AllCandidatesQuoteAnalysis

March 21, 2016

```
In [1]: from textstat.textstat import textstat
        import csv
        import pandas
        import matplotlib
        #matplotlib.style.use('ggplot')
        %matplotlib inline
        import ast
```

```
In [2]: trump_df = pandas.read_csv('data/all_trump_w_topics.csv')
        trump_df['candidate'] = 'trump'
        clinton_df = pandas.read_csv('data/all_clinton_w_topics.csv')
        clinton_df['candidate'] = 'clinton'
        sanders_df = pandas.read_csv('data/all_sanders_w_topics.csv')
        sanders_df['candidate'] = 'sanders'
        cruz_df = pandas.read_csv('data/all_cruz_w_topics.csv')
        cruz_df['candidate'] = 'cruz'
        ORGS = ['nyt', 'wsj', 'cnn', 'fox', 'ap', 'reuters', 'politico', 'mcclatchy', 'buzzfeed', 'huff
```

```
In [3]: n = len(clinton_df)
        clinton_df.index = xrange(len(trump_df), (len(trump_df) + n))
        m = len(sanders_df)
        sanders_df.index = xrange(max(clinton_df.index), max(clinton_df.index) + m)
        c = len(cruz_df)
        cruz_df.index = xrange(max(sanders_df.index), max(sanders_df.index) + c)
```

```
In [4]: all_df = pandas.concat([trump_df,clinton_df, sanders_df, cruz_df])
        all_df['gunning_fog'] = all_df['body'].apply(lambda x: textstat.gunning_fog(x) if type(x) == st
        all_df['flesch'] = all_df['body'].apply(lambda x: textstat.flesch_kincaid_grade(x) if type(x) =
        all_df['readability'] = all_df['body'].apply(lambda x: textstat.flesch_reading_ease(x) if type(
```

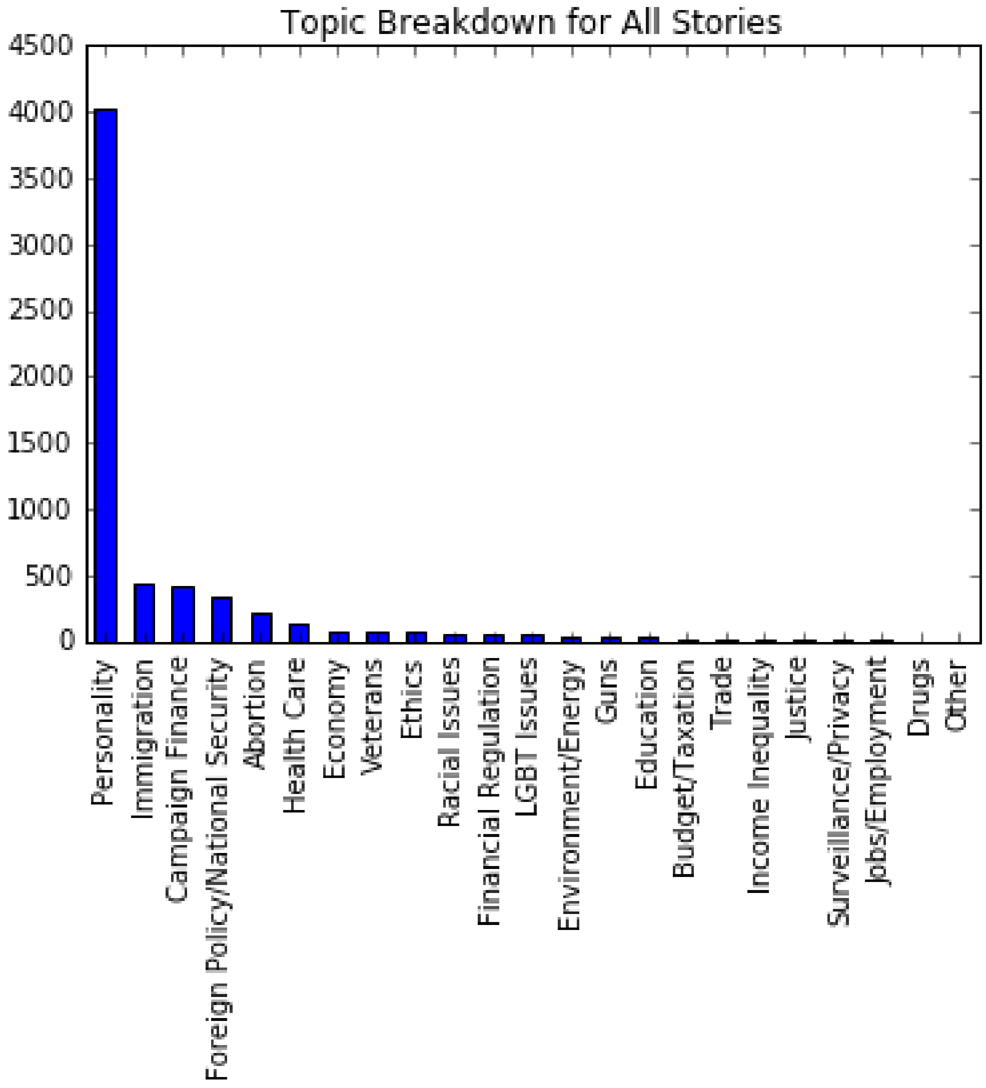
1 Convert topics to Dict and Filter by > 0.1

```
In [5]: all_df['topic_dict'] = all_df['topic'].apply(lambda d: ast.literal_eval(d))
        all_df['top_topics'] = all_df['topic_dict'].apply(lambda d: {k:v for k, v in d.iteritems() if v
        all_df['topic_list'] = all_df['top_topics'].apply(lambda d: d.keys())
        all_df['top_topic'] = all_df['topic_dict'].apply(lambda d: max(d, key=lambda i: d[i]))
```

2 Breakdown of Story Topics

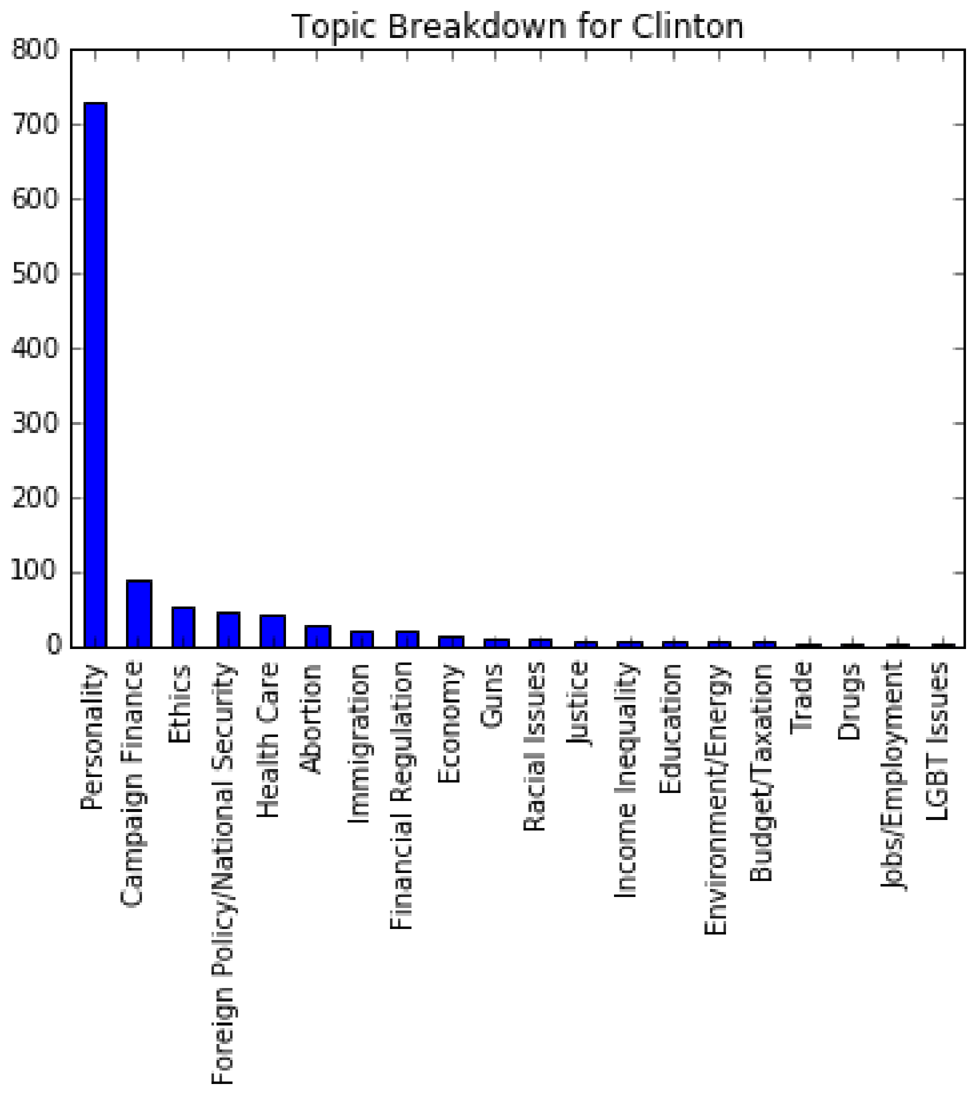
```
In [6]: all_df['top_topic'].value_counts().plot(kind="bar", title="Topic Breakdown for All Stories")
        # Top 10: Personality, Immigration, Campaign Finance, Foreign Policy/National Security, Abortio
        # Health Care, Economy, Veterans, Ethics, Racial Issues
```

```
Out[6]: <matplotlib.axes._subplots.AxesSubplot at 0x111ada710>
```

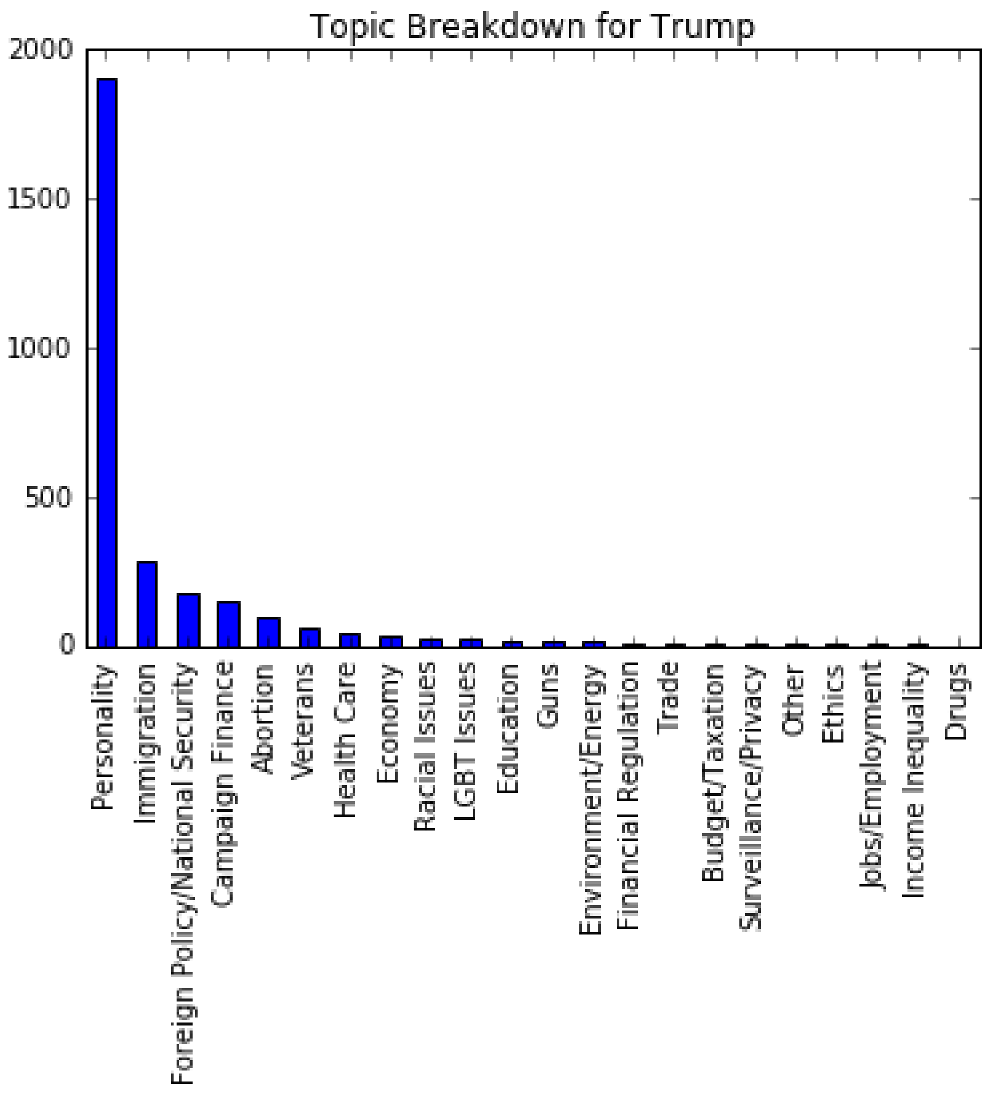


```
In [7]: all_df[all_df['candidate'] == 'clinton']['top_topic'].value_counts().plot(kind="bar", title="To
```

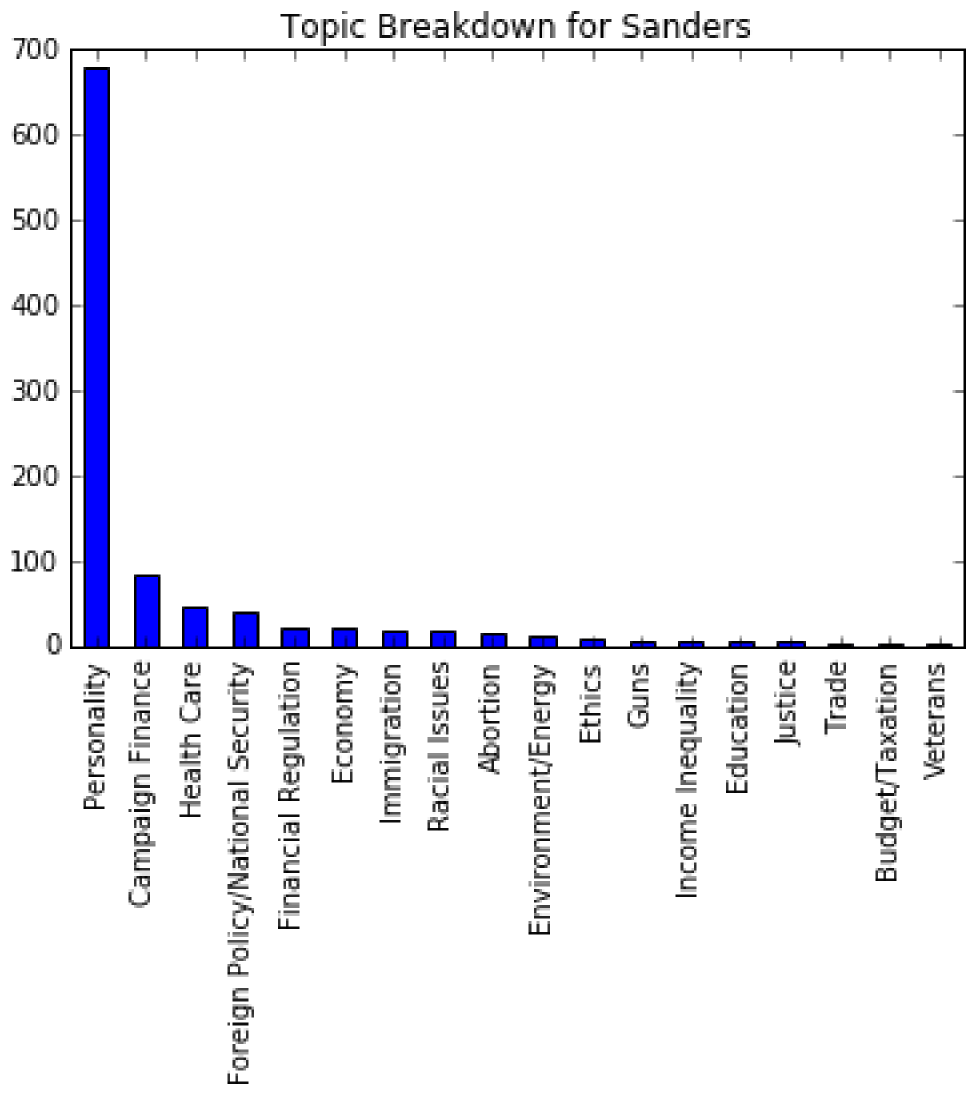
```
Out[7]: <matplotlib.axes._subplots.AxesSubplot at 0x1120f5410>
```



```
In [8]: all_df[all_df['candidate'] == 'trump']['top_topic'].value_counts().plot(kind="bar", title="Topi

Out[8]: <matplotlib.axes._subplots.AxesSubplot at 0x11245c650>
```

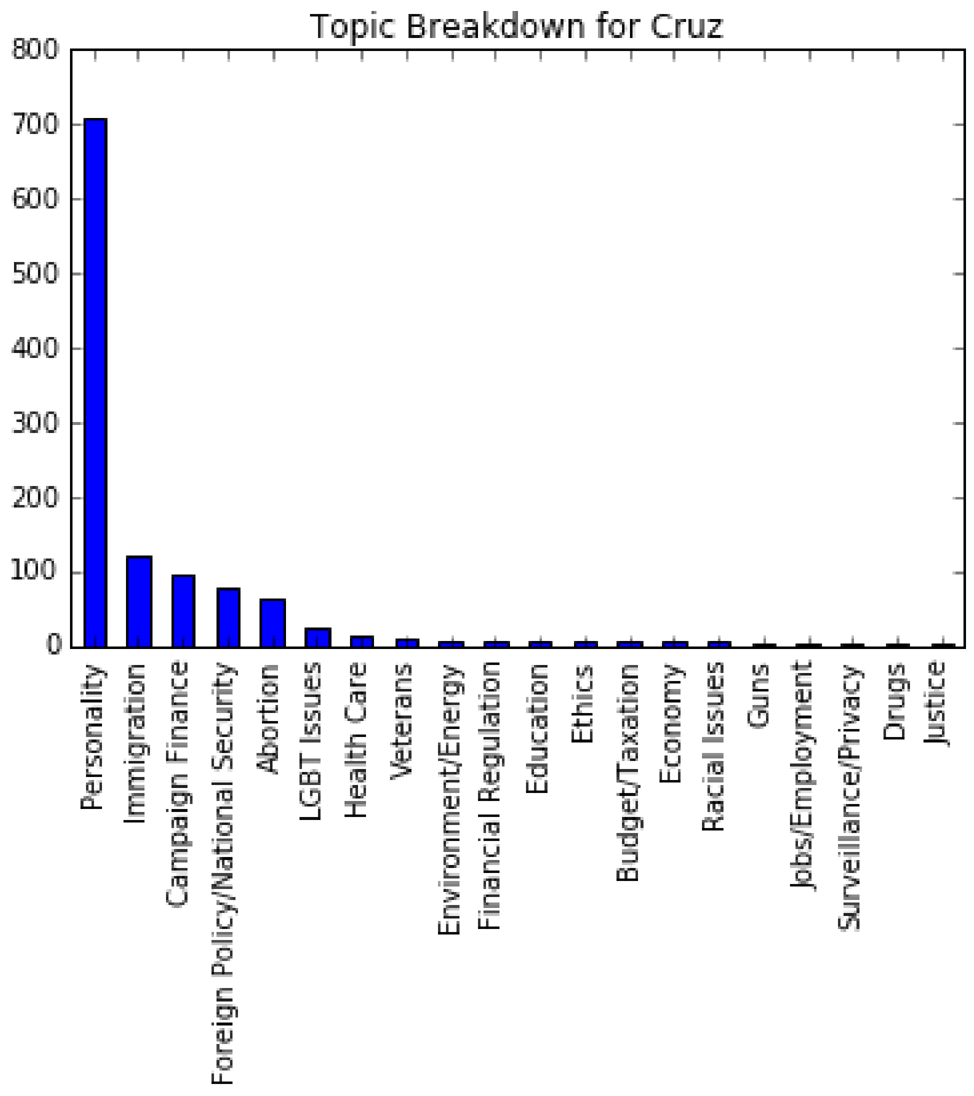


```
In [9]: all_df[all_df['candidate'] == 'sanders']['top_topic'].value_counts().plot(kind="bar", title="To

Out[9]: <matplotlib.axes._subplots.AxesSubplot at 0x11251f450>
```



```
In [10]: all_df[all_df['candidate'] == 'cruz']['top_topic'].value_counts().plot(kind="bar", title="Topi
```

```
Out[10]: <matplotlib.axes._subplots.AxesSubplot at 0x112719390>
```



2.1 Reading Level Breakdown by Topic

```
In [11]: # Top 10: Personality, Immigration, Campaign Finance, Foreign Policy/National Security, Aborti
         # Health Care, Economy, Veterans, Ethics, Racial Issues

         TOPICS = ['Personality', 'Immigration', 'Campaign Finance', 'Foreign Policy/National Security'
                   'Abortion', 'Health Care', 'Economy', 'Veterans', 'Ethics', 'Racial Issues']

         print "Average Flesch Scores by Topic"
         for t in TOPICS:
             df_t = all_df[all_df['top_topic'] == t]
             print t, ":", '%.2f' % df_t['flesch'].mean()
```

```
Average Flesch Scores by Topic
Personality : 9.02
Immigration : 9.28
```

```
Campaign Finance : 9.01
Foreign Policy/National Security : 9.19
Abortion : 9.08
Health Care : 9.86
Economy : 9.75
Veterans : 9.06
Ethics : 10.90
Racial Issues : 9.93
```

2.2 Topic Breakdown By Candidate

```
In [12]: CANDIDATES = ['clinton', 'sanders', 'trump', 'cruz']
         for c in CANDIDATES:
             print c, 'average Flesch score', '%.2f' % all_df[all_df['candidate'] == c]['flesch'].mean(
             print "\t\t\t\t\t%"
             print 100* all_df[all_df['candidate'] == c]['top_topic'].value_counts(normalize=True)[:5]
             print
```

```
clinton average Flesch score 9.55
                                        %
Personality                     66.453965
Campaign Finance                 8.204193
Ethics                           4.740201
Foreign Policy/National Security 4.193254
Health Care                      3.828624
Name: top_topic, dtype: float64

sanders average Flesch score 9.55
                                        %
Personality                     68.442211
Campaign Finance                 8.442211
Health Care                      4.623116
Foreign Policy/National Security 4.020101
Financial Regulation             2.211055
Name: top_topic, dtype: float64

trump average Flesch score 8.94
                                        %
Personality                     66.110532
Immigration                      9.871394
Foreign Policy/National Security 6.082725
Campaign Finance                 5.318040
Abortion                         3.441084
Name: top_topic, dtype: float64

cruz average Flesch score 8.85
                                        %
Personality                     61.154177
Immigration                     10.335917
Campaign Finance                 8.182601
Foreign Policy/National Security 6.546081
Abortion                         5.598622
Name: top_topic, dtype: float64
```

2.3 Average Reading Scores by Candidate per Topic

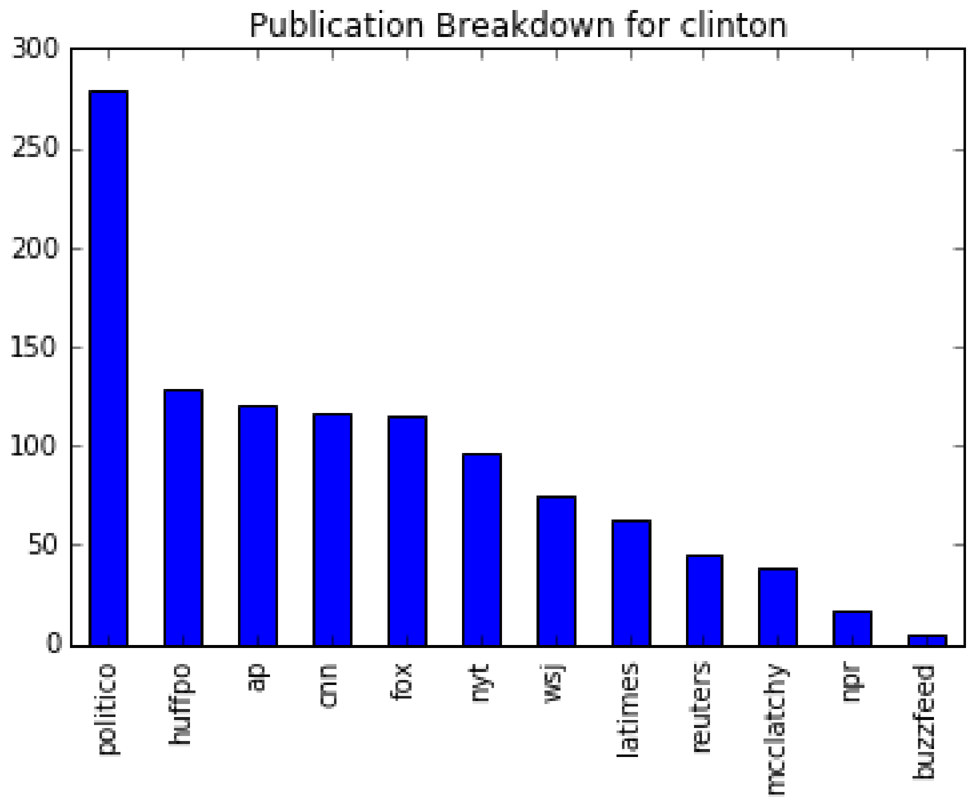
```
In [13]: CANDIDATES = ['clinton', 'sanders', 'trump', 'cruz']
         for t in TOPICS:
             scores = []
             for c in CANDIDATES:
                 scores.append((c,all_df[(all_df['candidate'] == c) & (all_df['top_topic'] == t)]['fles
             scores.sort(key=lambda x: x[1], reverse=True)

             print t
             for s in scores:
                 print s[0], '%.2f' % s[1]
             print
```

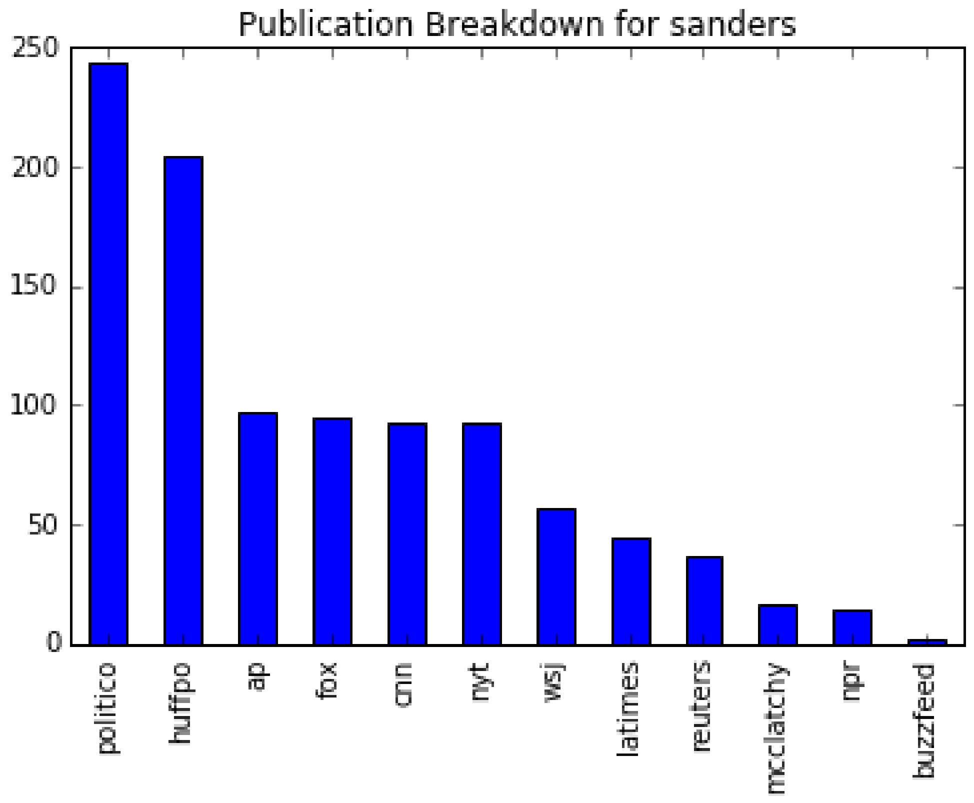
```
Personality
sanders 9.35
clinton 9.30
trump 8.87
cruz 8.79

Immigration
sanders 10.19
clinton 10.09
trump 9.31
cruz 8.91

Campaign Finance
sanders 9.40
clinton 9.34
trump 8.79
cruz 8.73

Foreign Policy/National Security
clinton 10.16
sanders 9.77
trump 8.93
cruz 8.89

Abortion
clinton 10.19
sanders 9.45
cruz 8.90
trump 8.81

Health Care
sanders 10.52
clinton 9.85
cruz 9.55
trump 9.16

Economy
clinton 10.42
sanders 9.98
trump 9.48
cruz 8.50
```

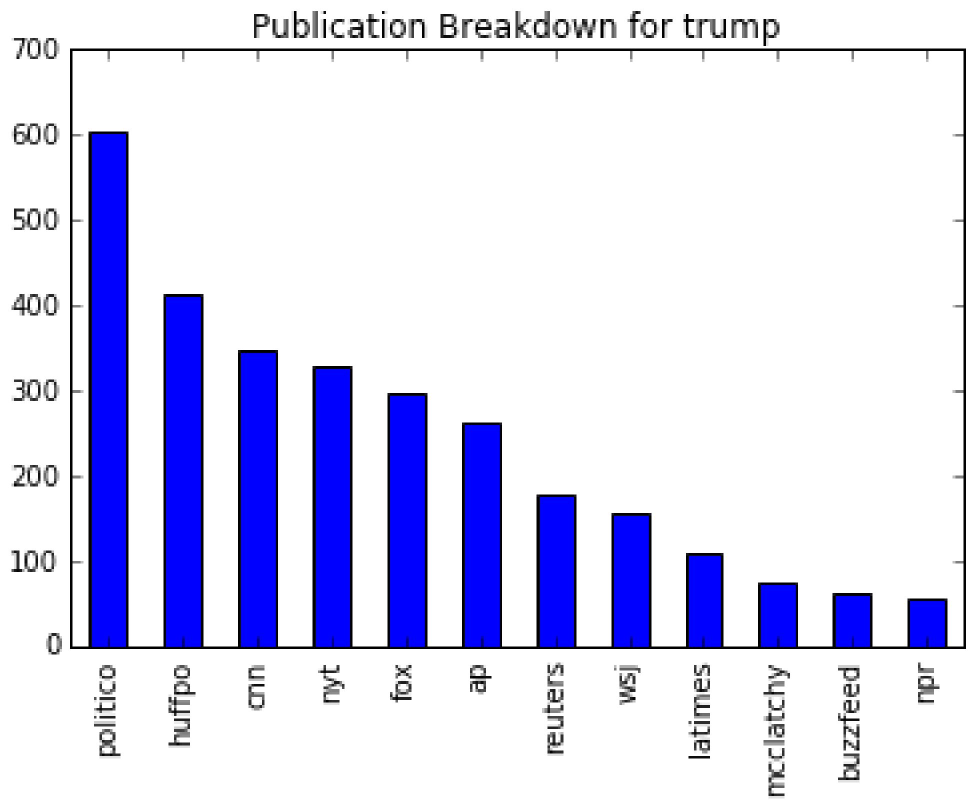
```
Veterans
clinton nan
trump 9.08
cruz 9.07
sanders 8.30

Ethics
sanders 11.11
trump 11.10
cruz 10.88
clinton 10.86

Racial Issues
sanders 10.99
clinton 10.76
trump 9.20
cruz 8.66
```

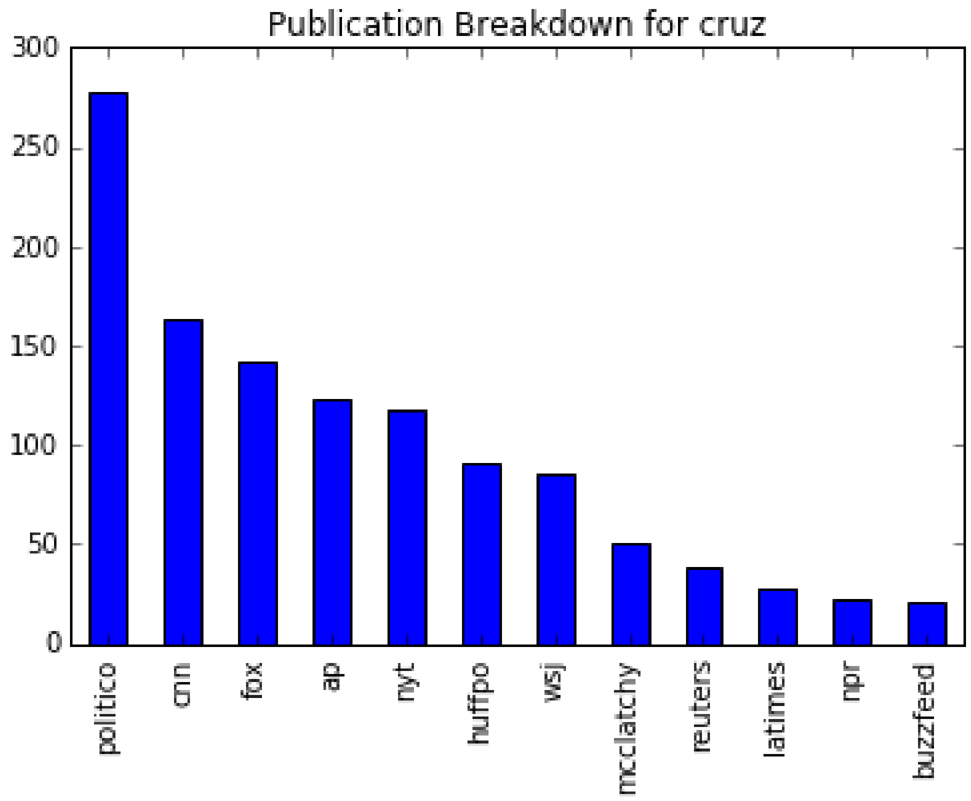
2.4 Story Distrubtion Per Candidate

```
In [14]: CANDIDATES = ['clinton', 'sanders', 'trump', 'cruz']

         for c in CANDIDATES:
             all_df[all_df['candidate'] == c]['org'].value_counts().plot(kind="bar", title="Publication
             matplotlib.pyplot.show()
```



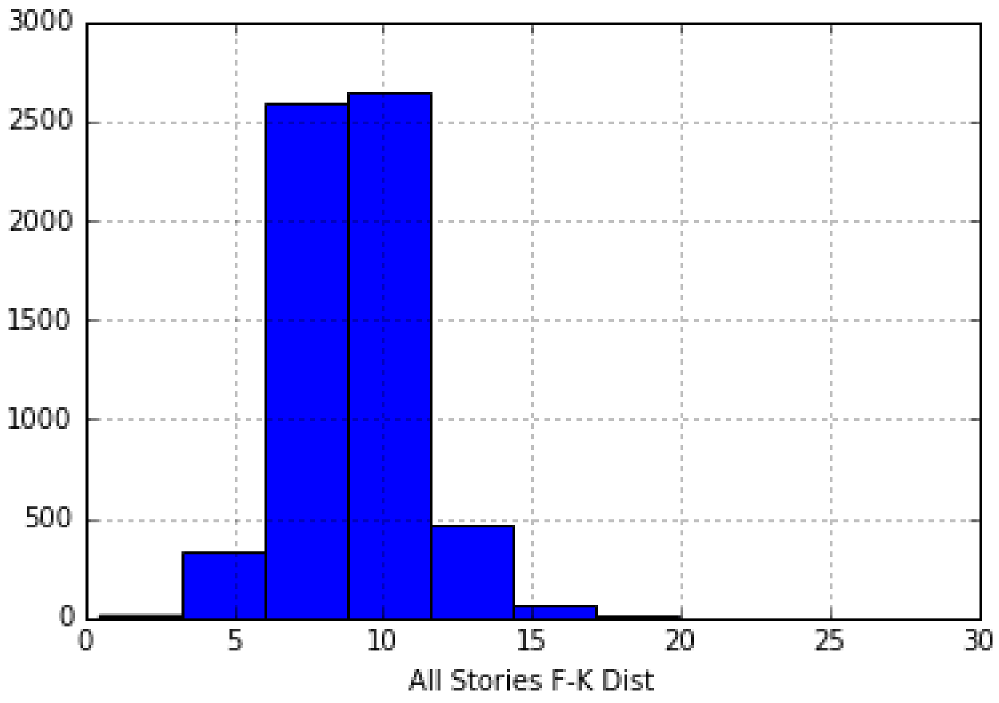

Publication Breakdown for sanders
250
200
150
100
50
0
politico
huffpo
ap
fox
cnn
nyt
wsj
latimes
reuters
mcclatchy
npr
buzzfeed


Publication Breakdown for trump
700
600
500
400
300
200
100
0
politico
huffpo
cnn
nyt
fox
ap
reuters
wsj
latimes
mcclatchy
buzzfeed
npr



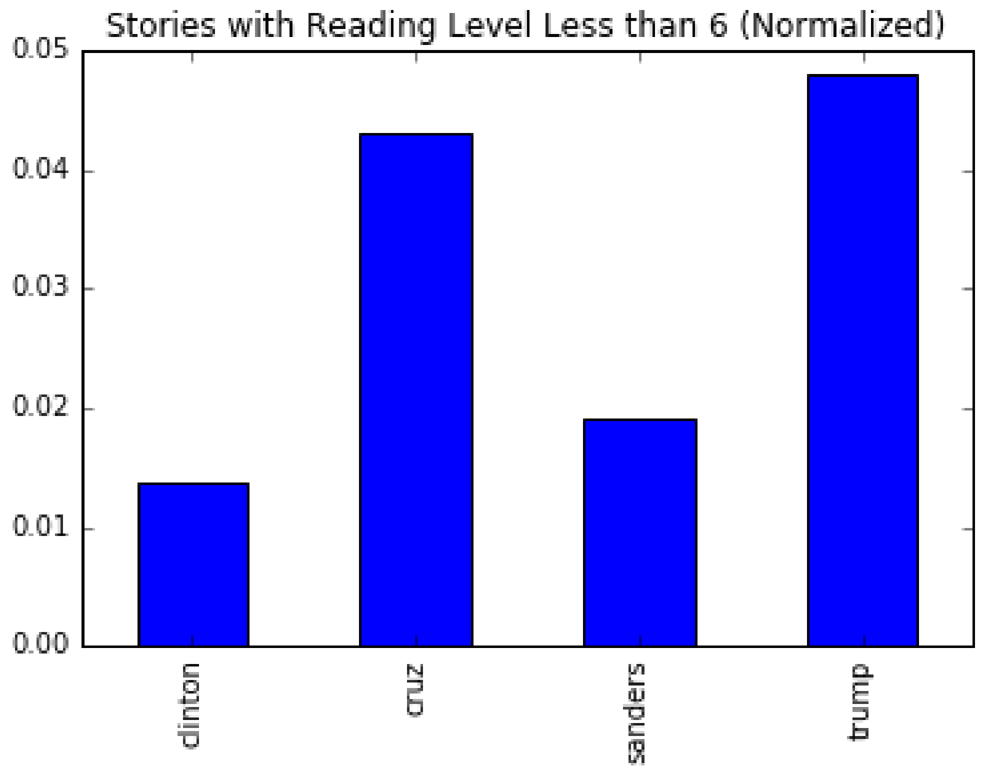
3 Let's look at the polar ends.

```
In [41]: all_df['flesch'].hist().set_xlabel('All Stories F-K Dist')

Out[41]: <matplotlib.text.Text at 0x113402a50>
```

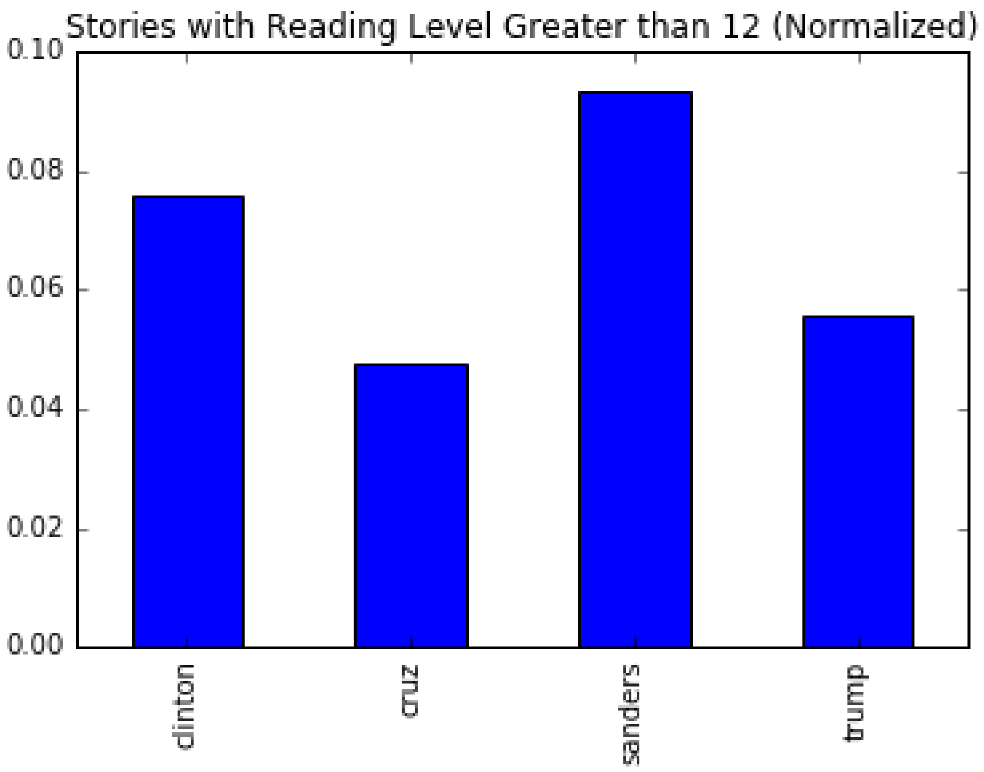


```
In [99]: t = len(all_df)
         print "TOTAL:", t
         low = all_df[all_df['flesch'] < 6]
         high = all_df[all_df['flesch'] > 12]
         mid = all_df[(all_df['flesch'] > 8) & (all_df['flesch'] < 10)]
         print "OVERALL LESS THAN 6:", len(low), '%.2f' % (100* len(low)/(len(all_df) * 1.0)), '%'
         print "OVERALL GREATER THAN 12:", len(high), '%.2f' % (100* len(high)/(len(all_df) * 1.0)), '%
         print "OVERALL MIDDLE 8-10:", len(mid), '%.2f' % (100* len(mid)/(len(all_df) * 1.0)), '%'
         print
         # Not normalized
         #low['candidate'].value_counts().plot(kind="bar", title="Stories with Reading Level Less than
         #matplotlib.pyplot.show()
         #high['candidate'].value_counts().plot(kind="bar", title="Stories with Reading Level Greater t
         #matplotlib.pyplot.show()

         # Normalize

         (low['candidate'].value_counts() / all_df['candidate'].value_counts()).plot(kind="bar", title=
         matplotlib.pyplot.show()
         print 'Raw Counts'
         print low['candidate'].value_counts()

         (high['candidate'].value_counts() / all_df['candidate'].value_counts()).plot(kind="bar", title
         matplotlib.pyplot.show()
         print 'Raw Counts'
         print high['candidate'].value_counts()

         (mid['candidate'].value_counts() / all_df['candidate'].value_counts()).plot(kind="bar", title=
         matplotlib.pyplot.show()
         print 'Raw Counts'
         print mid['candidate'].value_counts()

         #    all_df[all_df['candidate'] == c]['org'].value_counts().plot(kind="bar", title="Publicatio
         #    matplotlib.pyplot.show()
```

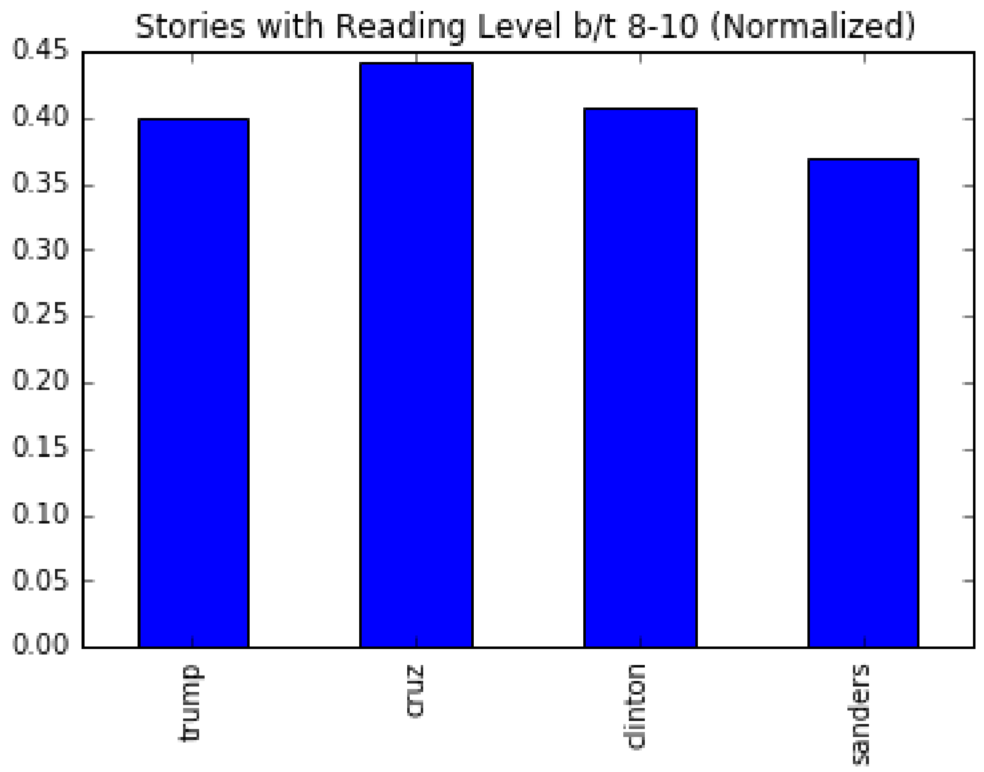
```
TOTAL: 6130
OVERALL LESS THAN 6: 222 3.62 %
OVERALL GREATER THAN 12: 391 6.38 %
OVERALL MIDDLE 8-10: 2475 40.38 %
```



```
Raw Counts
trump      138
cruz        50
sanders     19
clinton     15
Name: candidate, dtype: int64
```



```
Raw Counts
trump      160
sanders     93
clinton     83
cruz        55
Name: candidate, dtype: int64
```



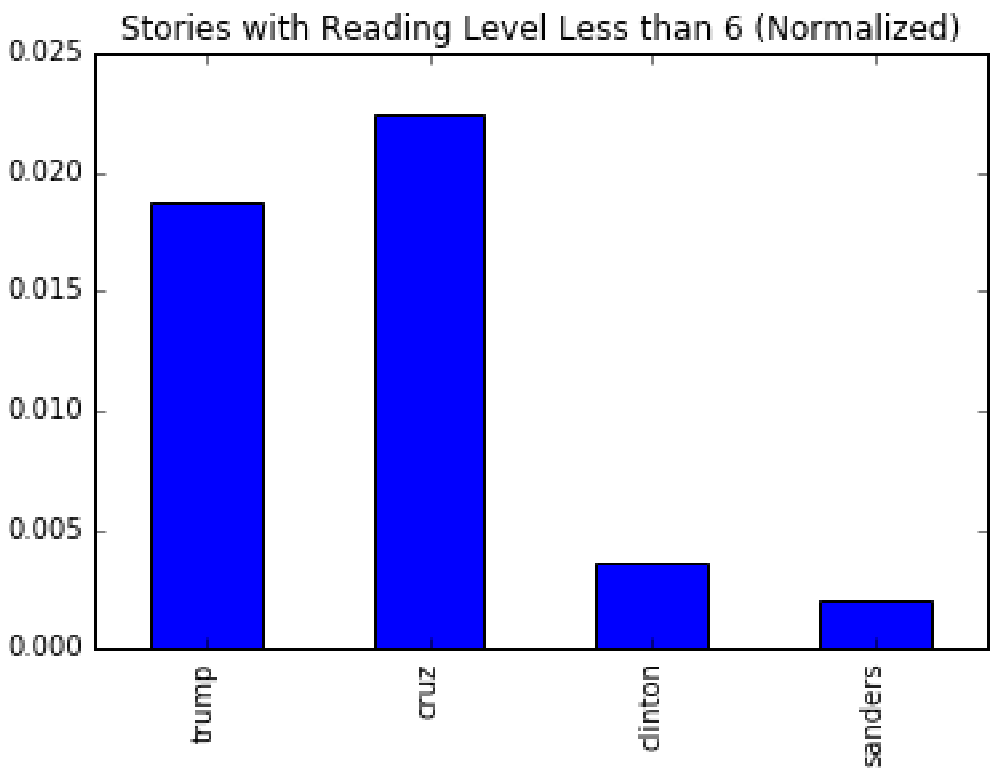
```
Raw Counts
trump      1147
cruz        513
clinton     447
sanders     368
Name: candidate, dtype: int64
```

3.1 Remove Personality (Other) Category

```
In [111]: t = len(all_df)
          print "TOTAL:", t
          low_nop = all_df[(all_df['flesch'] < 6) & (all_df['top_topic'] != "Personality")]
          high_nop = all_df[(all_df['flesch'] > 12) & (all_df['top_topic'] != "Personality")]
          mid_nop = all_df[(all_df['flesch'] > 8) & (all_df['flesch'] < 10) & (all_df['top_topic'] != "
          print "OVERALL LESS THAN 6:", len(low_nop), '%.2f' % (100* len(low_nop)/(len(all_df) * 1.0)),
          print "OVERALL GREATER THAN 12:", len(high_nop), '%.2f' % (100* len(high_nop)/(len(all_df) * 
          print "OVERALL MIDDLE 8-10:", len(mid_nop), '%.2f' % (100* len(mid_nop)/(len(all_df) * 1.0)),
          print
          # Not normalized
          #low['candidate'].value_counts().plot(kind="bar", title="Stories with Reading Level Less than
          #matplotlib.pyplot.show()
          #high['candidate'].value_counts().plot(kind="bar", title="Stories with Reading Level Greater
          #matplotlib.pyplot.show()

          # Normalize
```

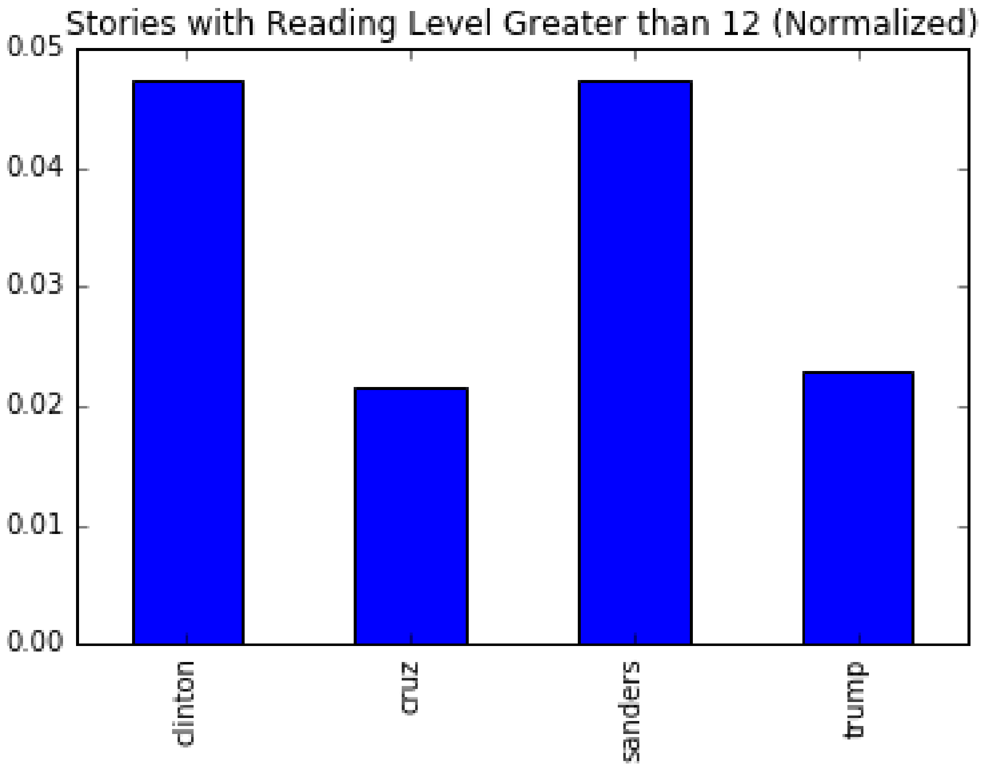
```
    (low_nop['candidate'].value_counts() / all_df['candidate'].value_counts()).plot(kind="bar", t
    matplotlib.pyplot.show()
    print 'Raw Counts'
    print low_nop['candidate'].value_counts()

    (high_nop['candidate'].value_counts() / all_df['candidate'].value_counts()).plot(kind="bar", 
    matplotlib.pyplot.show()
    print 'Raw Counts'
    print high_nop['candidate'].value_counts()

    (mid_nop['candidate'].value_counts() / all_df['candidate'].value_counts()).plot(kind="bar", t
    matplotlib.pyplot.show()
    print 'Raw Counts'
    print mid_nop['candidate'].value_counts()

    #    all_df[all_df['candidate'] == c]['org'].value_counts().plot(kind="bar", title="Publicati
    #    matplotlib.pyplot.show()
```

```
TOTAL: 6130
OVERALL LESS THAN 6: 86 1.40 %
OVERALL GREATER THAN 12: 190 3.10 %
OVERALL MIDDLE 8-10: 775 12.64 %
```

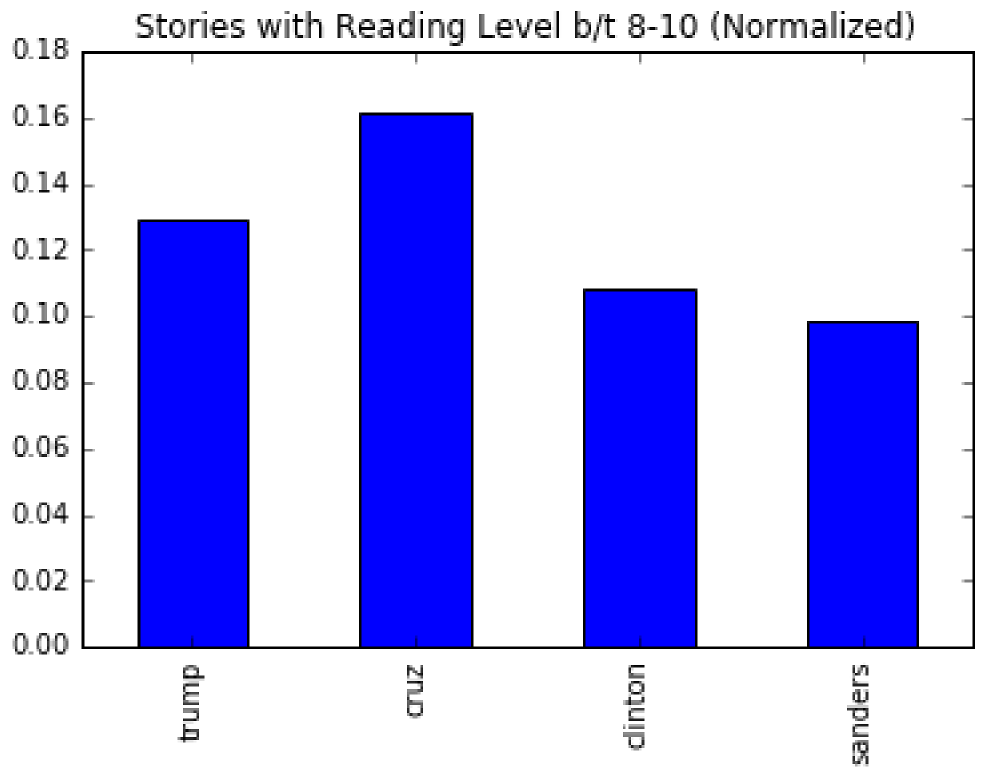


```
Raw Counts
trump      54
cruz       26
```

```
clinton     4
sanders     2
Name: candidate, dtype: int64
```



```
Raw Counts
trump      66
clinton    52
sanders    47
cruz       25
Name: candidate, dtype: int64
```

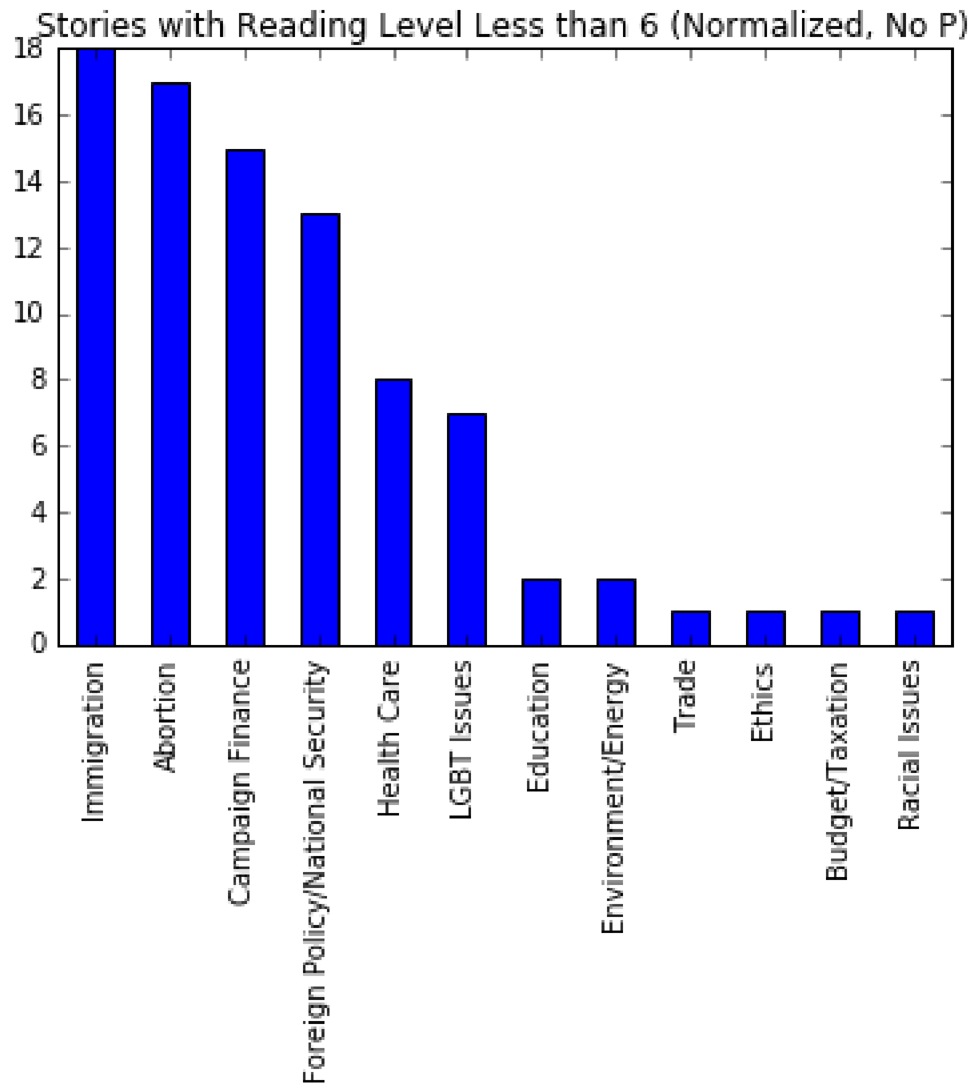


```
Raw Counts
trump      371
cruz       187
clinton    119
sanders     98
Name: candidate, dtype: int64
```

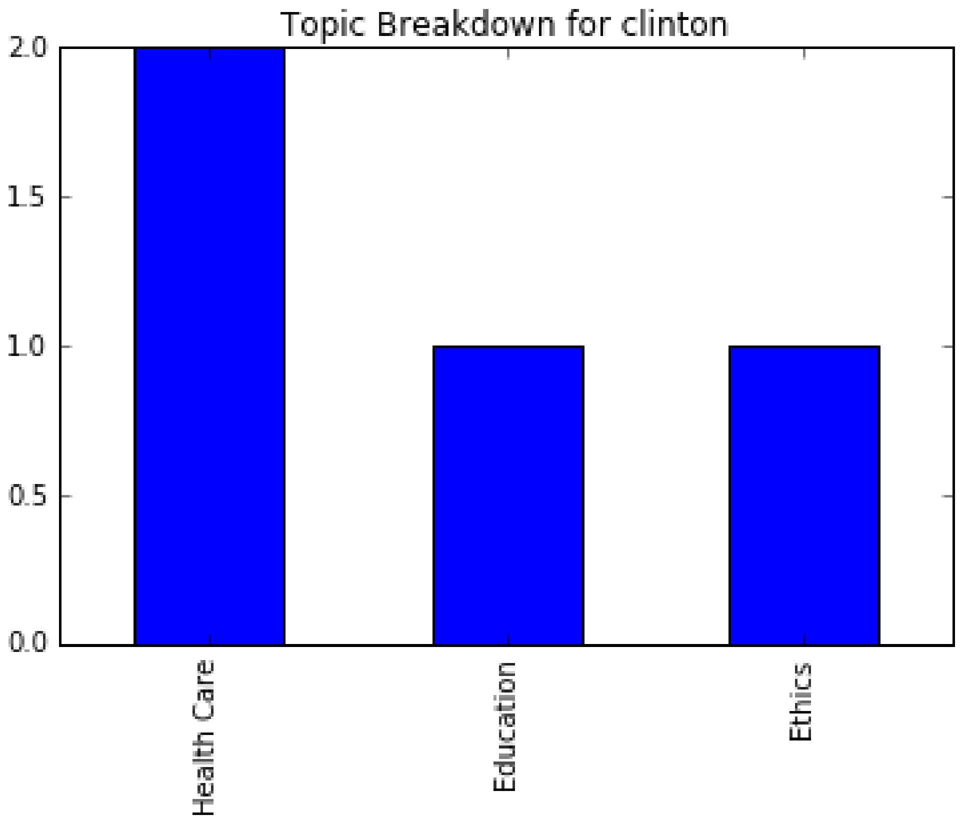
3.2 Topic breakdown for above

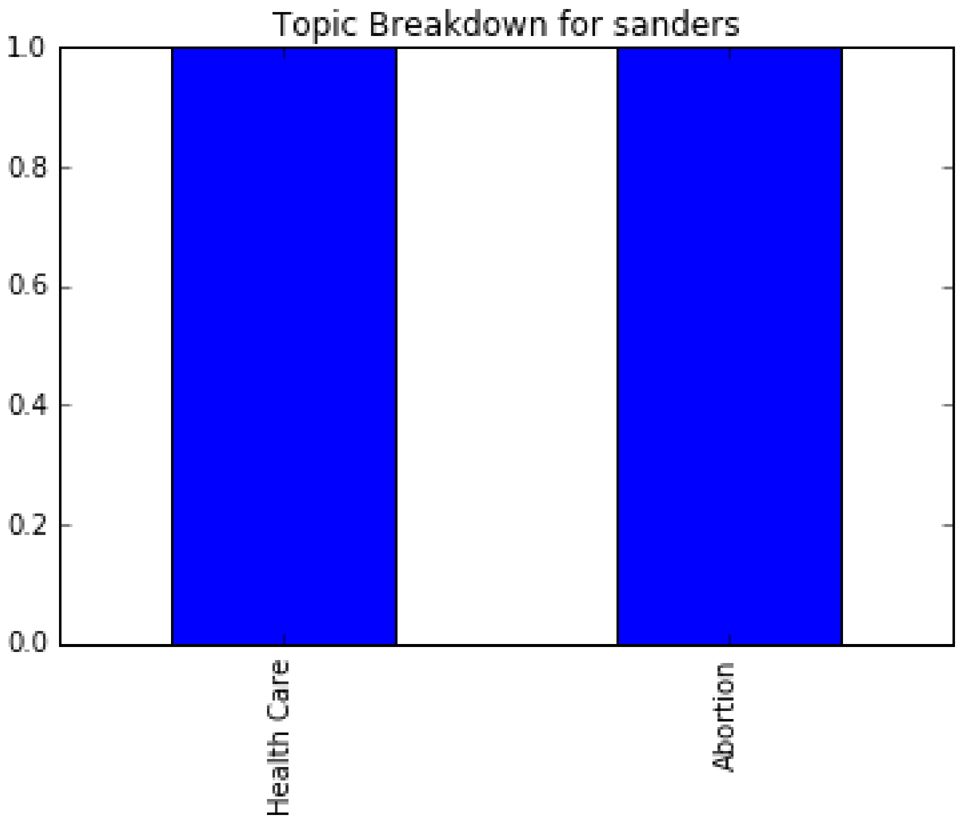
```
In [115]: low_nop['top_topic'].value_counts().plot(kind="bar", title="Stories with Reading Level Less t
          matplotlib.pyplot.show()

          print "LOW READING LEVEL < 6"
          for c in CANDIDATES:
              low_nop[low_nop['candidate'] == c]['top_topic'].value_counts().plot(kind="bar", title="To
              matplotlib.pyplot.show()


          print "HIGH READING LEVEL > 12"
          for c in CANDIDATES:
              high_nop[high_nop['candidate'] == c]['top_topic'].value_counts().plot(kind="bar", title="
              matplotlib.pyplot.show()


          print "MID READING LEVEL 8-10"
          for c in CANDIDATES:
```

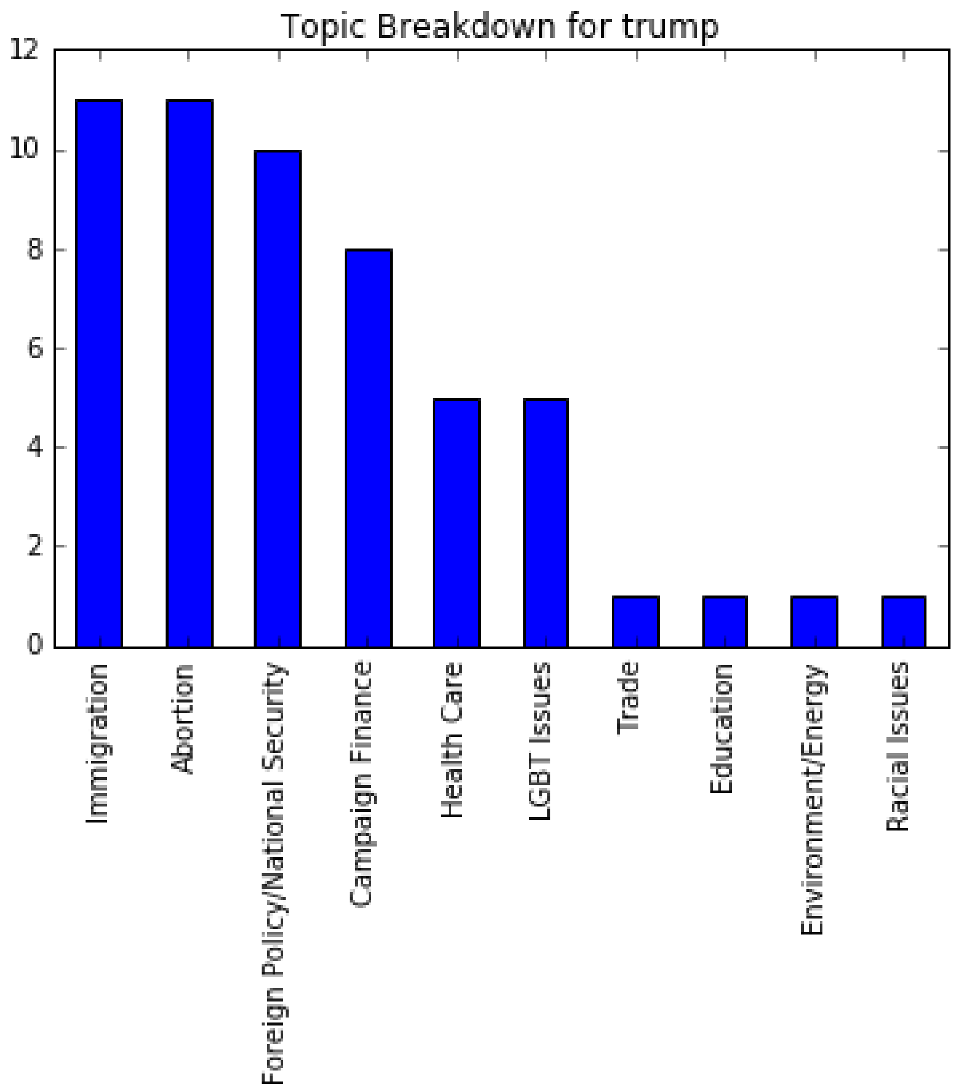
```
mid_nop[mid_nop['candidate'] == c]['top_topic'].value_counts().plot(kind="bar", title="To
matplotlib.pyplot.show()
```

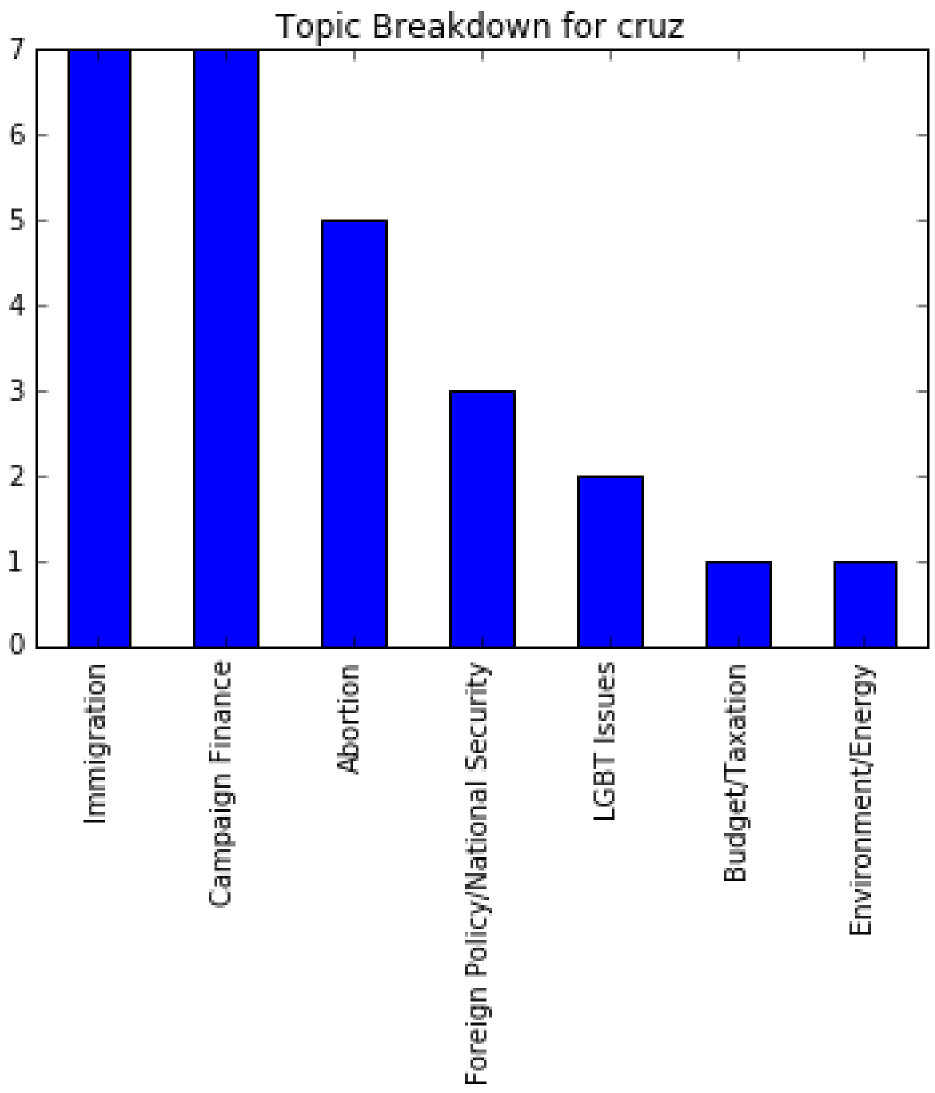


```
LOW READING LEVEL < 6
```

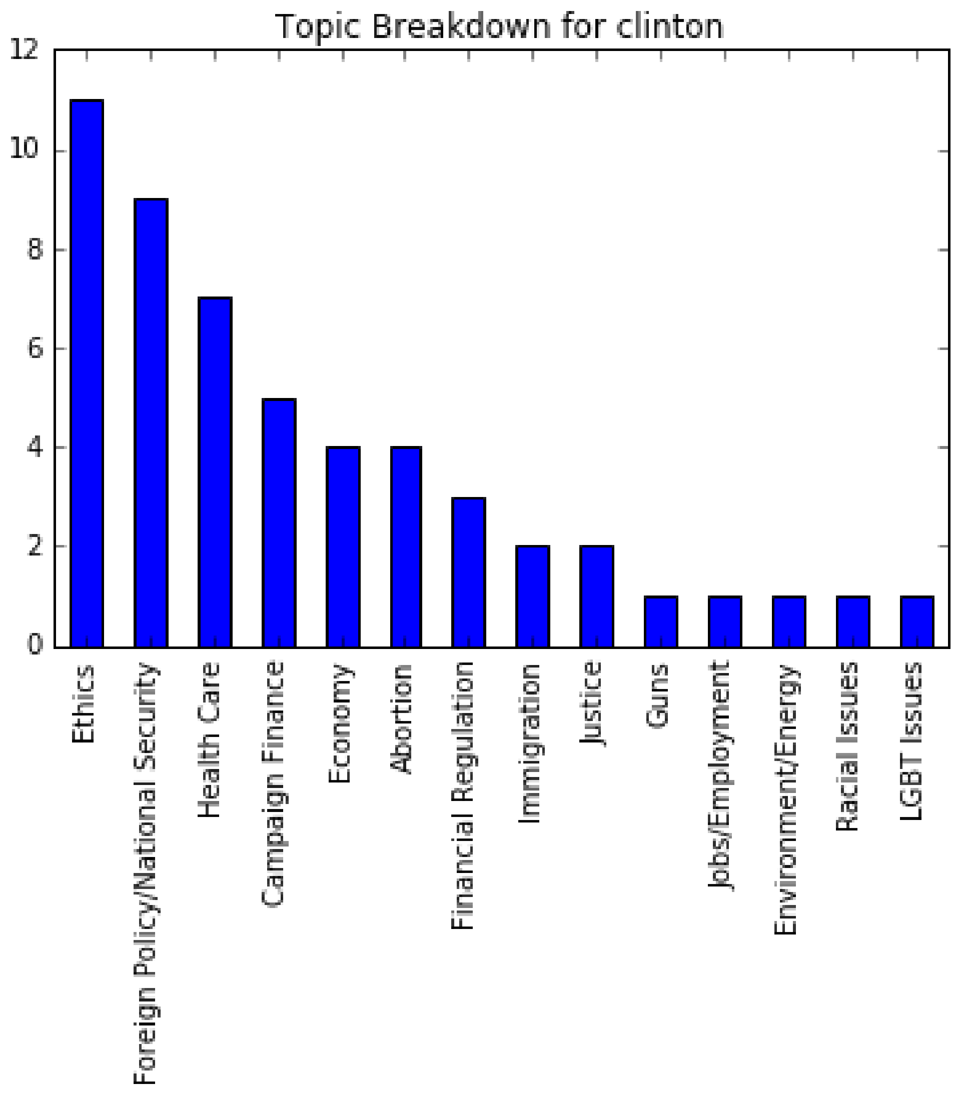

Topic Breakdown for clinton
2.0
1.5
1.0
0.5
0.0
Health Care
Education
Ethics

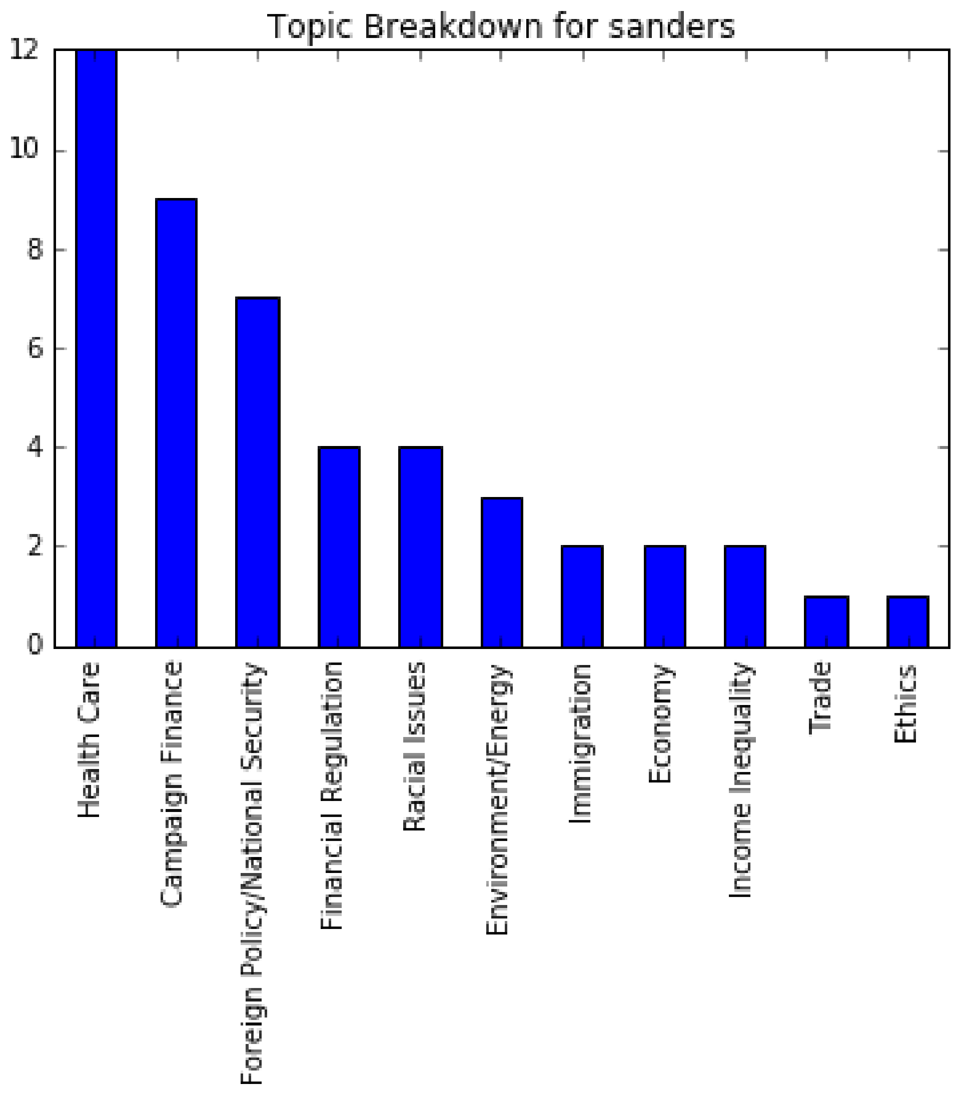

Topic Breakdown for sanders
1.0
0.8
0.6
0.4
0.2
0.0
Health Care
Abortion

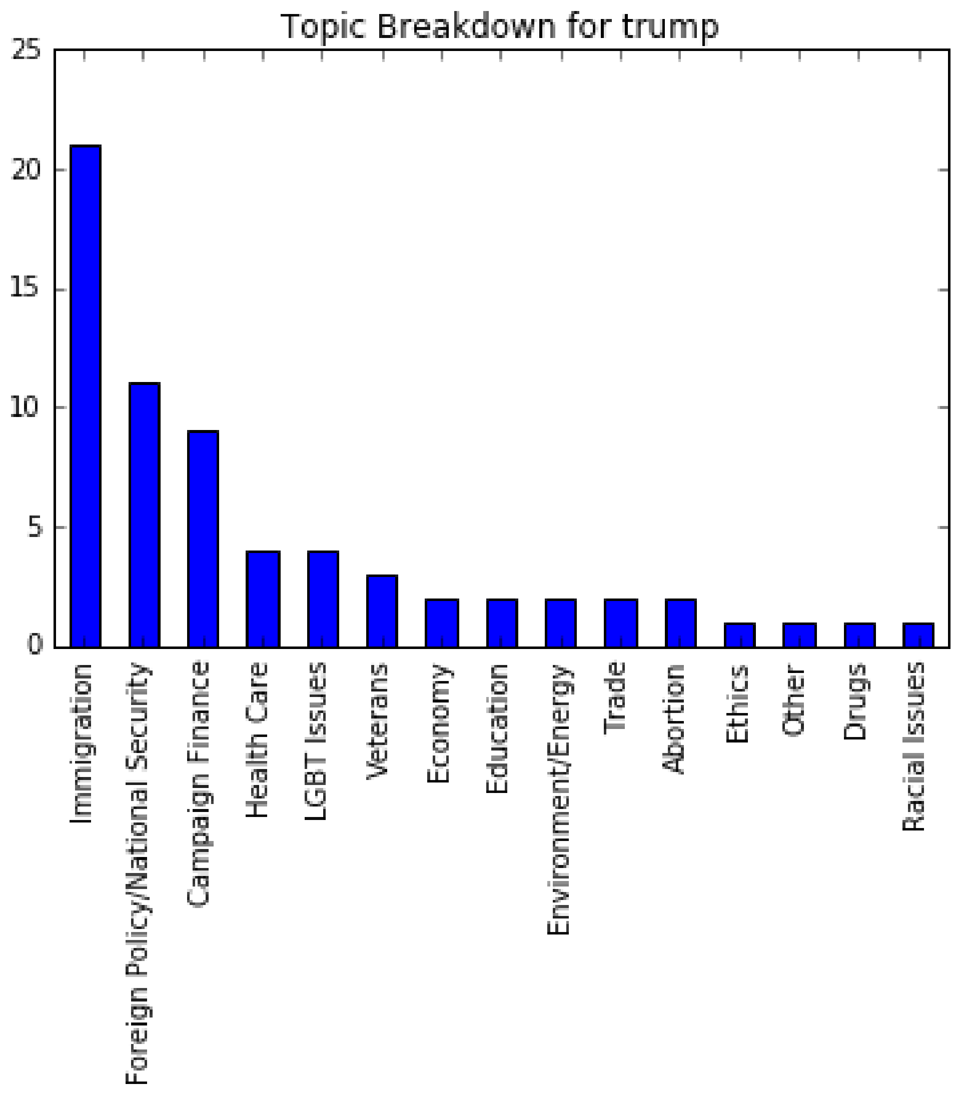

Topic Breakdown for trump
12
10
8
6
4
2
0
Immigration
Abortion
Foreign Policy/National Security
Campaign Finance
Health Care
LGBT Issues
Trade
Education
Environment/Energy
Racial Issues

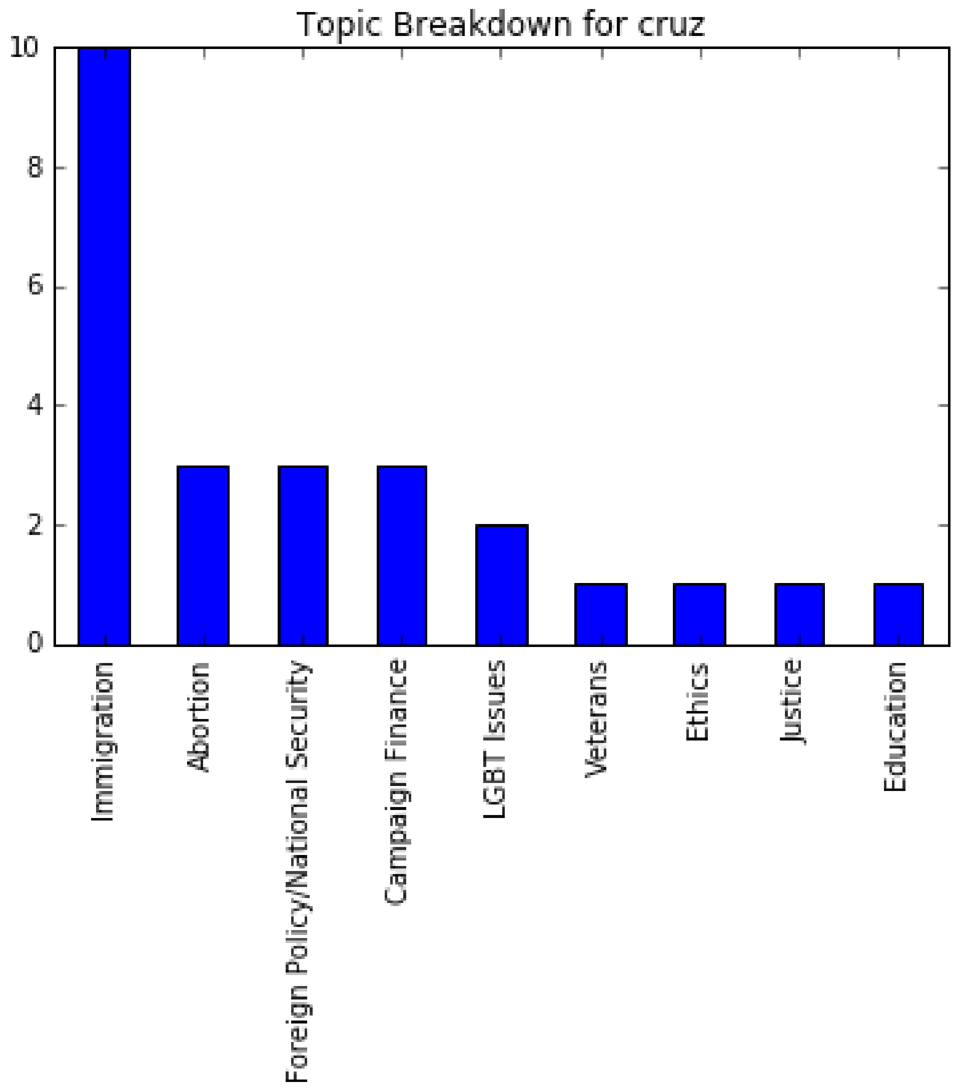


```
HIGH READING LEVEL > 12
```

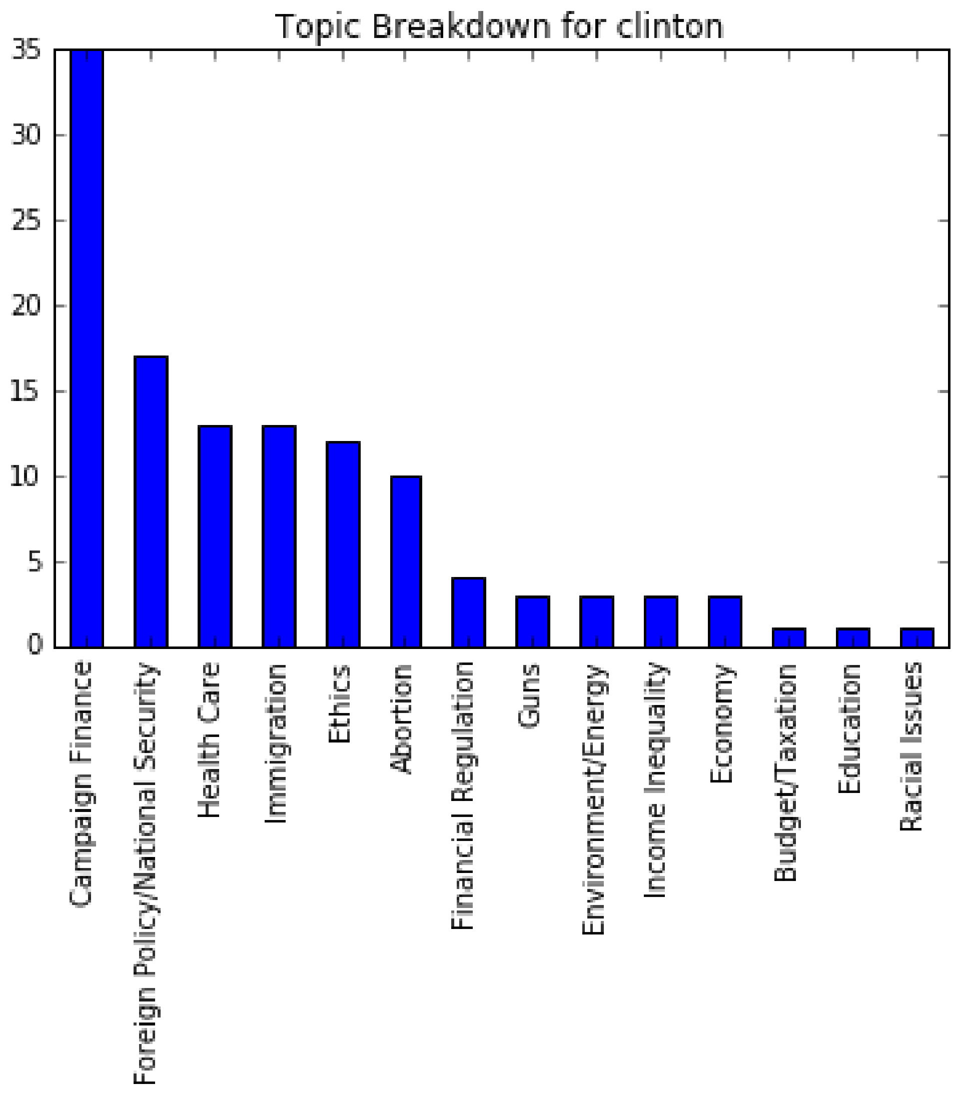

Topic Breakdown for clinton
12
10
8
6
4
2
0
Ethics
Foreign Policy/National Security
Health Care
Campaign Finance
Economy
Abortion
Financial Regulation
Immigration
Justice
Guns
Jobs/Employment
Environment/Energy
Racial Issues
LGBT Issues

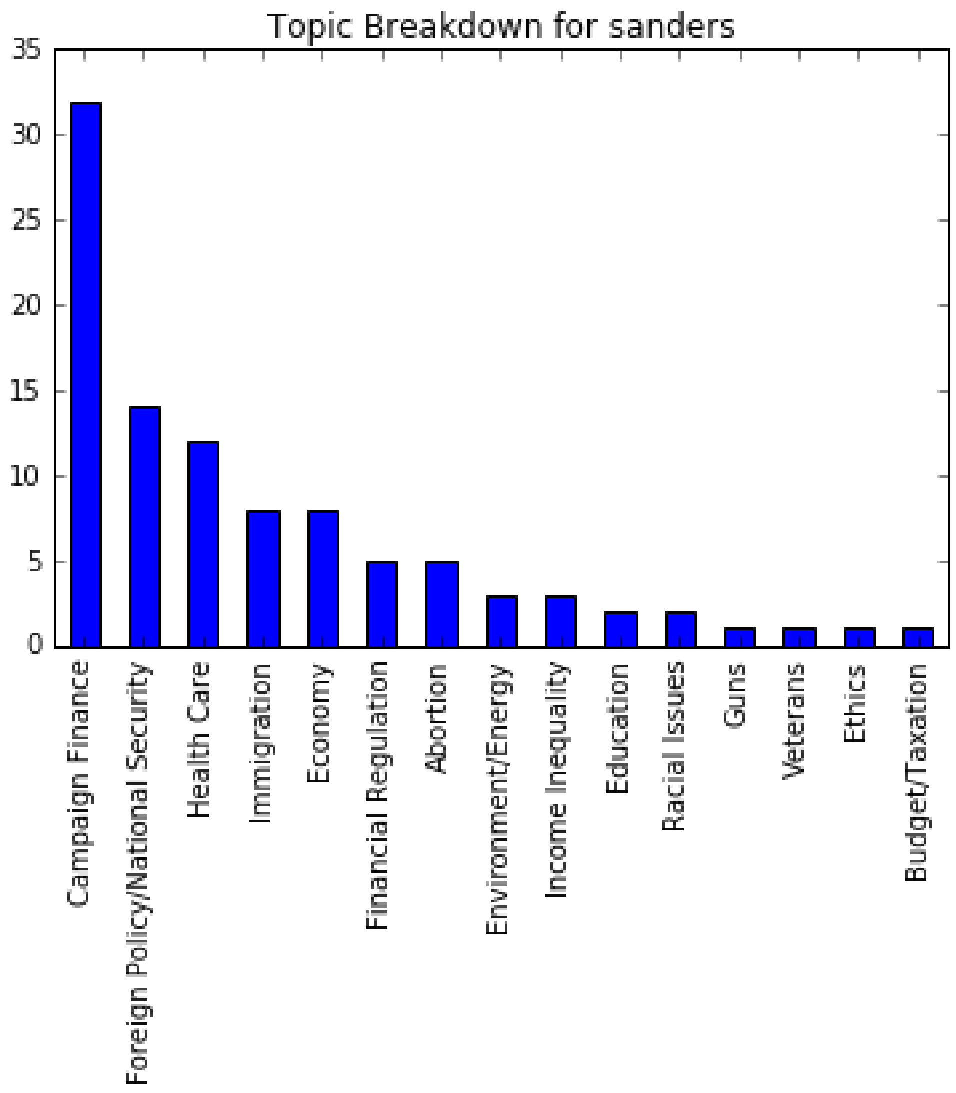

Topic Breakdown for sanders
12
10
8
6
4
2
0
Health Care
Campaign Finance
Foreign Policy/National Security
Financial Regulation
Racial Issues
Environment/Energy
Immigration
Economy
Income Inequality
Trade
Ethics

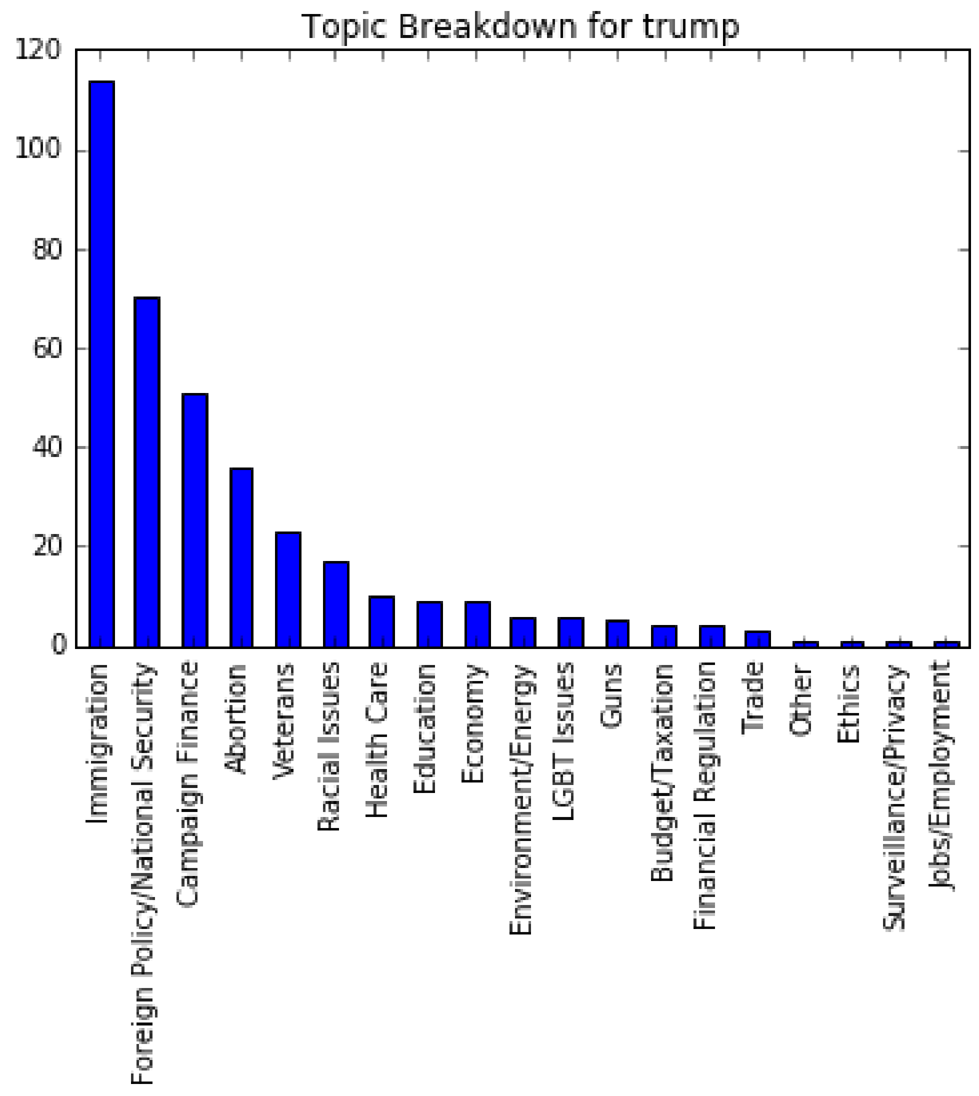

Topic Breakdown for trump
25
20
15
10
5
0
Immigration
Foreign Policy/National Security
Campaign Finance
Health Care
LGBT Issues
Veterans
Economy
Education
Environment/Energy
Trade
Abortion
Ethics
Other
Drugs
Racial Issues

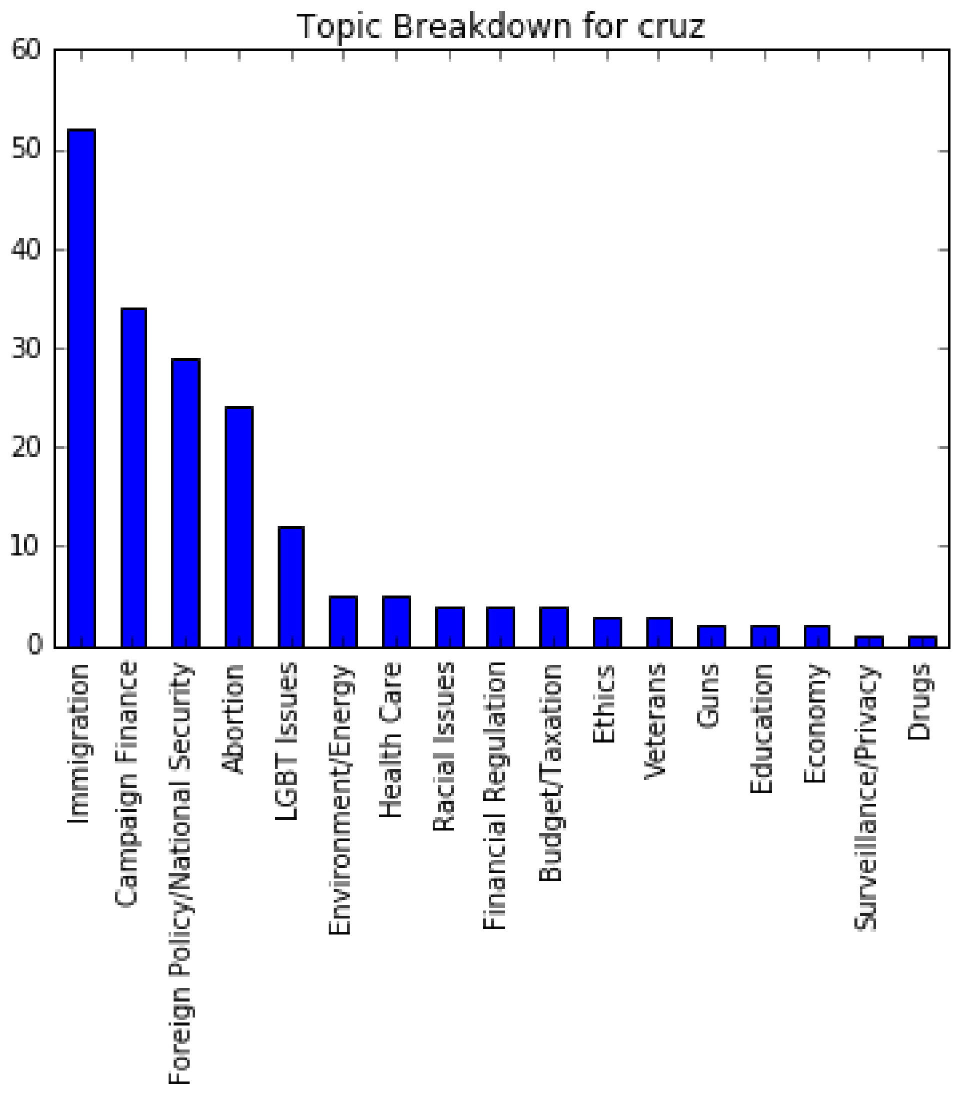


MID READING LEVEL 8-10


Topic Breakdown for clinton
35
30
25
20
15
10
5
0
Campaign Finance
Foreign Policy/National Security
Health Care
Immigration
Ethics
Abortion
Financial Regulation
Guns
Environment/Energy
Income Inequality
Economy
Budget/Taxation
Education
Racial Issues


Topic Breakdown for sanders
35
30
25
20
15
10
5
0
Campaign Finance
Foreign Policy/National Security
Health Care
Immigration
Economy
Financial Regulation
Abortion
Environment/Energy
Income Inequality
Education
Racial Issues
Guns
Veterans
Ethics
Budget/Taxation


Topic Breakdown for trump
120
100
80
60
40
20
0
Immigration
Foreign Policy/National Security
Campaign Finance
Abortion
Veterans
Racial Issues
Health Care
Education
Economy
Environment/Energy
LGBT Issues
Guns
Budget/Taxation
Financial Regulation
Trade
Other
Ethics
Surveillance/Privacy
Jobs/Employment



4 For the above, what is the quote ratio?

5 fill this in.

```
In [15]: import re
```

```
In [33]: def get_quoted_text(text):
             return re.findall(r'[\\|\"](.+)[\"|\"]', text)
         def get_quoted_text_author_1(text):
             return re.findall(r'[\\|\"](.+)[\"|\"] (\w+) said.+\.', text)
         def get_quoted_text_author_2(text):
             return re.findall(r'[\\|\"](.+)[\"|\"] said (\w+ \w+).+\.', text)
```

```
In [38]: t = all_df['body'][0]
         print t
         print get_quoted_text(t)
```

```
Fox Business Network
's Republican primary debate was watched by an average of 11 million viewers on Thursday, the smallest a
GOP
 candidate showdowns held so far.
The figure from Nielsen is down 2.5 million viewers from the first FBN debate on Nov. 10, which pulled a
Fox News Channel
 on Aug. 6 and significantly below the last GOP debate on CNN, which had 18 million viewers on Dec. 15.
See the most-read stories in Entertainment this hour >>
FBN's audience was still substantial compared to previous primary seasons. The largest audience for a Re
The large audiences for the 2016-primary debates have been attributed to the presence of front-runner
Donald Trump
, whose celebrity status has drawn viewers who might not have been engaged in the party nomination proce
On Thursday, Trump's confrontations with his chief rival, Sen. Ted Cruz of Texas, provided some of the m
FBN has the smallest reach of any of the networks carrying the Republican debates, with 82 million cable
The network's online stream of the debate, made available for free over FoxBusiness.com, peaked with 1.
"The X Files," Fox's groundbreaking series about the mysterious and the unexplained, is coming back for
Although fan fever for the drama hasn't died since it went off...
"The X Files," Fox's groundbreaking series about the mysterious and the unexplained, is coming back for
Although fan fever for the drama hasn't died since it went off...
The debate from North Charleston, S.C., was moderated by FBN anchors Neil Cavuto and Maria Bartiromo.
['The X Files,', 'The X Files,']
```

```
In [ ]:
```