In [33]:
```
!pip install textblob
```

```
Requirement already satisfied: textblob in c:\users\arnav\appdata\local\programs\python
\python37\lib\site-packages (0.17.1)
Requirement already satisfied: nltk>=3.1 in c:\users\arnav\appdata\local\programs\python
\python37\lib\site-packages (from textblob) (3.5)
Requirement already satisfied: regex in c:\users\arnav\appdata\local\programs\python\pyt
hon37\lib\site-packages (from nltk>=3.1->textblob) (2020.6.8)
Requirement already satisfied: joblib in c:\users\arnav\appdata\local\programs\python\py
thon37\lib\site-packages (from nltk>=3.1->textblob) (0.15.1)
Requirement already satisfied: click in c:\users\arnav\appdata\local\programs\python\pyt
hon37\lib\site-packages (from nltk>=3.1->textblob) (8.1.3)
Requirement already satisfied: tqdm in c:\users\arnav\appdata\local\programs\python\pyth
on37\lib\site-packages (from nltk>=3.1->textblob) (4.55.1)
Requirement already satisfied: colorama in c:\users\arnav\appdata\local\programs\python
\python37\lib\site-packages (from click->nltk>=3.1->textblob) (0.4.6)
Requirement already satisfied: importlib-metadata in c:\users\arnav\appdata\local\progra
ms\python\python37\lib\site-packages (from click->nltk>=3.1->textblob) (6.3.0)
Requirement already satisfied: typing-extensions>=3.6.4 in c:\users\arnav\appdata\local
\programs\python\python37\lib\site-packages (from importlib-metadata->click->nltk>=3.1->
textblob) (4.4.0)
Requirement already satisfied: zipp>=0.5 in c:\users\arnav\appdata\local\programs\python
\python37\lib\site-packages (from importlib-metadata->click->nltk>=3.1->textblob) (3.1.
0)
[notice] A new release of pip is available: 23.0.1 -> 23.1
[notice] To update, run: python.exe -m pip install --upgrade pip
```

In [1]:
```
import pandas as pd
from vaderSentiment.vaderSentiment import SentimentIntensityAnalyzer
import numpy as np
from scipy.stats import pearsonr
```

Reading data from dataset

In [2]:
```
df=pd.read_csv('15uni.csv',encoding='utf-8')
df.head()
```

Out[2]:

	Serial Number	World Rank	University name	Mission	Vision
0	1	2	Cambridge University	The mission of the University of Cambridge is ...	The University's core values are as follows: f...
1	2	4	University of Oxford	We inspire people locally, nationally, and glo...	To be a global center of excellence for lifelo...
2	3	8	UCL	To transform people's lives through education,...	Enabling social good: societal advancement is ...
3	4	15	University of Edinburg	The mission of our University is the creation,...	To recruit and develop the world's most promis...
4	5	26	Universit PSL	We, the undersigned alliance partners, Budapes...	We envision a future in which society thrives ...

Initializing the sentiment analyzer

In [4]:
```
analyzer = SentimentIntensityAnalyzer()
```

Getting sentiment values of Mission Statements

In [5]:
```
mission=df['Mission']
neg=[]
pos=[]
neu=[]
comp=[]
for sentence in mission:
  vs = analyzer.polarity_scores(sentence)
  # print("{:-<65} {}".format(sentence, str(vs)))
  neg.append(vs['neg'])
  pos.append(vs['pos'])
  neu.append(vs['neu'])
  comp.append(vs['compound'])

df['neg_mission']=neg
df['pos_mission']=pos
df['neu_mission']=neu
df['comp_mission']=comp
df.head()
```

Out[5]:

	Serial Number	World Rank	University name	Mission	Vision	neg_mission	pos_mission	neu_mission	comp_r
0	1	2	Cambridge University	The mission of the University of Cambridge is ...	The University's core values are as follows: f...	0.000	0.136	0.864	
1	2	4	University of Oxford	We inspire people locally, nationally, and glo...	To be a global center of excellence for lifelo...	0.000	0.272	0.728	
2	3	8	UCL	To transform people's lives through education,...	Enabling social good: societal advancement is ...	0.023	0.164	0.813	
3	4	15	University of Edinburg	The mission of our University is the creation,...	To recruit and develop the world's most promis...	0.000	0.191	0.809	
4	5	26	Universit PSL	We, the undersigned alliance partners, Budapes...	We envision a future in which society thrives ...	0.000	0.143	0.857	

Getting sentiment values of Vision Statements

In [6]:
```
vision=df['Vision']
neg=[]
pos=[]
neu=[]
comp=[]
for sentence in vision:
  vs = analyzer.polarity_scores(sentence)
  # print("{:-<65} {}".format(sentence, str(vs)))
  neg.append(vs['neg'])
  pos.append(vs['pos'])
  neu.append(vs['neu'])
```

```
  comp.append(vs['compound'])

df['neg_vision']=neg
df['pos_vision']=pos
df['neu_vision']=neu
df['comp_vision']=comp
df.head()
```

Out[6]:

	Serial Number	World Rank	University name	Mission	Vision	neg_mission	pos_mission	neu_mission	comp_r
0	1	2	Cambridge University	The mission of the University of Cambridge is ...	The University's core values are as follows: f...	0.000	0.136	0.864	
1	2	4	University of Oxford	We inspire people locally, nationally, and glo...	To be a global center of excellence for lifelo...	0.000	0.272	0.728	
2	3	8	UCL	To transform people's lives through education,...	Enabling social good: societal advancement is ...	0.023	0.164	0.813	
3	4	15	University of Edinburg	The mission of our University is the creation,...	To recruit and develop the world's most promis...	0.000	0.191	0.809	
4	5	26	Universit PSL	We, the undersigned alliance partners, Budapes...	We envision a future in which society thrives ...	0.000	0.143	0.857	

Formulating the compound values of mission and vision statements and the world rank

In [7]:

```
world_rank=df['World Rank']
mission_compound=df['comp_mission']
vision_compound=df['comp_vision']
print(type(world_rank[0]))
df1=pd.DataFrame()
df1['World Rank']=[float(x) for x in world_rank]
df1['Mission Compound']=[float(x) for x in mission_compound]
df1['Vision Compound']=[float(x) for x in vision_compound]
df1.head()
```

```
<class 'numpy.int64'>
```

Out[7]:

	World Rank	Mission Compound	Vision Compound
0	2.0	0.6249	0.9022
1	4.0	0.8020	0.9828
2	8.0	0.9287	0.9287
3	15.0	0.9633	0.8803
4	26.0	0.9985	0.9571

Finding the pearsons correlation coefficient

In [8]:
```
corr, pval = pearsonr(df1['World Rank'], df1['Mission Compound'])
print(f"Pearson correlation coefficient between World Rank and Mission Compound: {corr:.

corr, pval = pearsonr(df['World Rank'], df['pos_mission'])
print(f"Pearson correlation coefficient between World Rank and pos_mision: {corr:.2f}, p

corr, pval = pearsonr(df['World Rank'], df['neu_mission'])
print(f"Pearson correlation coefficient between World Rank and neu_mision: {corr:.2f}, p

corr, pval = pearsonr(df['World Rank'], df['neg_mission'])
print(f"Pearson correlation coefficient between World Rank and neg_mision: {corr:.2f}, p

corr, pval = pearsonr(df1['World Rank'], df1['Vision Compound'])
print(f"Pearson correlation coefficient between World Rank and Vision Compound: {corr:.2

corr, pval = pearsonr(df['World Rank'], df['pos_vision'])
print(f"Pearson correlation coefficient between World Rank and pos_vision: {corr:.2f}, p

corr, pval = pearsonr(df['World Rank'], df['neu_vision'])
print(f"Pearson correlation coefficient between World Rank and neu_vision: {corr:.2f}, p

corr, pval = pearsonr(df['World Rank'], df['neg_vision'])
print(f"Pearson correlation coefficient between World Rank and neg_vision: {corr:.2f}, p
```

```
Pearson correlation coefficient between World Rank and Mission Compound: -0.08, p-value:
0.66
Pearson correlation coefficient between World Rank and pos_mision: 0.04, p-value: 0.81
Pearson correlation coefficient between World Rank and neu_mision: -0.01, p-value: 0.94
Pearson correlation coefficient between World Rank and neg_mision: -0.25, p-value: 0.14
Pearson correlation coefficient between World Rank and Vision Compound: -0.33, p-value:
0.05
Pearson correlation coefficient between World Rank and pos_vision: -0.11, p-value: 0.54
Pearson correlation coefficient between World Rank and neu_vision: 0.04, p-value: 0.80
Pearson correlation coefficient between World Rank and neg_vision: 0.34, p-value: 0.05
```

Making a column for mission and vision statements combined

In [9]:
```
df["Total"] = df[["Mission", "Vision"]].apply("-".join, axis=1)
```

Getting the sentiment values of mission and vision statements combined

In [10]:
```
total=df['Total']
neg=[]
pos=[]
neu=[]
comp=[]
for sentence in total:
  vs = analyzer.polarity_scores(sentence)
  # print("{:-<65} {}".format(sentence, str(vs)))
  neg.append(vs['neg'])
  pos.append(vs['pos'])
  neu.append(vs['neu'])
  comp.append(vs['compound'])

df['neg_total']=neg
df['pos_total']=pos
df['neu_total']=neu
df['comp_total']=comp
df.head()
```

Out[10]:

	Serial	World	University	Mission	Vision	neg_mission	pos_mission	neu_mission	comp_r

	Number	Rank	name					
0	1	2	Cambridge University	The mission of the University of Cambridge is ...	The University's core values are as follows: f...	0.000	0.136	0.864
1	2	4	University of Oxford	We inspire people locally, nationally, and glo...	To be a global center of excellence for lifelo...	0.000	0.272	0.728
2	3	8	UCL	To transform people's lives through education,...	Enabling social good: societal advancement is ...	0.023	0.164	0.813
3	4	15	University of Edinburg	The mission of our University is the creation,...	To recruit and develop the world's most promis...	0.000	0.191	0.809
4	5	26	Universit PSL	We, the undersigned alliance partners, Budapes...	We envision a future in which society thrives ...	0.000	0.143	0.857

Finding the pearsons correlation coefficients for mission and vision statements combined

In [11]:
```
corr, pval = pearsonr(df1['World Rank'], df['neg_total'])
print(f"Pearson correlation coefficient between World Rank and neg_total: {corr:.2f}, p-

corr, pval = pearsonr(df['World Rank'], df['pos_total'])
print(f"Pearson correlation coefficient between World Rank and pos_total: {corr:.2f}, p-

corr, pval = pearsonr(df['World Rank'], df['neu_total'])
print(f"Pearson correlation coefficient between World Rank and neu_total: {corr:.2f}, p-

corr, pval = pearsonr(df['World Rank'], df['comp_total'])
print(f"Pearson correlation coefficient between World Rank and comp_total: {corr:.2f}, p
```

```
Pearson correlation coefficient between World Rank and neg_total: 0.09, p-value: 0.60
Pearson correlation coefficient between World Rank and pos_total: -0.01, p-value: 0.96
Pearson correlation coefficient between World Rank and neu_total: -0.00, p-value: 0.99
Pearson correlation coefficient between World Rank and comp_total: -0.10, p-value: 0.58
```

Finding sentiment values using NLTK

In [29]:
```
def sentiment_analyzer(sentence):
  sia=SentimentIntensityAnalyzer()
  sent=sia.polarity_scores(sentence)
  # print(sent)
  return sent

# sentiment_analyzer("Our mission is to improve peoples health and wellbeing through out
```

In [32]:
```
nltk_neg = []
nltk_pos = []
```

```
nltk_neu = []
nltk_comp = []
for sentence in total:
    sent = sentiment_analyzer(sentence)
    nltk_neg.append(sent['neg'])
    nltk_pos.append(sent['pos'])
    nltk_neu.append(sent['neu'])
    nltk_comp.append(sent['compound'])

df['nltk_neg']=nltk_neg
df['nltk_pos']=nltk_pos
df['nltk_neu']=nltk_neu
df['nltk_comp']=nltk_comp
df.head()
```

Out[32]:

	Serial Number	World Rank	University name	Mission	Vision	neg_mission	pos_mission	neu_mission	comp_r
0	1	2	Cambridge University	The mission of the University of Cambridge is ...	The University's core values are as follows: f...	0.000	0.136	0.864	
1	2	4	University of Oxford	We inspire people locally, nationally, and glo...	To be a global center of excellence for lifelo...	0.000	0.272	0.728	
2	3	8	UCL	To transform people's lives through education,...	Enabling social good: societal advancement is ...	0.023	0.164	0.813	
3	4	15	University of Edinburg	The mission of our University is the creation,...	To recruit and develop the world's most promis...	0.000	0.191	0.809	
4	5	26	Universit PSL	We, the undersigned alliance partners, Budapes...	We envision a future in which society thrives ...	0.000	0.143	0.857	

5 rows × 22 columns

Finding sentiment values using textblob

In [34]:
```
from textblob import TextBlob
```

In [38]:
```
text_polarity = []
text_subjectivity = []
for tot in total:
    sent=TextBlob(tot)
    text_polarity.append(sent.sentiment.polarity)
    text_subjectivity.append(sent.sentiment.subjectivity)

df['text_polarity']=text_polarity
df['text_subjectivity']=text_subjectivity
df.head()
```

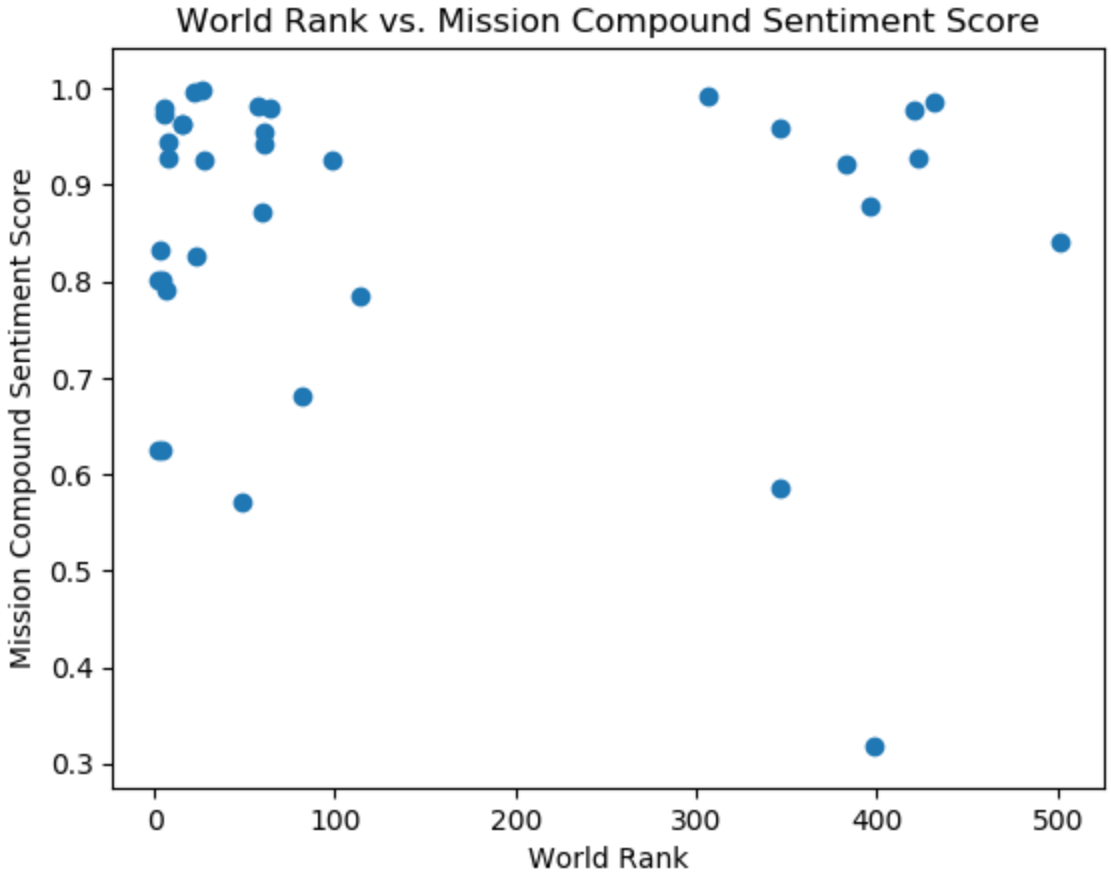
Out[38]:

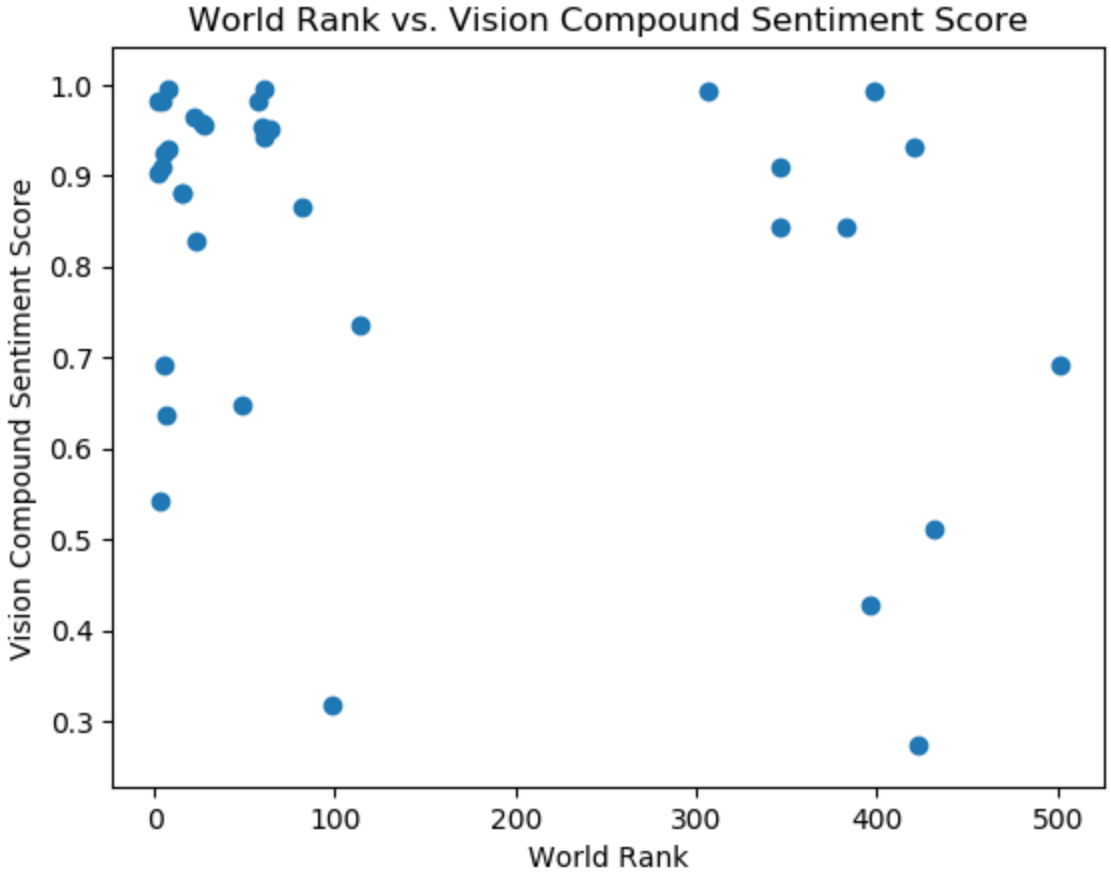
	Serial Number	World Rank	University name	Mission	Vision	neg_mission	pos_mission	neu_mission	comp_r
0	1	2	Cambridge University	The mission of the University of Cambridge is ...	The University's core values are as follows: f...	0.000	0.136	0.864	
1	2	4	University of Oxford	We inspire people locally, nationally, and glo...	To be a global center of excellence for lifelo...	0.000	0.272	0.728	
2	3	8	UCL	To transform people's lives through education,...	Enabling social good: societal advancement is ...	0.023	0.164	0.813	
3	4	15	University of Edinburg	The mission of our University is the creation,...	To recruit and develop the world's most promis...	0.000	0.191	0.809	
4	5	26	Universit PSL	We, the undersigned alliance partners, Budapes...	We envision a future in which society thrives ...	0.000	0.143	0.857	

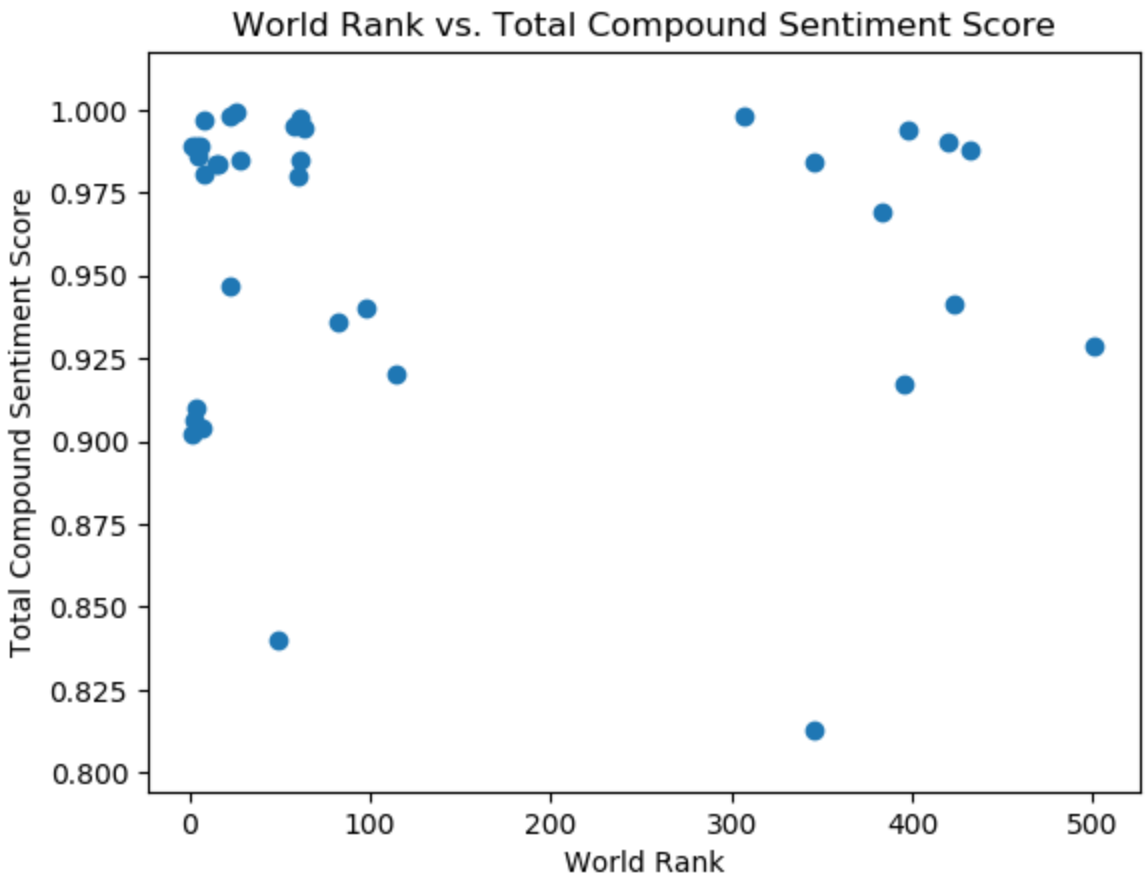
5 rows × 24 columns

In [13]:

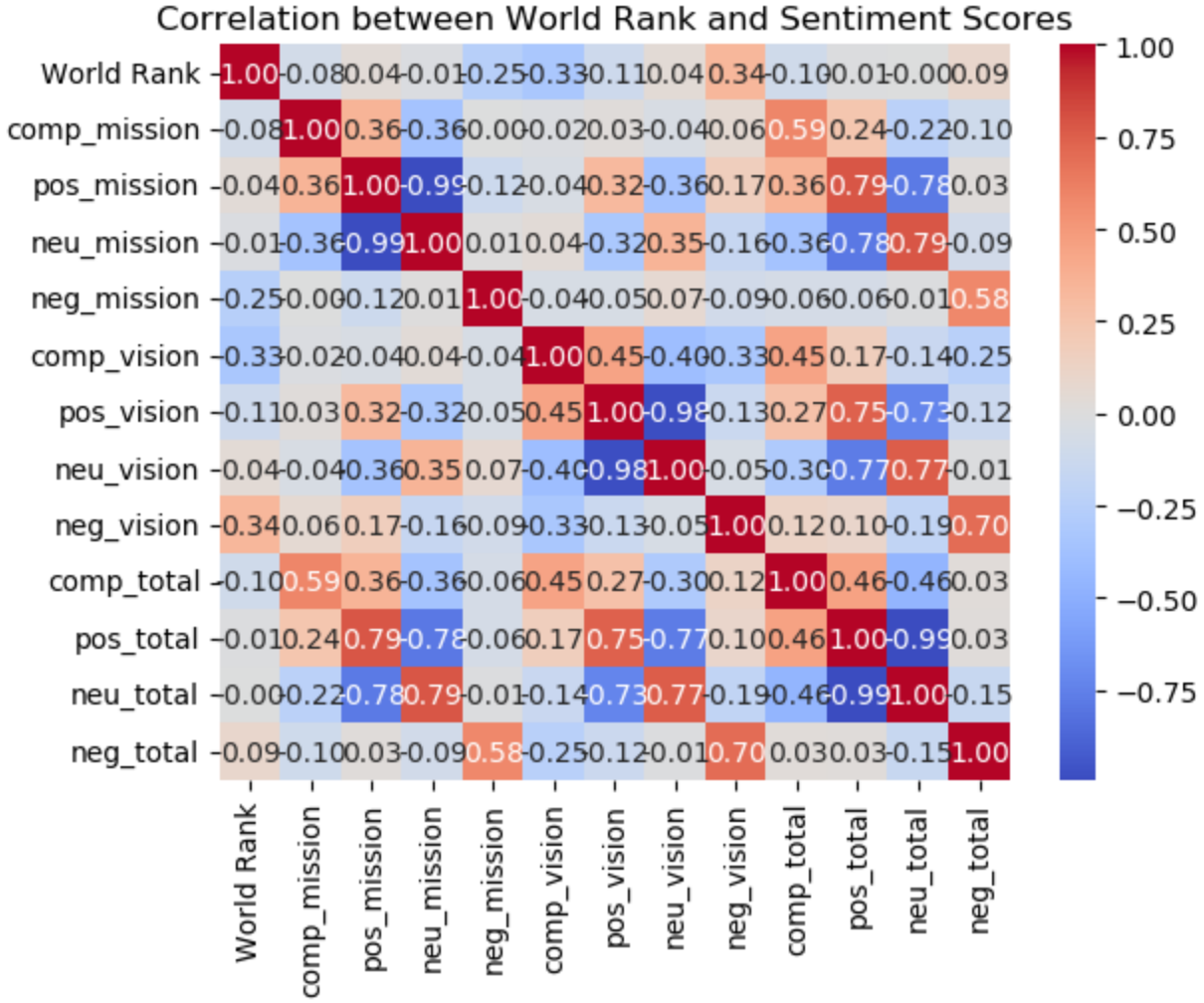
```
import matplotlib.pyplot as plt

# Plotting mission compound sentiment score against world rank
plt.scatter(df1['World Rank'], df1['Mission Compound'])
plt.title('World Rank vs. Mission Compound Sentiment Score')
plt.xlabel('World Rank')
plt.ylabel('Mission Compound Sentiment Score')
plt.show()

# Plotting vision compound sentiment score against world rank
plt.scatter(df1['World Rank'], df1['Vision Compound'])
plt.title('World Rank vs. Vision Compound Sentiment Score')
plt.xlabel('World Rank')
plt.ylabel('Vision Compound Sentiment Score')
plt.show()

# Plotting total compound sentiment score against world rank
plt.scatter(df['World Rank'], df['comp_total'])
plt.title('World Rank vs. Total Compound Sentiment Score')
plt.xlabel('World Rank')
plt.ylabel('Total Compound Sentiment Score')
plt.show()
```


World Rank vs. Mission Compound Sentiment Score
Mission Compound Sentiment Score
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0
100
200
300
400
500
World Rank


World Rank vs. Vision Compound Sentiment Score
Vision Compound Sentiment Score
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0
100
200
300
400
500
World Rank

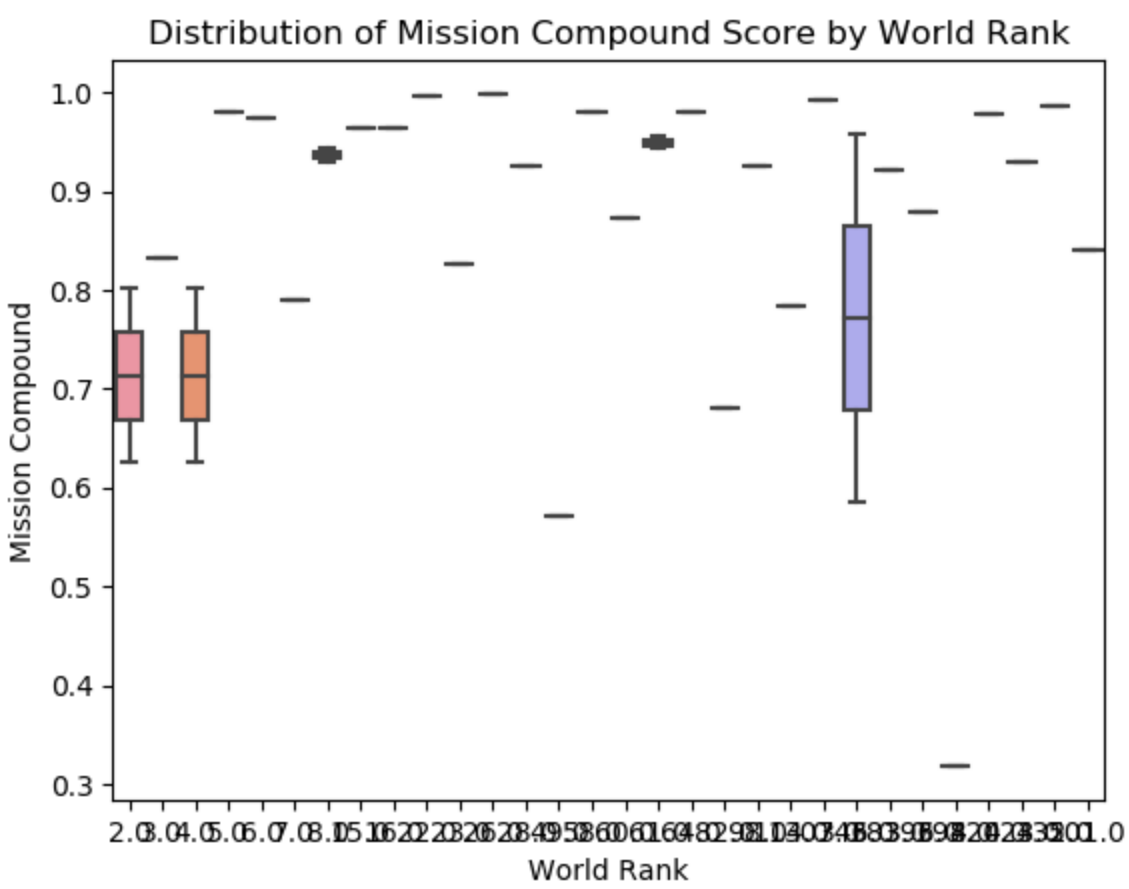


In [14]:
```
import seaborn as sns

# Creating a correlation matrix
corr_matrix = df[['World Rank', 'comp_mission', 'pos_mission', 'neu_mission', 'neg_missi

# Plotting a heatmap
sns.heatmap(corr_matrix, cmap='coolwarm', annot=True, fmt='.2f')
plt.title('Correlation between World Rank and Sentiment Scores')
plt.show()
```

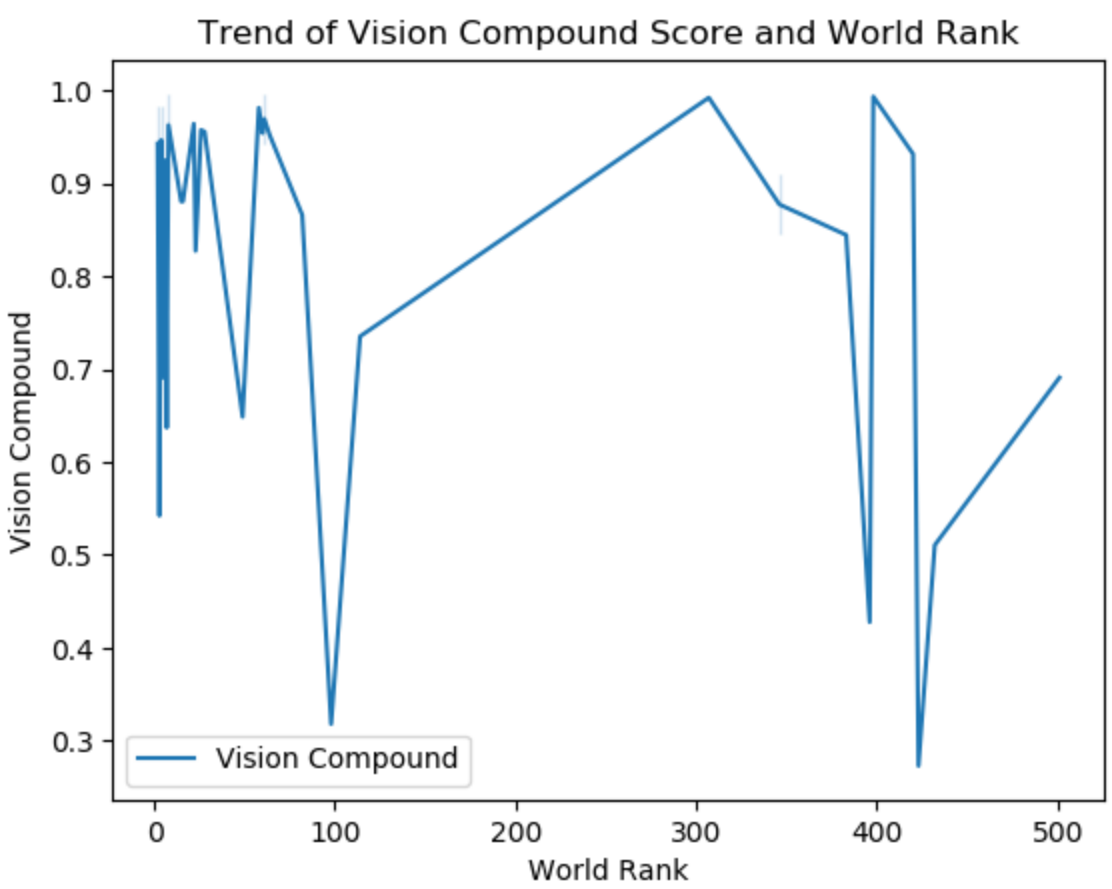


In [15]:

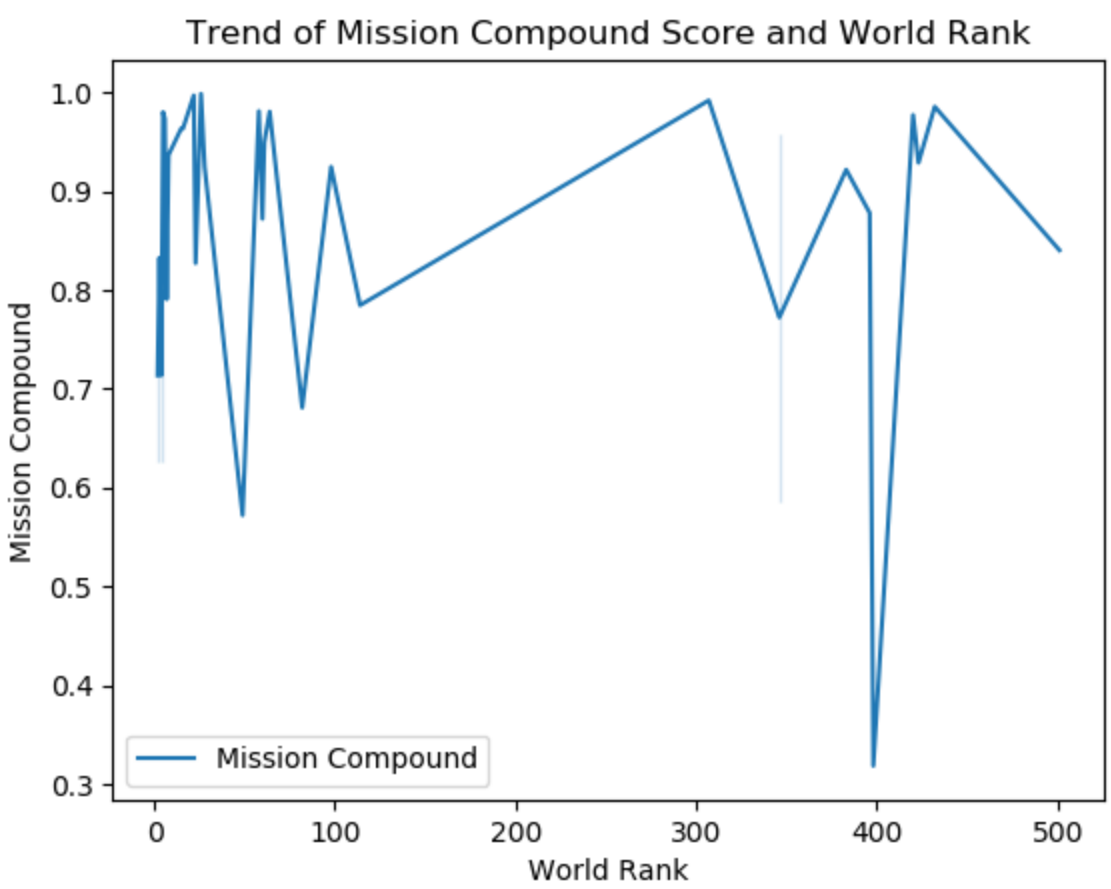
```
# Boxplot
sns.boxplot(x='World Rank', y='Mission Compound', data=df1)
plt.title('Distribution of Mission Compound Score by World Rank')
plt.show()

# Line plot
sns.lineplot(y='Vision Compound', x='World Rank', data=df1,label='Vision Compound')
plt.title('Trend of Vision Compound Score and World Rank')
plt.ylabel('Vision Compound')
plt.show()

sns.lineplot(y='Mission Compound', x='World Rank', data=df1,label='Mission Compound')
plt.title('Trend of Mission Compound Score and World Rank')
plt.ylabel('Mission Compound')
plt.show()

sns.lineplot(y='comp_total', x='World Rank', data=df,label='Total Compound')
plt.title('Trend of Total Compound Score and World Rank')
plt.ylabel('Total Compound')
plt.show()
# Bar plot
sns.barplot(x='World Rank', y='neg_total', data=df)
plt.title('Average Negative Sentiment Score by World Rank Group')
plt.show()

# Scatter plot with regression line
sns.regplot(x='World Rank', y='pos_total', data=df)
plt.title('Relationship between World Rank and Positive Sentiment Score')
plt.show()
```



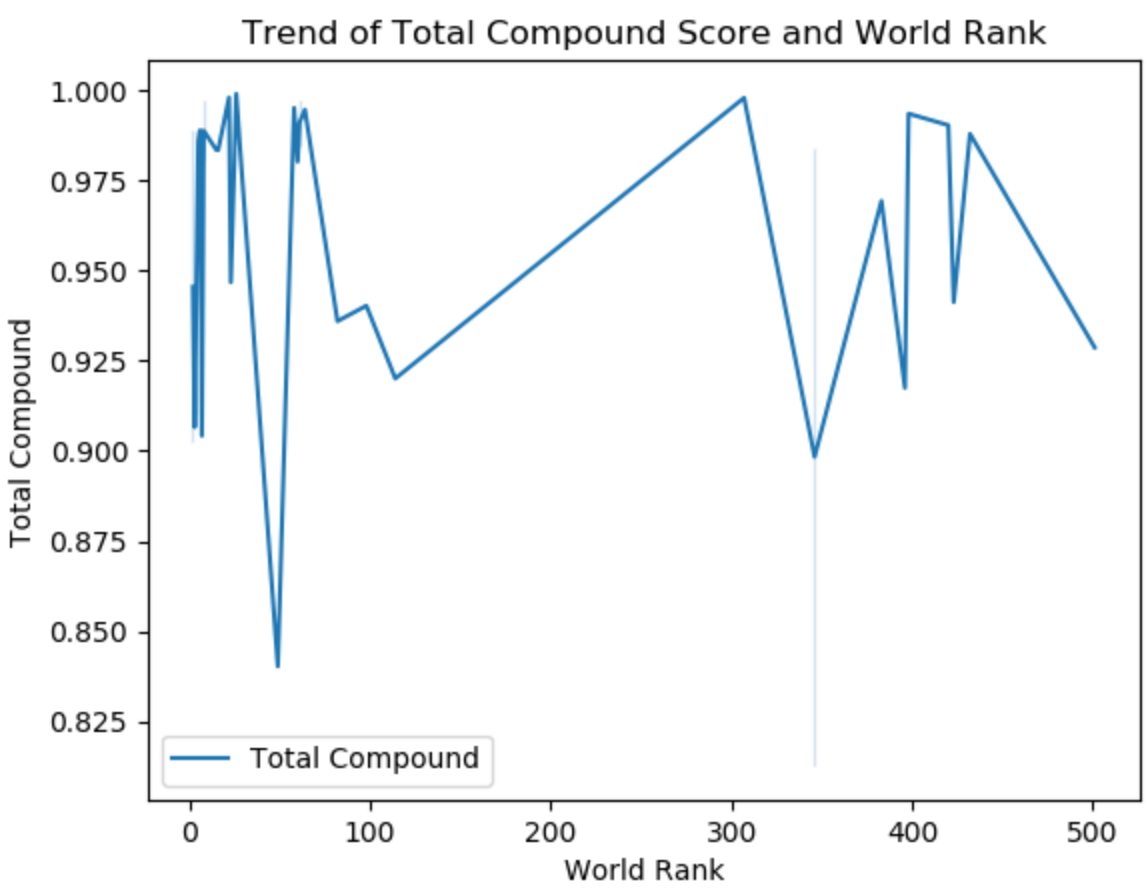

```
c:\Users\Arnav\AppData\Local\Programs\Python\Python37\lib\site-packages\matplotlib\cbook
\__init__.py:1377: FutureWarning: Support for multi-dimensional indexing (e.g. `obj[:, N
one]`) is deprecated and will be removed in a future version.  Convert to a numpy array
before indexing instead.
  x[:, None]
c:\Users\Arnav\AppData\Local\Programs\Python\Python37\lib\site-packages\matplotlib\axes
\_base.py:237: FutureWarning: Support for multi-dimensional indexing (e.g. `obj[:, None]
`) is deprecated and will be removed in a future version.  Convert to a numpy array befo
re indexing instead.
  x = x[:, np.newaxis]
c:\Users\Arnav\AppData\Local\Programs\Python\Python37\lib\site-packages\matplotlib\axes
\_base.py:239: FutureWarning: Support for multi-dimensional indexing (e.g. `obj[:, None]
`) is deprecated and will be removed in a future version.  Convert to a numpy array befo
re indexing instead.
  y = y[:, np.newaxis]
```

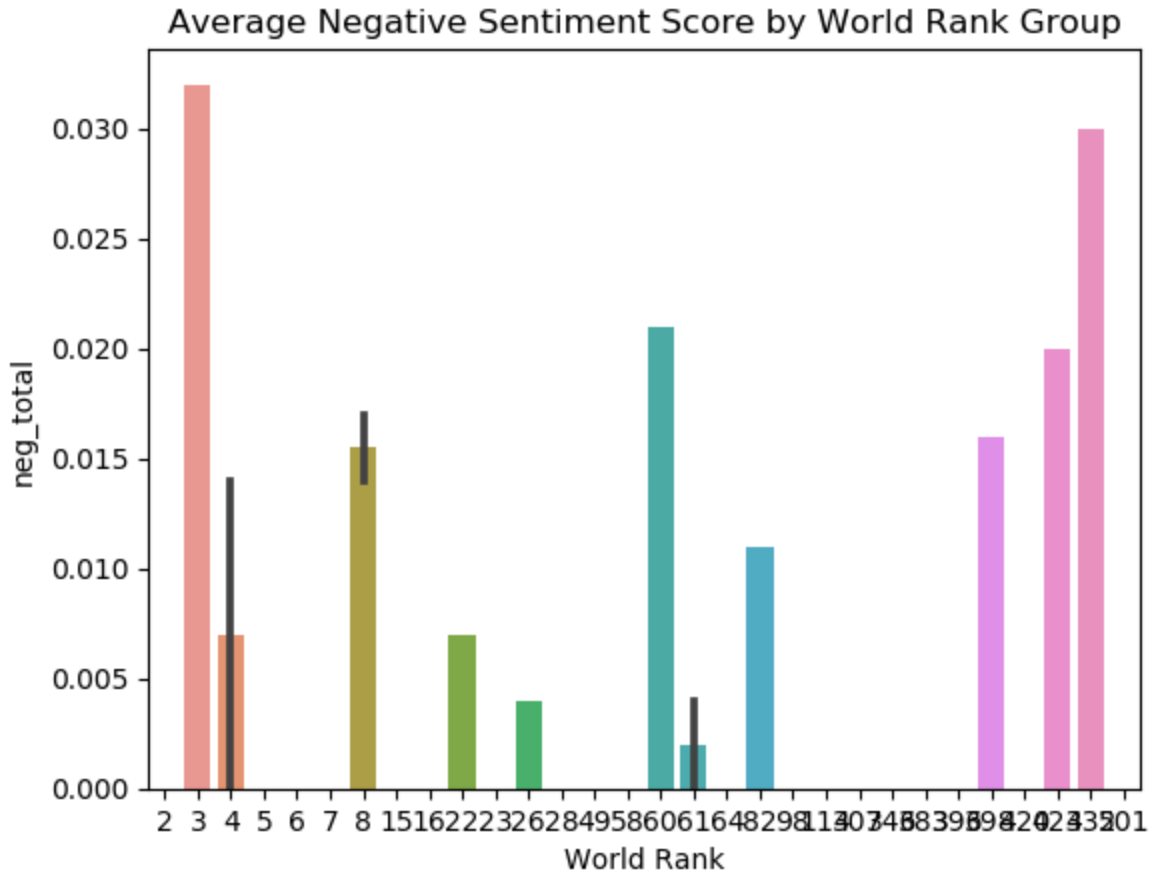


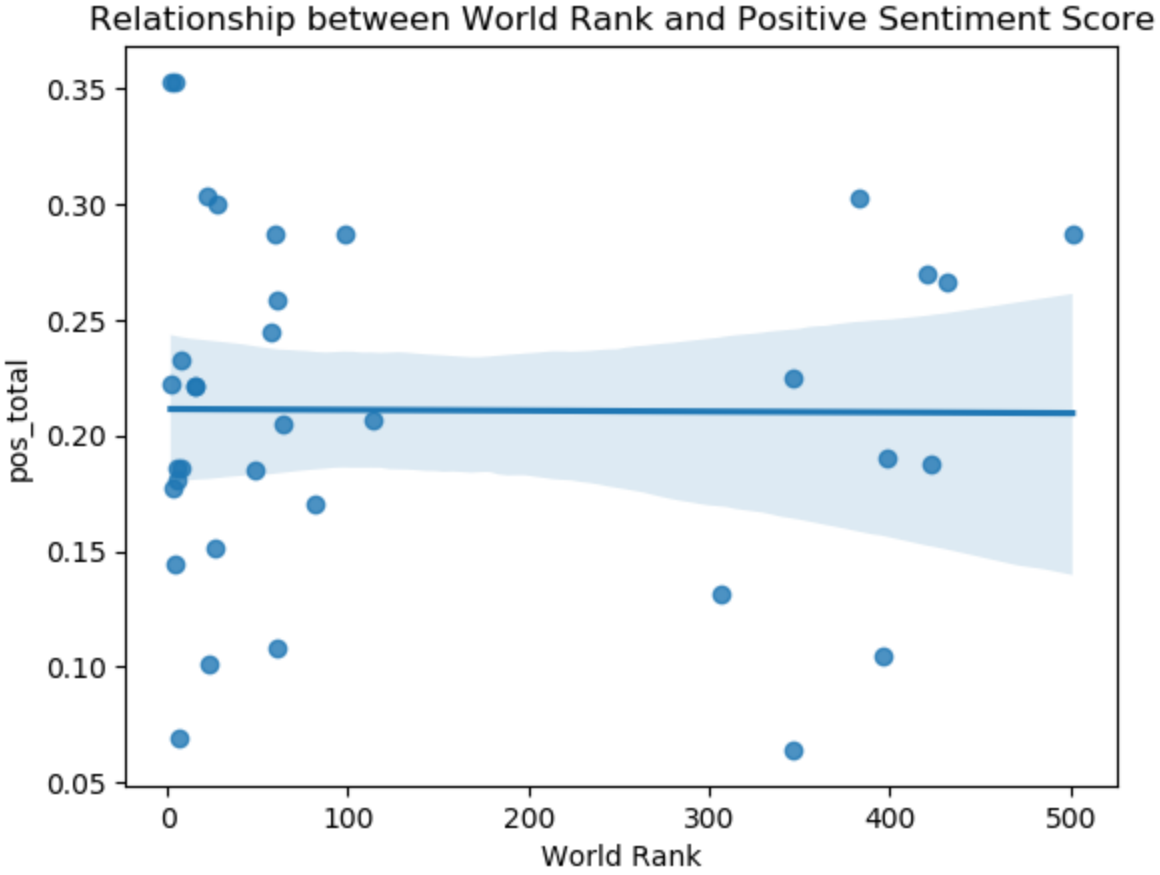

```
c:\Users\Arnav\AppData\Local\Programs\Python\Python37\lib\site-packages\matplotlib\cbook
\__init__.py:1377: FutureWarning: Support for multi-dimensional indexing (e.g. `obj[:, N
one]`) is deprecated and will be removed in a future version.  Convert to a numpy array
before indexing instead.
  x[:, None]
c:\Users\Arnav\AppData\Local\Programs\Python\Python37\lib\site-packages\matplotlib\axes
\_base.py:237: FutureWarning: Support for multi-dimensional indexing (e.g. `obj[:, None]
`) is deprecated and will be removed in a future version.  Convert to a numpy array befo
re indexing instead.
  x = x[:, np.newaxis]
c:\Users\Arnav\AppData\Local\Programs\Python\Python37\lib\site-packages\matplotlib\axes
\_base.py:239: FutureWarning: Support for multi-dimensional indexing (e.g. `obj[:, None]
`) is deprecated and will be removed in a future version.  Convert to a numpy array befo
re indexing instead.
  y = y[:, np.newaxis]
```




```
c:\Users\Arnav\AppData\Local\Programs\Python\Python37\lib\site-packages\matplotlib\cbook
\__init__.py:1377: FutureWarning: Support for multi-dimensional indexing (e.g. `obj[:, N
one]`) is deprecated and will be removed in a future version.  Convert to a numpy array
before indexing instead.
  x[:, None]
c:\Users\Arnav\AppData\Local\Programs\Python\Python37\lib\site-packages\matplotlib\axes
\_base.py:237: FutureWarning: Support for multi-dimensional indexing (e.g. `obj[:, None]
`) is deprecated and will be removed in a future version.  Convert to a numpy array befo
re indexing instead.
  x = x[:, np.newaxis]
c:\Users\Arnav\AppData\Local\Programs\Python\Python37\lib\site-packages\matplotlib\axes
\_base.py:239: FutureWarning: Support for multi-dimensional indexing (e.g. `obj[:, None]
`) is deprecated and will be removed in a future version.  Convert to a numpy array befo
re indexing instead.
  y = y[:, np.newaxis]
```


Trend of Total Compound Score and World Rank
Total Compound
World Rank
Total Compound
1.000
0.975
0.950
0.925
0.900
0.875
0.850
0.825
0
100
200
300
400
500


Average Negative Sentiment Score by World Rank Group
neg_total
World Rank
0.030
0.025
0.020
0.015
0.010
0.005
0.000
2 3 4 5 6 7 8 15 16 22 23 26 28 49 58 60 61 64 82 98 11 40 74 83 89 98 42 43 32 01


Relationship between World Rank and Positive Sentiment Score
pos_total
0.35
0.30
0.25
0.20
0.15
0.10
0.05
0
100
200
300
400
500
World Rank