EDA_topics

March 24, 2022

[1]:
```
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns
```

[2]:
```
data = pd.read_csv('combined_data_20211217.csv')
```

```
/opt/anaconda3/lib/python3.8/site-
packages/IPython/core/interactiveshell.py:3444: DtypeWarning: Columns
(36,37,38,39,40,41) have mixed types.Specify dtype option on import or set
low_memory=False.
  exec(code_obj, self.user_global_ns, self.user_ns)
```

[3]:
```
topics = pd.read_csv('features/partner_data/GDI/
↪GDI_Domain_Topics_Traffic_December2021.csv')
```

[4]:
```
topics
```

[4]:

	domain_name	narrative_density	\
0	100777.com	[Decimal('0.183'), Decimal('0.765'), Decimal('…	
1	100percentfedup.com	[Decimal('0.354'), Decimal('0.686'), Decimal('…	
2	12minutos.com	[None]	
3	2020conservative.com	[Decimal('0.946'), Decimal('0.474')]	
4	2020dirtsheet.com	[Decimal('0.705'), Decimal('0.687'), Decimal('…	
…	…	…	
1392	zelfzorgcovid19.nl	[None]	
1393	zerohedge.com	[Decimal('0.133'), Decimal('0.658'), Decimal('…	
1394	zigforums.com	[Decimal('0.639'), Decimal('0.812'), Decimal('…	
1395	zionica.com	[Decimal('0.929'), Decimal('0.648'), Decimal('…	
1396	zvedavec.org	[None]	

	topics	monthly_pageviews
0	['antivaxx', 'voterfraud', 'antilgbt', 'pseudo…	10,000
1	['votinglaws', 'voterfraud', 'antiimmigrant', …	4,110,000
2	[None]	610,000
3	['voterfraud', 'biden']	310,000
4	['voterfraud', 'biden', 'coronavirus']	0
…	…	…

```
1392                                                [None]           410,000
1393  ['antilatinx', 'whitesupremacy', 'coronavirus'…       108,050,000
1394  ['whitesupremacy', 'voterfraud', 'antiasian', …            20,000
1395  ['bigtech', 'whitesupremacy', 'biden', 'corona…                 0
1396                                                [None]           700,000

[1397 rows x 4 columns]
```

[5]:
```
data.head()
```

[5]:
```
   Unnamed: 0                 date  \
0           0  2020-10-27 16:21:00
1           1  2020-08-20 14:34:00
2           2  2020-11-17 15:35:00
3           3  2021-03-03 03:19:00
4           4  2020-08-30 16:26:00

                                        headline  \
0                      The balls on this guy, huh?
1  Lindell has come under fire for promoting pote…
2  Biden has told aides that he's concerned that …
3  The response was a remarkable moment at a pivo…
4  Astronaut Jeanette Epps is the first Black wom…

                                       message_x  \
0                                            NaN
1                                        En Serio?
2  Wary ?? Wary ?? More like he is worried that t…
3                                            NaN
4                                            NaN

                                                link       domain rating  \
0  https://www.tmz.com/2020/10/27/arizona-racist-…      tmz.com      N
1  https://www.forbes.com/sites/andrewsolender/20…   forbes.com      T
2  https://www.msn.com/en-us/news/politics/presid…      msn.com      T
3  https://www.nbcnews.com/politics/elections/sup…  nbcnews.com      T
4  https://newsone.com/4005134/nasa-astronaut-jea…  newsone.com      T

     orientation sourceEchochamber  actualangryCount  …  antilgbt  antivaxx  \
0            NaN           Liberal               0.0  …       NaN       NaN
1            NaN           Liberal               4.0  …       NaN       NaN
2            NaN      Conservative               1.0  …       NaN       NaN
3            NaN           Liberal              10.0  …       NaN       NaN
4  Slightly Left           Liberal               0.0  …       NaN       NaN

   voterfraud  coronavirus  qanon  votinglaws  antiimmigrant  antimuslim  \
0         NaN          NaN    NaN         NaN            NaN         NaN
```

```
1          NaN          NaN    NaN          NaN             NaN          NaN
2          NaN          NaN    NaN          NaN             NaN          NaN
3          NaN          NaN    NaN          NaN             NaN          NaN
4          NaN          NaN    NaN          NaN             NaN          NaN

   antiasian  bigtech
0        NaN      NaN
1        NaN      NaN
2        NaN      NaN
3        NaN      NaN
4        NaN      NaN

[5 rows x 90 columns]
```

[6]:
```
sub_data = data.loc[:,['rating','domain','biden', 'pseudoscience',
                       'misogyny', 'climatedenial','antilatinx',
                       '5g', 'whitesupremacy', 'antiblack',
                       'aliens','antisemitic', 'antilgbt',
                       'antivaxx', 'voterfraud', 'coronavirus',
                       'qanon', 'votinglaws', 'antiimmigrant',
                       'antimuslim', 'antiasian','bigtech']]
```

[7]:
```
sub_data_selected = sub_data.loc[sub_data['domain'].
↪isin(list(topics['domain_name'].values)),:]
```

[8]:
```
sub_data_selected
```

[8]:
```
       rating              domain  biden  pseudoscience  misogyny  \
5           T  westernjournal.com    1.0            1.0       1.0
7           N   theepochtimes.com    1.0            1.0       1.0
12          N         bongino.com    0.0            0.0       0.0
14          T  politicalflare.com    1.0            1.0       1.0
15          N       breitbart.com    1.0            1.0       1.0
…       …                   …    …            …       …
911700      T  nationalreview.com    1.0            1.0       1.0
911709      N        polinews.org    1.0            0.0       0.0
911725      N        polinews.org    1.0            0.0       0.0
911747      N        polinews.org    1.0            0.0       0.0
911811      T  nationalreview.com    1.0            1.0       1.0

        climatedenial  antilatinx   5g  whitesupremacy  antiblack  …  \
5                 1.0         1.0  0.0             1.0        1.0  …
7                 1.0         1.0  1.0             1.0        1.0  …
12                0.0         0.0  0.0             0.0        0.0  …
14                0.0         1.0  0.0             1.0        1.0  …
15                1.0         1.0  1.0             1.0        1.0  …
…               …         …  …            …        …  …
```

```
911700            0.0         1.0  1.0             1.0        1.0  …
911709            0.0         0.0  0.0             0.0        0.0  …
911725            0.0         0.0  0.0             0.0        0.0  …
911747            0.0         0.0  0.0             0.0        0.0  …
911811            0.0         1.0  1.0             1.0        1.0  …

        antilgbt  antivaxx  voterfraud  coronavirus  qanon  votinglaws  \
5            1.0       0.0         1.0          1.0    1.0         1.0
7            1.0       1.0         1.0          1.0    0.0         1.0
12           0.0       0.0         0.0          0.0    0.0         0.0
14           1.0       0.0         1.0          1.0    1.0         0.0
15           1.0       0.0         1.0          1.0    1.0         1.0
…            …         …           …            …      …           …
911700       1.0       0.0         1.0          1.0    0.0         1.0
911709       0.0       0.0         1.0          1.0    0.0         0.0
911725       0.0       0.0         1.0          1.0    0.0         0.0
911747       0.0       0.0         1.0          1.0    0.0         0.0
911811       1.0       0.0         1.0          1.0    0.0         1.0

        antiimmigrant  antimuslim  antiasian  bigtech
5                 1.0         1.0        1.0      1.0
7                 1.0         1.0        1.0      1.0
12                0.0         0.0        0.0      0.0
14                1.0         1.0        1.0      1.0
15                1.0         1.0        1.0      1.0
…                 …           …          …        …
911700            1.0         1.0        1.0      1.0
911709            0.0         0.0        0.0      0.0
911725            0.0         0.0        0.0      0.0
911747            0.0         0.0        0.0      0.0
911811            1.0         1.0        1.0      1.0

[271218 rows x 22 columns]
```

[9]:
```
link_topic_count = sub_data_selected.drop('domain',axis=1).groupby('rating').
↪sum()
```

[10]:
```
link_topic_row_count = sub_data_selected.drop('domain',axis=1).
↪groupby('rating').count()
```

[11]:
```
link_topic_row_count
```

[11]:
```
          biden  pseudoscience  misogyny  climatedenial  antilatinx      5g  \
rating
N        130242         130242    130242         130242      130242  130242
R         69780          69780     69780          69780       69780   69780
T         71196          71196     71196          71196       71196   71196
```

```
        whitesupremacy  antiblack  aliens  antisemitic  antilgbt  antivaxx  \
rating
N               130242     130242  130242       130242    130242    130242
R                69780      69780   69780        69780     69780     69780
T                71196      71196   71196        71196     71196     71196

        voterfraud  coronavirus   qanon  votinglaws  antiimmigrant  \
rating
N           130242       130242  130242      130242         130242
R            69780        69780   69780       69780          69780
T            71196        71196   71196       71196          71196

        antimuslim  antiasian  bigtech
rating
N           130242     130242   130242
R            69780      69780    69780
T            71196      71196    71196
```

[12]:
```
ratio_raw = link_topic_count/link_topic_row_count
ratio_raw = ratio_raw.reset_index()
ratio = link_topic_count/link_topic_row_count
ratio = ratio.transpose()
ratio = ratio.reset_index()
ratio
```

[12]:

rating	index	N	R	T
0	biden	0.919980	0.853439	0.891272
1	pseudoscience	0.360007	0.612496	0.365990
2	misogyny	0.764646	0.729980	0.645050
3	climatedenial	0.368069	0.564101	0.273105
4	antilatinx	0.818760	0.868845	0.919546
5	5g	0.338616	0.481442	0.079906
6	whitesupremacy	0.911918	0.961551	0.926990
7	antiblack	0.703636	0.720163	0.513849
8	aliens	0.000000	0.310949	0.000000
9	antisemitic	0.762250	0.893580	0.707680
10	antilgbt	0.833809	0.923832	0.804722
11	antivaxx	0.167864	0.619060	0.013189
12	voterfraud	0.803212	0.824749	0.808683
13	coronavirus	0.919319	0.982029	0.968285
14	qanon	0.254948	0.586386	0.282811
15	votinglaws	0.433877	0.619719	0.452582
16	antiimmigrant	0.669999	0.760519	0.628547
17	antimuslim	0.795980	0.881814	0.696317
18	antiasian	0.541285	0.792892	0.647761
19	bigtech	0.845434	0.861579	0.709956

[13]:
```
ratio_raw
```

[13]:

	rating	biden	pseudoscience	misogyny	climatedenial	antilatinx	\
0	N	0.919980	0.360007	0.764646	0.368069	0.818760	
1	R	0.853439	0.612496	0.729980	0.564101	0.868845	
2	T	0.891272	0.365990	0.645050	0.273105	0.919546	

	5g	whitesupremacy	antiblack	aliens	…	antilgbt	antivaxx	\
0	0.338616	0.911918	0.703636	0.000000	…	0.833809	0.167864	
1	0.481442	0.961551	0.720163	0.310949	…	0.923832	0.619060	
2	0.079906	0.926990	0.513849	0.000000	…	0.804722	0.013189	

	voterfraud	coronavirus	qanon	votinglaws	antiimmigrant	antimuslim	\
0	0.803212	0.919319	0.254948	0.433877	0.669999	0.795980	
1	0.824749	0.982029	0.586386	0.619719	0.760519	0.881814	
2	0.808683	0.968285	0.282811	0.452582	0.628547	0.696317	

	antiasian	bigtech
0	0.541285	0.845434
1	0.792892	0.861579
2	0.647761	0.709956

[3 rows x 21 columns]

[14]:
```
link_topic_count
```

[14]:

rating	biden	pseudoscience	misogyny	climatedenial	antilatinx	5g	\
N	119820.0	46888.0	99589.0	47938.0	106637.0	44102.0	
R	59553.0	42740.0	50938.0	39363.0	60628.0	33595.0	
T	63455.0	26057.0	45925.0	19444.0	65468.0	5689.0	

rating	whitesupremacy	antiblack	aliens	antisemitic	antilgbt	antivaxx	\
N	118770.0	91643.0	0.0	99277.0	108597.0	21863.0	
R	67097.0	50253.0	21698.0	62354.0	64465.0	43198.0	
T	65998.0	36584.0	0.0	50384.0	57293.0	939.0	

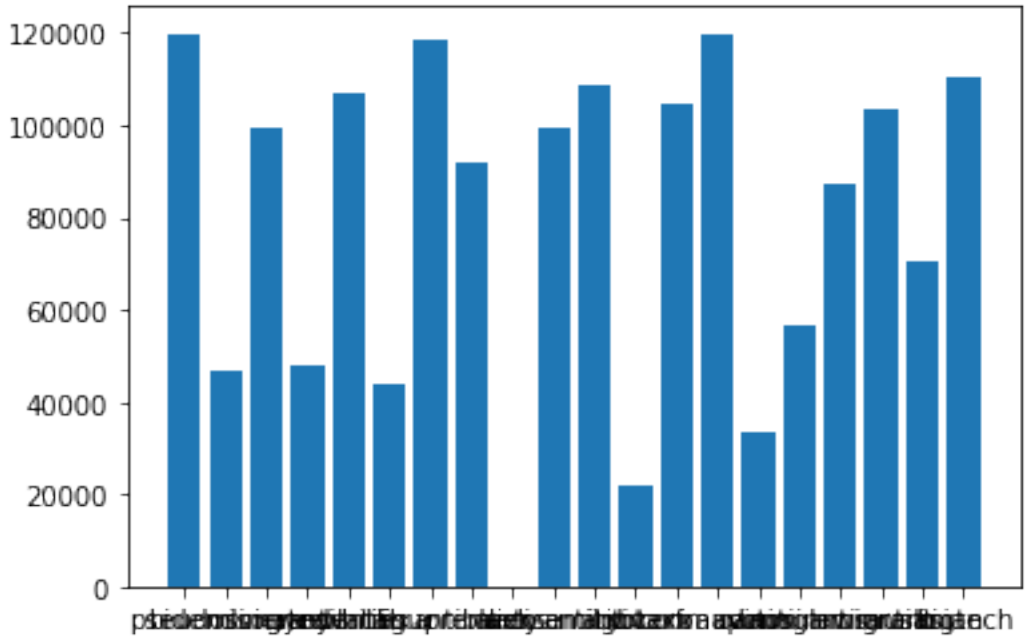
rating	voterfraud	coronavirus	qanon	votinglaws	antiimmigrant	\
N	104612.0	119734.0	33205.0	56509.0	87262.0	
R	57551.0	68526.0	40918.0	43244.0	53069.0	
T	57575.0	68938.0	20135.0	32222.0	44750.0	

rating	antimuslim	antiasian	bigtech
N	103670.0	70498.0	110111.0

```
R          61533.0    55328.0   60121.0
T          49575.0    46118.0   50546.0
```

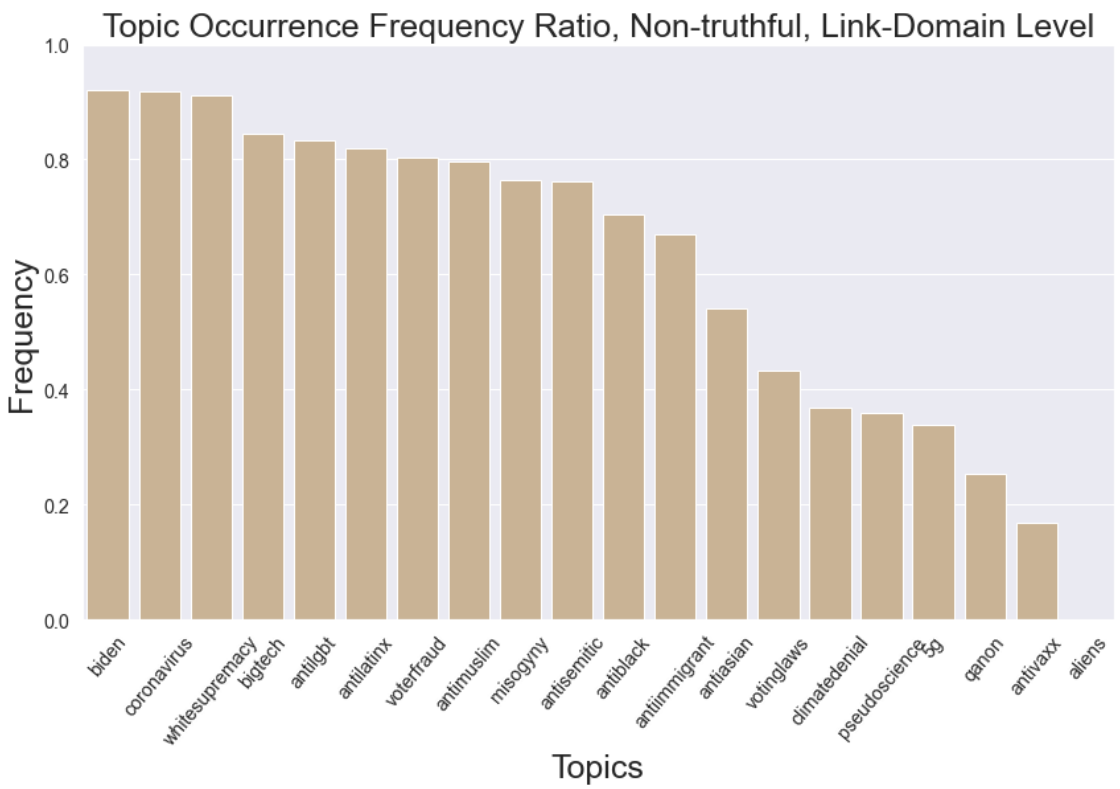
[15]:
```
plt.bar(link_topic_count.columns, link_topic_count.iloc[0,:])
```

[15]:
```
<BarContainer object of 20 artists>
```



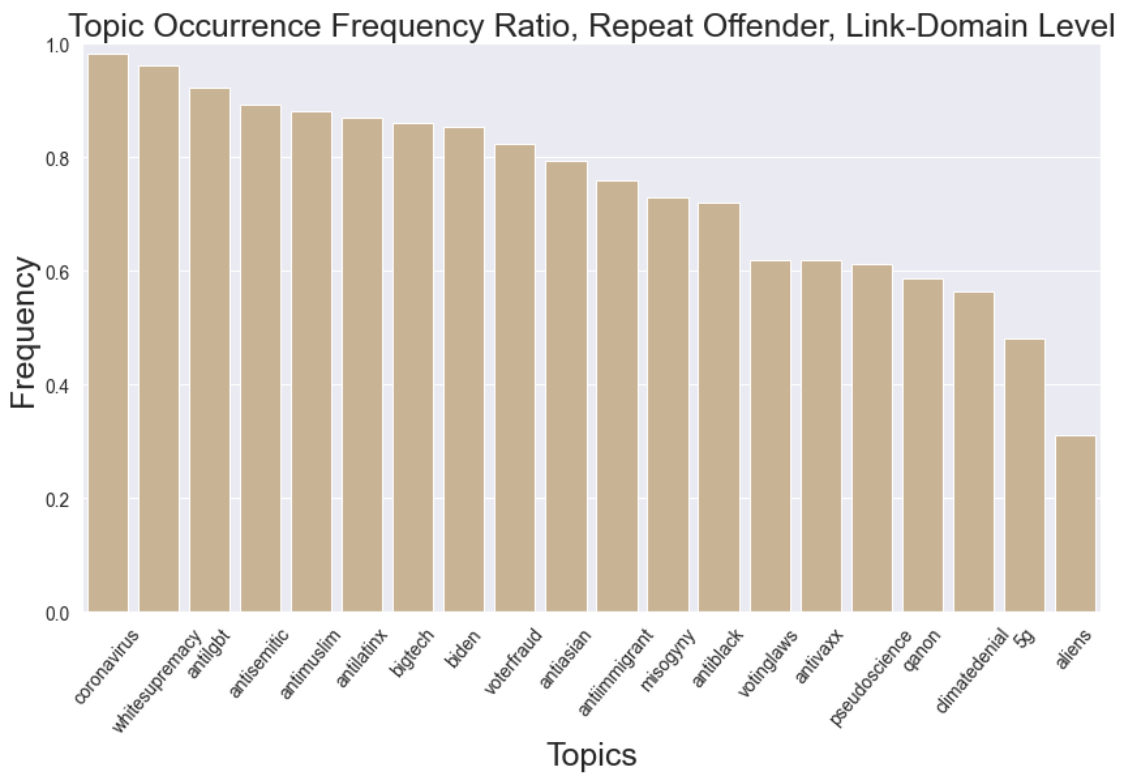
[23]:
```
sns.set(rc = {'figure.figsize':(14,8)}, font_scale = 1.3)
grp_order = ratio.sort_values(['N'], ascending=False).
 ↪reset_index(drop=True)['index']
ax = sns.barplot(x='index', y='N',
            data=ratio, order=grp_order, color = 'tan')
ax.set_xticklabels(ax.get_xticklabels(),rotation = 50)
ax.set(ylim=(0, 1))
ax.set_xlabel('Topics', fontsize = 25)
ax.set_ylabel('Frequency', fontsize = 25)
ax.set_title('Topic Occurrence Frequency Ratio, Non-truthful, Link-Domain␣
 ↪Level', fontsize = 25)
ax
```

[23]:
```
<AxesSubplot:title={'center':'Topic Occurrence Frequency Ratio, Non-truthful,
Link-Domain Level'}, xlabel='Topics', ylabel='Frequency'>
```



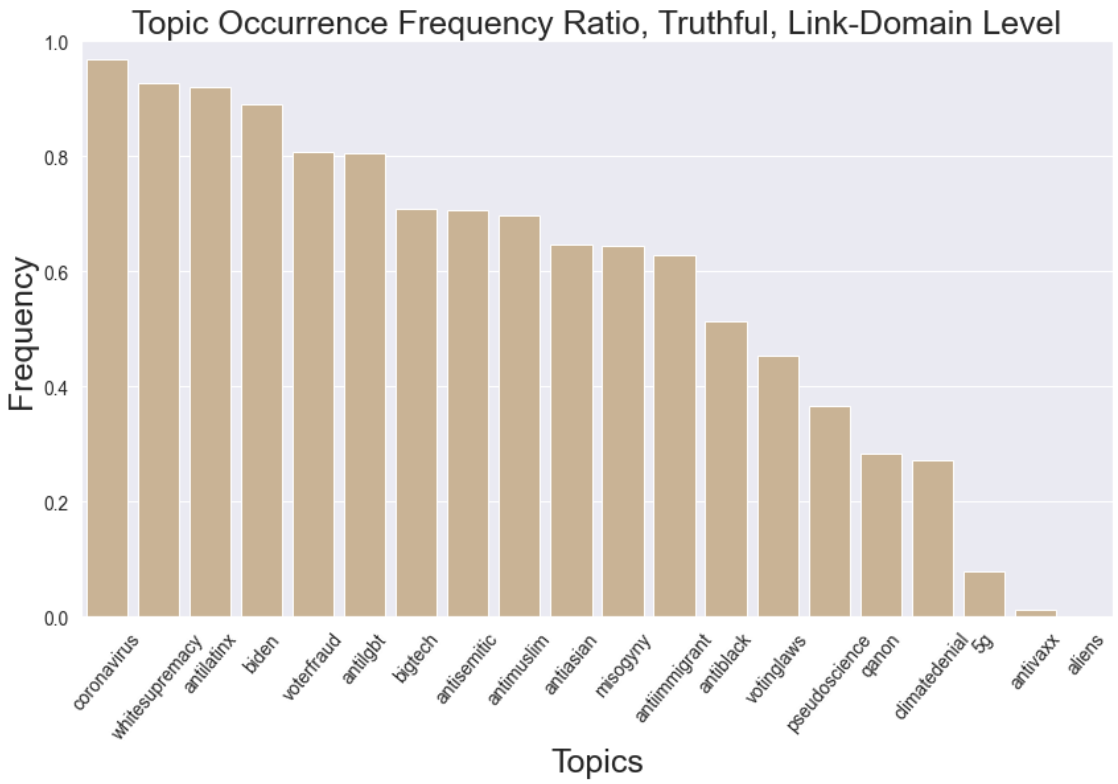
[24]:
```
sns.set(rc = {'figure.figsize':(14,8)}, font_scale = 1.25)
grp_order = ratio.sort_values(['R'], ascending=False).
 ↪reset_index(drop=True)['index']
ax = sns.barplot(x='index', y='R',
            data=ratio, order=grp_order, color = 'tan')
ax.set_xticklabels(ax.get_xticklabels(),rotation = 50)
ax.set(ylim=(0, 1))
ax.set_xlabel('Topics', fontsize = 25)
ax.set_ylabel('Frequency', fontsize = 25)
ax.set_title('Topic Occurrence Frequency Ratio, Repeat Offender, Link-Domain␣
 ↪Level', fontsize = 25)
ax
```

[24]:
```
<AxesSubplot:title={'center':'Topic Occurrence Frequency Ratio, Repeat Offender,
Link-Domain Level'}, xlabel='Topics', ylabel='Frequency'>
```



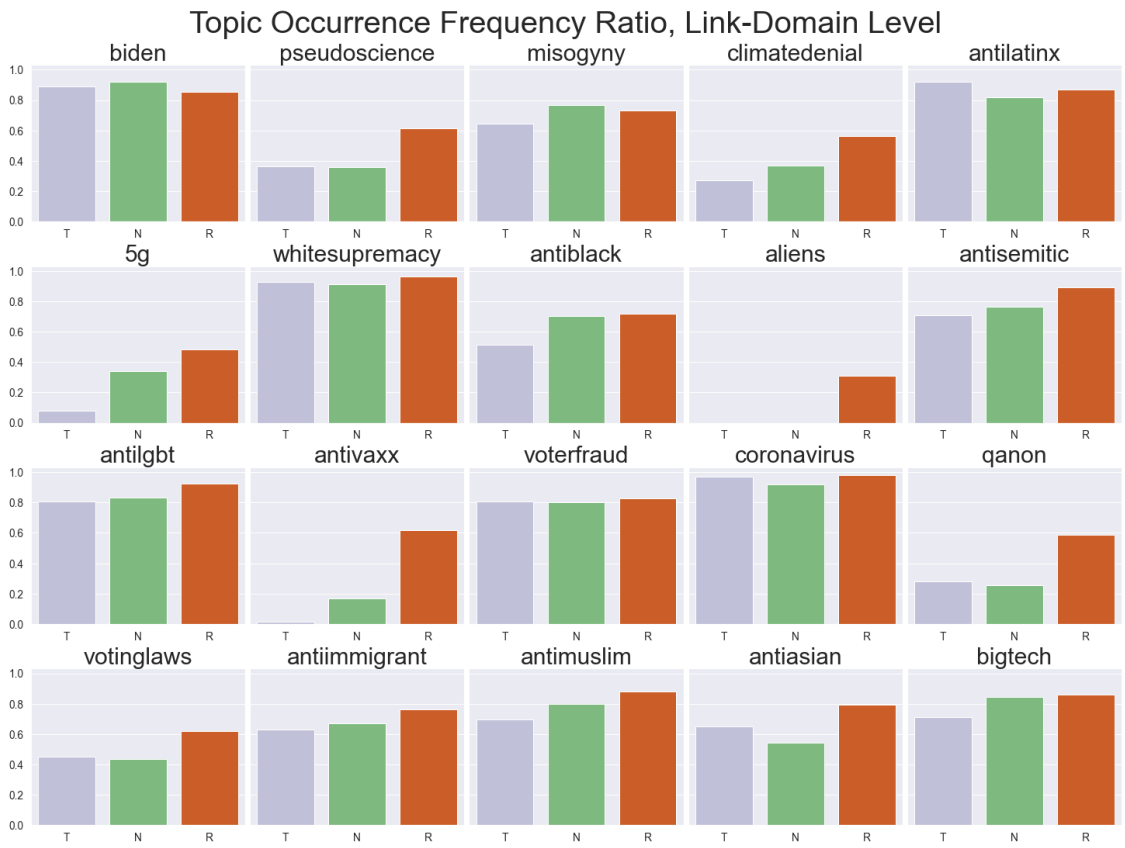
[25]:
```
sns.set(rc = {'figure.figsize':(14,8)}, font_scale = 1.25)
grp_order = ratio.sort_values(['T'], ascending=False).
 ↪reset_index(drop=True)['index']
ax = sns.barplot(x='index', y='T',
            data=ratio, order=grp_order, color = 'tan')
ax.set_xticklabels(ax.get_xticklabels(),rotation = 50)
ax.set(ylim=(0, 1))
ax.set_xlabel('Topics', fontsize = 25)
ax.set_ylabel('Frequency', fontsize = 25)
ax.set_title('Topic Occurrence Frequency Ratio, Truthful, Link-Domain Level',␣
 ↪fontsize = 25)
ax
```

[25]:
```
<AxesSubplot:title={'center':'Topic Occurrence Frequency Ratio, Truthful, Link-
Domain Level'}, xlabel='Topics', ylabel='Frequency'>
```



[26]:
```
topics = ['biden', 'pseudoscience', 'misogyny', 'climatedenial','antilatinx',
          '5g', 'whitesupremacy', 'antiblack', 'aliens','antisemitic',␣
 ↪'antilgbt',
          'antivaxx', 'voterfraud', 'coronavirus','qanon', 'votinglaws',␣
 ↪'antiimmigrant',
          'antimuslim', 'antiasian','bigtech']
plt.subplots_adjust(bottom = 0.5, top = 0.9)
fig, axes = plt.subplots(4, 5, figsize=(20, 15), sharey=True,␣
 ↪constrained_layout=True)
fig.suptitle('Topic Occurrence Frequency Ratio, Link-Domain Level', fontsize=40)
for i in range(20):
    t = topics[i]
    sns.barplot(ax=axes[i//5, i%5], x='rating', y=t,
                data=ratio_raw, order = ['T', 'N', 'R'], palette = 'tab20c_r')
    axes[i//5, i%5].set_title(t,fontsize=30)
    axes[i//5, i%5].set_xlabel('')
    axes[i//5, i%5].set_ylabel('')
```

```
<Figure size 1008x576 with 0 Axes>
```



[27]:
```
topic_data = pd.read_csv('topicDF.csv').iloc[:,1:]
```

[28]:
```
topic_data
```

[28]:

	domain	bigtech	5g	pseudoscience	antiblack	\
0	westernjournal.com	1	0	1	1	
1	theepochtimes.com	1	1	1	1	
2	bongino.com	0	0	0	0	
3	politicalflare.com	1	0	1	1	
4	breitbart.com	1	1	1	1	
..	…	…	..	…	…	
258	activistmommy.com	0	0	0	0	
259	wisemindhealthybody.com	0	0	1	0	
260	worldhealth.net	0	0	1	0	
261	healthy-holistic-living.com	0	0	1	0	
262	dailyhealthpost.com	0	0	1	0	

	antiasian	antivaxx	antisemitic	antiimmigrant	biden	…	\
0	1	0	1	1	1	…	
1	1	1	1	1	1	…	
2	0	0	0	0	0	…	

```
3            1         0            1              1      1  …
4            1         0            1              1      1  …
..         …       …          …            …    …  …
258          0         0            0              0      0  …
259          0         0            0              0      0  …
260          0         0            0              0      0  …
261          0         0            0              0      0  …
262          0         0            0              0      1  …

     climatedenial  qanon  aliens  votinglaws  voterfraud  antimuslim  \
0                1      1       0           1           1           1
1                1      0       0           1           1           1
2                0      0       0           0           0           0
3                0      1       0           0           1           1
4                1      1       0           1           1           1
..             …    …     …         …         …         …
258              0      0       0           0           0           0
259              0      0       0           0           0           0
260              0      0       0           0           0           0
261              0      0       0           0           0           0
262              0      0       0           0           0           0

     whitesupremacy  misogyny  antilgbt  antilatinx
0                 1         1         1           1
1                 1         1         1           1
2                 0         0         0           0
3                 1         1         1           1
4                 1         1         1           1
..              …       …       …         …
258               1         0         0           0
259               0         0         0           0
260               0         0         0           0
261               0         0         0           0
262               0         0         0           0

[263 rows x 21 columns]
```

[29]:
```
sub_data_domain = data.loc[:,['rating','domain']]
topic_data_rating = topic_data.merge(sub_data_domain, on='domain',how='inner')\
                    .drop_duplicates().reset_index().iloc[:,1:]
topic_data_rating
```

[29]:
```
                        domain  bigtech  5g  pseudoscience  antiblack  \
0             westernjournal.com        1   0              1          1
1              theepochtimes.com        1   1              1          1
2                    bongino.com        0   0              0          0
3             politicalflare.com        1   0              1          1
```

```
4                  breitbart.com        1   1              1          1
..                               …      …  ..            …        …
258            activistmommy.com        0   0              0          0
259      wisemindhealthybody.com        0   0              1          0
260              worldhealth.net        0   0              1          0
261  healthy-holistic-living.com        0   0              1          0
262          dailyhealthpost.com        0   0              1          0

     antiasian  antivaxx  antisemitic  antiimmigrant  biden  …  qanon  \
0            1         0            1              1      1  …      1
1            1         1            1              1      1  …      0
2            0         0            0              0      0  …      0
3            1         0            1              1      1  …      1
4            1         0            1              1      1  …      1
..         …       …          …            …    …  …    …
258          0         0            0              0      0  …      0
259          0         0            0              0      0  …      0
260          0         0            0              0      0  …      0
261          0         0            0              0      0  …      0
262          0         0            0              0      1  …      0

     aliens  votinglaws  voterfraud  antimuslim  whitesupremacy  misogyny  \
0         0           1           1           1               1         1
1         0           1           1           1               1         1
2         0           0           0           0               0         0
3         0           0           1           1               1         1
4         0           1           1           1               1         1
..      …          …          …         …             …        …
258       0           0           0           0               1         0
259       0           0           0           0               0         0
260       0           0           0           0               0         0
261       0           0           0           0               0         0
262       0           0           0           0               0         0

     antilgbt  antilatinx  rating
0           1           1       T
1           1           1       N
2           0           0       N
3           1           1       T
4           1           1       N
..        …          …     …
258         0           0       T
259         0           0       R
260         0           0       R
261         0           0       R
262         0           0       R
```

```
[263 rows x 22 columns]
```

[30]:
```
domain_rating_topic_count = topic_data_rating.drop('domain',axis=1).
 ↪groupby('rating').count()
domain_rating_topic_sum = topic_data_rating.drop('domain',axis=1).
 ↪groupby('rating').sum()
```

[31]:
```
domain_rating_topic_ratio = domain_rating_topic_sum/domain_rating_topic_count
domain_rating_topic_ratio = domain_rating_topic_ratio.reset_index()
domain_rating_topic_ratio
```

[31]:
```
  rating   bigtech        5g  pseudoscience  antiblack  antiasian  antivaxx  \
0      N  0.528571  0.042857       0.114286   0.328571   0.314286  0.057143
1      R  0.685484  0.282258       0.435484   0.427419   0.540323  0.403226
2      T  0.536232  0.115942       0.144928   0.333333   0.333333  0.043478

   antisemitic  antiimmigrant     biden  …  climatedenial     qanon  \
0     0.442857       0.357143  0.857143  …       0.071429  0.071429
1     0.629032       0.362903  0.725806  …       0.201613  0.266129
2     0.579710       0.304348  0.840580  …       0.086957  0.130435

     aliens  votinglaws  voterfraud  antimuslim  whitesupremacy  misogyny  \
0  0.000000    0.171429    0.685714    0.514286        0.814286  0.342857
1  0.040323    0.201613    0.629032    0.556452        0.733871  0.370968
2  0.000000    0.173913    0.666667    0.550725        0.855072  0.376812

   antilgbt  antilatinx
0  0.542857    0.514286
1  0.604839    0.467742
2  0.681159    0.579710

[3 rows x 21 columns]
```

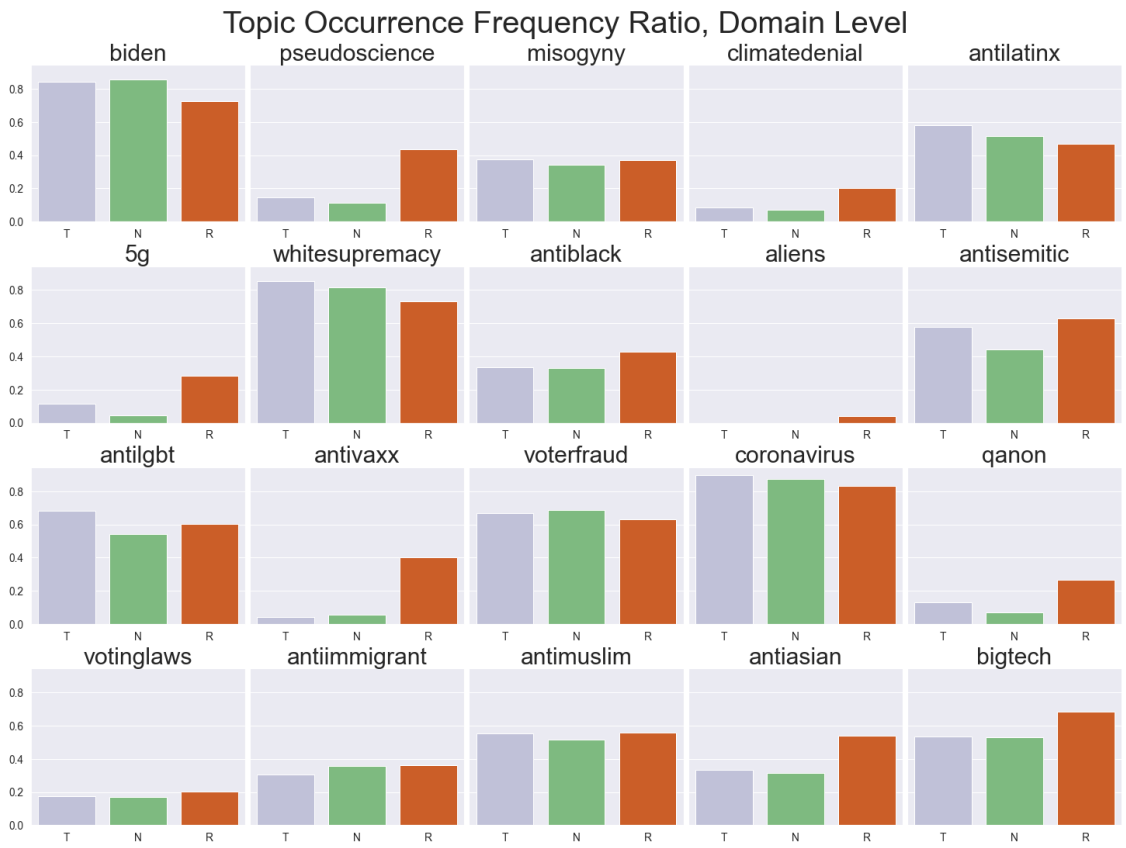
[32]:
```
domain_rating_topic_ratio_T = domain_rating_topic_sum/domain_rating_topic_count
domain_rating_topic_ratio_T = domain_rating_topic_ratio_T.transpose()
domain_rating_topic_ratio_T = domain_rating_topic_ratio_T.reset_index()
domain_rating_topic_ratio_T
```

[32]:
```
rating           index         N         R         T
0              bigtech  0.528571  0.685484  0.536232
1                   5g  0.042857  0.282258  0.115942
2        pseudoscience  0.114286  0.435484  0.144928
3            antiblack  0.328571  0.427419  0.333333
4            antiasian  0.314286  0.540323  0.333333
5             antivaxx  0.057143  0.403226  0.043478
6          antisemitic  0.442857  0.629032  0.579710
7        antiimmigrant  0.357143  0.362903  0.304348
```

8	biden	0.857143	0.725806	0.840580
9	coronavirus	0.871429	0.830645	0.898551
10	climatedenial	0.071429	0.201613	0.086957
11	qanon	0.071429	0.266129	0.130435
12	aliens	0.000000	0.040323	0.000000
13	votinglaws	0.171429	0.201613	0.173913
14	voterfraud	0.685714	0.629032	0.666667
15	antimuslim	0.514286	0.556452	0.550725
16	whitesupremacy	0.814286	0.733871	0.855072
17	misogyny	0.342857	0.370968	0.376812
18	antilgbt	0.542857	0.604839	0.681159
19	antilatinx	0.514286	0.467742	0.579710

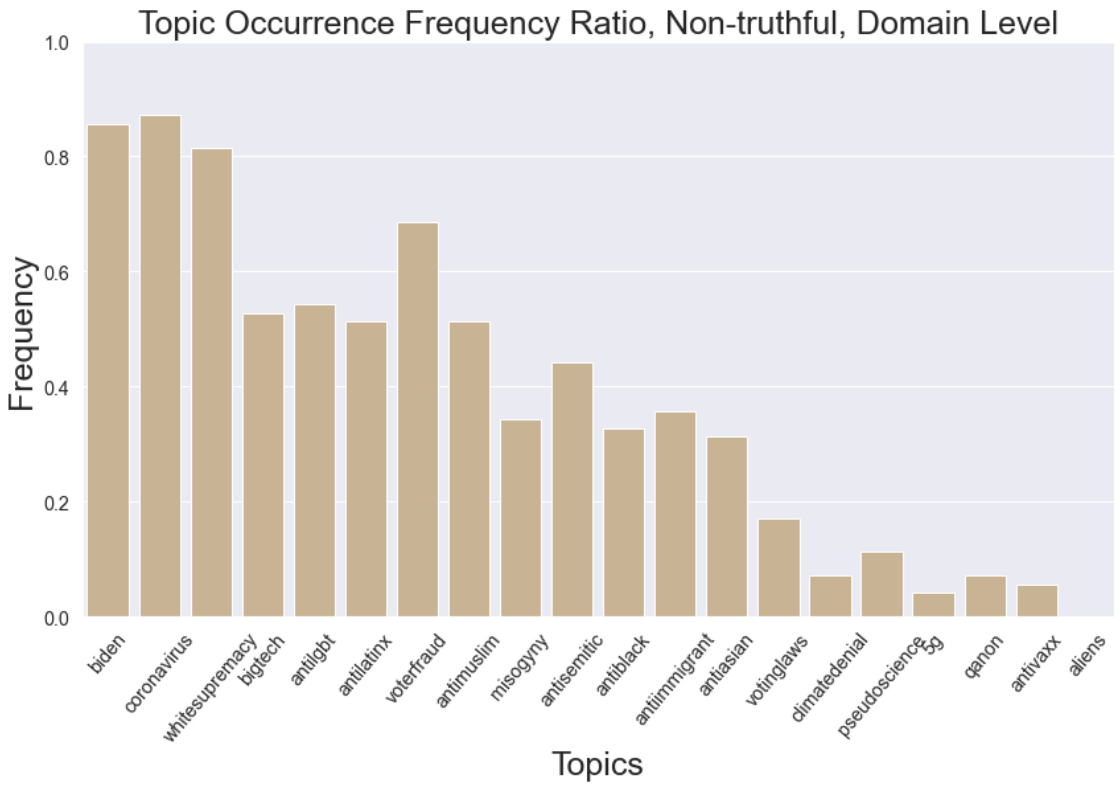
[33]:
```
plt.subplots_adjust(bottom = 0.5, top = 0.9)
fig, axes = plt.subplots(4, 5, figsize=(20, 15), sharey=True,␣
↪constrained_layout=True)
fig.suptitle('Topic Occurrence Frequency Ratio, Domain Level', fontsize=40)
for i in range(20):
    t = topics[i]
    sns.barplot(ax=axes[i//5, i%5], x='rating', y=t,
                data=domain_rating_topic_ratio, order = ['T', 'N', 'R'],␣
↪palette = 'tab20c_r')
    axes[i//5, i%5].set_title(t,fontsize=30)
    axes[i//5, i%5].set_xlabel('')
    axes[i//5, i%5].set_ylabel('')
```

```
<Figure size 1008x576 with 0 Axes>
```



[34]:
```
sns.set(rc = {'figure.figsize':(14,8)}, font_scale = 1.3)
#grp_order = domain_rating_topic_ratio_T.sort_values(['N'], ascending=False).
 ↪reset_index(drop=True)['index']
grp_order = ratio.sort_values(['N'], ascending=False).
 ↪reset_index(drop=True)['index']
ax = sns.barplot(x='index', y='N',
            data=domain_rating_topic_ratio_T, order=grp_order, color = 'tan')
ax.set_xticklabels(ax.get_xticklabels(),rotation = 50)
ax.set(ylim=(0, 1))
ax.set_xlabel('Topics', fontsize = 25)
ax.set_ylabel('Frequency', fontsize = 25)
ax.set_title('Topic Occurrence Frequency Ratio, Non-truthful, Domain Level',␣
 ↪fontsize = 25)
ax
```

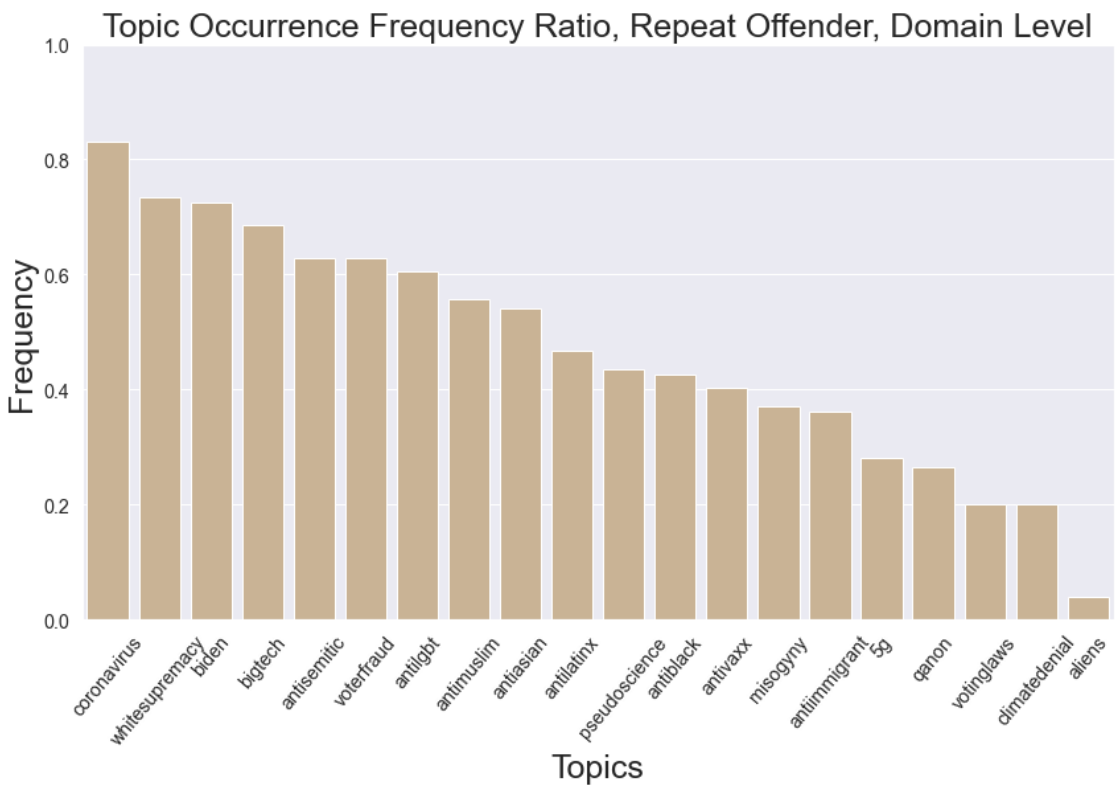
[34]:
```
<AxesSubplot:title={'center':'Topic Occurrence Frequency Ratio, Non-truthful,
Domain Level'}, xlabel='Topics', ylabel='Frequency'>
```



[37]:
```
sns.set(rc = {'figure.figsize':(14,8)}, font_scale = 1.3)
grp_order = domain_rating_topic_ratio_T.sort_values(['R'], ascending=False).
 ↪reset_index(drop=True)['index']
#grp_order = ratio.sort_values(['R'], ascending=False).
 ↪reset_index(drop=True)['index']

ax = sns.barplot(x='index', y='R',
            data=domain_rating_topic_ratio_T, order=grp_order, color = 'tan')
ax.set_xticklabels(ax.get_xticklabels(),rotation = 50)
ax.set(ylim=(0, 1))
ax.set_xlabel('Topics', fontsize = 25)
ax.set_ylabel('Frequency', fontsize = 25)
ax.set_title('Topic Occurrence Frequency Ratio, Repeat Offender, Domain Level',␣
 ↪fontsize = 25)
ax
```

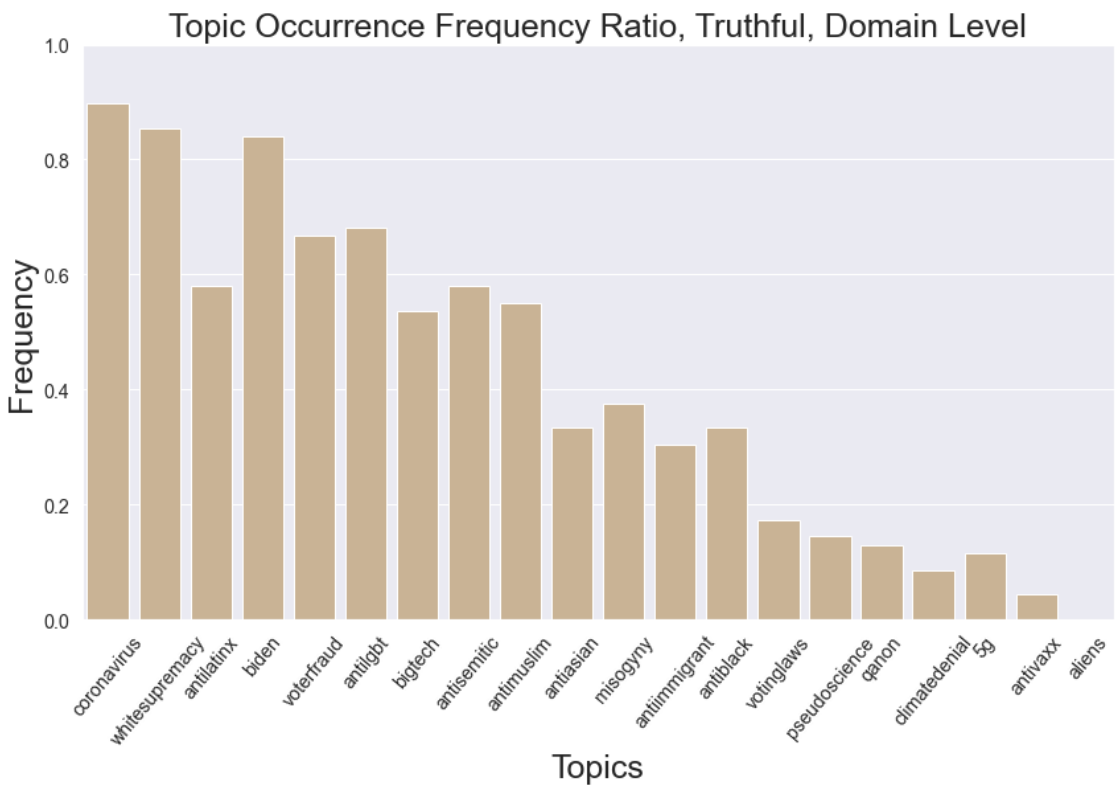
[37]:
```
<AxesSubplot:title={'center':'Topic Occurrence Frequency Ratio, Repeat Offender,
Domain Level'}, xlabel='Topics', ylabel='Frequency'>
```



[36]:
```
sns.set(rc = {'figure.figsize':(14,8)}, font_scale = 1.3)
#grp_order = domain_rating_topic_ratio_T.sort_values(['T'], ascending=False).
 ↪reset_index(drop=True)['index']
grp_order = ratio.sort_values(['T'], ascending=False).
 ↪reset_index(drop=True)['index']

ax = sns.barplot(x='index', y='T',
            data=domain_rating_topic_ratio_T, order=grp_order, color = 'tan')
ax.set_xticklabels(ax.get_xticklabels(),rotation = 50)
ax.set(ylim=(0, 1))
ax.set_xlabel('Topics', fontsize = 25)
ax.set_ylabel('Frequency', fontsize = 25)
ax.set_title('Topic Occurrence Frequency Ratio, Truthful, Domain Level',␣
 ↪fontsize = 25)
ax
```

[36]:
```
<AxesSubplot:title={'center':'Topic Occurrence Frequency Ratio, Truthful, Domain
Level'}, xlabel='Topics', ylabel='Frequency'>
```


Topic Occurrence Frequency Ratio, Truthful, Domain Level
Frequency
1.0
0.8
0.6
0.4
0.2
0.0
coronavirus
whitesupremacy
antilatinx
biden
voterfraud
antilgbt
bigtech
antisemitic
antimuslim
antiasian
misogyny
antiimmigrant
antiblack
votinglaws
pseudoscience
qanon
climatedenial
5g
antivaxx
aliens
Topics

[ ]: