H4 - Amount of speech variation of seasons

In [24]:

```
import pandas as pd
import csv
import numpy as np
import pandas as pd
```

In [25]:

```
def amount_of_speech_over_seasons(season):
    df= pd.read_csv("../clean_data/csv/S"+str(season)+"-E1-clean.csv",
                    names=["character","text"], header=0)
    episode=2
    while episode <=30:
        file= "../clean_data/csv/S"+str(season)+"-E"+str(episode)+"-clean.csv"
        try:
            temp_df = pd.read_csv(file, names=["character","text"], header=0)
            df=df.append(temp_df)
            episode= episode+1
        except:
            episode= episode+1
    df=df.reset_index(drop=True)
    #-- Add column with word count
    words = df.text
    column_name='word_count_S'+str(season)
    df[column_name] = words.apply(lambda x: len(x.split()))
    # characters sorted by total word count
    total_word_count_per_character=df[['character', column_name]].groupby(
        'character').sum().sort_values(by=column_name,
                                       ascending=False).reset_index()

    return total_word_count_per_character
```

In [26]:

```
def all_characters_seasons():
    df_seasons= pd.DataFrame(columns=['character', 'text'])
    season=1
    while season<10:
        episode=1
        while episode <=30:
            file= "../clean_data/csv/S"+str(season)+"-E"+str(episode)+"-clean.csv'
            try:
                temp_df = pd.read_csv(file,
                                      names=["character","text"]
                                      , header=0)
                df_seasons=df_seasons.append(temp_df)
                episode= episode+1
            except:
                episode= episode+1
        df_seasons=df_seasons.reset_index(drop=True)
        season=season+1
        # characters sorted by total word count
    all_character=df_seasons[['character']]
    return all_character
```

In [27]:

```
all_characters = all_characters_seasons()
all_characters =all_characters.groupby('character').sum()
season=1
while season<10:
    temp=amount_of_speech_over_seasons(season)
    column_name='word_count_S'+str(season)
    word_count = temp[column_name]
    all_characters = pd.merge(all_characters,
                              temp,
                              on="character",
                              how="outer")

    season=season+1

all_characters = all_characters.fillna(0)
all_characters =all_characters.sort_values('word_count_S1',
                                           ascending=False).reset_index()
all_characters.drop('index', axis=1, inplace=True)
```

In [28]:

```
first_five=all_characters.head(5)
first_five
```

Out[28]:

	character	word_count_S1	word_count_S2	word_count_S3	word_count_S4	word_count_S5
0	jack_o_neill	14951.0	12524.0	12901.0	14945.0	15291.0
1	daniel_jackson	14002.0	11632.0	11122.0	12240.0	11933.0
2	samantha_carter	12411.0	14331.0	10939.0	13955.0	14956.0
3	hammond	6523.0	7323.0	4145.0	2826.0	5224.0
4	teal_c	5631.0	5682.0	4490.0	5058.0	4205.0

In [29]:

```
jack_o_neill=[first_five["word_count_S1"][0],
              first_five["word_count_S2"][0],
              first_five["word_count_S3"][0],
              first_five["word_count_S4"][0],
              first_five["word_count_S5"][0],
              first_five["word_count_S6"][0],
              first_five["word_count_S7"][0],
              first_five["word_count_S8"][0],
              first_five["word_count_S9"][0]]
jack_o_neill= pd.DataFrame(jack_o_neill,
                           columns=[first_five["character"][0]])
jack_o_neill.index += 1
jack_o_neill
```

Out[29]:

	jack_o_neill
1	14951.0
2	12524.0
3	12901.0
4	14945.0
5	15291.0

	jack_o_neill
6	12245.0
7	9666.0
8	8415.0

In [30]:

```
daniel_jackson=[first_five["word_count_S1"][1],
                first_five["word_count_S2"][1],
                first_five["word_count_S3"][1],
                first_five["word_count_S4"][1],
                first_five["word_count_S5"][1],
                first_five["word_count_S6"][1],
                first_five["word_count_S7"][1],
                first_five["word_count_S8"][1],
                first_five["word_count_S9"][1]]
daniel_jackson= pd.DataFrame(daniel_jackson,
                             columns=[first_five["character"][1]])
daniel_jackson.index += 1
daniel_jackson
```

Out[30]:

	daniel_jackson
1	14002.0
2	11632.0
3	11122.0
4	12240.0
5	11933.0
6	2629.0
7	14150.0
8	10031.0
9	9519.0

In [31]:

```
samantha_carter=[first_five["word_count_S1"][2],
                 first_five["word_count_S2"][2],
                 first_five["word_count_S3"][2],
                 first_five["word_count_S4"][2],
                 first_five["word_count_S5"][2],
                 first_five["word_count_S6"][2],
                 first_five["word_count_S7"][2],
                 first_five["word_count_S8"][2],
                 first_five["word_count_S9"][2]]
samantha_carter= pd.DataFrame(samantha_carter,
                              columns=[first_five["character"][2]])
samantha_carter.index += 1
samantha_carter
```

Out[31]:

	samantha_carter
1	12411.0
2	14331.0
3	10939.0

	samantha_carter
4	13955.0
5	14956.0
6	14744.0
7	14756.0
8	12033.0

In [32]:

```python
hammond=[first_five["word_count_S1"][3],
         first_five["word_count_S2"][3],
         first_five["word_count_S3"][3],
         first_five["word_count_S4"][3],
         first_five["word_count_S5"][3],
         first_five["word_count_S6"][3],
         first_five["word_count_S7"][3],
         first_five["word_count_S8"][3],
         first_five["word_count_S9"][3]]
hammond= pd.DataFrame(hammond,
                      columns=[first_five["character"][3]])
hammond.index += 1
hammond
```

Out[32]:

	hammond
1	6523.0
2	7323.0
3	4145.0
4	2826.0
5	5224.0
6	4834.0
7	5019.0
8	675.0
9	83.0

In [33]:

```python
teal_c=[first_five["word_count_S1"][4],
        first_five["word_count_S2"][4],
        first_five["word_count_S3"][4],
        first_five["word_count_S4"][4],
        first_five["word_count_S5"][4],
        first_five["word_count_S6"][4],
        first_five["word_count_S7"][4],
        first_five["word_count_S8"][4],
        first_five["word_count_S9"][4]]
teal_c= pd.DataFrame(teal_c,
                     columns=[first_five["character"][4]])
teal_c.index += 1
teal_c
```

Out[33]:

	teal_c
1	5631.0

	teal_c
2	5682.0
3	4490.0
4	5058.0
5	4205.0
6	4746.0
7	4308.0
8	4829.0

In [34]:

```
all_five= jack_o_neill.join(daniel_jackson)
all_five= all_five.join(samantha_carter)
all_five= all_five.join(hammond)
all_five= all_five.join(teal_c)
all_five
```

Out[34]:

	jack_o_neill	daniel_jackson	samantha_carter	hammond	teal_c
1	14951.0	14002.0	12411.0	6523.0	5631.0
2	12524.0	11632.0	14331.0	7323.0	5682.0
3	12901.0	11122.0	10939.0	4145.0	4490.0
4	14945.0	12240.0	13955.0	2826.0	5058.0
5	15291.0	11933.0	14956.0	5224.0	4205.0
6	12245.0	2629.0	14744.0	4834.0	4746.0
7	9666.0	14150.0	14756.0	5019.0	4308.0
8	8415.0	10031.0	12033.0	675.0	4829.0
9	156.0	9519.0	3952.0	83.0	2672.0

In [35]:

```
all_characters =all_characters.sort_values('word_count_S6',
                                              ascending=False).reset_index()
all_characters.drop('index',
                    axis=1,
                    inplace=True)
all_characters.head(5)
```

Out[35]:

	character	word_count_S1	word_count_S2	word_count_S3	word_count_S4	word_count_S
0	samantha_carter	12411.0	14331.0	10939.0	13955.0	14956.
1	jack_o_neill	14951.0	12524.0	12901.0	14945.0	15291.
2	jonas	0.0	0.0	0.0	0.0	667.
3	hammond	6523.0	7323.0	4145.0	2826.0	5224.
4	teal_c	5631.0	5682.0	4490.0	5058.0	4205.

```
In [36]: jonas_quinn=[all_characters["word_count_S1"][2],
                      all_characters["word_count_S2"][2],
                      all_characters["word_count_S3"][2],
                      all_characters["word_count_S4"][2],
                      all_characters["word_count_S5"][2],
                      all_characters["word_count_S6"][2],
                      all_characters["word_count_S7"][2],
                      all_characters["word_count_S8"][2],
                      all_characters["word_count_S9"][2]]
         jonas_quinn= pd.DataFrame(jonas_quinn,
                                   columns=["jonas_quinn"])
         jonas_quinn.index += 1
         jonas_quinn
```

```
Out[36]:    jonas_quinn
         1          0.0
         2          0.0
         3          0.0
         4          0.0
         5        667.0
         6       9751.0
         7       2656.0
         8          0.0
         9          0.0
```

In [37]:

```
all_characters =all_characters.sort_values('word_count_S9',
                                           ascending=False).reset_index()
all_characters.drop('index', axis=1, inplace=True)
all_characters.head(5)

cameron_mitchell=[all_characters["word_count_S1"][1],
                  all_characters["word_count_S2"][1],
                  all_characters["word_count_S3"][1],
                  all_characters["word_count_S4"][1],
                  all_characters["word_count_S5"][1],
                  all_characters["word_count_S6"][1],
                  all_characters["word_count_S7"][1],
                  all_characters["word_count_S8"][1],
                  all_characters["word_count_S9"][1]]
cameron_mitchell= pd.DataFrame(cameron_mitchell,
                               columns=["cameron_mitchell"])
cameron_mitchell.index += 1
cameron_mitchell

vala_mal_doran=[all_characters["word_count_S1"][2],
                all_characters["word_count_S2"][2],
                all_characters["word_count_S3"][2],
                all_characters["word_count_S4"][2],
                all_characters["word_count_S5"][2],
                all_characters["word_count_S6"][2],
                all_characters["word_count_S7"][2],
                all_characters["word_count_S8"][2],
                all_characters["word_count_S9"][2]]
vala_mal_doran= pd.DataFrame(vala_mal_doran,
                             columns=["vala_mal_doran"])
vala_mal_doran.index += 1
vala_mal_doran

hank_landry=[all_characters["word_count_S1"][3],
             all_characters["word_count_S2"][3],
             all_characters["word_count_S3"][3],
             all_characters["word_count_S4"][3],
             all_characters["word_count_S5"][3],
             all_characters["word_count_S6"][3],
             all_characters["word_count_S7"][3],
             all_characters["word_count_S8"][3],
             all_characters["word_count_S9"][3]]
hank_landry= pd.DataFrame(hank_landry, columns=["hank_landry"])
hank_landry.index += 1
hank_landry
```

Out[37]:

	hank_landry
1	0.0
2	0.0
3	0.0
4	0.0
5	0.0
6	0.0
7	0.0
8	0.0

hank_landry

In [38]:

```
all_five= all_five.join(jonas_quinn)
all_five= all_five.join(cameron_mitchell)
all_five= all_five.join(vala_mal_doran)
all_five= all_five.join(hank_landry)
all_five
```

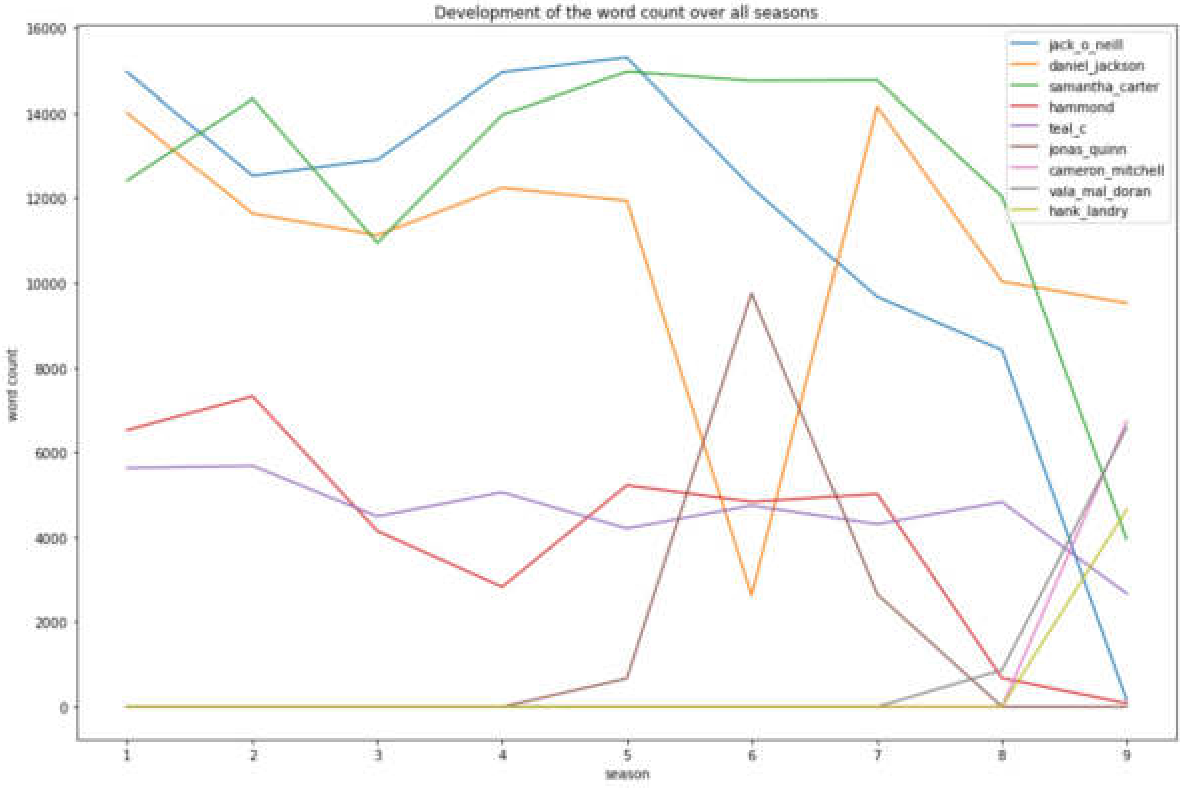
Out[38]:

	jack_o_neill	daniel_jackson	samantha_carter	hammond	teal_c	jonas_quinn	cameron_mitchell
1	14951.0	14002.0	12411.0	6523.0	5631.0	0.0	0.0
2	12524.0	11632.0	14331.0	7323.0	5682.0	0.0	0.0
3	12901.0	11122.0	10939.0	4145.0	4490.0	0.0	0.0
4	14945.0	12240.0	13955.0	2826.0	5058.0	0.0	0.0
5	15291.0	11933.0	14956.0	5224.0	4205.0	667.0	0.0
6	12245.0	2629.0	14744.0	4834.0	4746.0	9751.0	0.0
7	9666.0	14150.0	14756.0	5019.0	4308.0	2656.0	0.0
8	8415.0	10031.0	12033.0	675.0	4829.0	0.0	0.0
9	156.0	9519.0	3952.0	83.0	2672.0	0.0	6735.0

In [39]:

```
#Line plot
line_chart =all_five.plot.line(figsize=(15,10),
                               title="Development of the word count over all seas
line_chart.set_ylabel("word count")
line_chart.set_xlabel("season")
```

Out[39]: `Text(0.5, 0, 'season')`



In [40]:

```
#word count in relation to total amount of words spoken
total_words=[]
s=1
while s<10:
    column_name="word_count_S"+str(s)
    total_words_season = all_characters[column_name].sum()
    total_words.append(total_words_season)
    s=s+1
total_words
```

Out[40]:

```
[76413.0,
 77922.0,
 72920.0,
 82856.0,
 89922.0,
 89233.0,
 98728.0,
 64967.0,
 51121.0]
```

In [41]:

```
rel_word_count=all_five.copy()
rel_word_count
```

Out[41]:

	jack_o_neill	daniel_jackson	samantha_carter	hammond	teal_c	jonas_quinn	cameron_mitchell
1	14951.0	14002.0	12411.0	6523.0	5631.0	0.0	0.0
2	12524.0	11632.0	14331.0	7323.0	5682.0	0.0	0.0
3	12901.0	11122.0	10939.0	4145.0	4490.0	0.0	0.0
4	14945.0	12240.0	13955.0	2826.0	5058.0	0.0	0.0
5	15291.0	11933.0	14956.0	5224.0	4205.0	667.0	0.0
6	12245.0	2629.0	14744.0	4834.0	4746.0	9751.0	0.0
7	9666.0	14150.0	14756.0	5019.0	4308.0	2656.0	0.0
8	8415.0	10031.0	12033.0	675.0	4829.0	0.0	0.0
9	156.0	9519.0	3952.0	83.0	2672.0	0.0	6735.0

In [42]:

```
test= rel_word_count.values.tolist()
test[0]
```

Out[42]:

```
[14951.0, 14002.0, 12411.0, 6523.0, 5631.0, 0.0, 0.0, 0.0, 0.0]
```

In [43]:

```
list_relative_word_count=[]
row=[]
for x in test[0]:
    #print(x)
    x=x/total_words[0]*100
    row.append(x)
    #print(total_words[0])

list_relative_word_count.append(row)

row=[]
for x in test[1]:
    #print(x)
    x=x/total_words[1]*100
    row.append(x)
    #print(total_words[1])

list_relative_word_count.append(row)

row=[]
for x in test[2]:
    x=x/total_words[2]*100
    #print(total_words[2])
    row.append(x)
list_relative_word_count.append(row)

row=[]
for x in test[3]:
    x=x/total_words[3]*100
    #print(total_words[3])
    row.append(x)
list_relative_word_count.append(row)

row=[]
for x in test[4]:
    x=x/total_words[4]*100
    #print(total_words[4])
    row.append(x)
list_relative_word_count.append(row)

row=[]
for x in test[5]:
    x=x/total_words[5]*100
    #print(total_words[5])
    row.append(x)
list_relative_word_count.append(row)

row=[]
for x in test[6]:
    x=x/total_words[6]*100
    row.append(x)
list_relative_word_count.append(row)

row=[]
for x in test[7]:
    x=x/total_words[7]*100
    row.append(x)
list_relative_word_count.append(row)

row=[]
for x in test[8]:
    x=x/total_words[8]*100
    row.append(x)
list_relative_word_count.append(row)
```

In [44]:

```
list_relative_word_count[0]
```

Out[44]:

```
[19.56604242733566,
 18.324107154541768,
 16.242000706686035,
 8.536505568424221,
 7.369164932668524,
 0.0,
 0.0,
 0.0,
 0.0]
```

In [45]:

```
all_five_rel=pd.DataFrame(list_relative_word_count,
                          columns= ["jack_o_neill",
                                    "daniel_jackson",
                                    "samantha_carter",
                                    "hammond",
                                    "teal_c",
                                    "jonas_quinn",
                                    "cameron_mitchell",
                                    "vala_mal_doran",
                                    "hank_landry"])
all_five_rel.index += 1
all_five_rel
```

Out[45]:

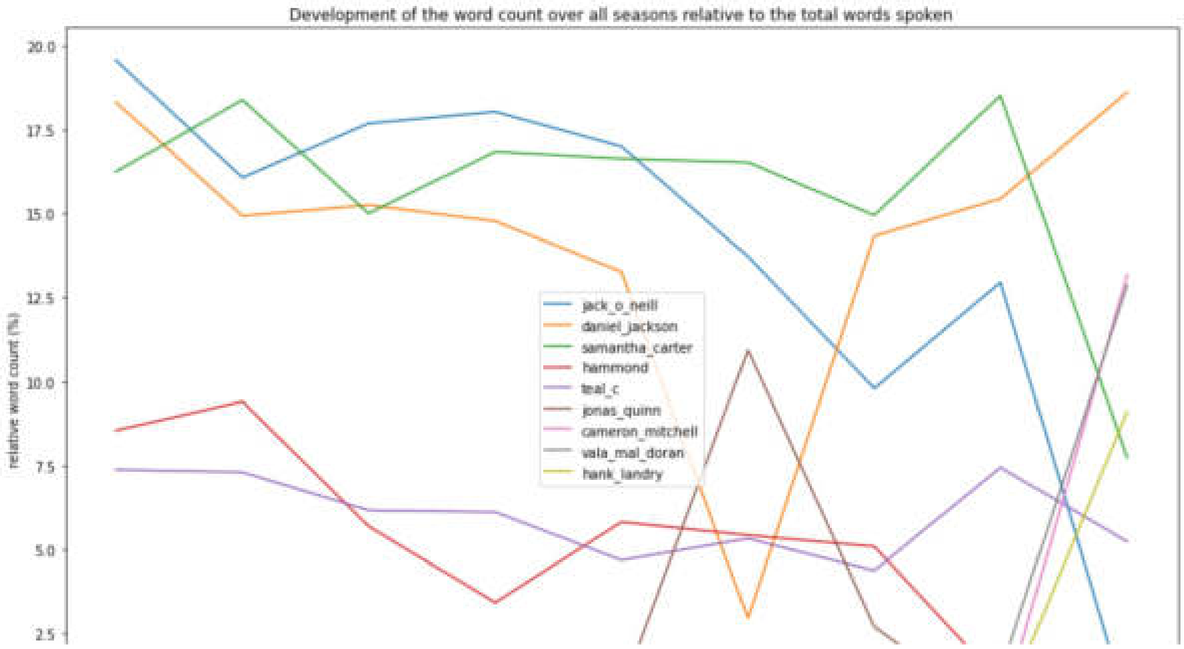
	jack_o_neill	daniel_jackson	samantha_carter	hammond	teal_c	jonas_quinn	cameron_mitch
1	19.566042	18.324107	16.242001	8.536506	7.369165	0.000000	0.0000
2	16.072483	14.927748	18.391468	9.397859	7.291907	0.000000	0.0000
3	17.691991	15.252331	15.001371	5.684312	6.157433	0.000000	0.0000
4	18.037318	14.772618	16.842474	3.410737	6.104567	0.000000	0.0000
5	17.004737	13.270390	16.632192	5.809479	4.676275	0.741754	0.0000
6	13.722502	2.946219	16.523035	5.417278	5.318660	10.927572	0.0000
7	9.790536	14.332307	14.946115	5.083664	4.363504	2.690220	0.0000
8	12.952730	15.440147	18.521711	1.038989	7.433004	0.000000	0.0000
9	0.305158	18.620528	7.730678	0.162360	5.226815	0.000000	13.1746

In [46]:

```
#line plot
line_chart =all_five_rel.plot.line(figsize=(15,10),
                                   title="Development of the word count over all
line_chart.set_ylabel("relative word count (%)")
line_chart.set_xlabel("season")
```

Out[46]:

```
Text(0.5, 0, 'season')
```


Development of the word count over all seasons relative to the total words spoken
relative word count (%)
20.0
17.5
15.0
12.5
10.0
7.5
5.0
2.5
jack_o_neill
daniel_jackson
samantha_carter
hammond
teal_c
jonas_quinn
cameron_mitchell
vala_mal_doran
hank_landry