In [36]:
```
import numpy as np
import pandas as pd
```

In [76]:
```
x=pd.read_csv(r"C:\Users\user\Downloads\2015 - 2015.csv")
print(x)
```

```
         Country                          Region  Happiness Rank  \
0    Switzerland                  Western Europe               1
1        Iceland                  Western Europe               2
2        Denmark                  Western Europe               3
3         Norway                  Western Europe               4
4         Canada                   North America               5
..           ...                             ...             ...
153       Rwanda              Sub-Saharan Africa             154
154        Benin              Sub-Saharan Africa             155
155        Syria  Middle East and Northern Africa             156
156      Burundi              Sub-Saharan Africa             157
157         Togo              Sub-Saharan Africa             158

     Happiness Score  Standard Error  Economy (GDP per Capita)   Family  \
0              7.587         0.03411                   1.39651  1.34951
1              7.561         0.04884                   1.30232  1.40223
2              7.527         0.03328                   1.32548  1.36058
3              7.522         0.03880                   1.45900  1.33095
4              7.427         0.03553                   1.32629  1.32261
..               ...             ...                       ...      ...
153            3.465         0.03464                   0.22208  0.77370
154            3.340         0.03656                   0.28665  0.35386
155            3.006         0.05015                   0.66320  0.47489
156            2.905         0.08658                   0.01530  0.41587
157            2.839         0.06727                   0.20868  0.13995

     Health (Life Expectancy)  Freedom  Trust (Government Corruption)  \
0                     0.94143  0.66557                        0.41978
1                     0.94784  0.62877                        0.14145
2                     0.87464  0.64938                        0.48357
3                     0.88521  0.66973                        0.36503
4                     0.90563  0.63297                        0.32957
..                        ...      ...                            ...
153                   0.42864  0.59201                        0.55191
154                   0.31910  0.48450                        0.08010
155                   0.72193  0.15684                        0.18906
156                   0.22396  0.11850                        0.10062
157                   0.28443  0.36453                        0.10731

     Generosity  Dystopia Residual
0       0.29678            2.51738
1       0.43630            2.70201
2       0.34139            2.49204
3       0.34699            2.46531
4       0.45811            2.45176
..          ...                ...
153     0.22628            0.67042
154     0.18260            1.63328
155     0.47179            0.32858
156     0.19727            1.83302
157     0.16681            1.56726

[158 rows x 12 columns]
```

In [77]:
```
x.head(100)
x
```

Out[77]:

	Country	Region	Happiness Rank	Happiness Score	Standard Error	Economy (GDP per Capita)	Family	Health (Life Expectancy)	Fre
0	Switzerland	Western Europe	1	7.587	0.03411	1.39651	1.34951	0.94143	0.6
1	Iceland	Western Europe	2	7.561	0.04884	1.30232	1.40223	0.94784	0.6
2	Denmark	Western Europe	3	7.527	0.03328	1.32548	1.36058	0.87464	0.6
3	Norway	Western Europe	4	7.522	0.03880	1.45900	1.33095	0.88521	0.6
4	Canada	North America	5	7.427	0.03553	1.32629	1.32261	0.90563	0.6
...	...	...	...	...	...	...	...	...	
153	Rwanda	Sub-Saharan Africa	154	3.465	0.03464	0.22208	0.77370	0.42864	0.5
154	Benin	Sub-Saharan Africa	155	3.340	0.03656	0.28665	0.35386	0.31910	0.4
155	Syria	Middle East and Northern Africa	156	3.006	0.05015	0.66320	0.47489	0.72193	0.1
156	Burundi	Sub-Saharan Africa	157	2.905	0.08658	0.01530	0.41587	0.22396	0.1
157	Togo	Sub-Saharan Africa	158	2.839	0.06727	0.20868	0.13995	0.28443	0.3

158 rows × 12 columns

In [78]:
```
x.tail(6)
```

Out[78]:

	Country	Region	Happiness Rank	Happiness Score	Standard Error	Economy (GDP per Capita)	Family	Health (Life Expectancy)	Fre
152	Afghanistan	Southern Asia	153	3.575	0.03084	0.31982	0.30285	0.30335	0.
153	Rwanda	Sub-Saharan Africa	154	3.465	0.03464	0.22208	0.77370	0.42864	0.
154	Benin	Sub-Saharan Africa	155	3.340	0.03656	0.28665	0.35386	0.31910	0.
155	Syria	Middle East and Northern Africa	156	3.006	0.05015	0.66320	0.47489	0.72193	0.
156	Burundi	Sub-Saharan Africa	157	2.905	0.08658	0.01530	0.41587	0.22396	0.
157	Togo	Sub-Saharan Africa	158	2.839	0.06727	0.20868	0.13995	0.28443	0.

In [79]:
```
x.dtypes
```

Out[79]:
```
Country                          object
Region                           object
Happiness Rank                    int64
Happiness Score                 float64
Standard Error                  float64
Economy (GDP per Capita)        float64
Family                          float64
Health (Life Expectancy)        float64
Freedom                         float64
Trust (Government Corruption)   float64
Generosity                      float64
Dystopia Residual               float64
dtype: object
```

In [80]:
```
x.index
```

Out[80]:
```
RangeIndex(start=0, stop=158, step=1)
```

In [81]:
```
x.describe
```

Out[81]:
```
<bound method NDFrame.describe of          Country                          Region  Happiness Rank  \
0    Switzerland                 Western Europe               1
1        Iceland                 Western Europe               2
2        Denmark                 Western Europe               3
3         Norway                 Western Europe               4
4         Canada                  North America               5
..           ...                            ...             ...
153       Rwanda             Sub-Saharan Africa             154
154        Benin             Sub-Saharan Africa             155
155        Syria  Middle East and Northern Africa             156
156      Burundi             Sub-Saharan Africa             157
157         Togo             Sub-Saharan Africa             158

     Happiness Score  Standard Error  Economy (GDP per Capita)   Family  \
0              7.587         0.03411                   1.39651  1.34951
1              7.561         0.04884                   1.30232  1.40223
2              7.527         0.03328                   1.32548  1.36058
3              7.522         0.03880                   1.45900  1.33095
4              7.427         0.03553                   1.32629  1.32261
..               ...             ...                       ...      ...
153            3.465         0.03464                   0.22208  0.77370
154            3.340         0.03656                   0.28665  0.35386
155            3.006         0.05015                   0.66320  0.47489
156            2.905         0.08658                   0.01530  0.41587
157            2.839         0.06727                   0.20868  0.13995

     Health (Life Expectancy)  Freedom  Trust (Government Corruption)  \
0                     0.94143  0.66557                        0.41978
1                     0.94784  0.62877                        0.14145
2                     0.87464  0.64938                        0.48357
3                     0.88521  0.66973                        0.36503
4                     0.90563  0.63297                        0.32957
..                        ...      ...                            ...
153                   0.42864  0.59201                        0.55191
154                   0.31910  0.48450                        0.08010
155                   0.72193  0.15684                        0.18906
156                   0.22396  0.11850                        0.10062
157                   0.28443  0.36453                        0.10731

     Generosity  Dystopia Residual
0       0.29678            2.51738
1       0.43630            2.70201
2       0.34139            2.49204
3       0.34699            2.46531
4       0.45811            2.45176
..          ...                ...
153     0.22628            0.67042
154     0.18260            1.63328
155     0.47179            0.32858
156     0.19727            1.83302
157     0.16681            1.56726

[158 rows x 12 columns]>
```

In [84]:
```
x["Country"]
```

Out[84]:
```
0      Switzerland
1          Iceland
2          Denmark
3           Norway
4           Canada
           ...
153         Rwanda
154          Benin
155          Syria
156        Burundi
157           Togo
Name: Country, Length: 158, dtype: object
```

In [85]:
```
x.loc[1:7]
```

Out[85]:

	Country	Region	Happiness Rank	Happiness Score	Standard Error	Economy (GDP per Capita)	Family	Health (Life Expectancy)	Freed
1	Iceland	Western Europe	2	7.561	0.04884	1.30232	1.40223	0.94784	0.628
2	Denmark	Western Europe	3	7.527	0.03328	1.32548	1.36058	0.87464	0.649
3	Norway	Western Europe	4	7.522	0.03880	1.45900	1.33095	0.88521	0.669
4	Canada	North America	5	7.427	0.03553	1.32629	1.32261	0.90563	0.632
5	Finland	Western Europe	6	7.406	0.03140	1.29025	1.31826	0.88911	0.641
6	Netherlands	Western Europe	7	7.378	0.02799	1.32944	1.28017	0.89284	0.615
7	Sweden	Western Europe	8	7.364	0.03157	1.33171	1.28907	0.91087	0.659

In [86]:
```
x.fillna(value=100)
```

Out[86]:

	Country	Region	Happiness Rank	Happiness Score	Standard Error	Economy (GDP per Capita)	Family	Health (Life Expectancy)	Fre
0	Switzerland	Western Europe	1	7.587	0.03411	1.39651	1.34951	0.94143	0.6
1	Iceland	Western Europe	2	7.561	0.04884	1.30232	1.40223	0.94784	0.6
2	Denmark	Western Europe	3	7.527	0.03328	1.32548	1.36058	0.87464	0.6
3	Norway	Western Europe	4	7.522	0.03880	1.45900	1.33095	0.88521	0.6
4	Canada	North America	5	7.427	0.03553	1.32629	1.32261	0.90563	0.6
...	...	...	...	...	...	...	...	...	
153	Rwanda	Sub-Saharan Africa	154	3.465	0.03464	0.22208	0.77370	0.42864	0.5
154	Benin	Sub-Saharan Africa	155	3.340	0.03656	0.28665	0.35386	0.31910	0.4
155	Syria	Middle East and Northern Africa	156	3.006	0.05015	0.66320	0.47489	0.72193	0.1
156	Burundi	Sub-Saharan Africa	157	2.905	0.08658	0.01530	0.41587	0.22396	0.
157	Togo	Sub-Saharan Africa	158	2.839	0.06727	0.20868	0.13995	0.28443	0.3

158 rows × 12 columns

In [87]:
```
x.dropna()
```

Out[87]:

	Country	Region	Happiness Rank	Happiness Score	Standard Error	Economy (GDP per Capita)	Family	Health (Life Expectancy)	Fre
0	Switzerland	Western Europe	1	7.587	0.03411	1.39651	1.34951	0.94143	0.6
1	Iceland	Western Europe	2	7.561	0.04884	1.30232	1.40223	0.94784	0.6
2	Denmark	Western Europe	3	7.527	0.03328	1.32548	1.36058	0.87464	0.6
3	Norway	Western Europe	4	7.522	0.03880	1.45900	1.33095	0.88521	0.6
4	Canada	North America	5	7.427	0.03553	1.32629	1.32261	0.90563	0.6
...	...	...	...	...	...	...	...	...	
153	Rwanda	Sub-Saharan Africa	154	3.465	0.03464	0.22208	0.77370	0.42864	0.5
154	Benin	Sub-Saharan Africa	155	3.340	0.03656	0.28665	0.35386	0.31910	0.4
155	Syria	Middle East and Northern Africa	156	3.006	0.05015	0.66320	0.47489	0.72193	0.1
156	Burundi	Sub-Saharan Africa	157	2.905	0.08658	0.01530	0.41587	0.22396	0.
157	Togo	Sub-Saharan Africa	158	2.839	0.06727	0.20868	0.13995	0.28443	0.3

158 rows × 12 columns

In [88]:
```
x.columns
```

Out[88]:
```
Index(['Country', 'Region', 'Happiness Rank', 'Happiness Score',
       'Standard Error', 'Economy (GDP per Capita)', 'Family',
       'Health (Life Expectancy)', 'Freedom', 'Trust (Government Corruptio
n)',
       'Generosity', 'Dystopia Residual'],
      dtype='object')
```

In [89]:
```
x.dropna(axis=1,how="any")
```

Out[89]:

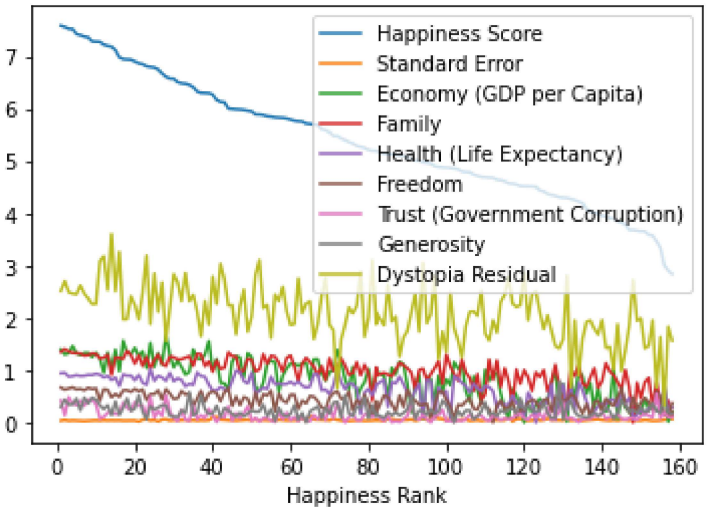
	Country	Region	Happiness Rank	Happiness Score	Standard Error	Economy (GDP per Capita)	Family	Health (Life Expectancy)	Fre
0	Switzerland	Western Europe	1	7.587	0.03411	1.39651	1.34951	0.94143	0.6
1	Iceland	Western Europe	2	7.561	0.04884	1.30232	1.40223	0.94784	0.6
2	Denmark	Western Europe	3	7.527	0.03328	1.32548	1.36058	0.87464	0.6
3	Norway	Western Europe	4	7.522	0.03880	1.45900	1.33095	0.88521	0.6
4	Canada	North America	5	7.427	0.03553	1.32629	1.32261	0.90563	0.6
...	...	...	...	...	...	...	...	...	
153	Rwanda	Sub-Saharan Africa	154	3.465	0.03464	0.22208	0.77370	0.42864	0.5
154	Benin	Sub-Saharan Africa	155	3.340	0.03656	0.28665	0.35386	0.31910	0.4
155	Syria	Middle East and Northern Africa	156	3.006	0.05015	0.66320	0.47489	0.72193	0.1
156	Burundi	Sub-Saharan Africa	157	2.905	0.08658	0.01530	0.41587	0.22396	0.
157	Togo	Sub-Saharan Africa	158	2.839	0.06727	0.20868	0.13995	0.28443	0.3

158 rows × 12 columns

In [90]:
```
import matplotlib.pyplot as pp
```

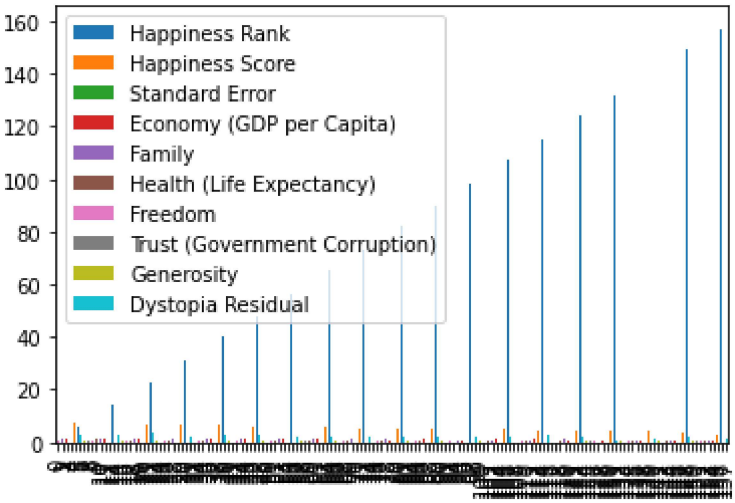
In [91]:
```
x.plot.line("Happiness Rank")
```

Out[91]: <AxesSubplot:xlabel='Happiness Rank'>



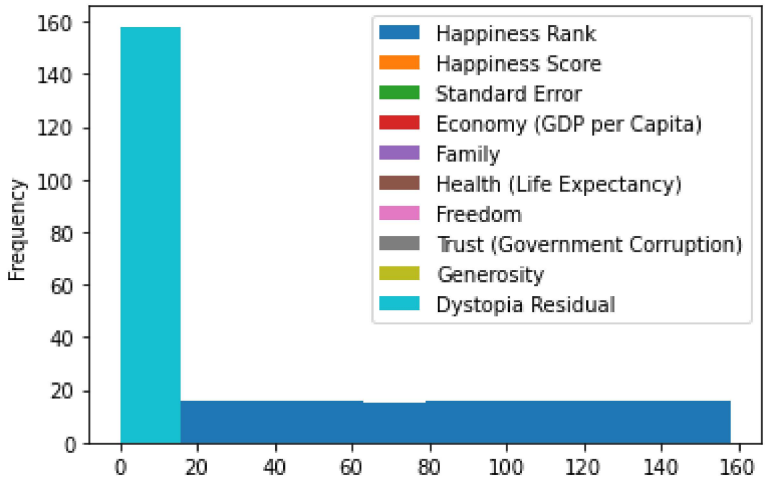
In [92]:
```
x.plot.bar()
```

Out[92]: <AxesSubplot:>



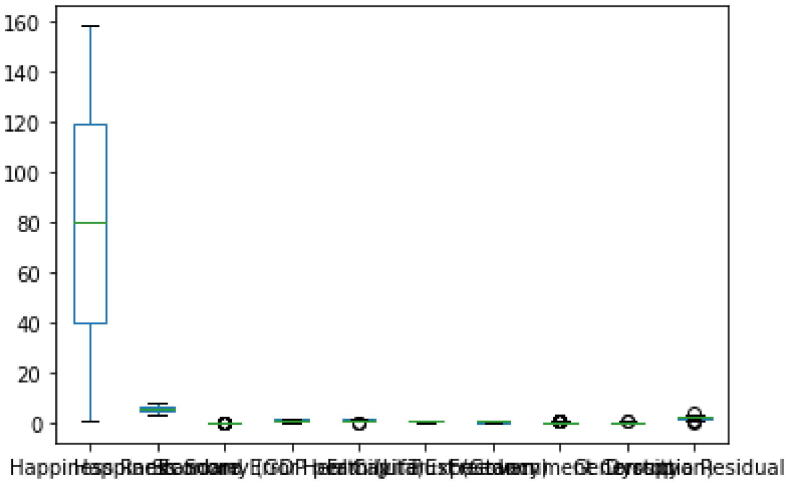
In [93]:
```
x.plot.hist()
```

Out[93]: <AxesSubplot:ylabel='Frequency'>

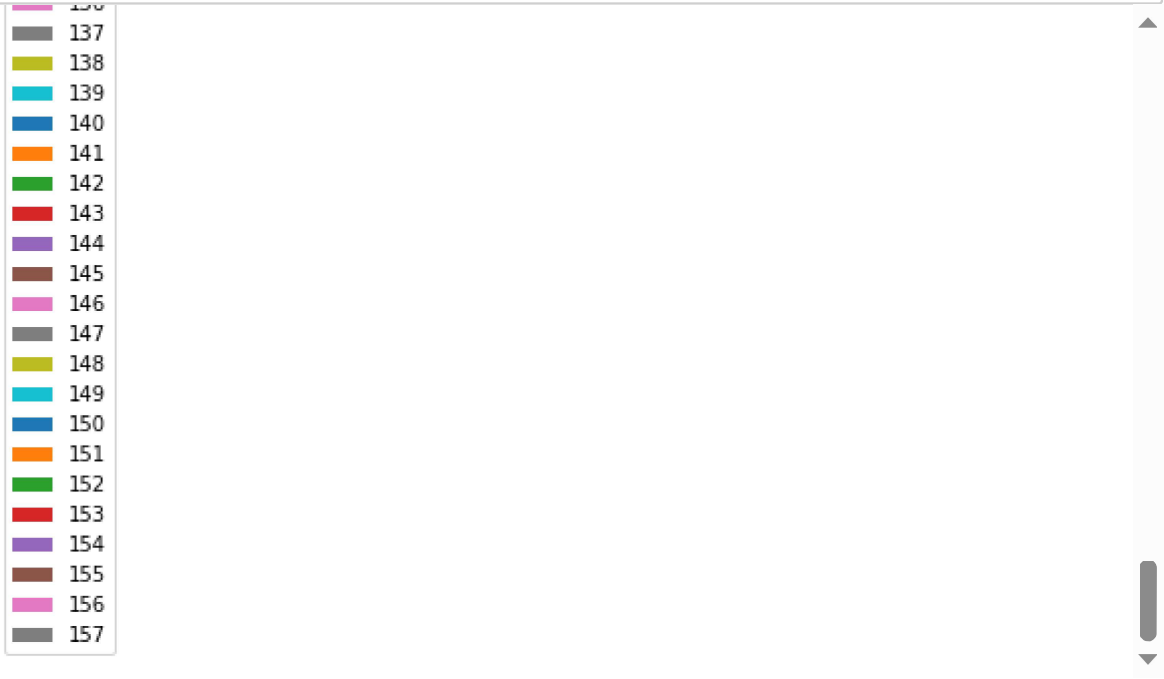


In [94]:
```
x.plot.box()
```

Out[94]: <AxesSubplot:>

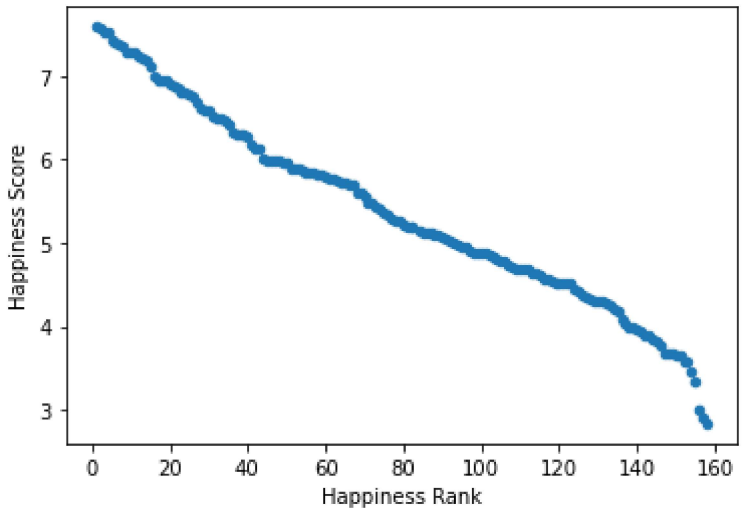


In [95]:
```
x.plot.pie(y="Happiness Rank")
```



In [96]:
```
x.plot.scatter(x='Happiness Rank',y='Happiness Score')
```

Out[96]:
```
<AxesSubplot:xlabel='Happiness Rank', ylabel='Happiness Score'>
```



In [97]:
```
y=x[["Happiness Score"]]
y
```

Out[97]:

	Happiness Score
0	7.587
1	7.561
2	7.527
3	7.522
4	7.427
...	...
153	3.465
154	3.340
155	3.006
156	2.905
157	2.839

158 rows × 1 columns

In [98]:
```
x.mean()
```

Out[98]:
```
Happiness Rank                   79.493671
Happiness Score                   5.375734
Standard Error                    0.047885
Economy (GDP per Capita)          0.846137
Family                            0.991046
Health (Life Expectancy)          0.630259
Freedom                           0.428615
Trust (Government Corruption)     0.143422
Generosity                        0.237296
Dystopia Residual                 2.098977
dtype: float64
```

In [99]:
```
x.median()
```

Out[99]:
```
Happiness Rank                   79.500000
Happiness Score                   5.232500
Standard Error                    0.043940
Economy (GDP per Capita)          0.910245
Family                            1.029510
Health (Life Expectancy)          0.696705
Freedom                           0.435515
Trust (Government Corruption)     0.107220
Generosity                        0.216130
Dystopia Residual                 2.095415
dtype: float64
```

In [100]:
```
x.mode()
```

Out[100]:

	Country	Region	Happiness Rank	Happiness Score	Standard Error	Economy (GDP per Capita)	Family	Health (Life Expectancy)	Fre
0	Afghanistan	Sub-Saharan Africa	82.0	5.192	0.03751	0.00000	0.00000	0.92356	0.(
1	Albania	NaN	NaN	NaN	0.03780	0.01530	0.13995	NaN	0.(
2	Algeria	NaN	NaN	NaN	0.04394	0.01604	0.30285	NaN	0.(
3	Angola	NaN	NaN	NaN	0.04934	0.06940	0.35386	NaN	0.1
4	Argentina	NaN	NaN	NaN	0.05051	0.07120	0.38174	NaN	0.1
...	...	...	...	...	...	...	...	...	
153	Venezuela	NaN	NaN	NaN	NaN	1.45900	1.34043	NaN	0.6
154	Vietnam	NaN	NaN	NaN	NaN	1.52186	1.34951	NaN	0.6
155	Yemen	NaN	NaN	NaN	NaN	1.55422	1.36058	NaN	0.6
156	Zambia	NaN	NaN	NaN	NaN	1.56391	1.36948	NaN	0.6
157	Zimbabwe	NaN	NaN	NaN	NaN	1.69042	1.40223	NaN	0.6

158 rows × 12 columns

In [101]:
```
x.sum()
```

Out[101]:
```
Country                          SwitzerlandIcelandDenmarkNorwayCanadaFinland
Ne...
Region                           Western EuropeWestern EuropeWestern EuropeWe
st...
Happiness Rank
12560
Happiness Score                                                          84
9.366
Standard Error                                                           7.
56579
Economy (GDP per Capita)                                               133.
68968
Family                                                                 156.
58526
Health (Life Expectancy)                                                99.
58098
Freedom                                                                 67.
72116
Trust (Government Corruption)                                           22.
66065
Generosity                                                              37.
49269
Dystopia Residual                                                      331.
63833
dtype: object
```

In [102]:
```
x.count()
```

Out[102]:
```
Country                          158
Region                           158
Happiness Rank                   158
Happiness Score                  158
Standard Error                   158
Economy (GDP per Capita)         158
Family                           158
Health (Life Expectancy)         158
Freedom                          158
Trust (Government Corruption)    158
Generosity                       158
Dystopia Residual                158
dtype: int64
```

In [103]:
```
x.min()
```

Out[103]:
```
Country                                  Afghanistan
Region                       Australia and New Zealand
Happiness Rank                                   1
Happiness Score                              2.839
Standard Error                             0.01848
Economy (GDP per Capita)                       0.0
Family                                         0.0
Health (Life Expectancy)                       0.0
Freedom                                        0.0
Trust (Government Corruption)                  0.0
Generosity                                     0.0
Dystopia Residual                          0.32858
dtype: object
```

In [104]:
```
x.max()
```

Out[104]:
```
Country                            Zimbabwe
Region                       Western Europe
Happiness Rank                          158
Happiness Score                       7.587
Standard Error                      0.13693
Economy (GDP per Capita)            1.69042
Family                              1.40223
Health (Life Expectancy)            1.02525
Freedom                             0.66973
Trust (Government Corruption)       0.55191
Generosity                          0.79588
Dystopia Residual                   3.60214
dtype: object
```

In [105]:
```
from numpy import cov
from scipy.stats import pearsonr
from scipy.stats import spearmanr
```

In [107]:
```
d1=x["Happiness Score"]
d2=x["Happiness Rank"]
cov(d1,d2)
```

Out[107]:
```
array([[ 1.31104821e+00, -5.19756132e+01],
       [-5.19756132e+01,  2.09346174e+03]])
```

In [108]:
```
print(pearsonr(d1,d2))
```

```
(-0.9921053148284924, 1.4013759581587442e-142)
```

In [109]:
```
print(spearmanr(d1,d2))
```

```
SpearmanrResult(correlation=-0.9999999999999999, pvalue=0.0)
```

In [ ]: