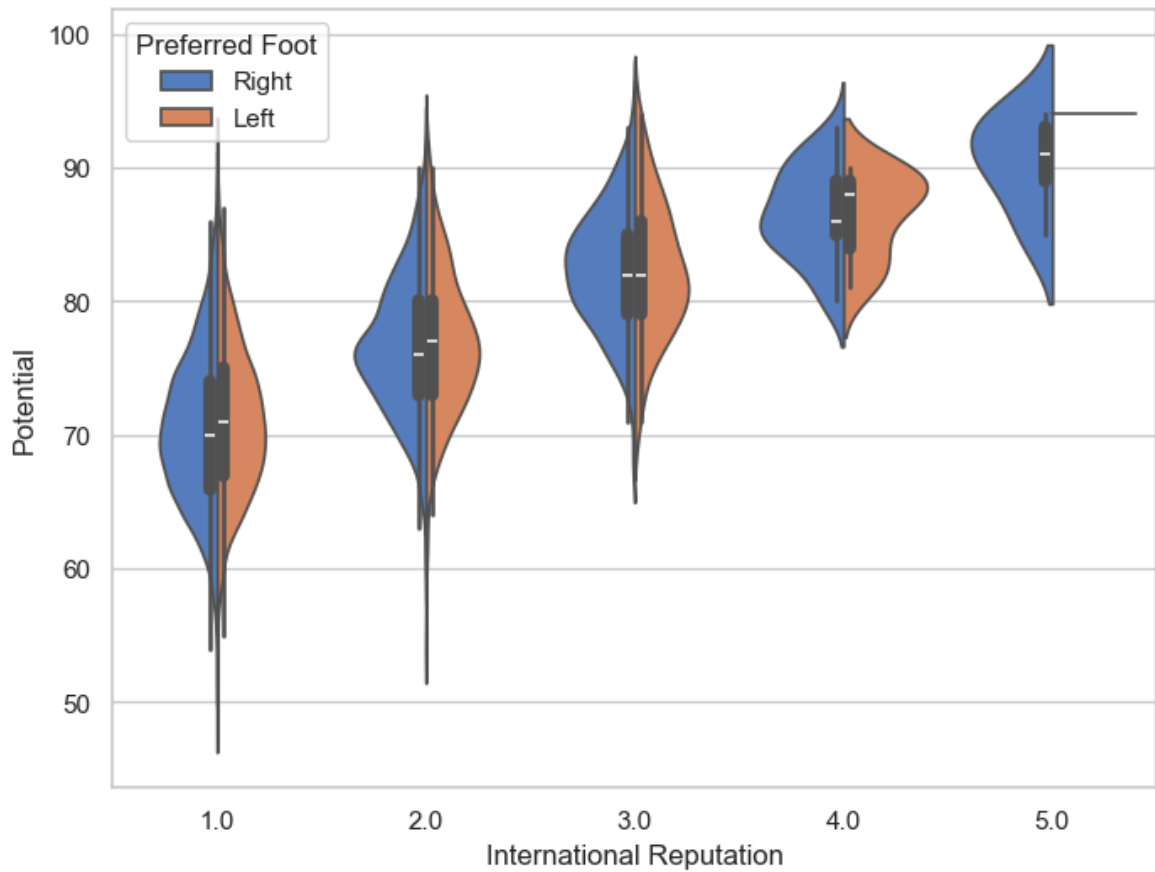

Seaborn `pointplot()` function

```
In [97]:  f, ax = plt.subplots(figsize=(8, 6))
          sns.pointplot(x="International Reputation", y="Potential", data=fifa19)
          plt.show()
```
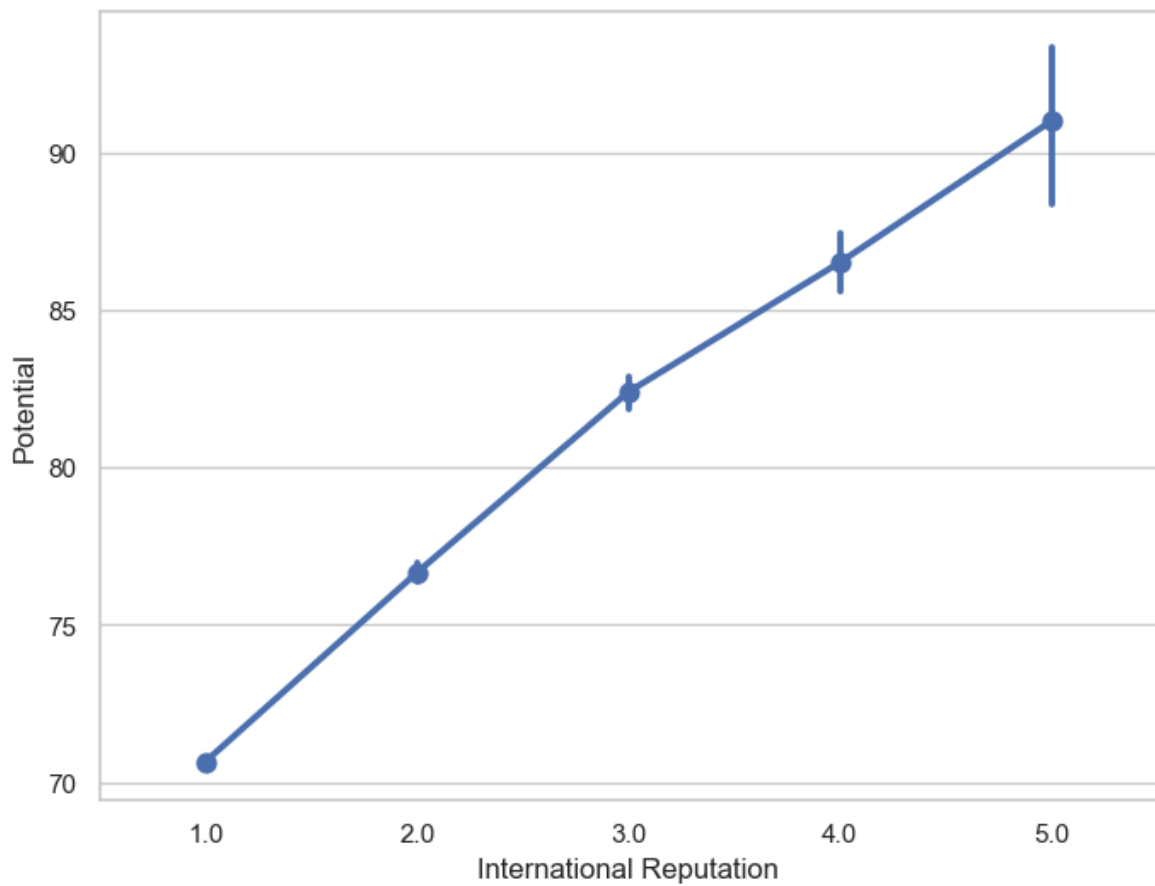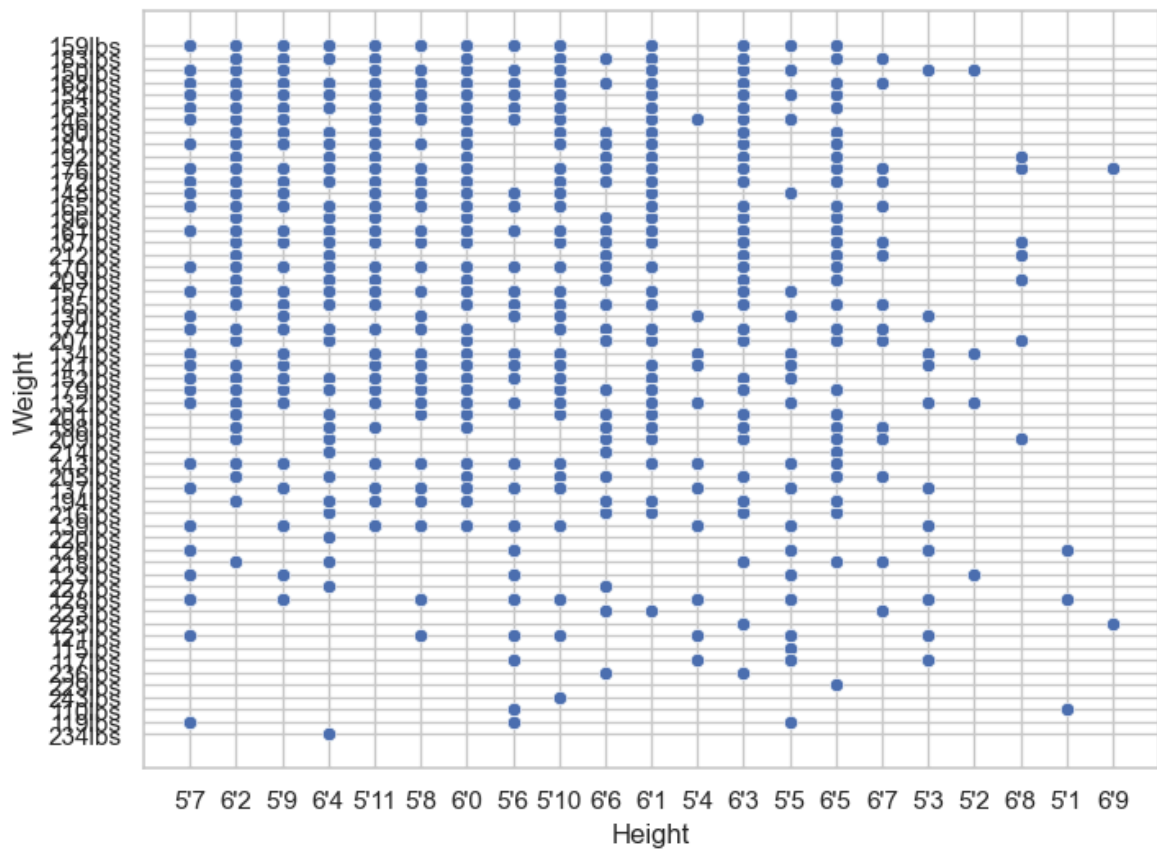
```
In [99]: f, ax = plt.subplots(figsize=(8, 6))
         sns.pointplot(x="International Reputation", y="Potential", hue="Preferred Foot",
         plt.show()
```

```
f, ax = plt.subplots(figsize=(8, 6))
sns.pointplot(x="International Reputation", y="Potential", hue="Preferred Foot",
plt.show()
```
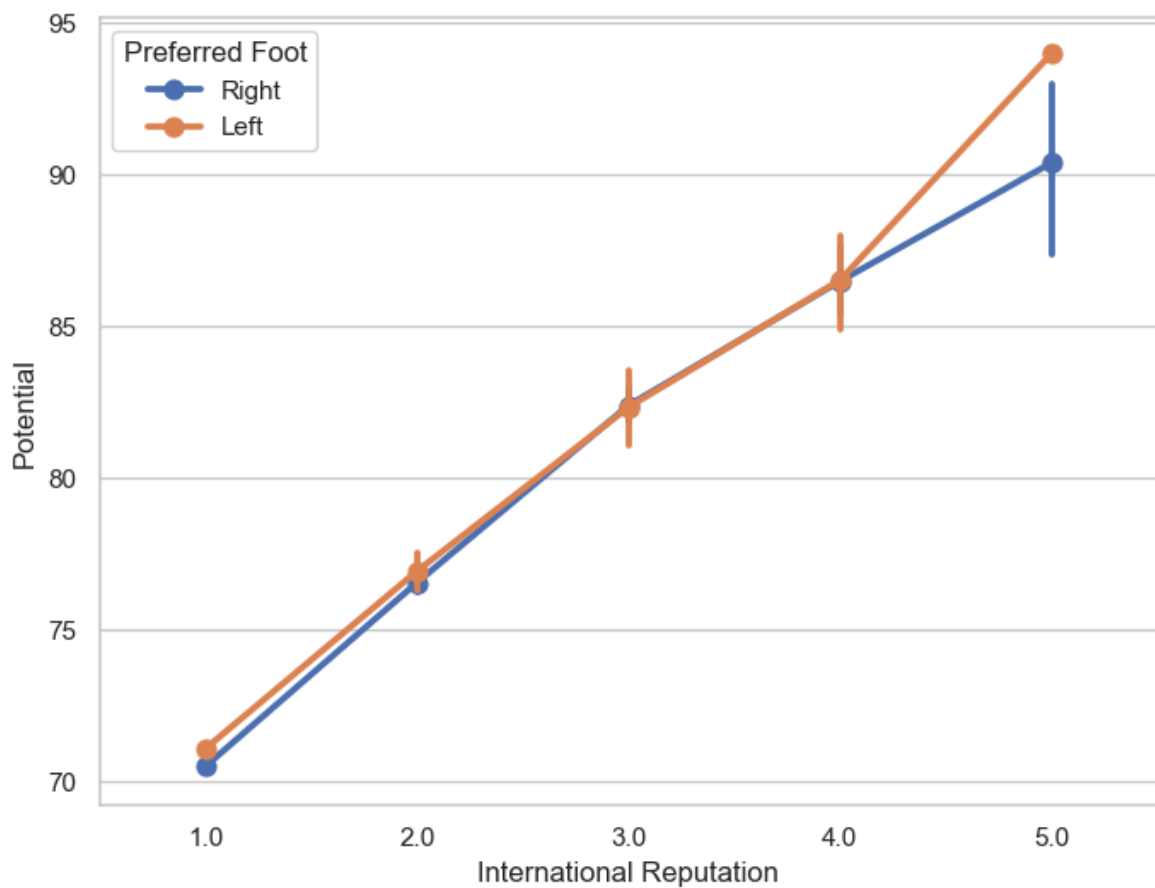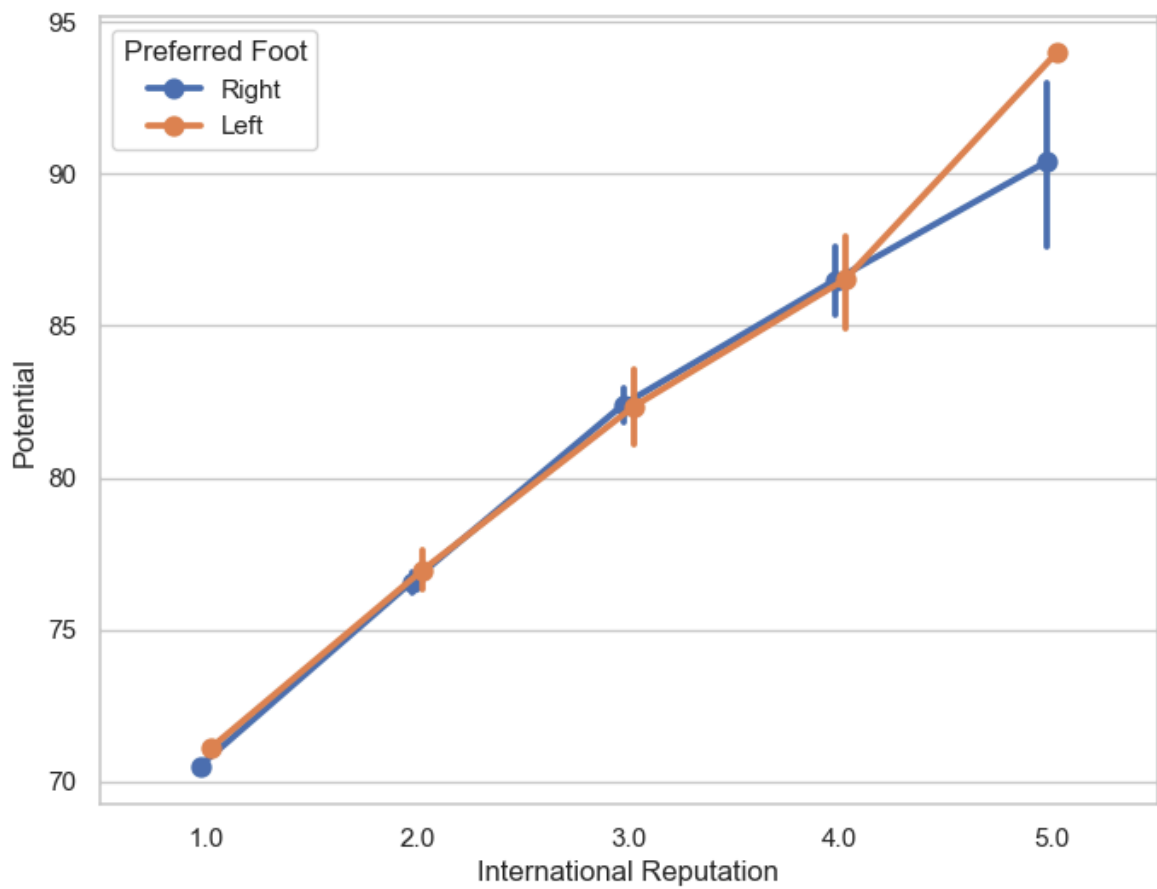


```
f, ax = plt.subplots(figsize=(8, 6))
sns.pointplot(x="International Reputation", y="Potential", hue="Preferred Foot",
              data=fifa19, markers=["o", "x"], linestyles=["-", "--"])
plt.show()
```
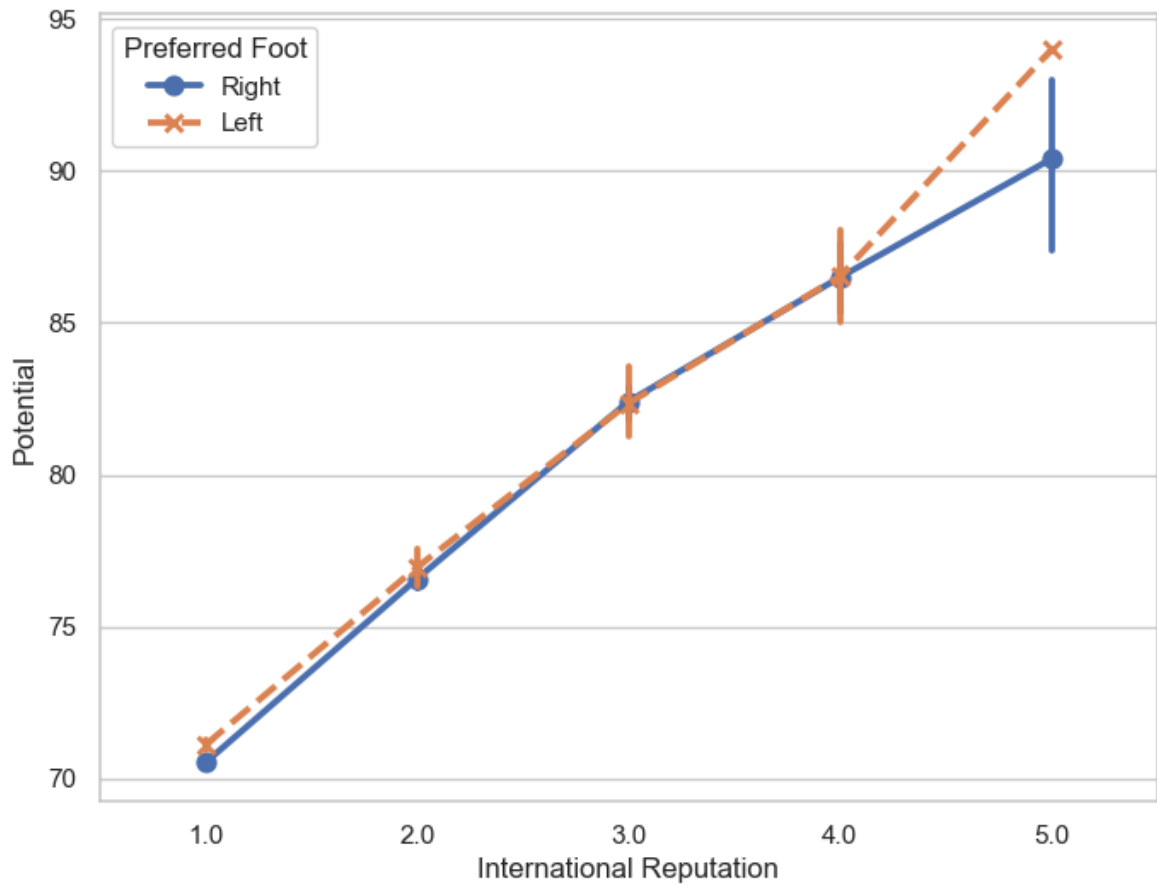
Seaborn `barplot()` function

```
In [108…    f, ax = plt.subplots(figsize=(8, 6))
            sns.barplot(x="International Reputation",hue='International Reputation', y="Pote
            plt.show()
```

```
In [110...    f, ax = plt.subplots(figsize=(8, 6))
             sns.barplot(x="International Reputation", y="Potential", hue="Preferred Foot", d
             plt.show()
```

In [114…
```python
from numpy import median
f, ax = plt.subplots(figsize=(8, 6))
sns.barplot(x="International Reputation", y="Potential", hue="Preferred Foot", d
plt.show()
```


In [116…
```python
from numpy import median
f, ax = plt.subplots(figsize=(8, 6))
sns.barplot(x="International Reputation", y="Potential",hue="Preferred Foot", da
plt.show()
```

```
In [122... from numpy import median
         f, ax = plt.subplots(figsize=(8, 6))
         sns.barplot(x="International Reputation", y="Potential", hue="Preferred Foot", d
         plt.show()
```
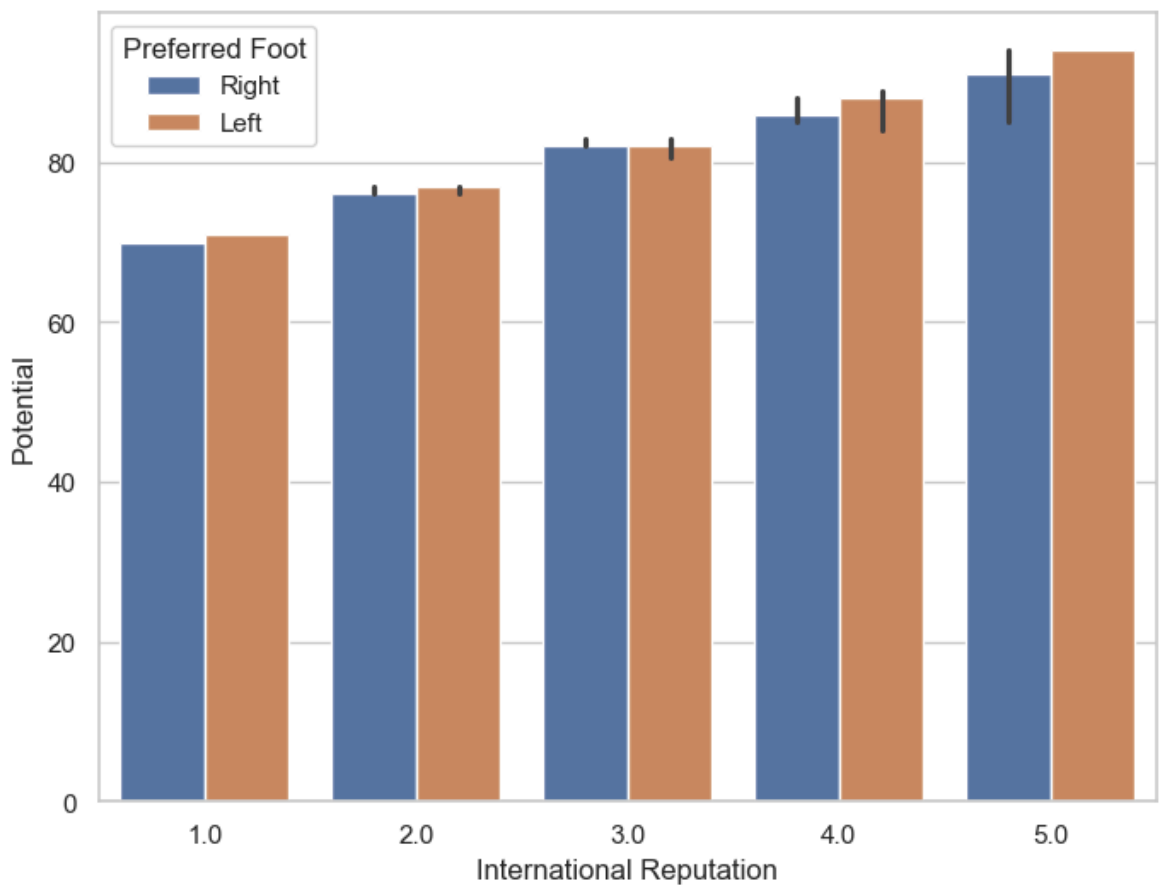
In [120...

```python
f, ax = plt.subplots(figsize=(8, 6))
sns.barplot(x="International Reputation", y="Potential", hue="Preferred Foot", d
plt.show()
```
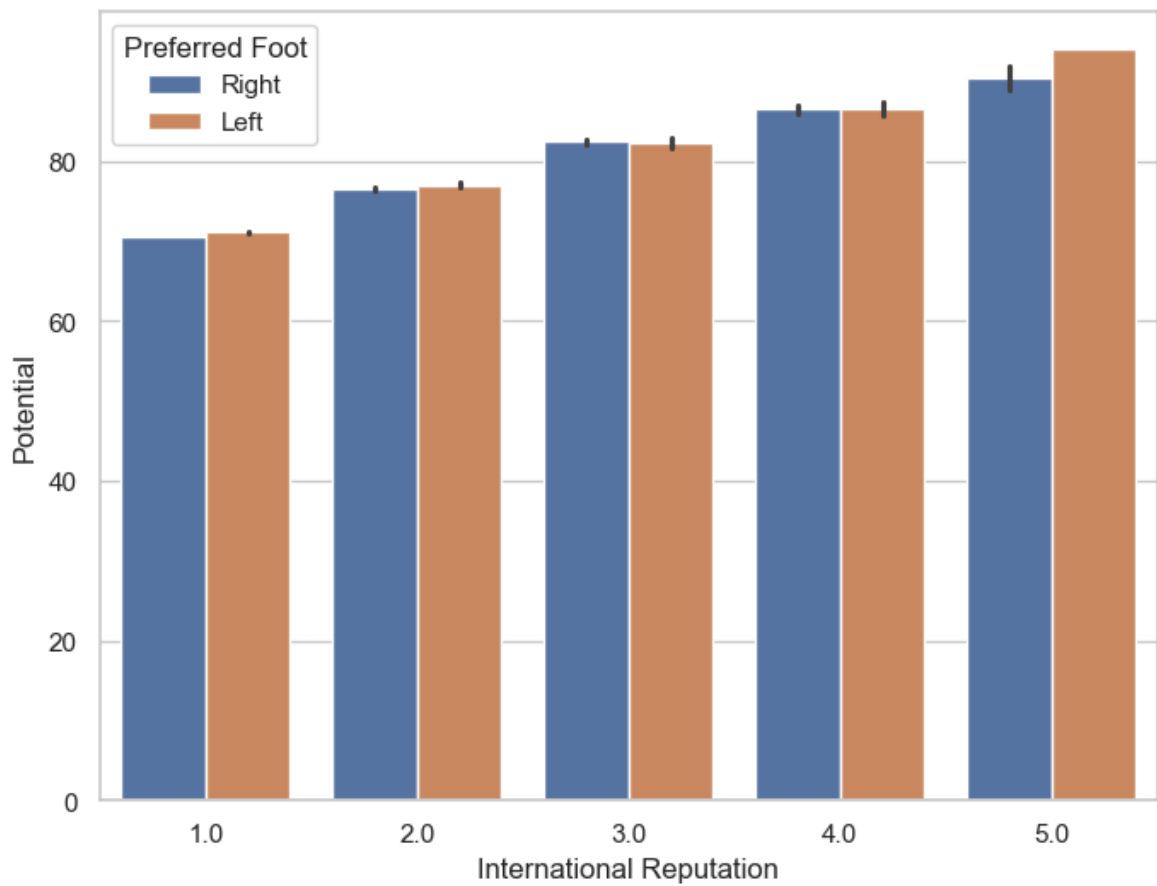

In [124...

```python
f, ax = plt.subplots(figsize=(8, 6))
sns.barplot(x="International Reputation", y="Potential", data=fifa19, ci="sd")
plt.show()
```
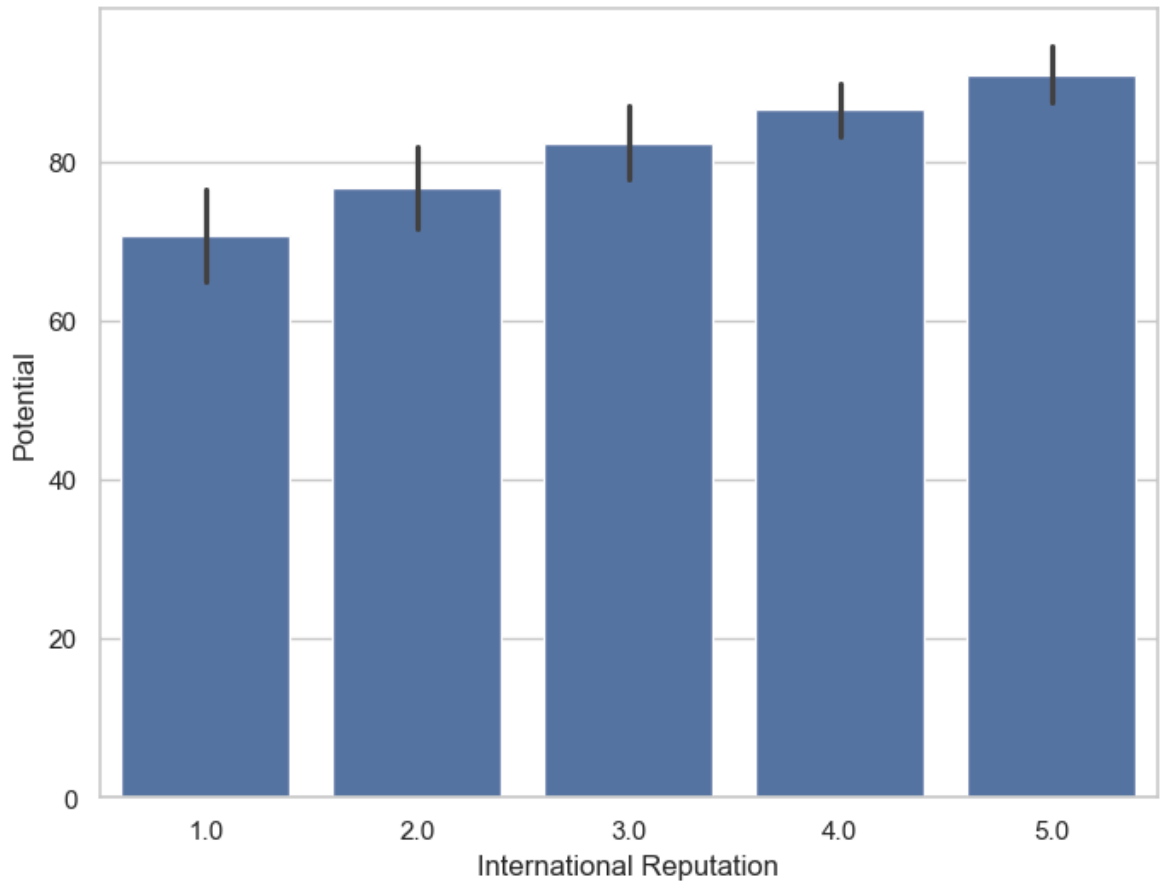
```
f, ax = plt.subplots(figsize=(8, 6))
sns.barplot(x="International Reputation", y="Potential", data=fifa19, capsize=0.
plt.show()
```
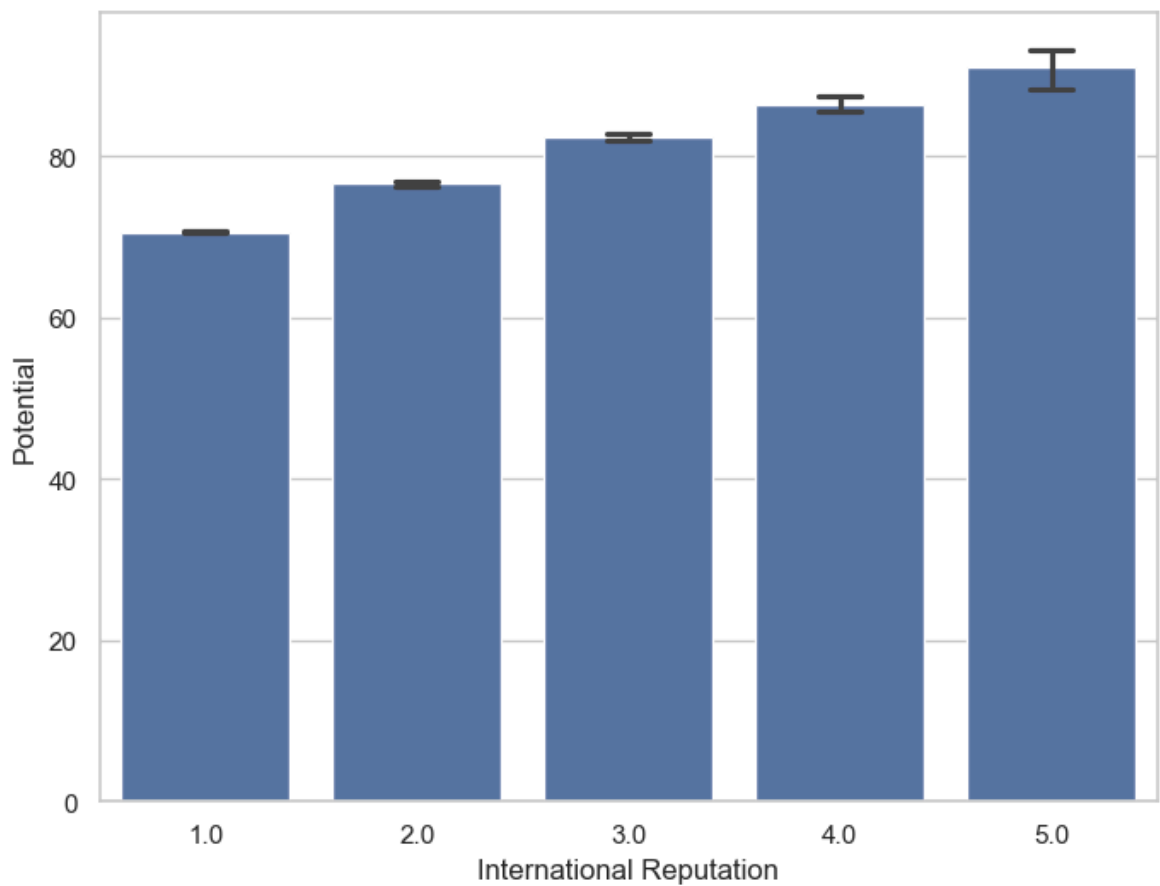
Visualizing statistical relationship with Seaborn `relplot()` function

In [129... `g = sns.relplot(x="Overall", y="Potential", data=fifa19)`
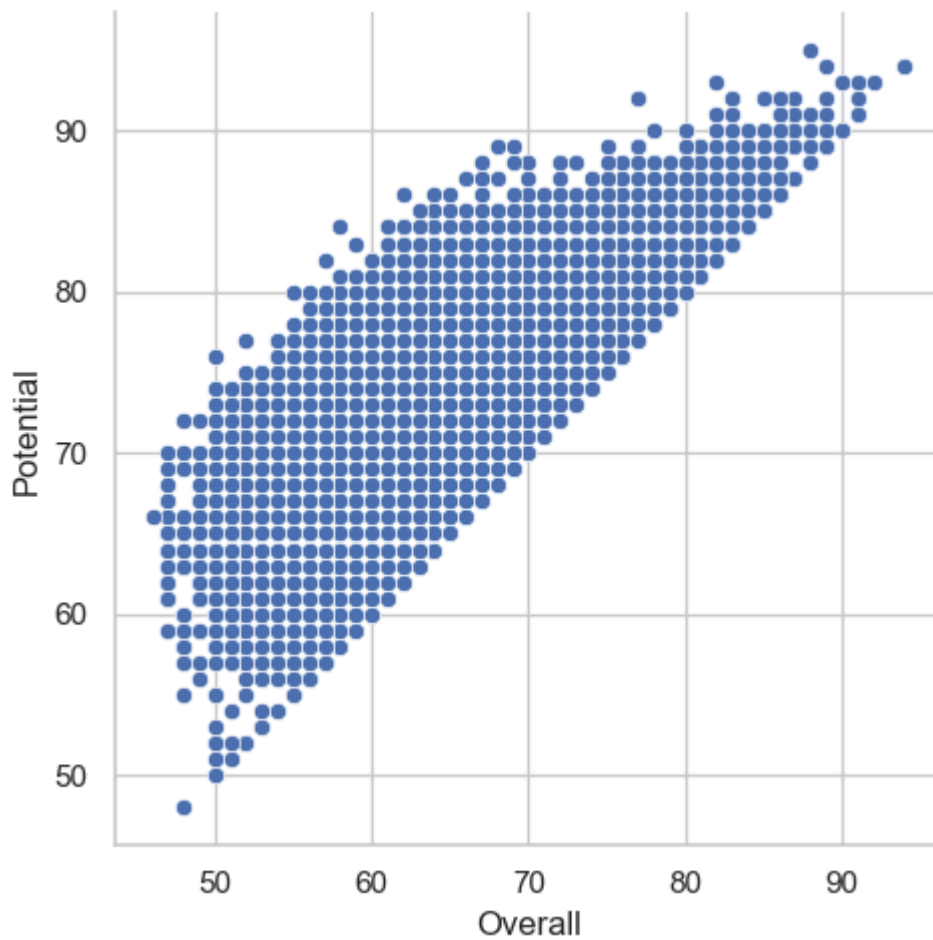
Seaborn `scatterplot()` function

In [132...
```
f, ax = plt.subplots(figsize=(8, 6))
sns.scatterplot(x="Height", y="Weight", data=fifa19)
plt.show()
```

Seaborn `lineplot()` function

```
In [135…   f, ax = plt.subplots(figsize=(8, 6))
           ax = sns.lineplot(x="Stamina", y="Strength", data=fifa19)
           plt.show()
```
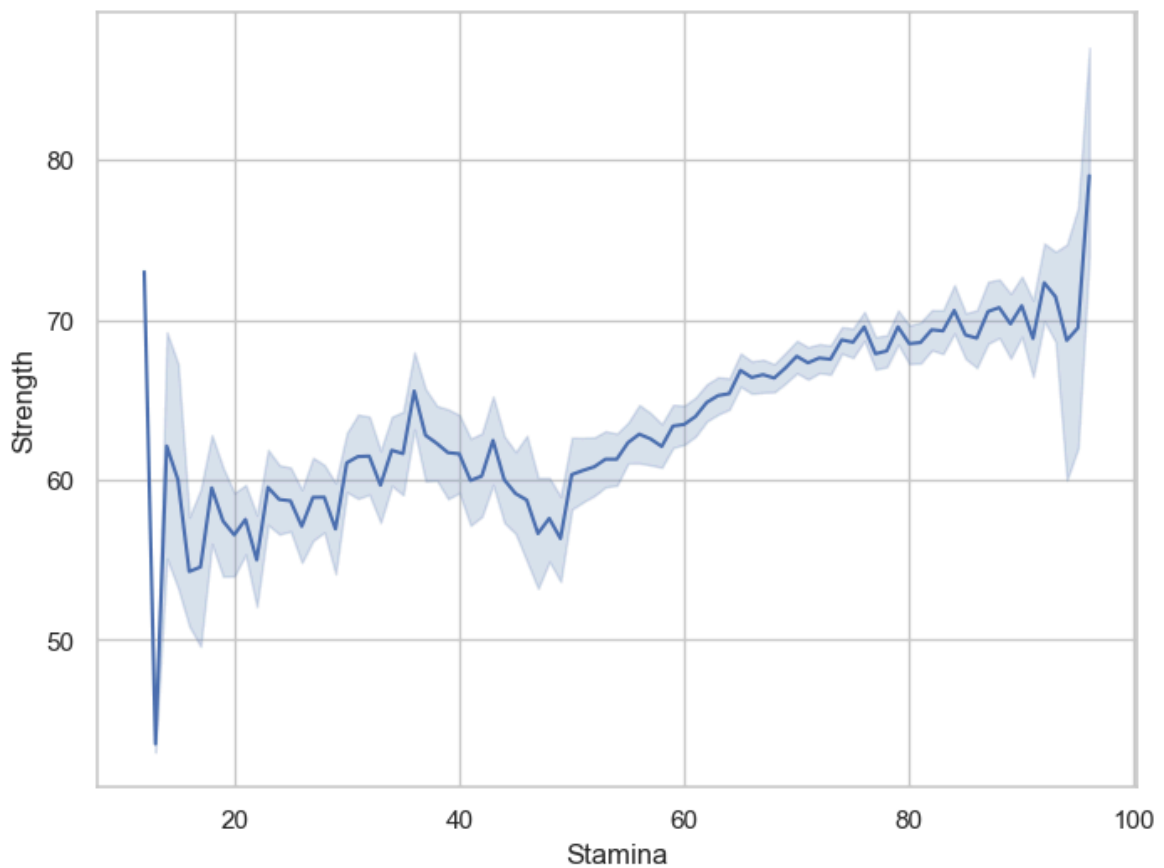
Visualize linear relationship with Seaborn `regplot()` function

In [138...
```python
f, ax = plt.subplots(figsize=(8, 6))
ax = sns.regplot(x="Overall", y="Potential", data=fifa19)
plt.show()
```
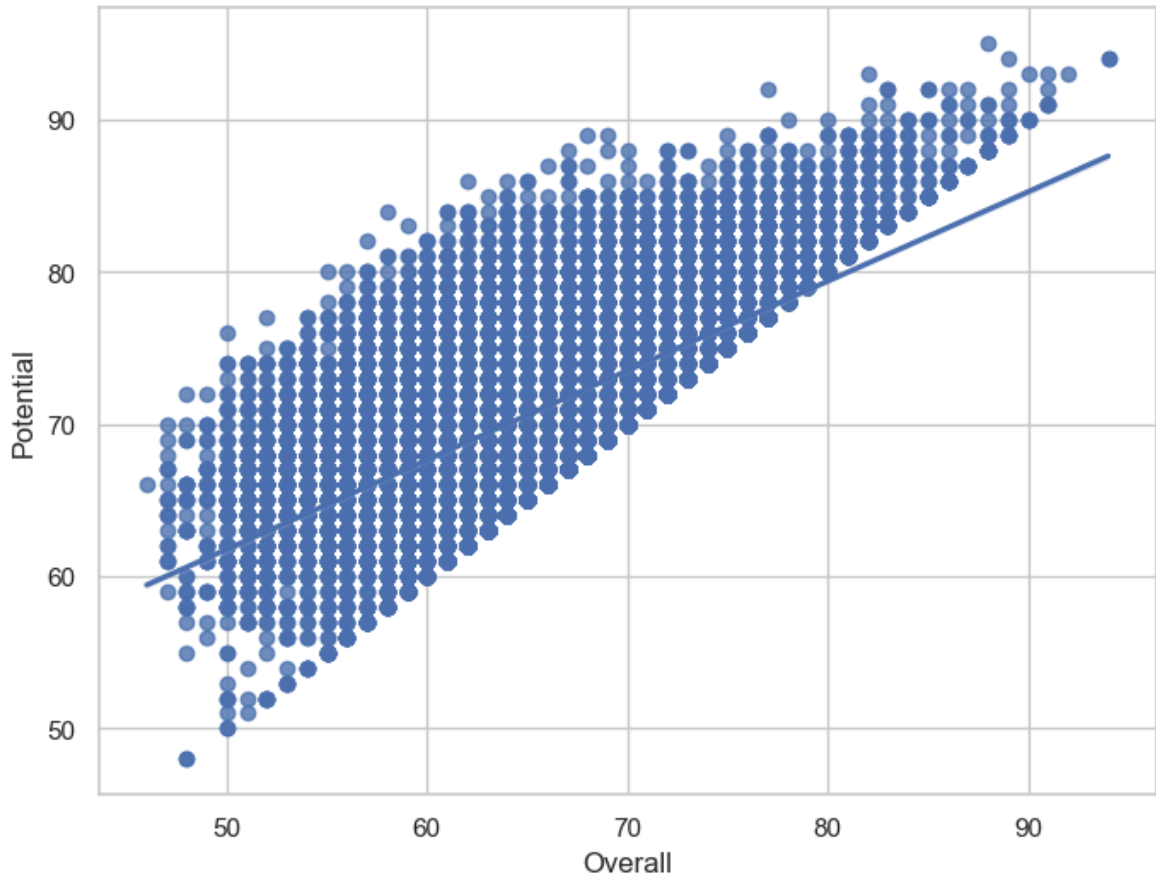

In [140...
```python
f, ax = plt.subplots(figsize=(8, 6))
ax = sns.regplot(x="Overall", y="Potential", data=fifa19, color= "g", marker="+"
plt.show()
```
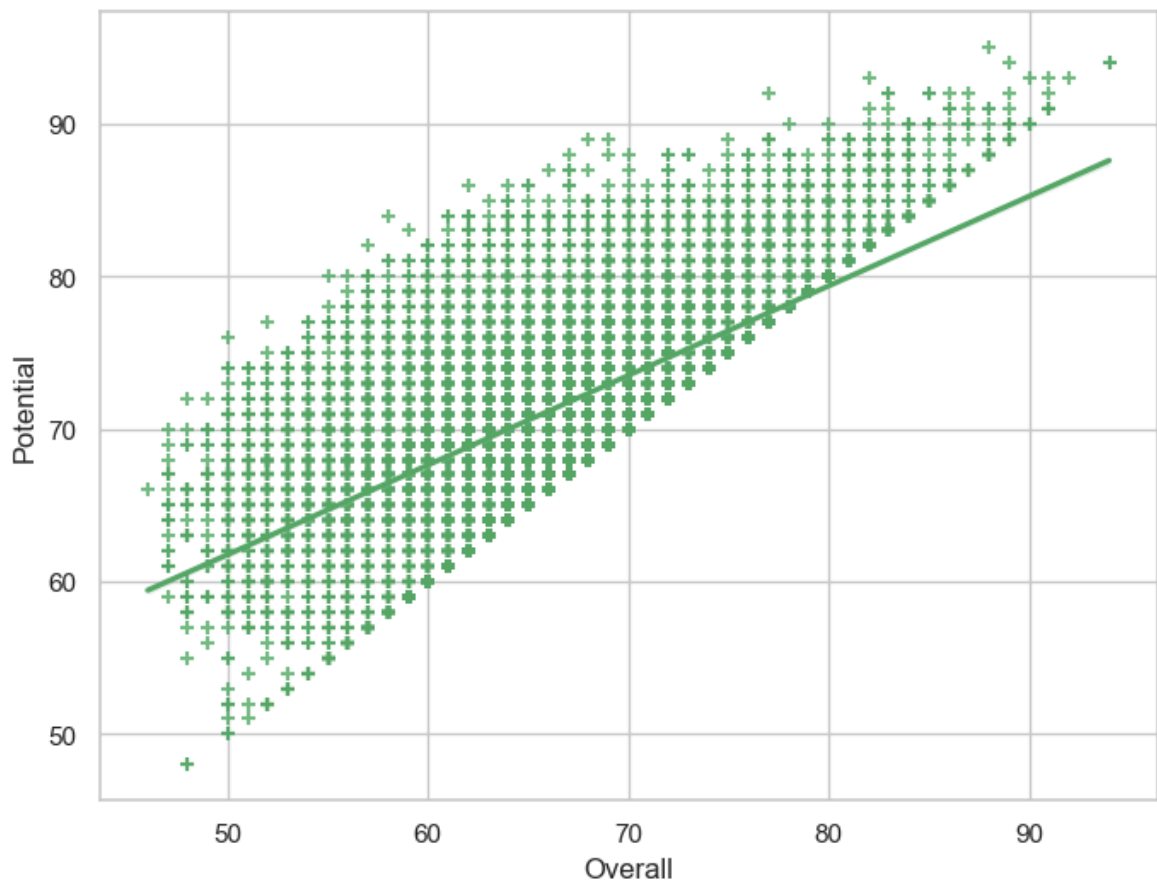
```
In [145…    f, ax = plt.subplots(figsize=(8, 6))
            sns.regplot(x="International Reputation", y="Potential", data=fifa19, x_jitter=.
            plt.show()
```
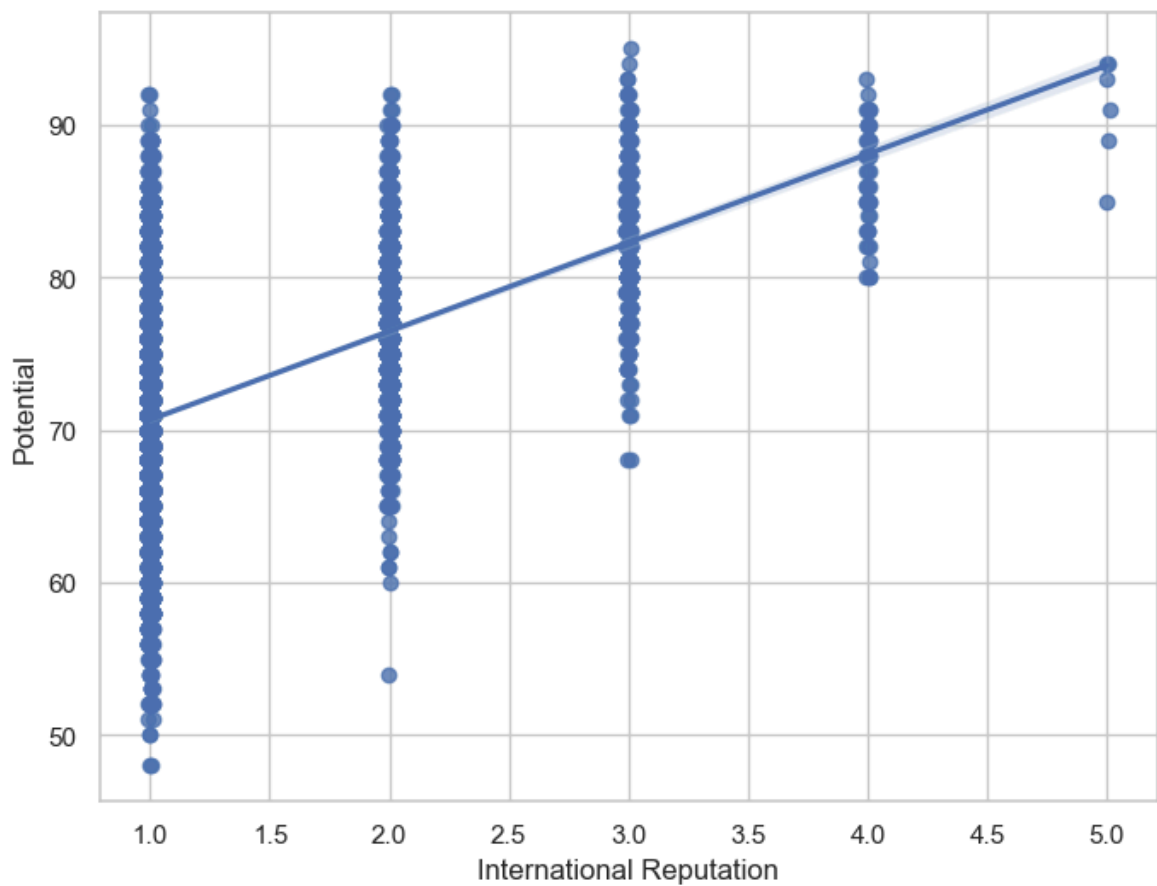
Seaborn `lmplot()` function

In [148… `g= sns.lmplot(x="Overall", y="Potential", data=fifa19)`
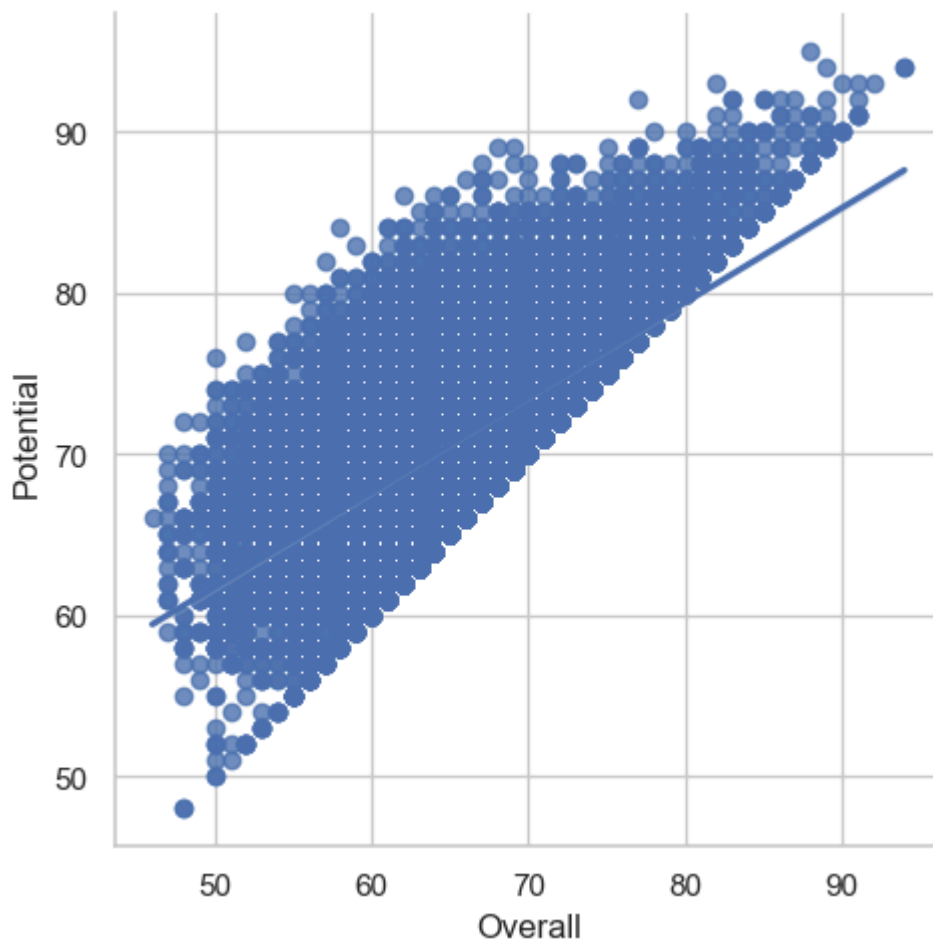
In [150… `g= sns.lmplot(x="Overall", y="Potential", hue="Preferred Foot", data=fifa19)`
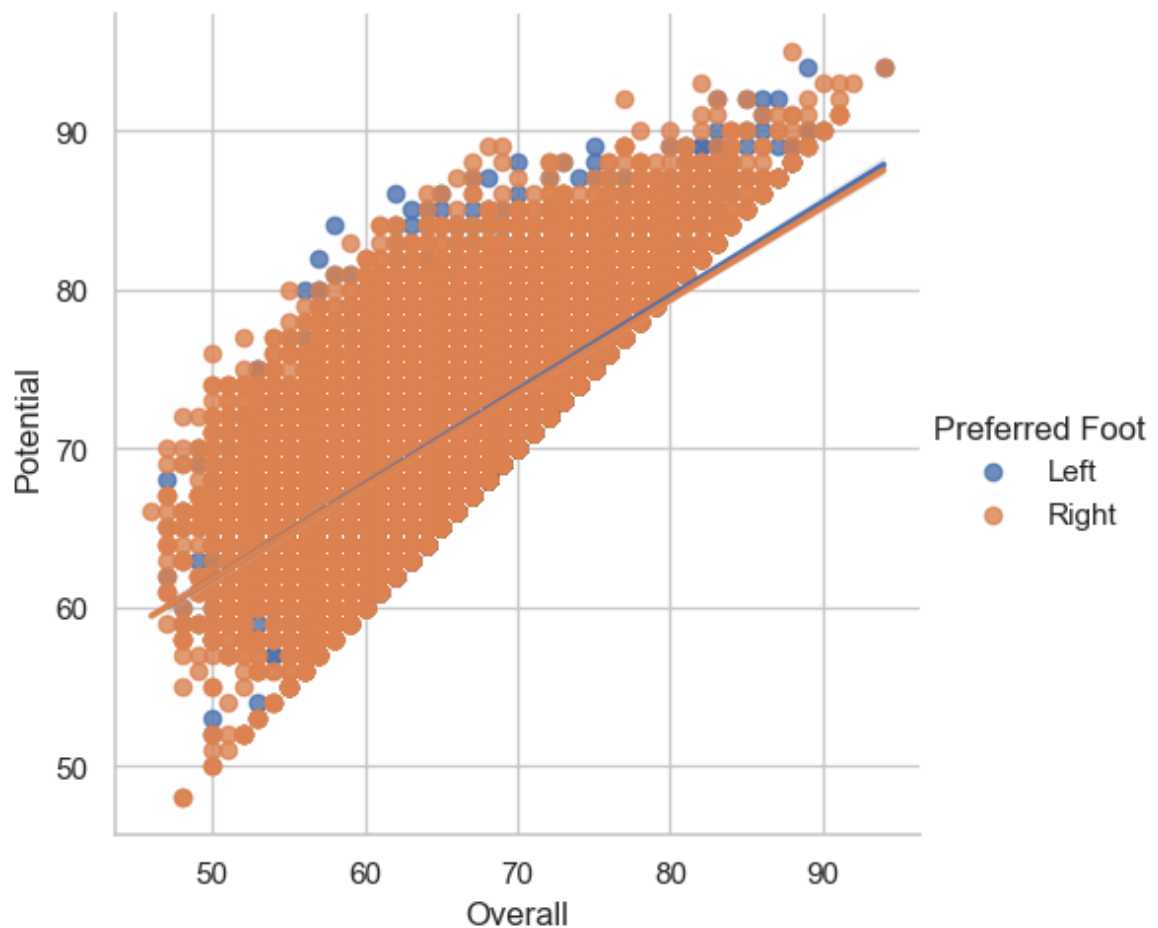
```
In [152…   g= sns.lmplot(x="Overall", y="Potential", hue="Preferred Foot", data=fifa19, pal
```
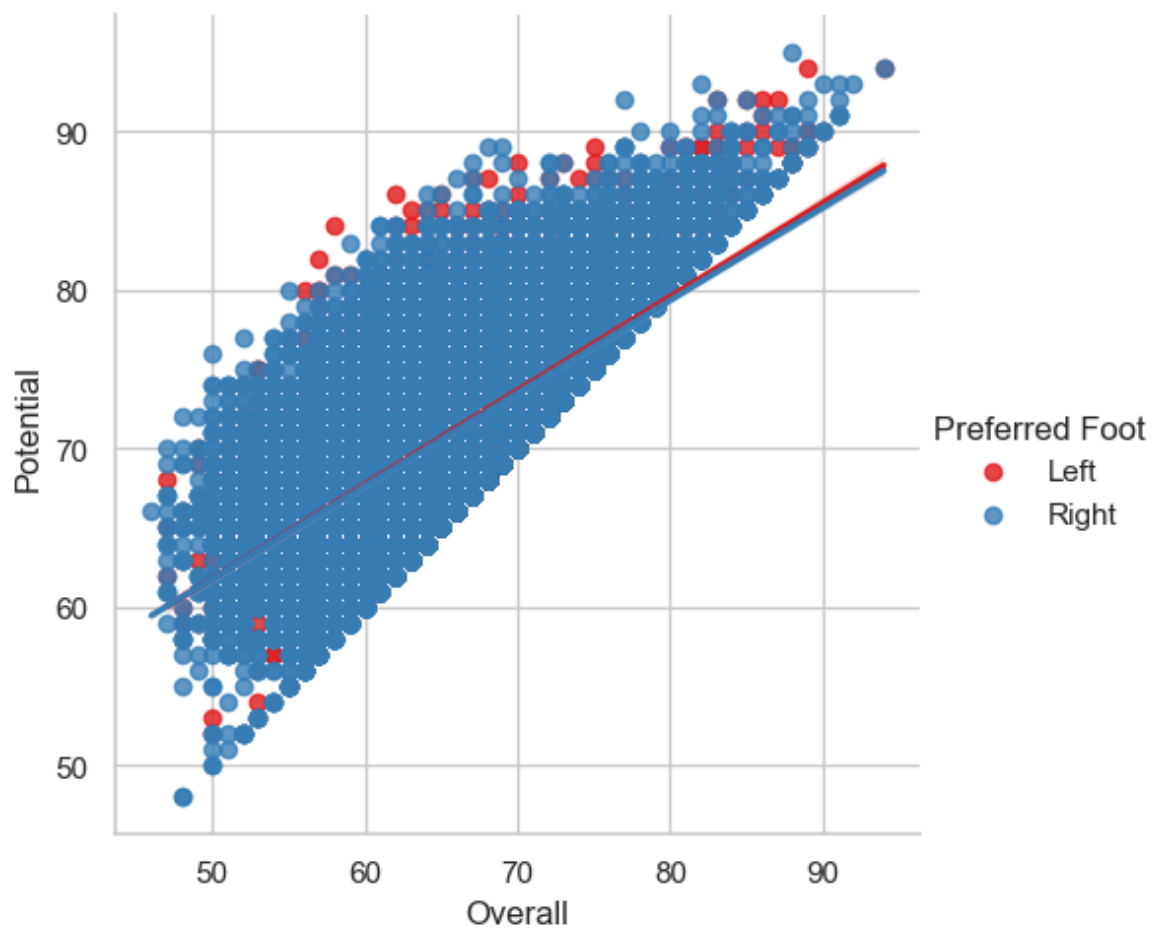
In [154…
```python
g= sns.lmplot(x="Overall", y="Potential", col="Preferred Foot", data=fifa19)
```
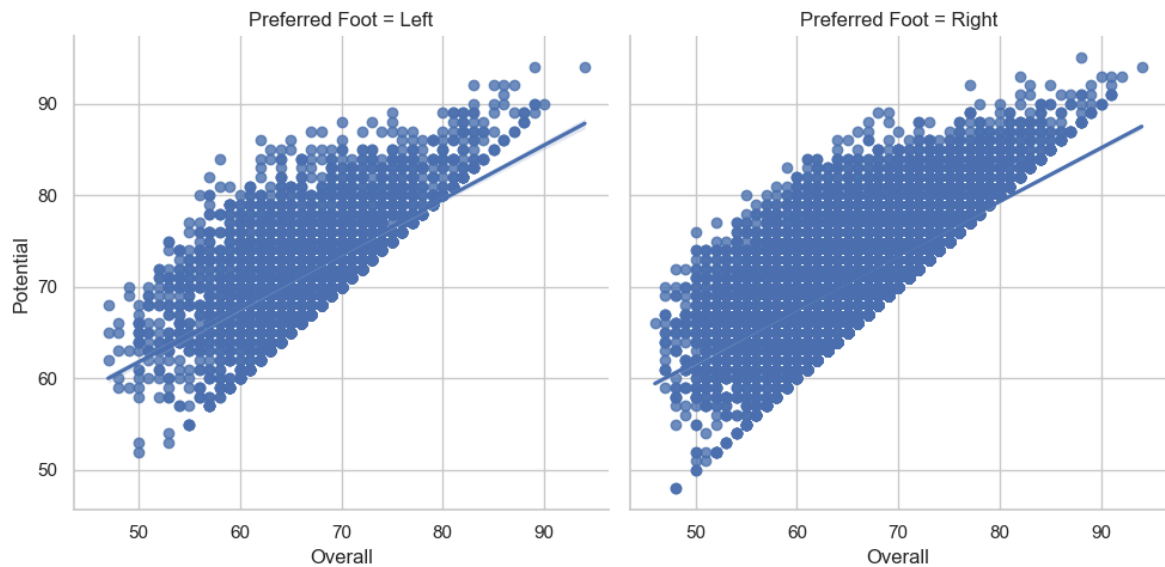

Multi-plot grids

Seaborn `FacetGrid()` function

In [157…
```python
g = sns.FacetGrid(fifa19, col="Preferred Foot")
```
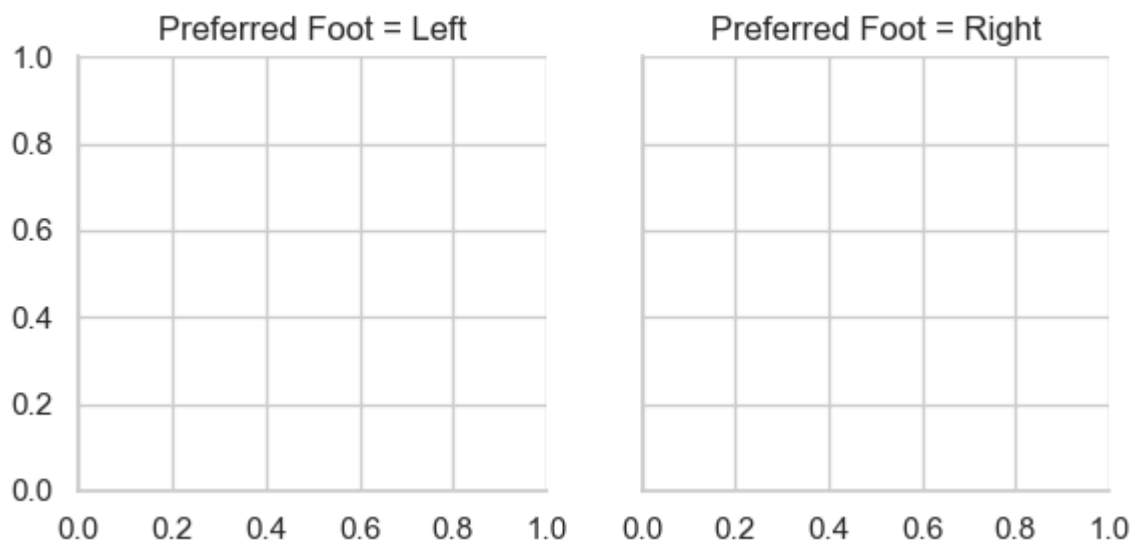

In [159…
```python
g = sns.FacetGrid(fifa19, col="Preferred Foot")
g = g.map(plt.hist, "Potential")
```
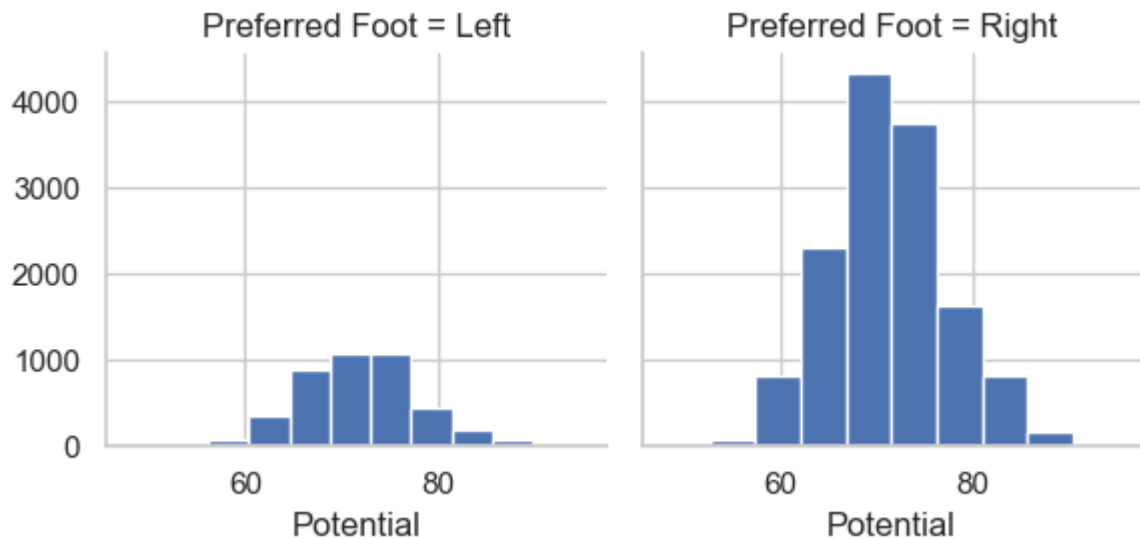
```
g = sns.FacetGrid(fifa19, col="Preferred Foot")
g = g.map(plt.hist, "Potential", bins=10, color="r")
```
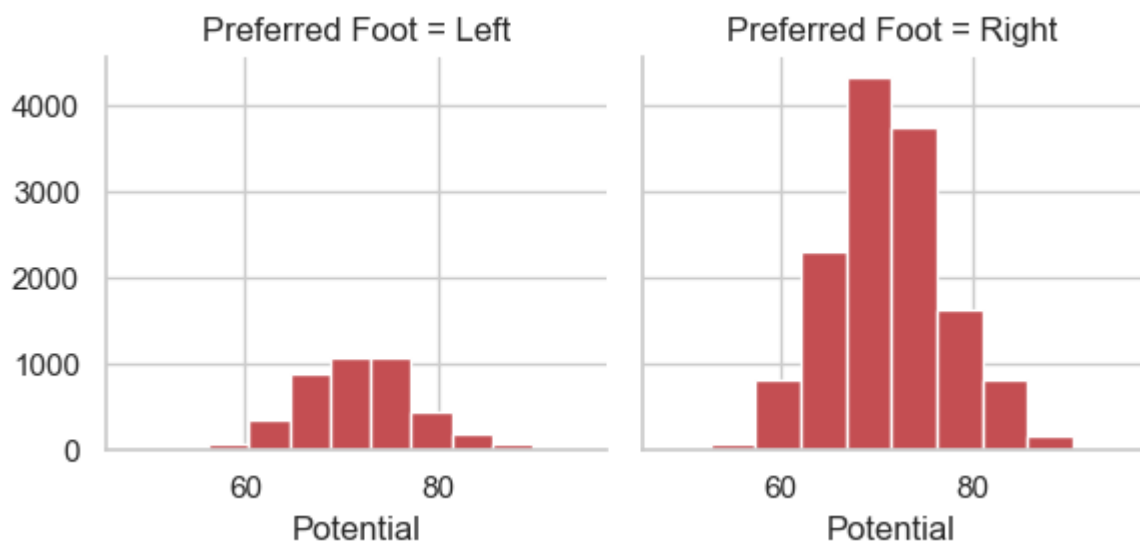


```
g = sns.FacetGrid(fifa19, col="Preferred Foot")
g = (g.map(plt.scatter, "Height", "Weight", edgecolor="w").add_legend())
```
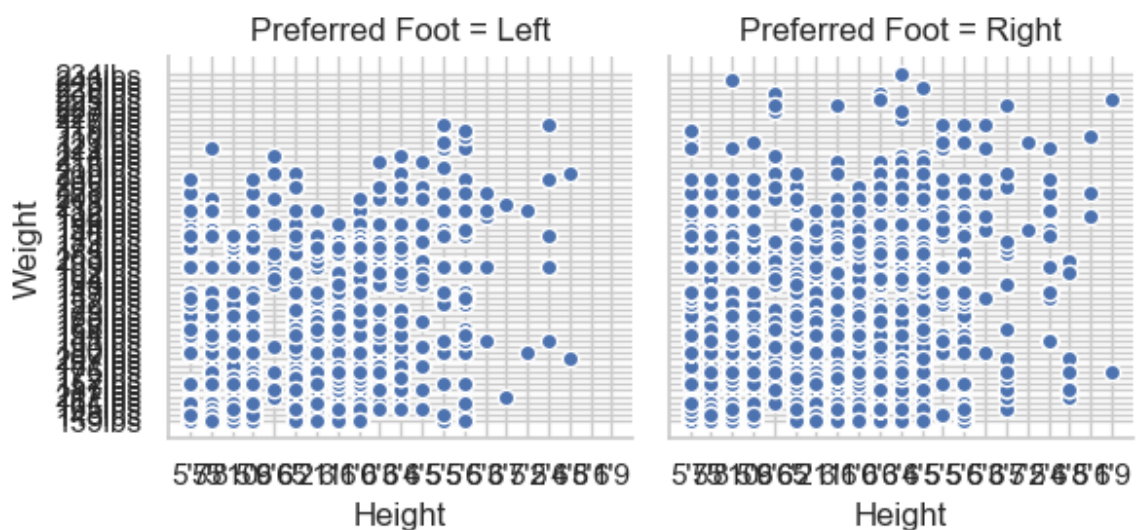
```
In [165…   g = sns.FacetGrid(fifa19, col="Preferred Foot", height=5, aspect=1)
           g = g.map(plt.hist, "Potential")
```
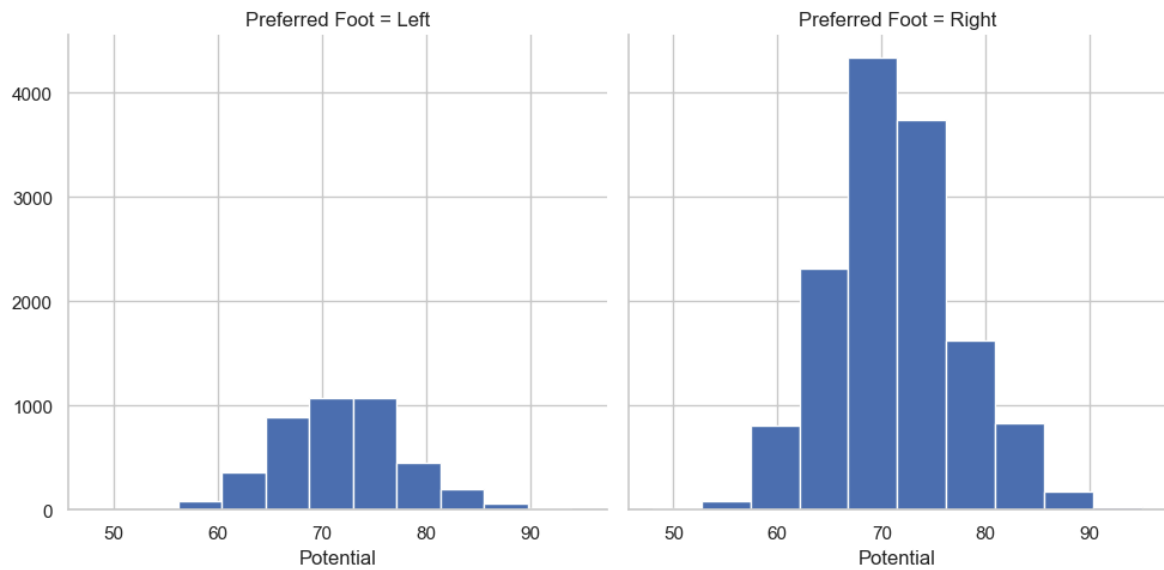

Seaborn `Pairgrid()` function

```
In [168…   fifa19_new = fifa19[['Age', 'Potential', 'Strength', 'Stamina', 'Preferred Foot'
```

```
In [170…   g = sns.PairGrid(fifa19_new)
           g = g.map(plt.scatter)
```
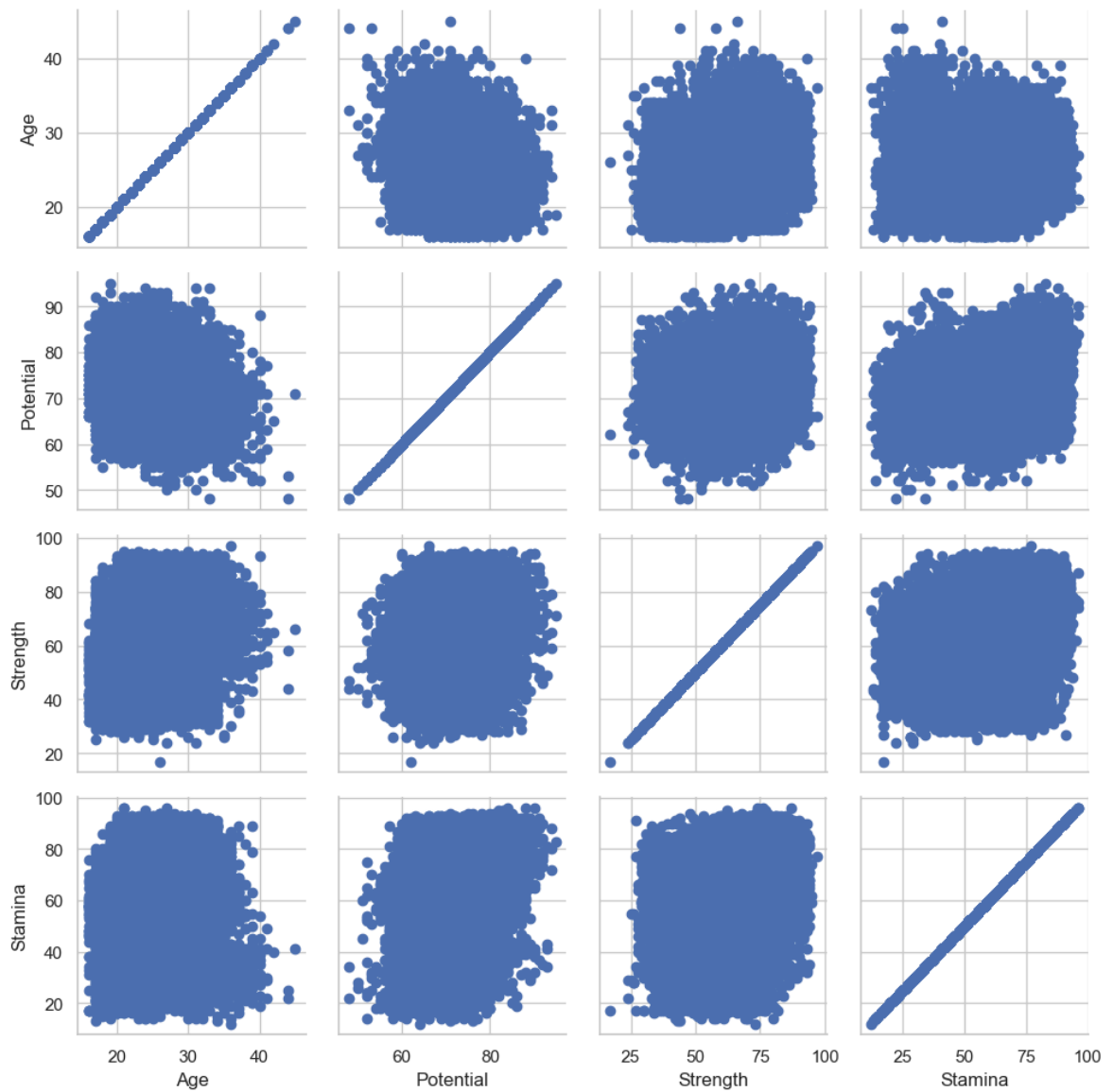
```
In [172…    g = sns.PairGrid(fifa19_new)
            g = g.map_diag(plt.hist)
            g = g.map_offdiag(plt.scatter)
```
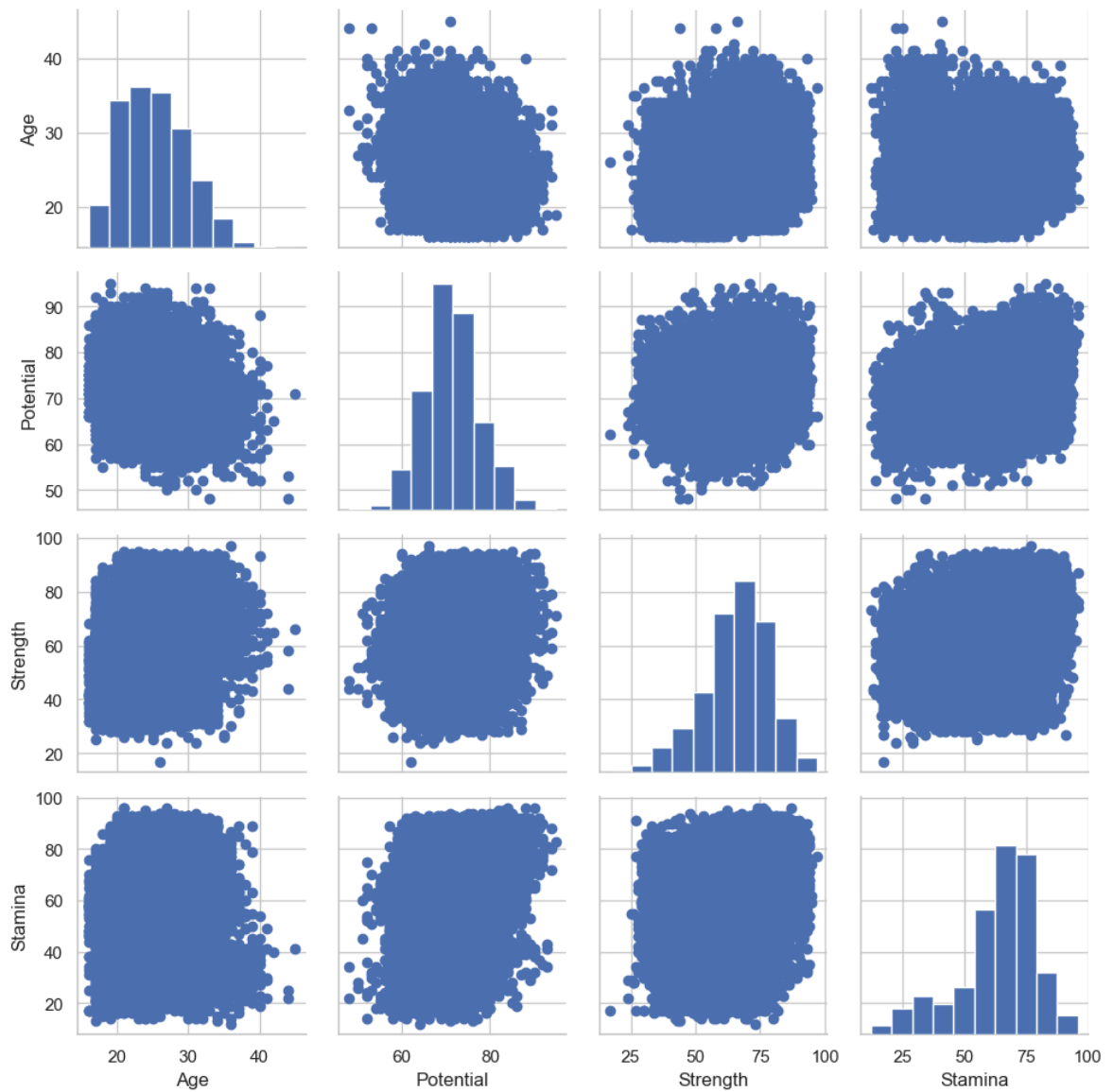
```
g = sns.PairGrid(fifa19_new, hue="Preferred Foot")
g = g.map_diag(plt.hist)
g = g.map_offdiag(plt.scatter)
g = g.add_legend()
```
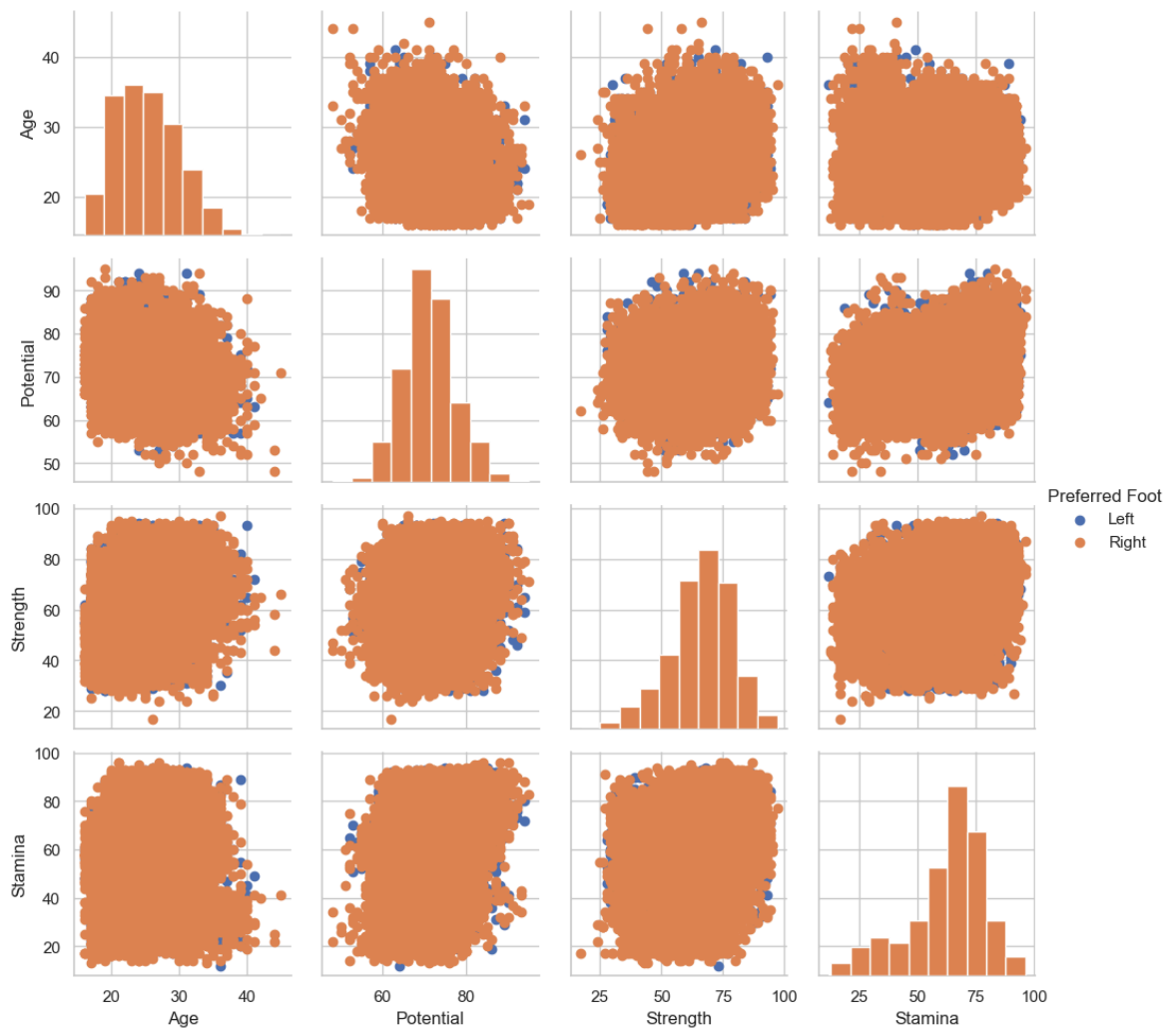
```
In [176…  g = sns.PairGrid(fifa19_new, hue="Preferred Foot")
          g = g.map_diag(plt.hist, histtype="step", linewidth=3)
          g = g.map_offdiag(plt.scatter)
          g = g.add_legend()
```
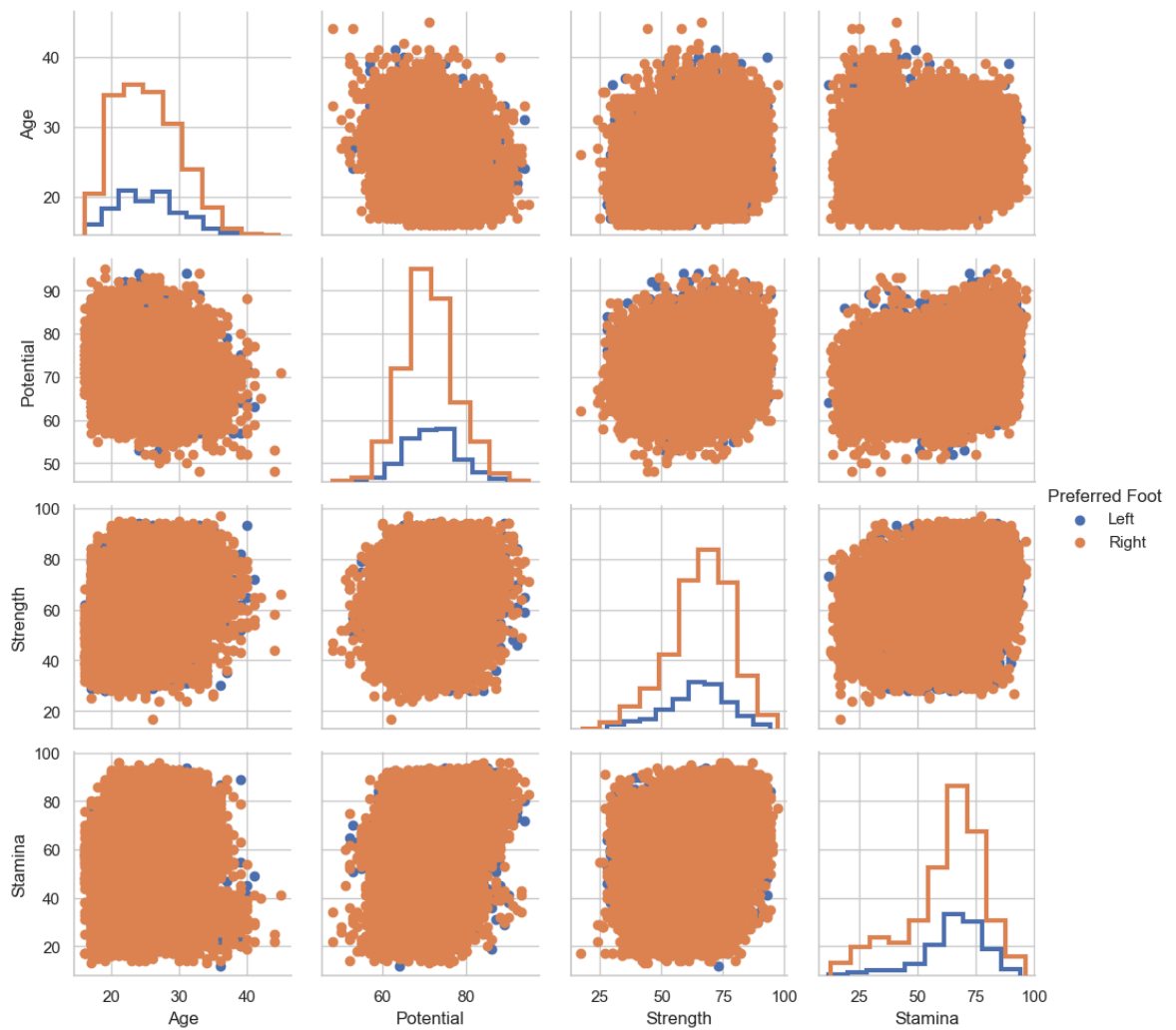
```
g = sns.PairGrid(fifa19_new, vars=['Age', 'Stamina'])
g = g.map(plt.scatter)
```
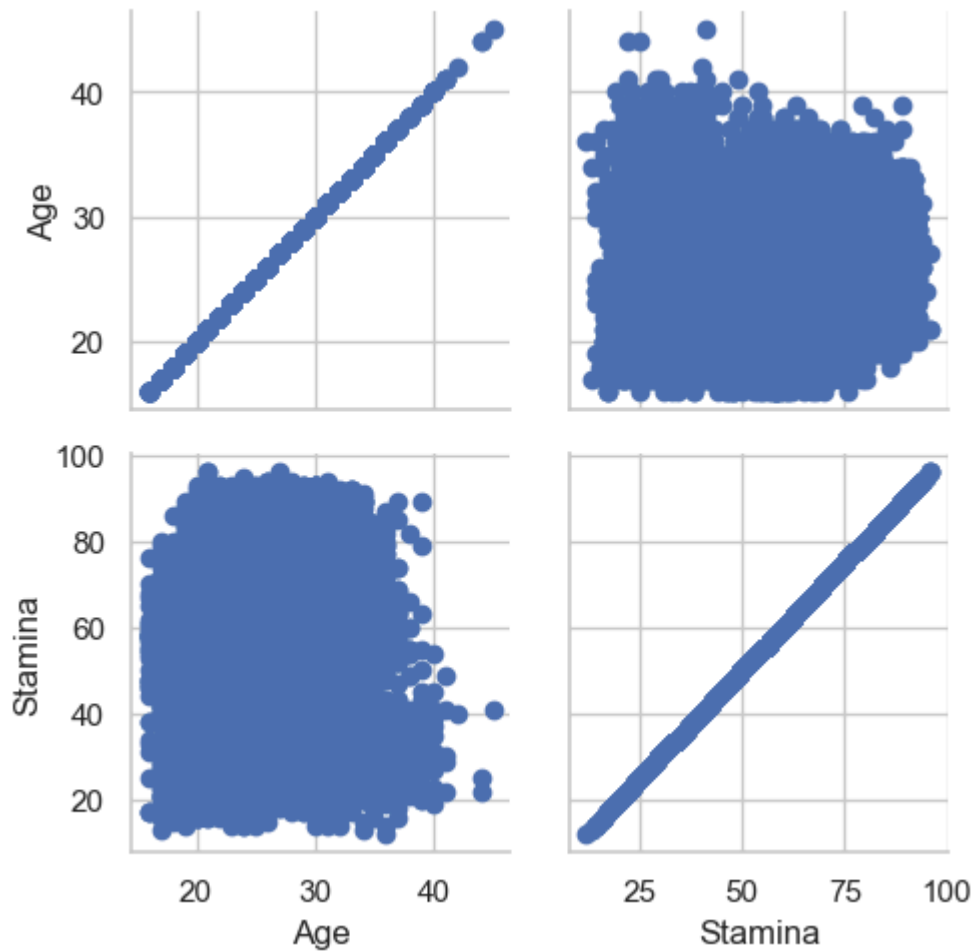
```
In [180…   g = sns.PairGrid(fifa19_new)
           g = g.map_upper(plt.scatter)
           g = g.map_lower(sns.kdeplot, cmap="Blues_d")
           g = g.map_diag(sns.kdeplot, lw=3, legend=False)
```
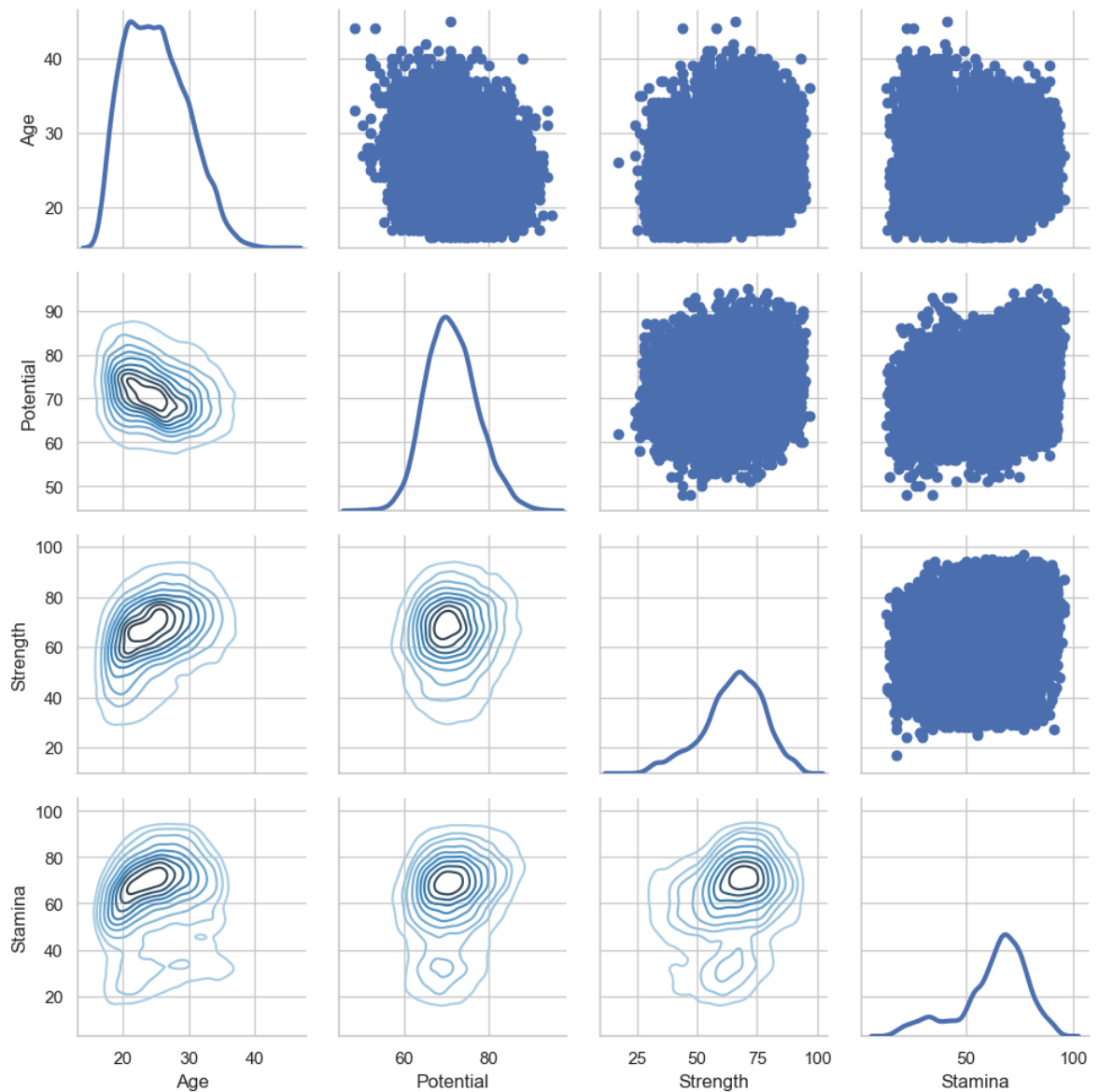
Seaborn `Jointgrid()` function

```
In [183…   g = sns.JointGrid(x="Overall", y="Potential", data=fifa19)
           g = g.plot(sns.regplot, sns.distplot)
```
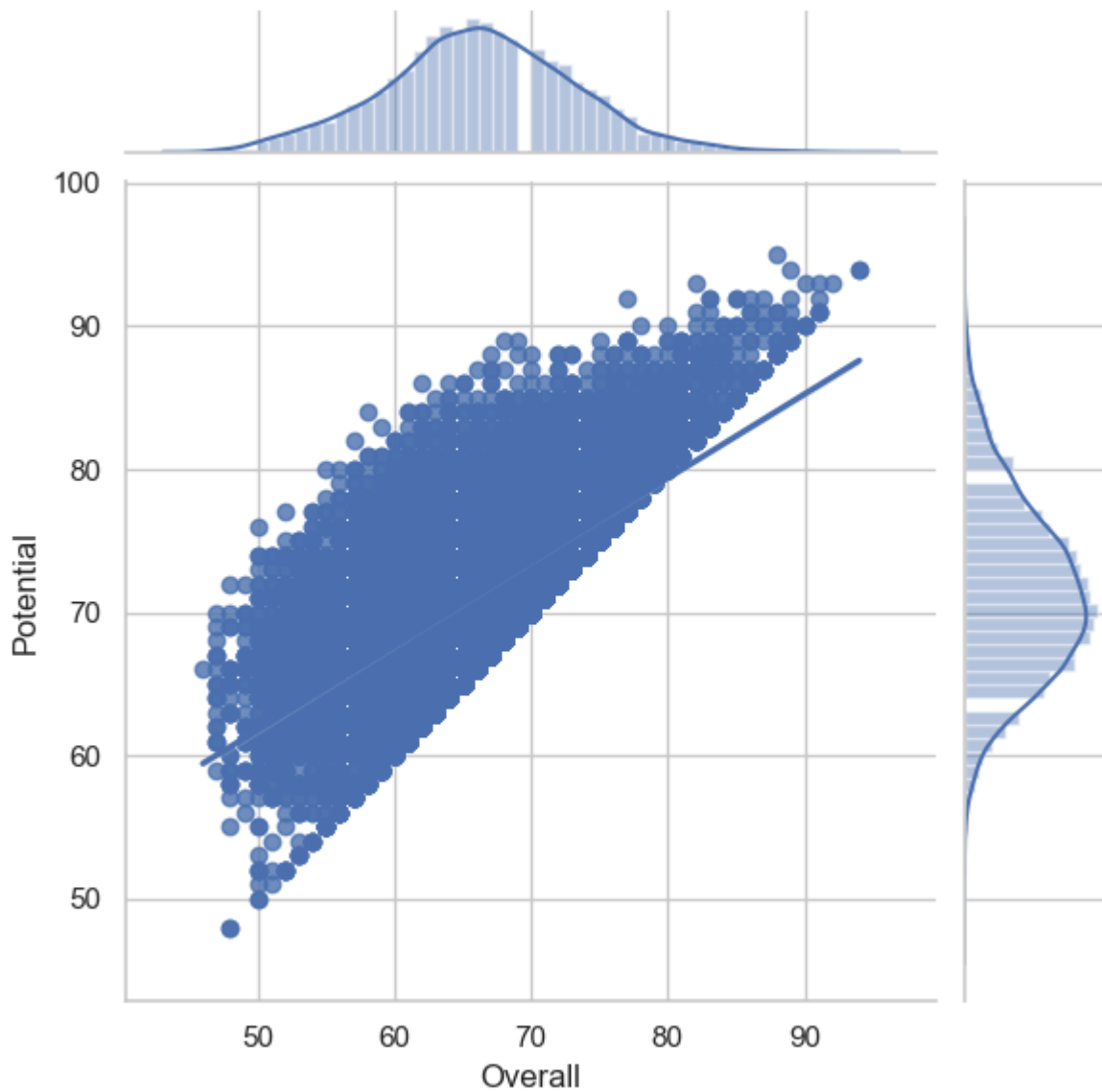
```
In [185...   import matplotlib.pyplot as plt
```

```
In [187...   g = sns.JointGrid(x="Overall", y="Potential", data=fifa19)
            g = g.plot_joint(plt.scatter, color=".5", edgecolor="white")
            g = g.plot_marginals(sns.distplot, kde=False, color=".5")
```
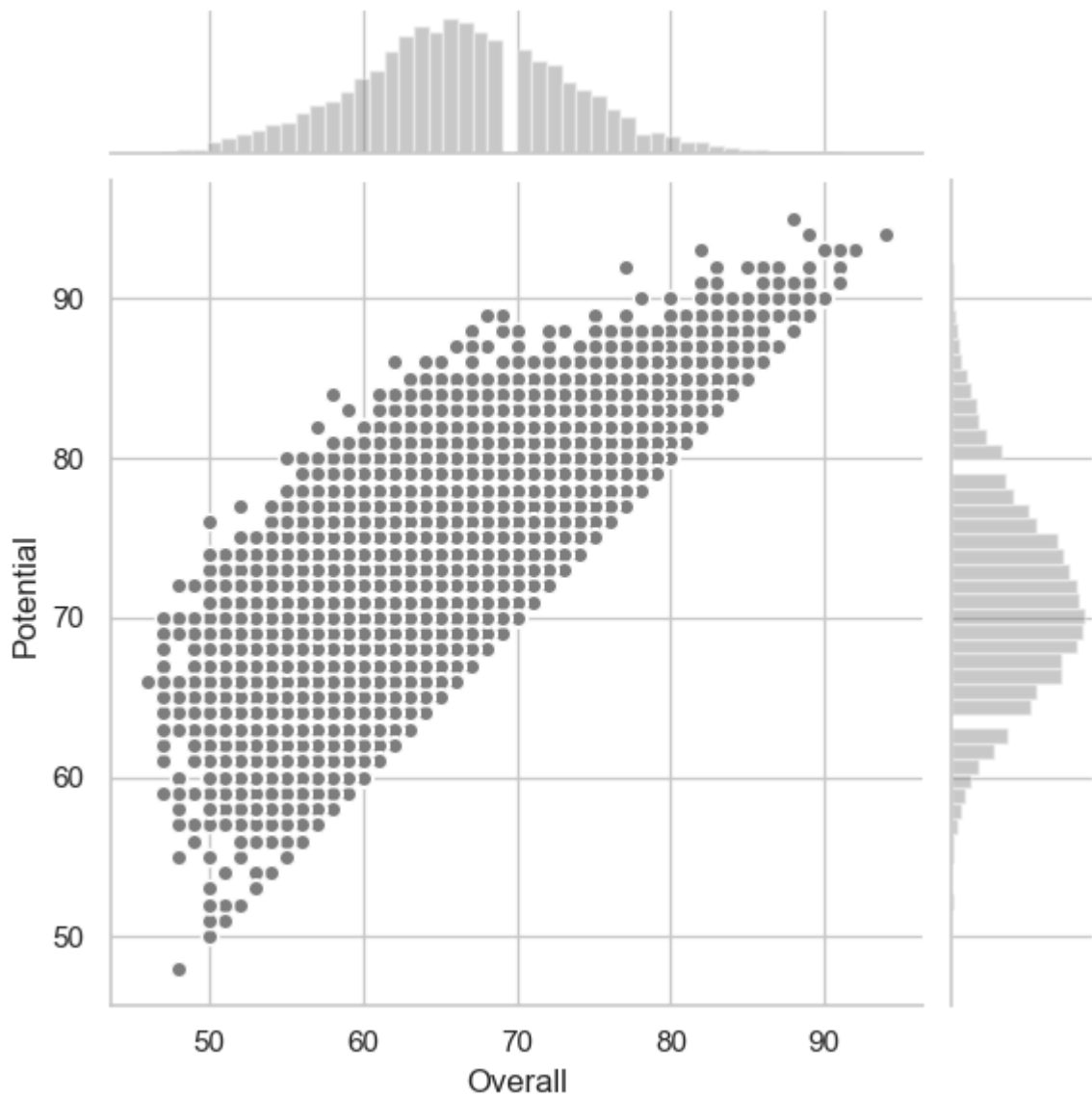
```
In [189…   g = sns.JointGrid(x="Overall", y="Potential", data=fifa19, space=0)
           g = g.plot_joint(sns.kdeplot, cmap="Blues_d")
           g = g.plot_marginals(sns.kdeplot, shade=True)
```
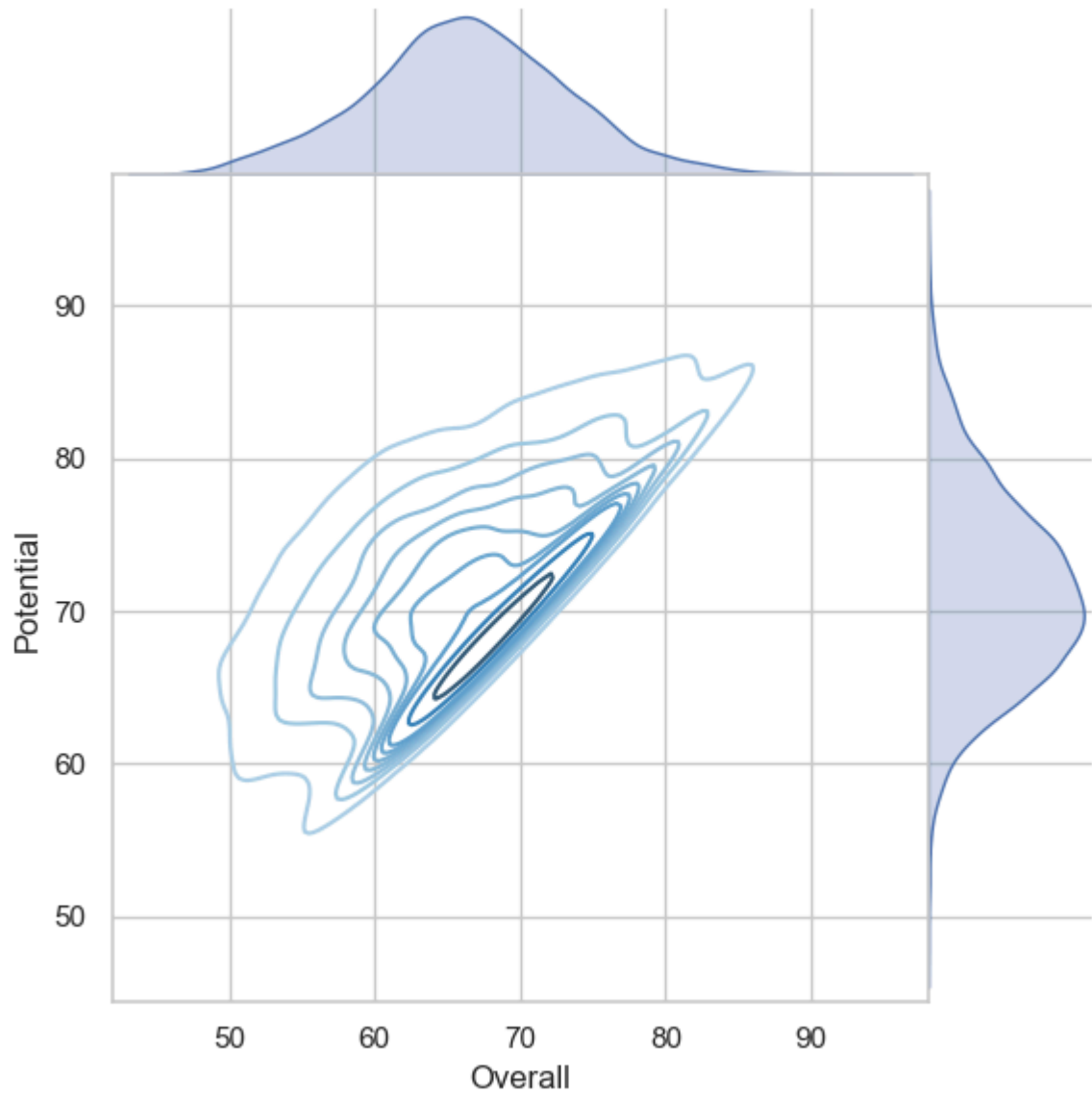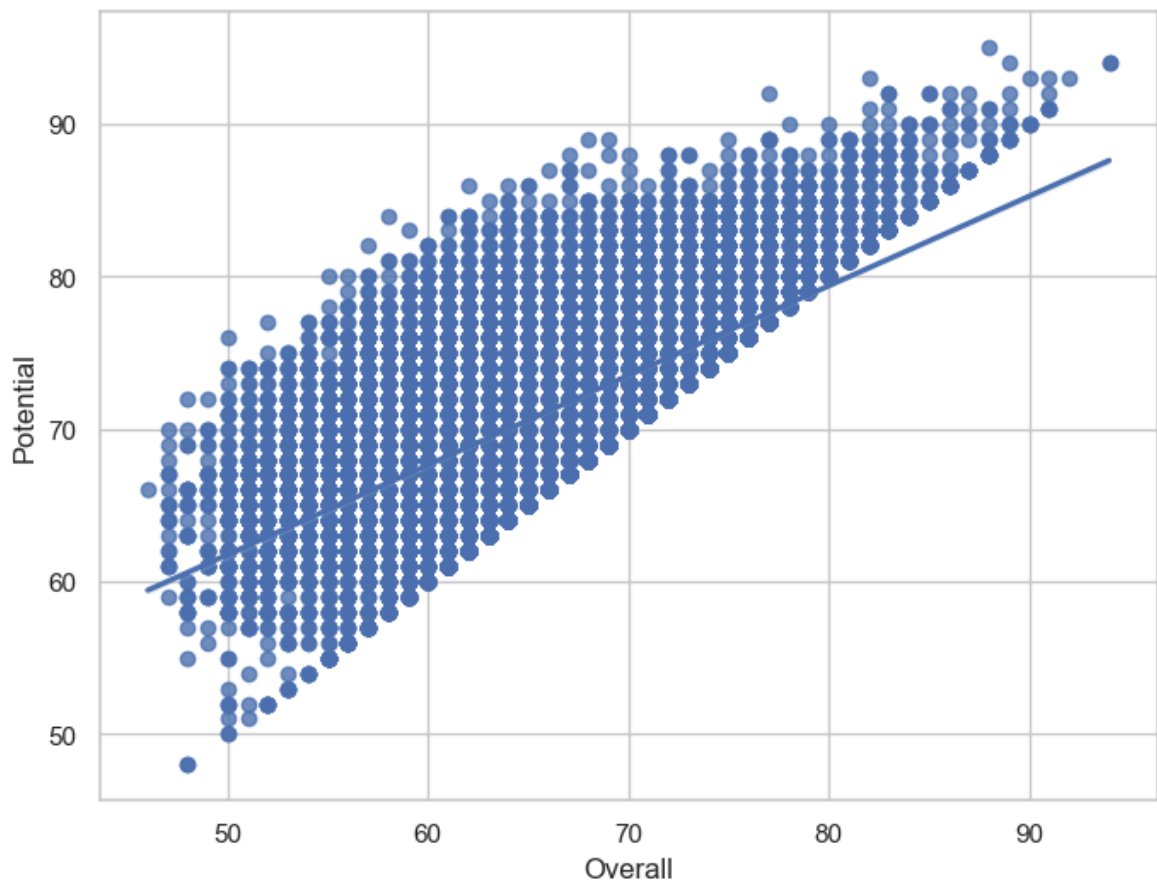
```
g = sns.JointGrid(x="Overall", y="Potential", data=fifa19, height=5, ratio=2)
g = g.plot_joint(sns.kdeplot, cmap="Reds_d")
g = g.plot_marginals(sns.kdeplot, color="r", shade=True)
```
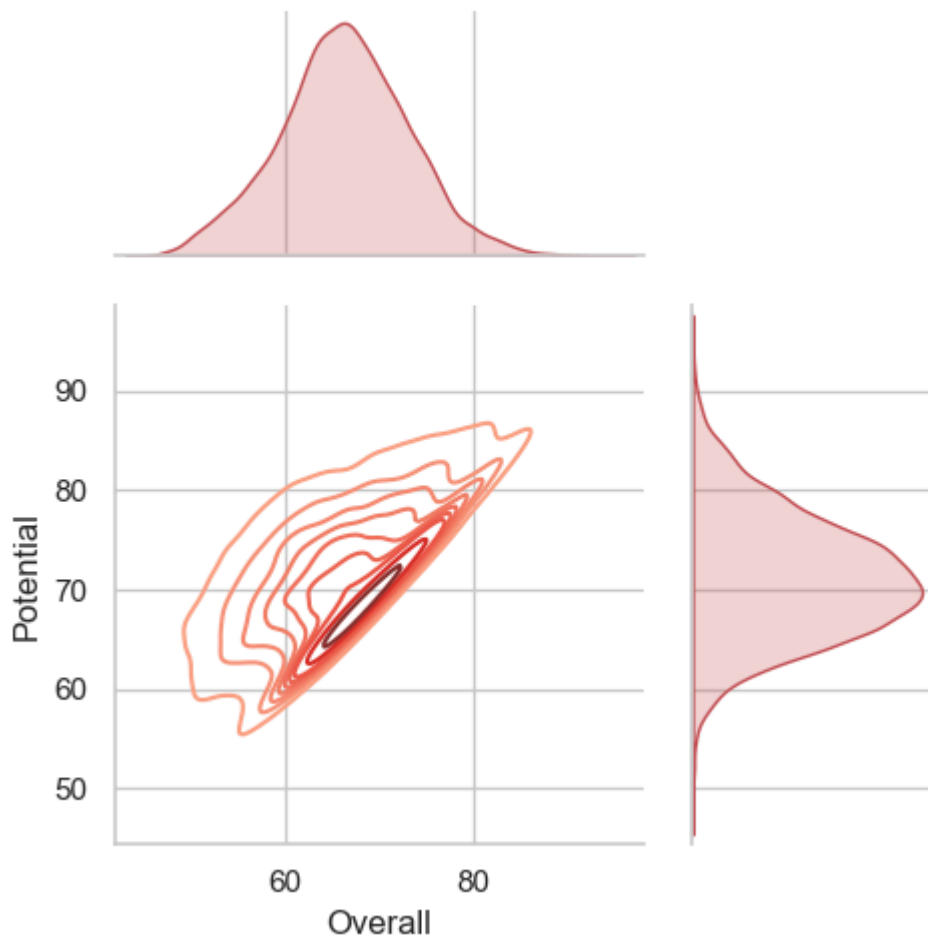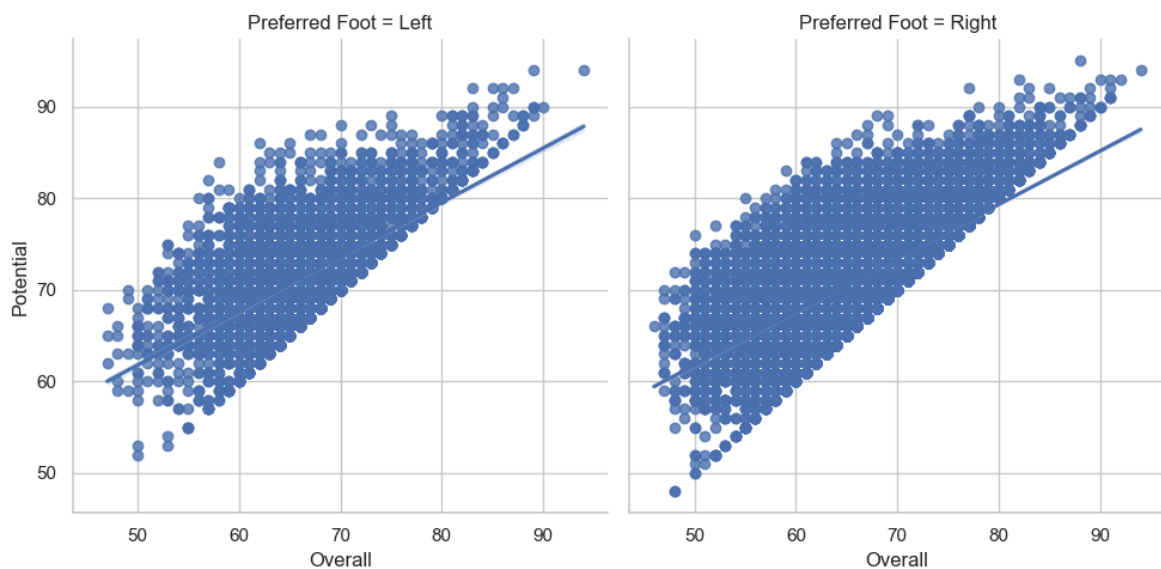
Controlling the size and shape of the plot

```
In [194…   f, ax = plt.subplots(figsize=(8, 6))
           ax = sns.regplot(x="Overall", y="Potential", data=fifa19);
```

```
In [196...  sns.lmplot(x="Overall", y="Potential", col="Preferred Foot", data=fifa19, col_wr
```
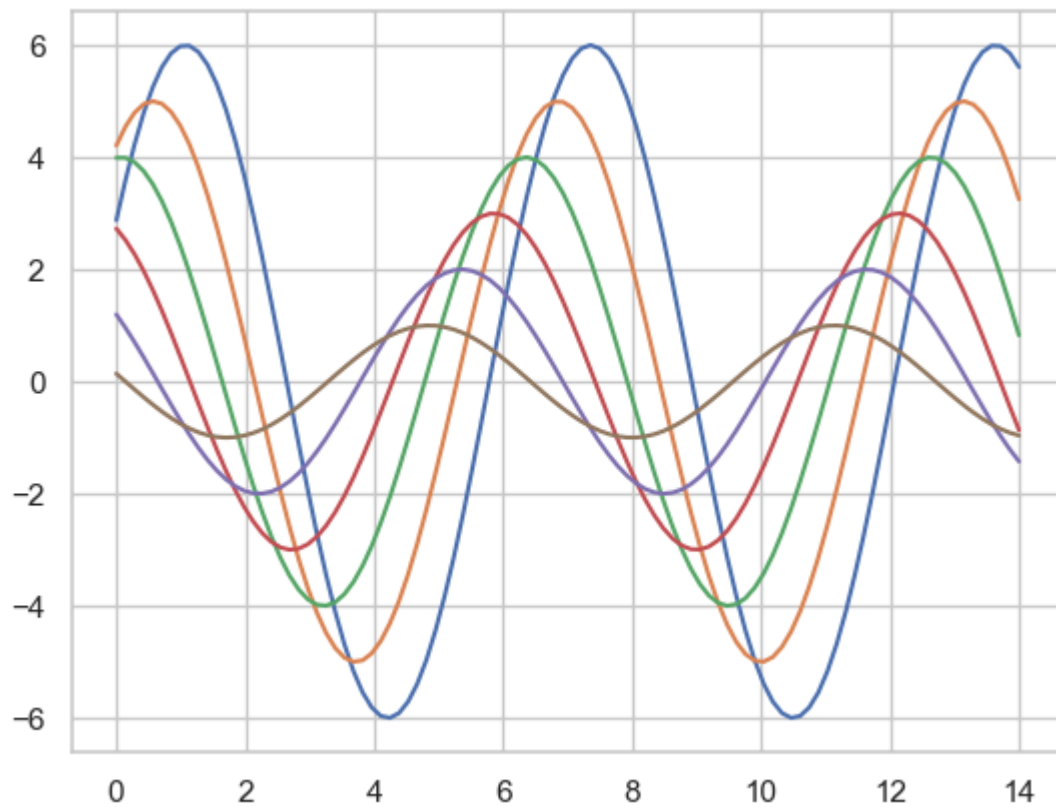
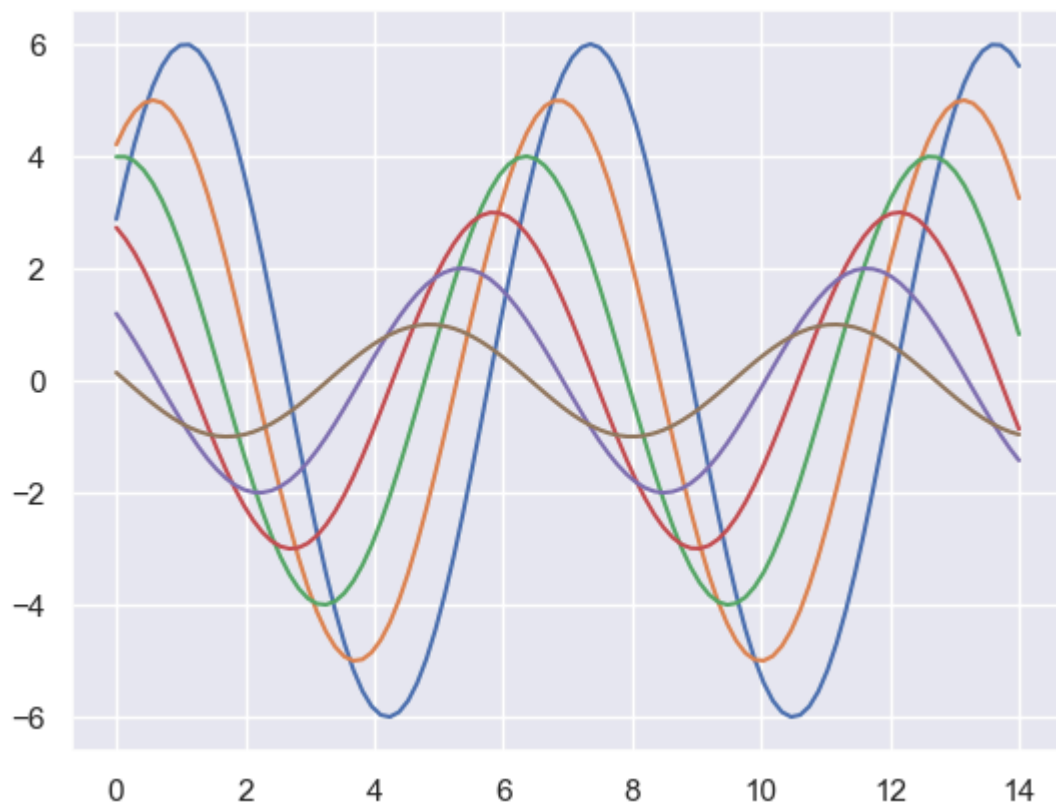Out[196...   <seaborn.axisgrid.FacetGrid at 0x1a0ea003cb0>

Seaborn figure styles

```
In [199...  def sinplot(flip=1):
               x = np.linspace(0, 14, 100)
               for i in range(1, 7):
                   plt.plot(x, np.sin(x + i * .5) * (7 - i) * flip)
```
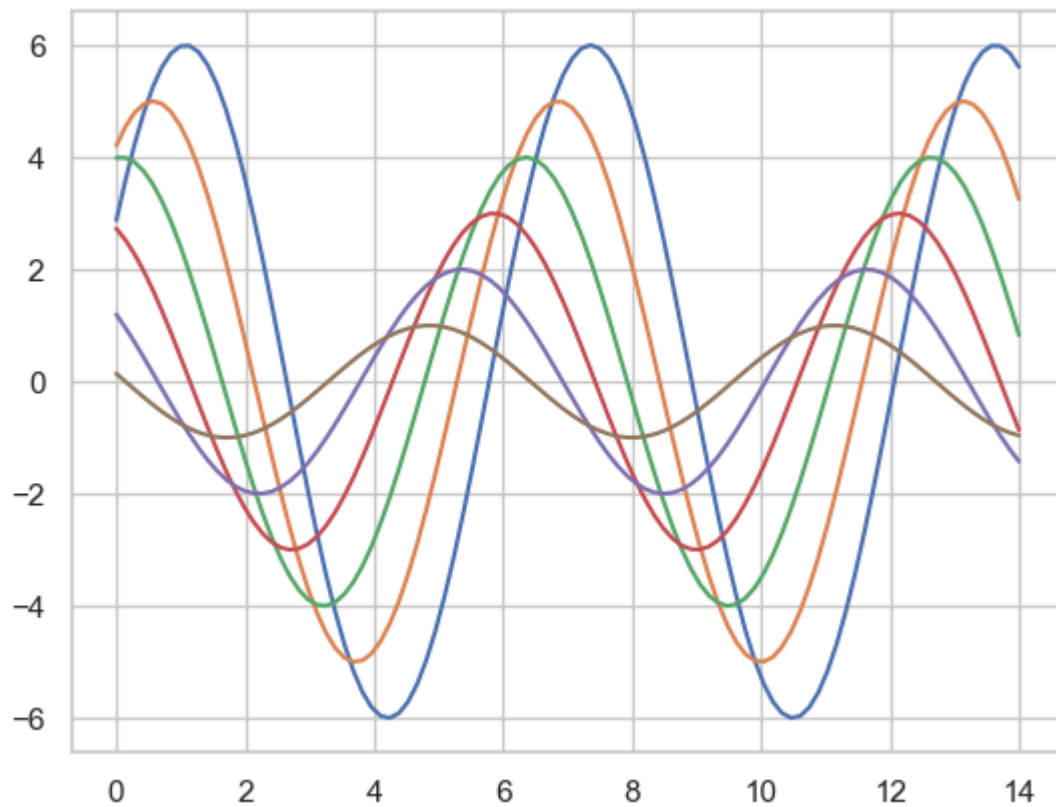
```
In [201...  sinplot()
```
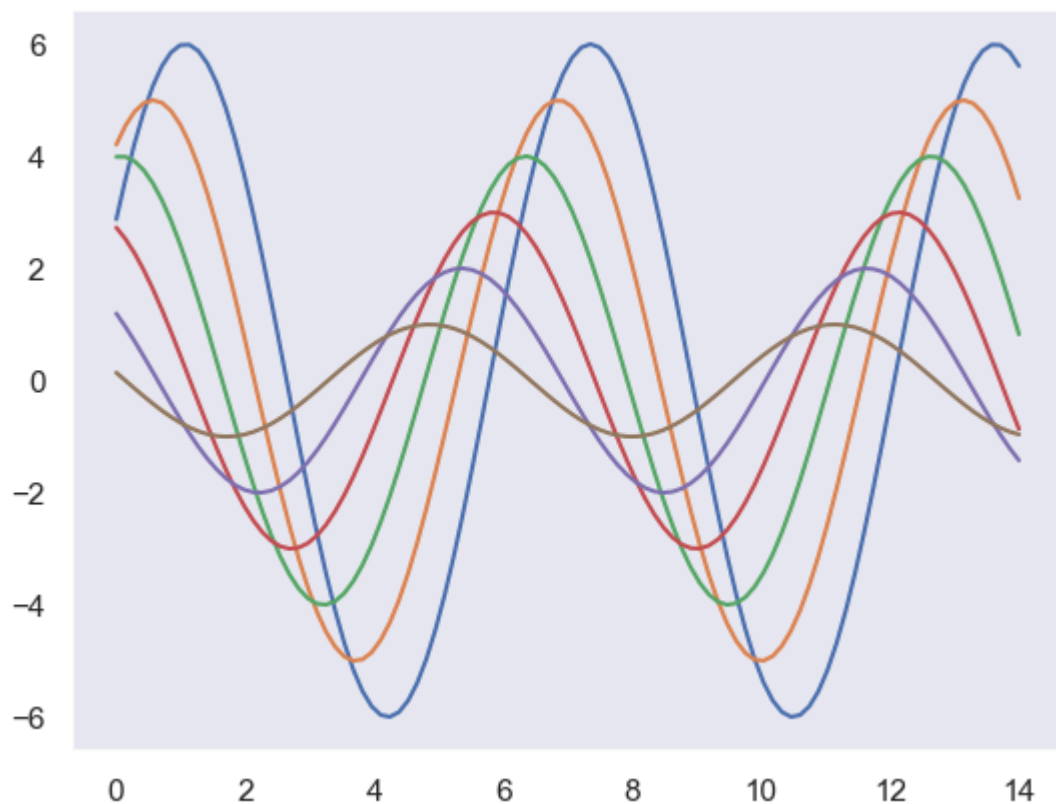
```
In [203…   sns.set()
           sinplot()
```



```
In [205…   sns.set_style("whitegrid")
           sinplot()
```
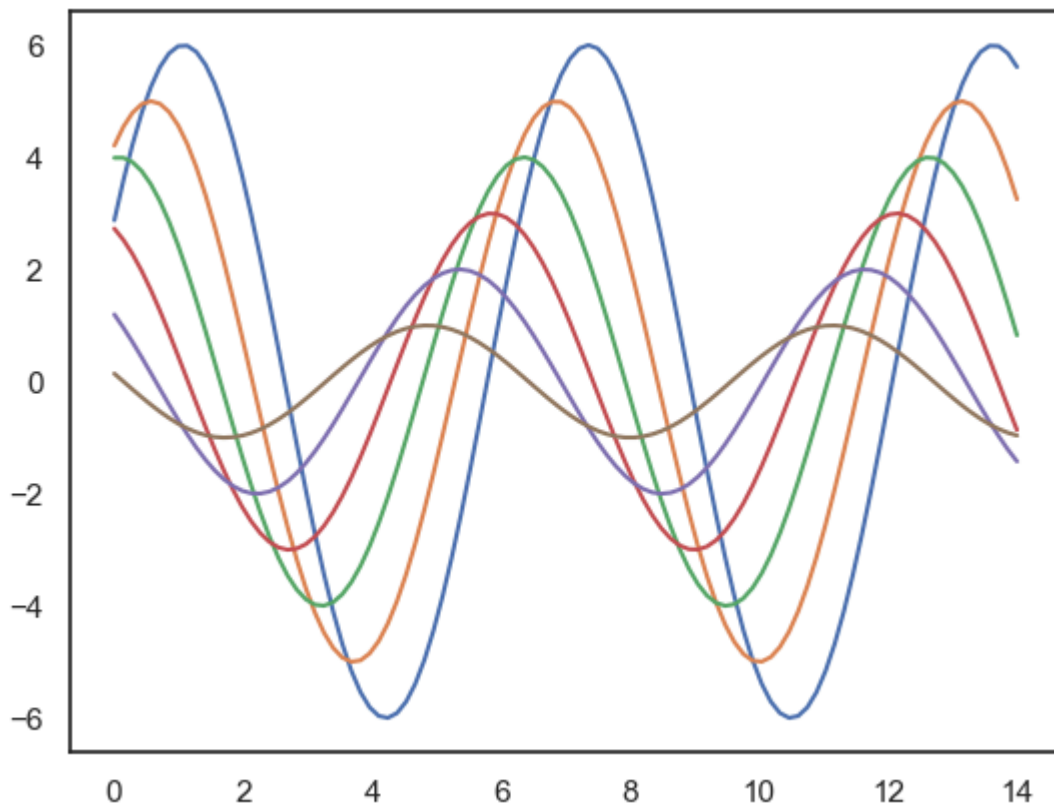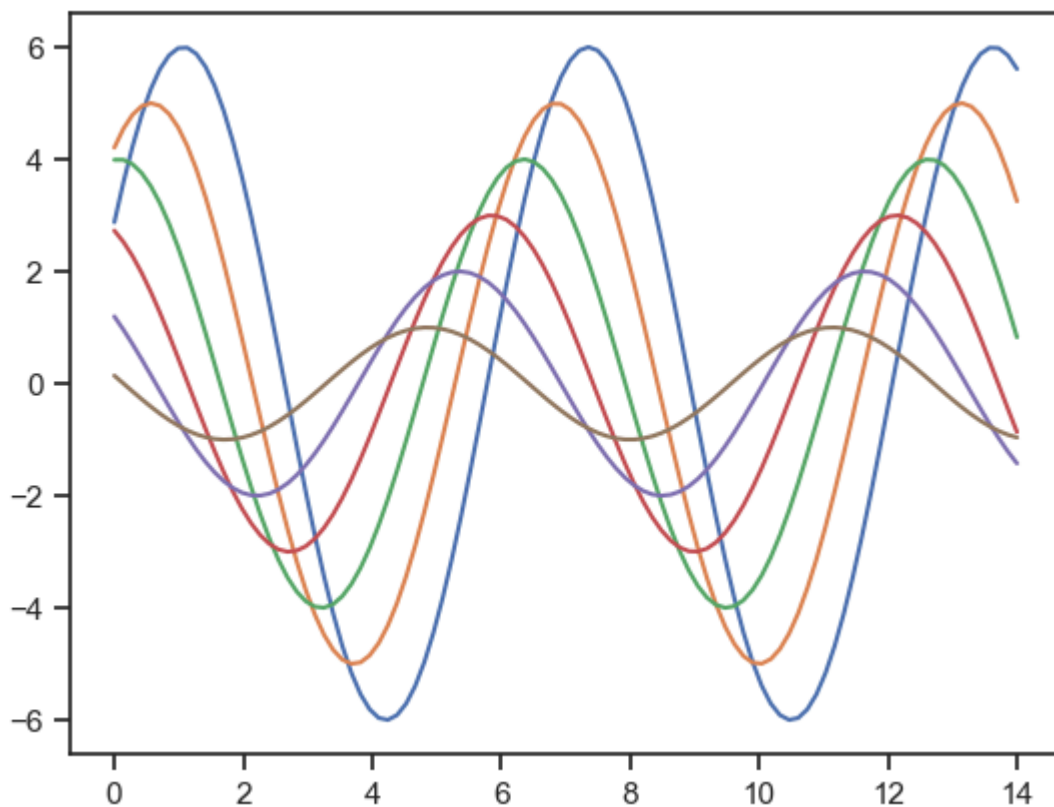
```
sns.set_style("dark")
sinplot()
```



```
sns.set_style("white")
sinplot()
```

```
sns.set_style("ticks")
sinplot()
```


Completed

In [ ]: