compare_responses

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0.1 Comparing the Online Responses of Two Presidents during 2020

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disclaimer: This project is intended purely for educational purposes

0.1.1 Libraries

[1]:
```
import pandas as pd
import numpy as np
import scipy as sp
import seaborn as sns
import nltk
import matplotlib.pyplot as plt
from wordcloud import WordCloud
import random
sns.set()
```

0.1.2 Load .csv to data frame

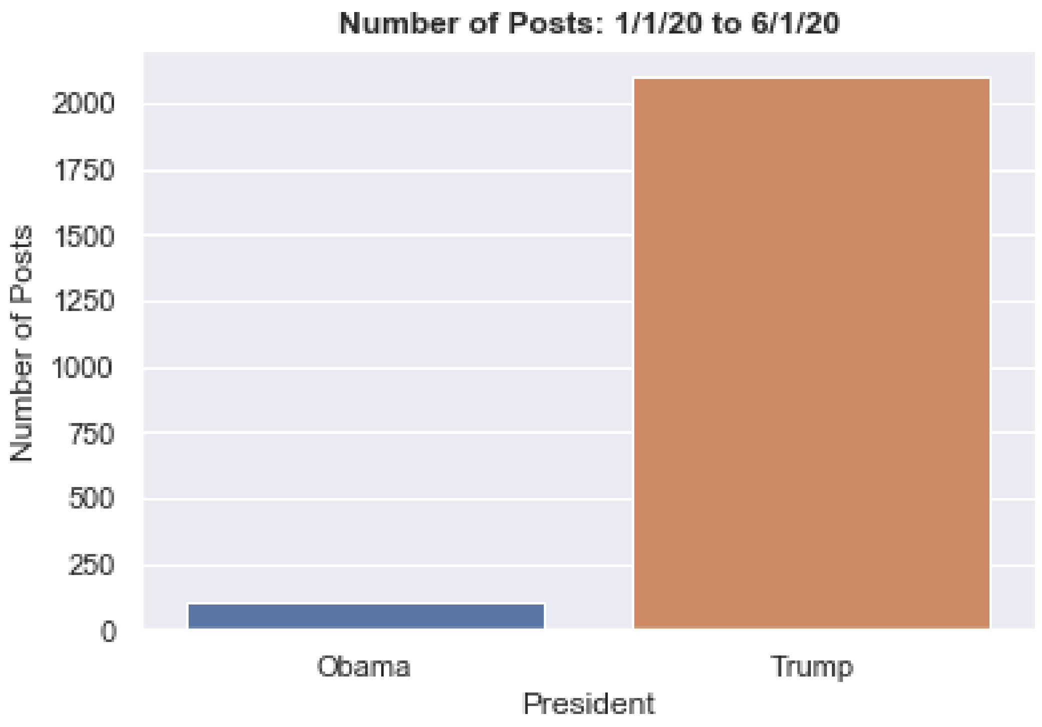
[2]:
```
# load data
obama_df = pd.read_csv('obama_2020.csv')
trump_df = pd.read_csv('trump_2020.csv')
```

[3]:
```
# check
obama_df.text[1]
```

[3]:
```
'If you believe in a more just, more generous, more democratic America, now is
the time to fight for it. Here’s a terrific way to register voters, organize
communities, and ramp up turnout in the battleground states that will decide
this election: http://votesaveamerica.com/adopt'
```

0.1.3 Number of Posts

[4]:
```
sns.barplot(['Obama', 'Trump'], [len(obama_df), len(trump_df)])
plt.xlabel('President')
plt.ylabel('Number of Posts')
plt.title('Number of Posts: 1/1/20 to 6/1/20', fontweight='bold')
plt.show()
```

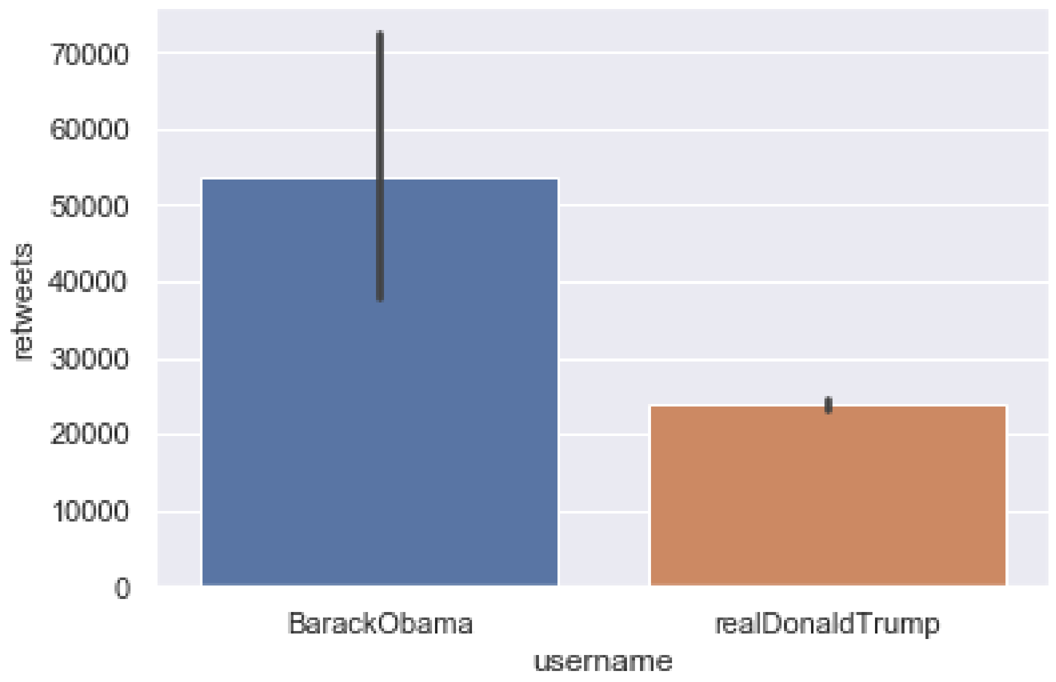


This result is not at all surprising.

0.1.4 Who's tweets are more popular? AKA most re-tweets

consider the average number of retweets to normalize for the fact that Trumps way more often than Obama

[5]:
```
# merge into one data frame to make plotting easier
all_df = pd.concat([obama_df, trump_df])
ax = sns.barplot(x="username", y="retweets", data=all_df)
```



This is a surprising result. Obama gets >2X the amount of retweets than Trump but has a much larger standard deviation than Trump. Trump's low standard deviation could be a result of a strong fan base that supports his Tweets

0.1.5 Clean text with natural language processing (NLTK Library)

check for package updates

[6]:
```
nltk.download('punkt')
nltk.download('stopwords')
```

```
[nltk_data] Downloading package punkt to /Users/dwhite7/nltk_data…
[nltk_data]   Package punkt is already up-to-date!
[nltk_data] Downloading package stopwords to
[nltk_data]     /Users/dwhite7/nltk_data…
[nltk_data]   Package stopwords is already up-to-date!
```

[6]:
```
True
```

Functions to clean text and make a word cloud

[7]:
```
def _clean_text(all_text, extra_stop_words=[], remove_stop_words=1,␣
 ↪stem_words=1, remove_punctuation=1):
    from nltk.corpus import stopwords
    from nltk.tokenize import word_tokenize
    from nltk.stem.snowball import SnowballStemmer

    word_list = []
    all_text_clean = []
    for text in all_text:
        if isinstance(text, str):
            # make lower case
            text = text.lower()

            # split into words and puncutation
            tokens = word_tokenize(text)

            # remove stop words
            stop_words = set(stopwords.words('english'))
            if len(extra_stop_words) > 0:
                stop_words.update(extra_stop_words)
            if remove_stop_words:
                words = [w for w in tokens if not w in stop_words]

            # stem words
            if stem_words:
                stemmer = SnowballStemmer('english')
                words  = [stemmer.stem(word) for word in words]

            # remove punctuation
            if remove_punctuation:
                words = [word for word in words if word.isalpha()]

            sentence = ' '.join(words)

            # store
            word_list.extend(words)
            all_text_clean.append(sentence)

    # store cleaned text in data frame
    all_text_df = pd.DataFrame({'text':all_text_clean}, dtype='str')

    return all_text_df, word_list
```

[8]:
```
def _plot_frequency(all_labels, norm=0, max_labels = 100, figure_size =[8,16],
                   xlabel='Frequency',ylabel='Items',title='Frequency of Items',
                   savefig=0, figname=[]):
    # all_labels = unique values to be counted
    fdist = nltk.FreqDist(all_labels)
    labels = np.array(list(fdist.keys()))
    counts = np.array(list(fdist.values()))
    # sort by descending
    sorted_idx = np.argsort(-1*counts)
    counts_sorted = counts[sorted_idx]
    labels_sorted = labels[sorted_idx]

    if len(counts_sorted) > max_labels:
        counts_sorted = counts_sorted[0:max_labels]
        labels_sorted = labels_sorted[0:max_labels]

    if norm:
        counts_sorted = (counts_sorted)/np.sum(counts_sorted)

    # plot the figure
    fig=plt.figure(figsize=(figure_size[0],figure_size[1]))
    ax = sns.barplot(counts_sorted, labels_sorted)
    plt.ylabel(ylabel)
    plt.xlabel(xlabel)
    plt.title(title)

    if savefig:
        fig.savefig(figname, bbox_inches="tight")

    return counts
```

```
[9]: def _make_word_cloud(obama_text, trump_text, num_rows=1, num_cols=2,␣
      ↪plot_size=[12,24],
                         savefig=0, figname=[]):
         fig = plt.figure(figsize=(plot_size[0],plot_size[1]))
         names = ['Obama', 'Trump']
         for i in [0,1]:
             if i == 0:
                 word_list = ' '.join(obama_text)
             else:
                 word_list = ' '.join(trump_text)
             # make word cloud
             wordcloud = WordCloud(width=1000, height=1000,
                         background_color='white',
                         min_font_size=10,
                         random_state=1).generate(word_list)
             ax = fig.add_subplot(num_rows, num_cols, i+1)
             plt.imshow(wordcloud, interpolation='bilinear')
             plt.title(names[i], fontsize=20, fontweight='bold')
             plt.axis("off")
         plt.tight_layout()
         plt.show()
```

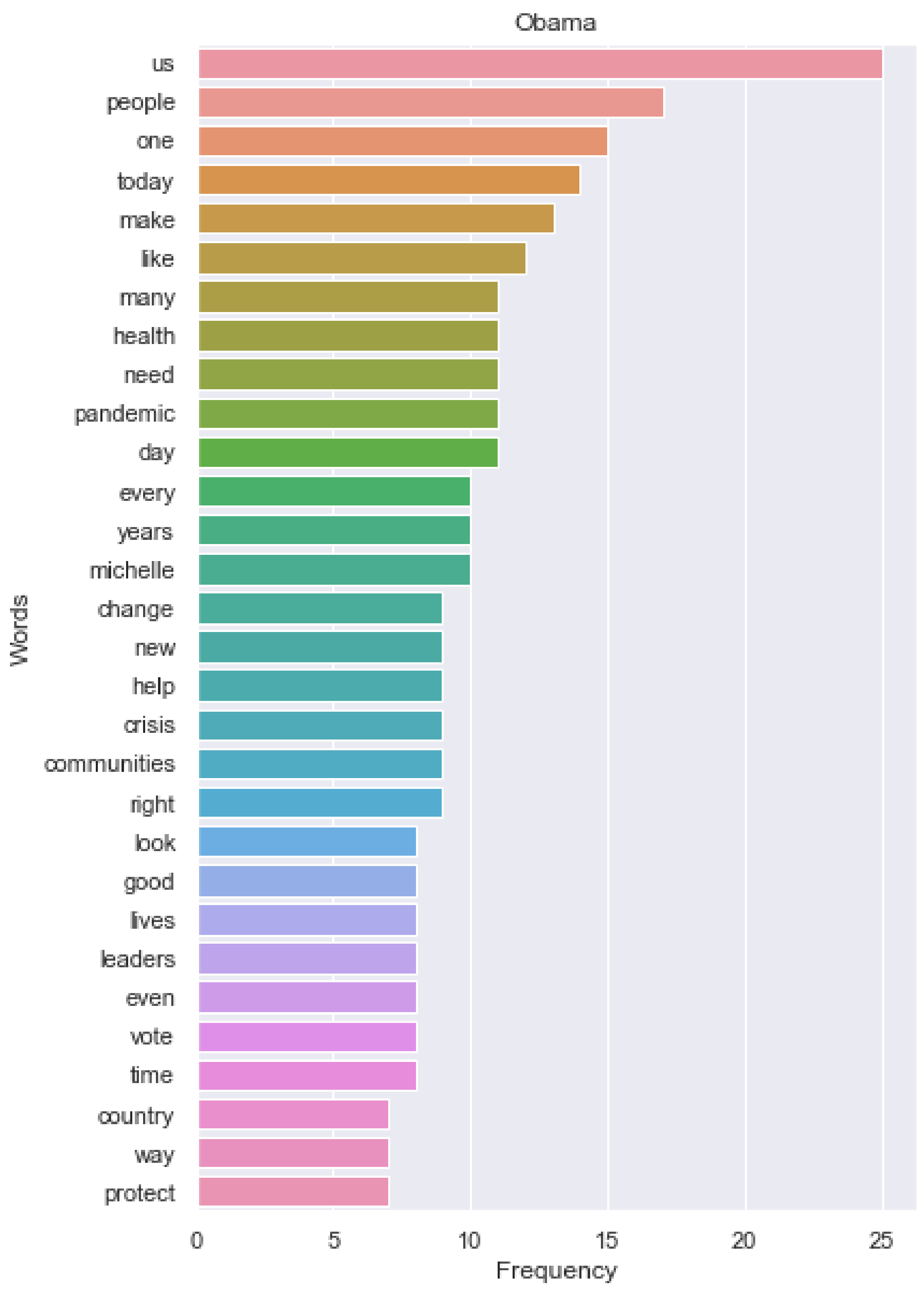
```
    if savefig:
        fig.savefig(figname, bbox_inches="tight")
```

Clean Text

```
[10]: obama_text_df, obama_word_list = _clean_text(obama_df['text'], stem_words=0)
      trump_text_df, trump_word_list = _clean_text(trump_df['text'], stem_words=0)
```

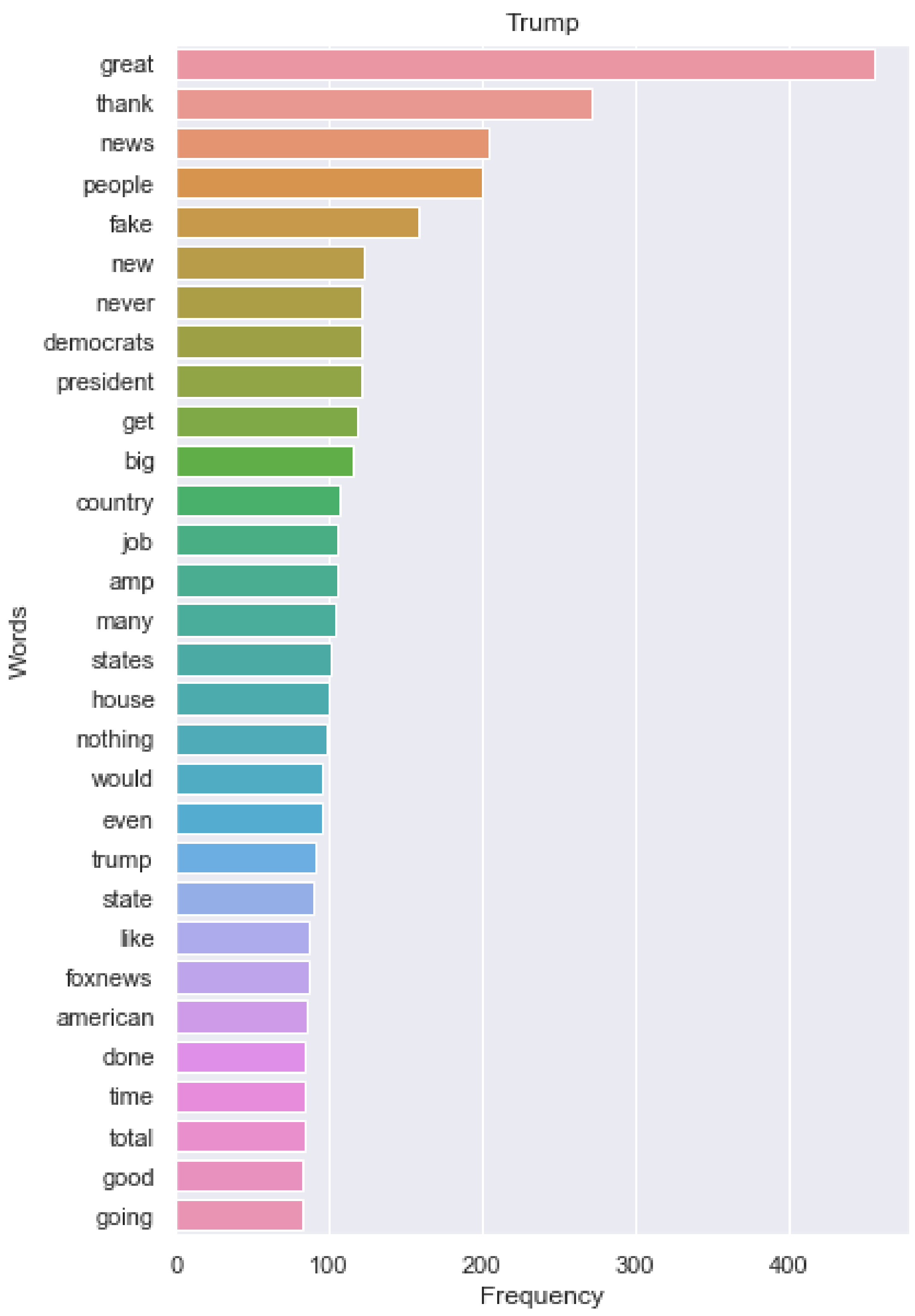
Word Frequency

```
[11]: _plot_frequency(obama_word_list, norm=0, max_labels = 30, figure_size =[6,10],
                          xlabel='Frequency',ylabel='Words',title='Obama')
      plt.show()
```



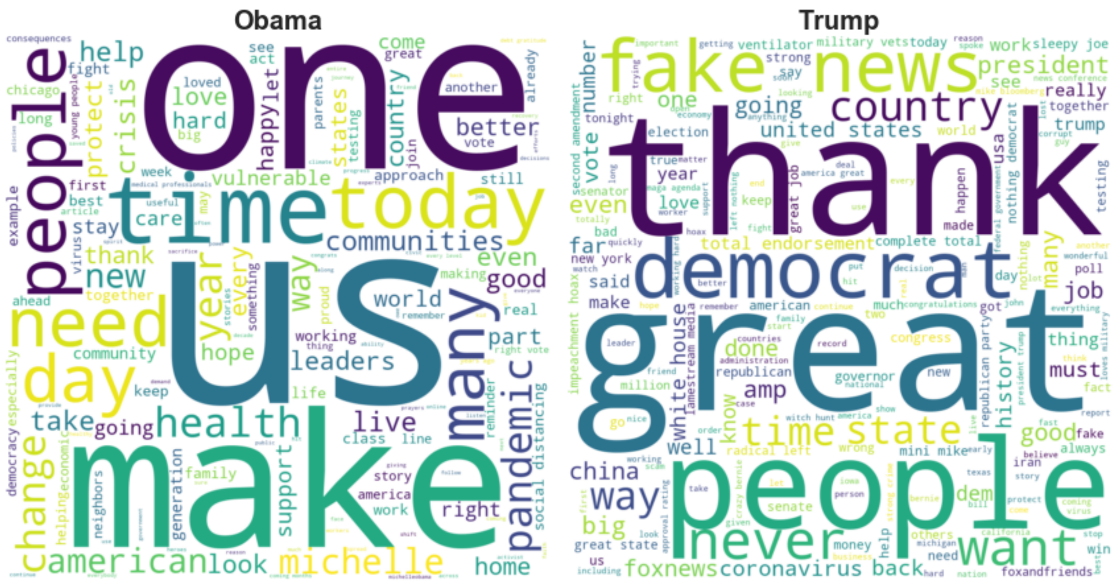
Obama
us
people
one
today
make
like
many
health
need
pandemic
day
every
years
michelle
change
new
help
crisis
communities
right
look
good
lives
leaders
even
vote
time
country
way
protect
Words
0
5
10
15
20
25
Frequency

[12]:
```
_plot_frequency(trump_word_list, norm=0, max_labels = 30, figure_size =[6,10],
                   xlabel='Frequency',ylabel='Words',title='Trump')
plt.show()
```



Trump
great
thank
news
people
fake
new
never
democrats
president
get
big
country
job
amp
many
states
house
nothing
would
even
trump
state
like
foxnews
american
done
time
total
good
going
Words
0
100
200
300
400
Frequency

```
[13]: _make_word_cloud(obama_word_list, trump_word_list, plot_size=[12,24], savefig=1, figname='compare_wordcloud.png')
```


Obama
Trump
one
us
make
time
today
people
need
day
many
thank
fake
news
great
democrat
people
country
never
want