

A more detailed exploration of MPs' attendance and speaking count

June 24, 2020

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1 Background context

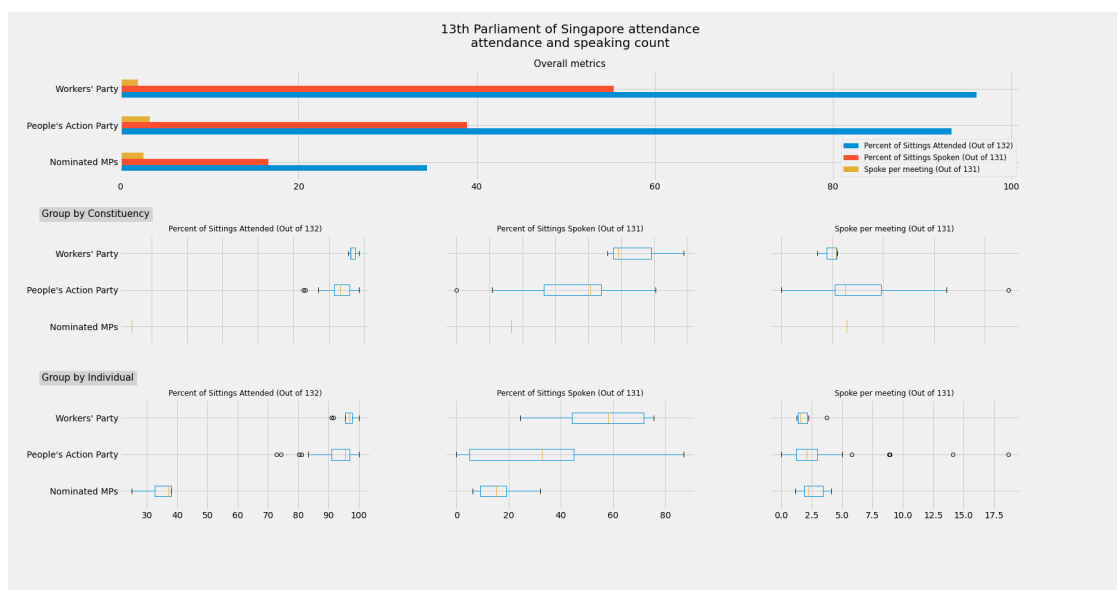
This is a report inspired by the Kopi.co (<https://thekopi.co/about/>)’s report on Singapore’s Members of Parliament, titled “How Active Are Your MPs in Parliament? Exploring MPs’ Attendance and Speaking Count”. Kopi’s report included two tables containing the count of attendance and speaking during parliament sitting for all MPs.

However, the original table presented by the Kopi is a bit hard to comprehend. Therefore, I have done some exploration based on the data provided by the Kopi.

I have not verified if the attendance and speaking counts are correct. I did however, found that one of the MPs profile was wrongly recorded. Assuming all counts are accurate, we might still underestimate the average performance of PAP here. The current cabinet members (including PM Lee) did not record any speaking counts. But I’m unsure of the reasons.

The dashboard here reflects the key findings in my report. For more detail breakdown, including the full table reports, please refer to section: Overall

Original report and data source: <https://thekopi.co/2020/06/23/singapore-parliament-performance/>



2 Library

```
[1]: import requests
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
plt.style.use('fivethirtyeight')
```

3 Data cleaning

The present Thirteenth Parliament has 100 MPs, consisting of 88 elected MPs, 3 Non-Constituency MPs (NCMPs) and 9 Nominated MPs (NMPs)

There are a total of 82 PAP, 9 WP and 9 NMP

<https://www.parliament.gov.sg/about-us/structure/members-of-parliament>

https://en.wikipedia.org/wiki/Parliament_of_Singapore

We will compare the entries in the Kopi with wikipedia page to determine if the entries in the Kopi is correct.

3.1 Load data

Loading data from the Kopi: <https://thekopi.co/2020/06/23/singapore-parliament-performance/>
and wikipedia page: https://en.wikipedia.org/wiki/List_of_members_of_the_13th_Parliament_of_Singapore

```
[2]: url = "https://thekopi.co/2020/06/23/singapore-parliament-performance/"
page = requests.get(url)
content = pd.read_html(page.content)
attendance = content[0]
speaking = content[1]
attendance = attendance[[
    'Party', 'Constituency', 'Name', 'Number of Sittings Attended (Out of 132)']
]]
```

```
[3]: mp_wiki = "https://en.wikipedia.org/wiki/"
      ↳List_of_members_of_the_13th_Parliament_of_Singapore"
mp_page = requests.get(mp_wiki)
mp_contet = pd.read_html(mp_page.content)
mp_names = mp_contet[1]
non_constituency_mp = mp_contet[2]
nmp_names = mp_contet[3]
```

3.2 First look at data

Let's check if the entries at wiki page are correct

```
[4]: mp_names.head()
```

```
[4]:
```

	Constituency	Party	Party.1	Name	Portrait	\
0	AljuniedGRC	NaN	WP	Chen Show Mao	NaN	
1	AljuniedGRC	NaN	WP	Sylvia Lim	NaN	
2	AljuniedGRC	NaN	WP	Low Thia Khian	NaN	
3	AljuniedGRC	NaN	WP	Muhamad Faisal bin Abdul Manap	-	
4	AljuniedGRC	NaN	WP	Pritam Singh	NaN	

	Date of birth(Age)	Ref
0	(59 years, 138 days)	[8]
1	(55 years, 87 days)	[9]
2	(63 years, 292 days)	[10][11]
3	(45 years, 17 days)	[12]
4	(43 years, 326 days)	[13]

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

```
[5]:
```

	Name	Portrait	Date of birth(Age)	Party	Party.1	\
0	Daniel Goh Pei Siong A	-	1973(46-47 years)	NaN	Workers' Party	
1	Leon Perera	-	1970(49-50 years)	NaN	Workers' Party	
2	Dennis Tan Lip Fong	-	1970(49-50 years)	NaN	Workers' Party	

	Ref
0	[125]
1	[126]
2	[127]

```
[6]: nmp_names.head()
```

```
[6]:
```

	Name	Date of birth(Age)	Ref
0	Azmoon Ahmad	1962(57-58 years)	[130]
1	Chia Yong Yong	10 October 1962(57 years, 257 days)	[131]
2	Thomas Chua Kee Seng	1 November 1954(65 years, 235 days)	[132]
3	Ganesh Rajaram	1967(52-53 years)	[133]
4	Kok Heng Leun	1966(53-54 years)	[134]

Let's standardise the Non constituency MP by changing their party name into WP (the naming used in mp_names)

```
[7]: non_constituency_mp['Party.1'] = "WP"
```

Let's standardise the NMPs by including a party name

```
[8]: nmp_names['Party.1'] = "Nominated MP"
```

Let's inspect the data

```
[9]: print('Number of')
print('MP: {} \n Non constituency MP: {} \n NMP: {}' \
```

```
.format(mp_names.shape[0], non_constituency_mp.shape[0], nmp_names.  
↪shape[0]))
```

Number of
MP: 89
Non constituency MP: 3
NMP: 9

```
[10]: (mp_names['Name'] == 'Seat Vacant').sum()
```

```
[10]: 1
```

There is one empty seat as Halimah Yacob step down as MP
<https://www.straitstimes.com/politics/halimah-yacob-steps-down-as-speaker-and-mp-resigns-from-pap-to-run-for-president>

```
[11]: #let's drop the row with vacant seats  
mp_names = mp_names[~(mp_names['Name'] == 'Seat Vacant')]
```

```
[12]: print('Number of')  
print('MP: {} \nNon constituency MP: {} \nNMP: {}' \n  
.format(mp_names.shape[0], non_constituency_mp.shape[0], nmp_names.  
↪shape[0]))
```

Number of
MP: 88
Non constituency MP: 3
NMP: 9

Now we have the expected numbers, let's combine the records

```
[13]: sg_parliament = pd.concat([mp_names, non_constituency_mp, nmp_names], axis=0).  
↪drop(['Party', 'Portrait', 'Ref'], axis=1)
```

```
[14]: sg_parliament.head()
```

```
[14]: Constituency Party.1      Name      Date of birth(Age)  
0  AljuniedGRC      WP      Chen Show Mao      (59 years, 138 days)  
1  AljuniedGRC      WP      Sylvia Lim      (55 years, 87 days)  
2  AljuniedGRC      WP      Low Thia Khiang      (63 years, 292 days)  
3  AljuniedGRC      WP      Muhamad Faisal bin Abdul Manap      (45 years, 17 days)  
4  AljuniedGRC      WP      Pritam Singh      (43 years, 326 days)
```

Let's check if the entries at Kopi are correct

3.3 Clean up names

Let's clean up the names first

```
[15]: speaking['Name'] = speaking['Name'].str.replace('^[A-Z]\w+ ', '', regex=True).\
      str.replace('^[A-Z][a-z]+ ', '', regex=True).str.title().\
      ↪str.strip()
attendance['Name'] = attendance['Name'].str.replace('^[A-Z]\w+ )\
      ↪', '', regex=True).\
      str.replace('^[A-Z][a-z]+ ', '', regex=True).str.title().\
      ↪str.strip()
```

/Users/lingjie/opt/anaconda3/lib/python3.7/site-packages/ipykernel_launcher.py:4: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: https://pandas.pydata.org/pandas-docs/stable/user_guide/indexing.html#returning-a-view-versus-a-copy
after removing the cwd from sys.path.

```
[16]: attendance.head()
```

```
[16]:
```

	Party	Constituency	Name \
0	Workers' Party	Aljunied GRC	Low Thia Khiang
1	Workers' Party	Aljunied GRC	Pritam Singh
2	People's Action Party	Holland-Bukit Timah GRC	Christopher De Souza
3	People's Action Party	Jalan Besar GRC	Denise Phua Lay Peng
4	People's Action Party	Nee Soon GRC	Louis Ng Kok Kwang

	Number of Sitzings Attended (Out of 132)
0	127
1	129
2	132
3	132
4	132

```
[17]: speaking.head()
```

```
[17]:
```

	Party	Constituency	Name \
0	People's Action Party	Nee Soon GRC	Louis Ng Kok Kwang
1	Workers' Party	Non-Constituency MPs	Leon Perera
2	Workers' Party	Non-Constituency MPs	Dennis Tan Lip Fong
3	Workers' Party	Aljunied GRC	Pritam Singh
4	People's Action Party	Nee Soon GRC	Lee Bee Wah

	Number of Sitzings Spoken (Out of 131)
0	114
1	99
2	96
3	94

3.4 Verify data accuracy

From the Kopi:

```
[18]: attendance.groupby('Party').count()
```

```
[18]:
```

	Constituency	Name	\
Party			
Nominated MPs	9	9	
People's Action Party	82	82	
Workers' Party	9	9	

	Number of Sittings Attended (Out of 132)
Party	
Nominated MPs	9
People's Action Party	82
Workers' Party	9

```
[19]: speaking.groupby('Party').count()
```

```
[19]:
```

	Constituency	Name	\
Party			
Nominated MPs	9	9	
People's Action Party	62	62	
Workers' Party	9	9	

	Number of Sittings Spoken (Out of 131)
Party	
Nominated MPs	9
People's Action Party	62
Workers' Party	9

From wikipedia:

```
[20]: sg_parliament.groupby('Party.1')[['Name']].count()
```

```
[20]:
```

	Name
Party.1	
Nominated MP	9
PAP	82
WP	9

There is something wrong with NMPs, we expect 9 but there are a total of 10 NMPs who spoke in parliament debates

```
[21]: attendance[attendance['Party'] == "Nominated MPs"].sort_values('Name')
```

```
[21]:
```

	Party	Constituency	Name \
93	Nominated MPs	Nominated MPs	Anthea Ong
91	Nominated MPs	Nominated MPs	Arasu Duraisamy
98	Nominated MPs	Nominated MPs	Douglas Foo
95	Nominated MPs	Nominated MPs	Dr Walter Theseira
97	Nominated MPs	Nominated MPs	Irene Quay Siew Ching
96	Nominated MPs	Nominated MPs	Lim Sun Sun
92	Nominated MPs	Nominated MPs	Mohamed Irshad
94	Nominated MPs	Nominated MPs	Terence Ho Wee San
99	Nominated MPs	Nominated MPs	Yip Pin Xiu

	Number of Sittings Attended (Out of 132)
93	50
91	50
98	39
95	49
97	43
96	46
92	50
94	49
99	33

```
[22]: speaking[speaking['Party'] == "Nominated MPs"].sort_values('Name')
```

```
[22]:
```

	Party	Constituency	Name \
51	Nominated MPs	Nominated MPs	Anthea Ong
75	Nominated MPs	Nominated MPs	Arasu Duraisamy
76	Nominated MPs	Nominated MPs	Douglas Foo
53	Nominated MPs	Nominated MPs	Dr Walter Theseira
68	Nominated MPs	Nominated MPs	Irene Quay Siew Ching
70	Nominated MPs	Nominated MPs	Lim Sun Sun
65	Nominated MPs	Nominated MPs	Mohamed Irshad
74	Nominated MPs	Nominated MPs	Terence Ho Wee San
78	Nominated MPs	Nominated MPs	Yip Pin Xiu

	Number of Sittings Spoken (Out of 131)
51	42
75	12
76	12
53	41
68	22
70	20
65	25
74	14
78	8

Ms FOO MEE HAR is wrongly classified as NMP when she is a MP

<https://www.pap.org.sg/representative/foo-mee-har/>

Let's correct Ms FOO MEE HAR's entry

```
[23]: speaking.loc[speaking['Name'] == 'Foo Mee Har', ['Party', 'Constituency']] = [
      "People's Action Party", "West Coast GRC"
    ]
```

```
[24]: speaking.groupby('Party').count()
```

```
[24]:
```

	Constituency	Name \
Party		
Nominated MPs	9	9
People's Action Party	62	62
Workers' Party	9	9

	Number of Sitzings Spoken (Out of 131)
Party	
Nominated MPs	9
People's Action Party	62
Workers' Party	9

3.5 Converting to percentage

We are more interested in the relative terms. For example, out of the total sittings, how many sittings did individual attend?

Therefore, we will compute the percentage terms for all dataframes.

We will keep only 2 decimal points for a neater presentation.

```
[25]: attendance['Percent of Sitzings Attended (Out of 132)'] = (attendance['Number_
      ↳ of Sitzings Attended (Out of 132)']\
                                          /132 * 100).round(2)
```

```
/Users/lingjie/opt/anaconda3/lib/python3.7/site-
packages/ipykernel_launcher.py:2: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead
```

See the caveats in the documentation: https://pandas.pydata.org/pandas-docs/stable/user_guide/indexing.html#returning-a-view-versus-a-copy

```
[26]: attendance.head()
```

```
[26]:
```

	Party	Constituency	Name \
0	Workers' Party	Aljunied GRC	Low Thia Khiang
1	Workers' Party	Aljunied GRC	Pritam Singh
2	People's Action Party	Holland-Bukit Timah GRC	Christopher De Souza

3	People's Action Party	Jalan Besar GRC	Denise Phua Lay Peng
4	People's Action Party	Nee Soon GRC	Louis Ng Kok Kwang

	Number of Sittings Attended (Out of 132) \
0	127
1	129
2	132
3	132
4	132

	Percent of Sittings Attended (Out of 132)
0	96.21
1	97.73
2	100.00
3	100.00
4	100.00

```
[27]: speaking['Percent of Sittings Spoken (Out of 131)'] = (speaking['Number of_
↪Sittings Spoken (Out of 131)']\
                                                    /131*100).round(2)
```

```
[28]: speaking.head()
```

```
[28]:
```

	Party	Constituency	Name \
0	People's Action Party	Nee Soon GRC	Louis Ng Kok Kwang
1	Workers' Party	Non-Constituency MPs	Leon Perera
2	Workers' Party	Non-Constituency MPs	Dennis Tan Lip Fong
3	Workers' Party	Aljunied GRC	Pritam Singh
4	People's Action Party	Nee Soon GRC	Lee Bee Wah

	Number of Sittings Spoken (Out of 131) \
0	114
1	99
2	96
3	94
4	92

	Percent of Sittings Spoken (Out of 131)
0	87.02
1	75.57
2	73.28
3	71.76
4	70.23

4 Data visualisation

4.1 Attendance

4.1.1 Attendance by Party

```
[29]: (attendance.groupby('Party')[['Percent of Sittings Attended (Out of 132)']].  
      ↪mean()).\  
      sort_values(['Percent of Sittings Attended (Out of 132)'],ascending=False).  
      ↪round(2)
```

```
[29]:
```

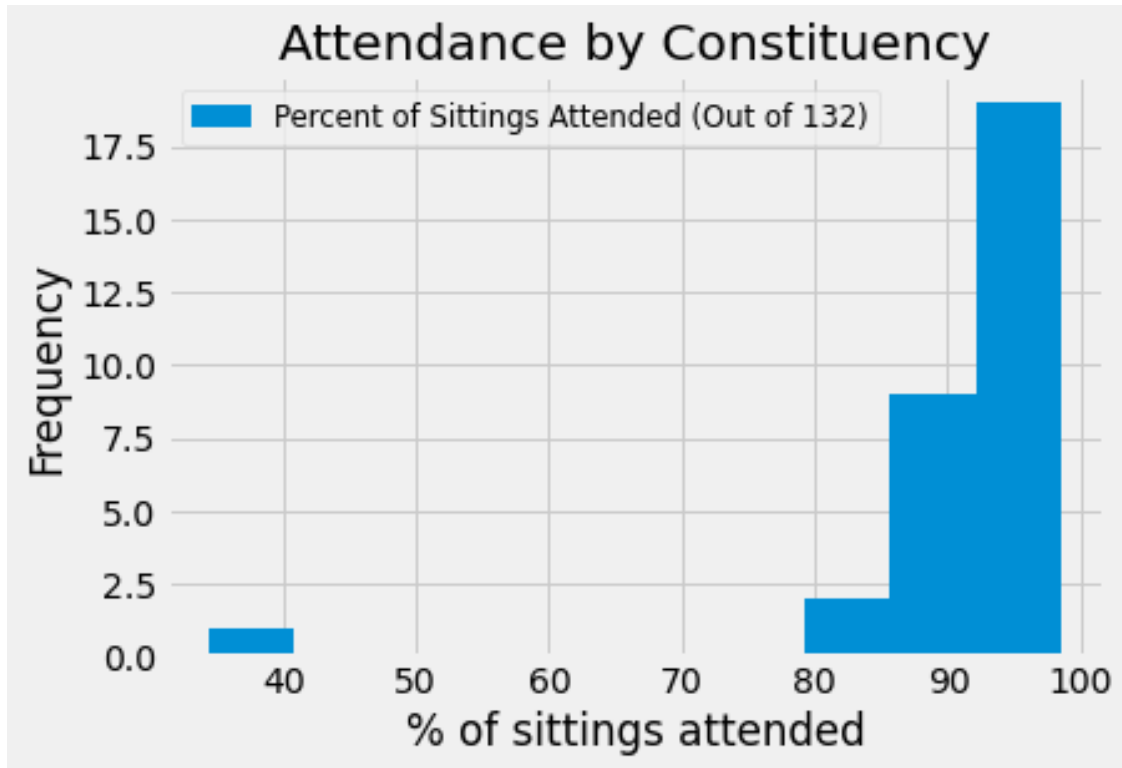
	Percent of Sittings Attended (Out of 132)
Party	
Workers' Party	96.13
People's Action Party	93.28
Nominated MPs	34.43

4.1.2 Attendance by Constituency

```
[30]: (attendance.groupby(['Constituency', 'Party'])[['Percent of Sittings Attended_  
      ↪(Out of 132)']].mean())\  
      .sort_values('Percent of Sittings Attended (Out of_  
      ↪132)',ascending=False).round(2).\  
      plot.hist(bins=10)  
plt.xlabel('% of sittings attended'), plt.title('Attendance by Constituency')  
plt.legend(fontsize='small')  
  
(attendance.groupby(['Constituency', 'Party'])[['Percent of Sittings Attended_  
      ↪(Out of 132)']].mean())\  
      .sort_values('Percent of Sittings Attended (Out of_  
      ↪132)',ascending=False).round(2).\  
      describe().T
```

```
[30]:
```

	count	mean	std	min	\
Percent of Sittings Attended (Out of 132)	31.0	91.464194	11.275163	34.43	
	25%	50%	75%	max	
Percent of Sittings Attended (Out of 132)	91.51	93.94	96.275	98.48	



Highest attendance rate

```
[31]: (attendance.groupby(['Constituency', 'Party'])[['Percent of Sittings Attended',
→('Out of 132')]].mean())\
        .sort_values('Percent of Sittings Attended (Out of 132)', ascending=False).round(2).head()
```

```
[31]:                                     Percent of Sittings Attended (Out
of 132)
Constituency      Party
Hougang SMC       Workers' Party
98.48
Mountbatten SMC   People's Action Party
98.48
Marsiling-Yew Tee GRC People's Action Party
97.98
Tanjong Pagar GRC  People's Action Party
97.27
Potong Pasir SMC   People's Action Party
96.97
```

Lowest attendance rate

```
[32]: (attendance.groupby(['Constituency', 'Party'])[['Percent of Sittings Attended (Out of 132)']].mean())\
        .sort_values('Percent of Sittings Attended (Out of 132)', ascending=False).round(2).tail()
```

```
[32]:                                     Percent of Sittings Attended (Out
of 132)
Constituency      Party
Pasir Ris-Punggol GRC People's Action Party
90.15
Radin Mas SMC      People's Action Party
87.12
Bukit Batok SMC    People's Action Party
83.33
East Coast GRC     People's Action Party
82.77
Nominated MPs      Nominated MPs
34.43
```

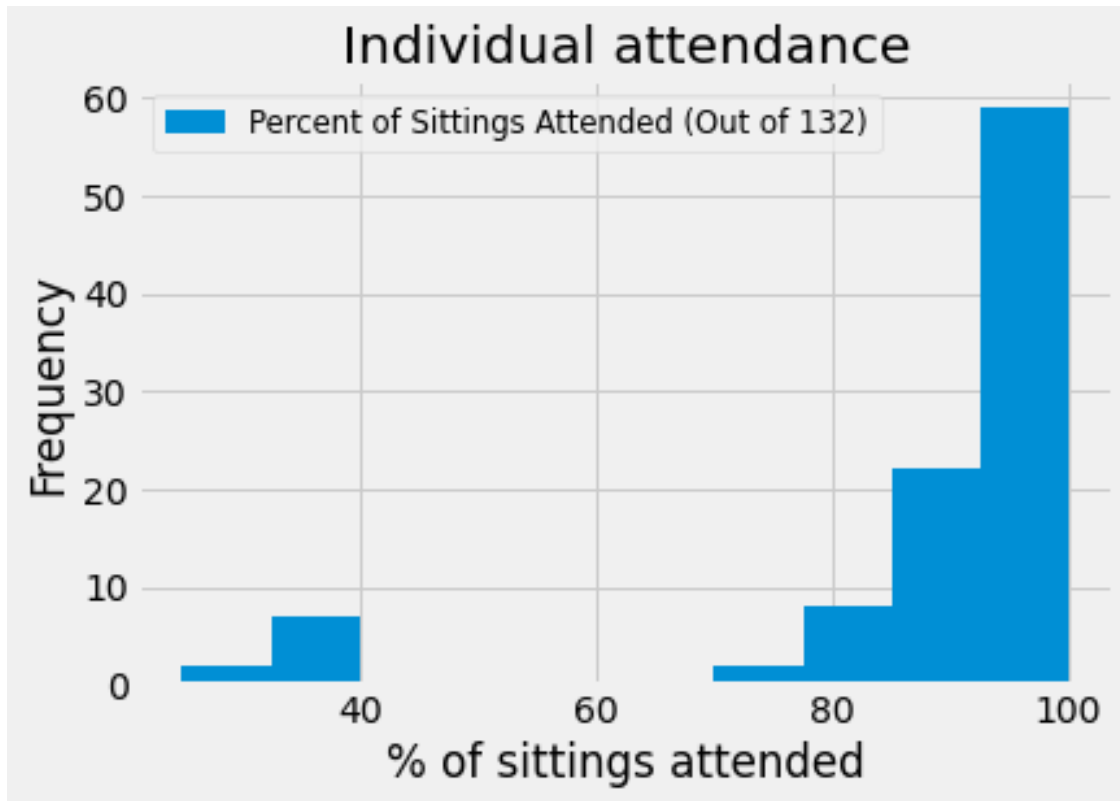
4.1.3 Individual attendance

```
[33]: (attendance.drop('Number of Sittings Attended (Out of 132)', axis=1).\
        sort_values('Percent of Sittings Attended (Out of 132)', ascending=False).\
        set_index(['Party', 'Constituency', 'Name'])).round(2).\
        plot.hist(bins=10)
plt.xlabel('% of sittings attended'), plt.title('Individual attendance')
plt.legend(fontsize='small')

(attendance.\
    sort_values('Percent of Sittings Attended (Out of 132)', ascending=False).\
    set_index(['Party', 'Constituency', 'Name'])).round(2).describe().T
```

```
[33]:
```

	count	mean	std	min	\
Number of Sittings Attended (Out of 132)	100.0	116.4800	23.631207	33.0	
Percent of Sittings Attended (Out of 132)	100.0	88.2418	17.901805	25.0	
	25%	50%	75%	max	
Number of Sittings Attended (Out of 132)	118.00	125.0	128.00	132.0	
Percent of Sittings Attended (Out of 132)	89.39	94.7	96.97	100.0	



Highest attendance

```
[34]: (attendance.drop('Number of Sittings Attended (Out of 132)', axis=1).\
        sort_values('Percent of Sittings Attended (Out of 132)', ascending=False).\
        set_index(['Party', 'Constituency', 'Name'])).round(2).head(10)
```

```
[34]:
```

Party	Constituency	Name	Percent of Sittings Attended (Out of 132)
People's Action Party	Holland-Bukit Timah GRC	Christopher De Souza	100.00
	Jalan Besar GRC	Denise Phua Lay Peng	100.00
	Nee Soon GRC	Louis Ng Kok Kwang	100.00
	Tampines GRC	Desmond Choo	100.00
	Tanjong Pagar GRC	Melvin Yong Yik Chye	100.00
	West Coast GRC	Patrick Tay Teck Guan	100.00
Workers' Party	Non-Constituency MPs	Dennis Tan Lip Fong	100.00

100.00	People's Action Party	Chua Chu Kang GRC	Low Yen Ling
99.24		Ang Mo Kio GRC	Lee Hsien Loong
99.24		Chua Chu Kang GRC	Yee Chia Hsing
99.24			

Lowest attendance

```
[35]: (attendance.drop('Number of Sittings Attended (Out of 132)', axis=1).\
        sort_values('Percent of Sittings Attended (Out of 132)',ascending=False).\
        set_index(['Party', 'Constituency','Name'])).round(2).tail(10)
```

```
[35]:                                     Percent of Sittings
Attended (Out of 132)
Party      Constituency  Name
People's Action Party East Coast GRC Lim Swee Say
72.73
Nominated MPs      Nominated MPs  Arasu Duraisamy
37.88
                                     Mohamed Irshad
37.88
                                     Anthea Ong
37.88
                                     Terence Ho Wee San
37.12
                                     Dr Walter Theseira
37.12
                                     Lim Sun Sun
34.85
                                     Irene Quay Siew Ching
32.58
                                     Douglas Foo
29.55
                                     Yip Pin Xiu
25.00
```

4.2 Speaking

4.2.1 Speaking by Party

```
[36]: (speaking.groupby('Party')[['Percent of Sittings Spoken (Out of 131)']].mean()).
        ↪\
        sort_values(['Percent of Sittings Spoken (Out of 131)'],ascending=False).
        ↪round(2)
```

```
[36]:
```

Percent of Sittings Spoken (Out of 131)	
Party	
Workers' Party	55.39
People's Action Party	38.92
Nominated MPs	16.62

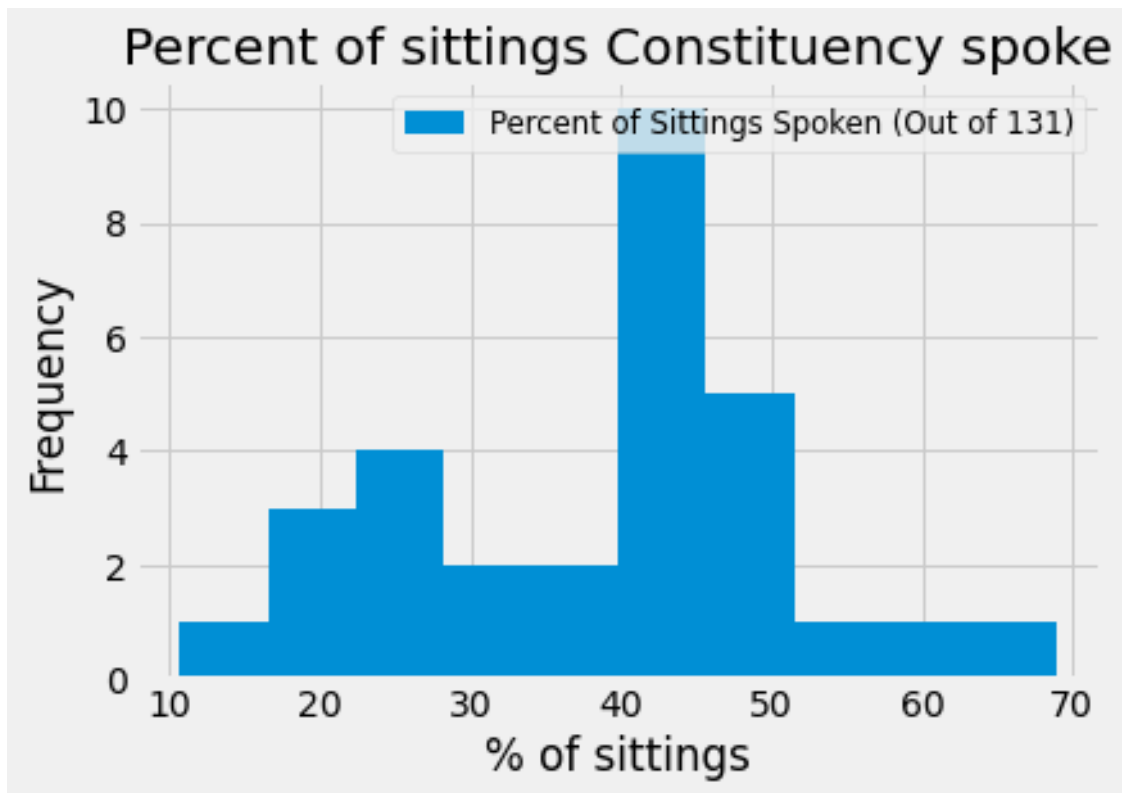
4.2.2 Speaking by Constituency

```
[37]: (speaking.groupby(['Constituency', 'Party']))[['Percent of Sittings Spoken (Out of 131)']].mean())\
        .sort_values('Percent of Sittings Spoken (Out of 131)', ascending=False).round(2).\
        plot.hist(bins=10)
plt.xlabel('% of sittings'), plt.title(
    'Percent of sittings Constituency spoke')
plt.legend(fontsize='small')

(speaking.groupby(['Constituency', 'Party']))[['Percent of Sittings Spoken (Out of 131)']].mean())\
        .sort_values('Percent of Sittings Spoken (Out of 131)', ascending=False).round(2).\
        describe().T
```

```
[37]:
```

	count	mean	std	min	\
Percent of Sittings Spoken (Out of 131)	30.0	38.757333	13.376417	10.69	
	25%	50%	75%	max	
Percent of Sittings Spoken (Out of 131)	28.055	41.22	45.495	68.96	



```
[38]: (speaking.groupby(['Constituency','Party'])[['Percent of Sittings Spoken (Out of 131)']].mean())\
        .sort_values('Percent of Sittings Spoken (Out of 131)',ascending=False).round(2).head()
```

```
[38]:                                     Percent of Sittings Spoken (Out of
131)
Constituency      Party
Non-Constituency MPs Workers' Party
68.96
Nee Soon GRC      People's Action Party
60.50
Bukit Batok SMC   People's Action Party
54.20
Mountbatten SMC   People's Action Party
51.15
Tanjong Pagar GRC People's Action Party
50.38
```

```
[39]: (speaking.groupby(['Constituency','Party'])[['Percent of Sittings Spoken (Out of 131)']].mean())\
        .sort_values('Percent of Sittings Spoken (Out of 131)',ascending=False).round(2).head()
```

```
.sort_values('Percent of Sittings Spoken (Out of 131)',ascending=False).round(2).tail()
```

```
[39]:
```

Constituency	Party	Percent of Sittings Spoken (Out of 131)
Pioneer SMC	People's Action Party	22.90
Radin Mas SMC	People's Action Party	22.14
East Coast GRC	People's Action Party	18.32
Nominated MPs	Nominated MPs	16.62
Punggol East SMC	People's Action Party	10.69

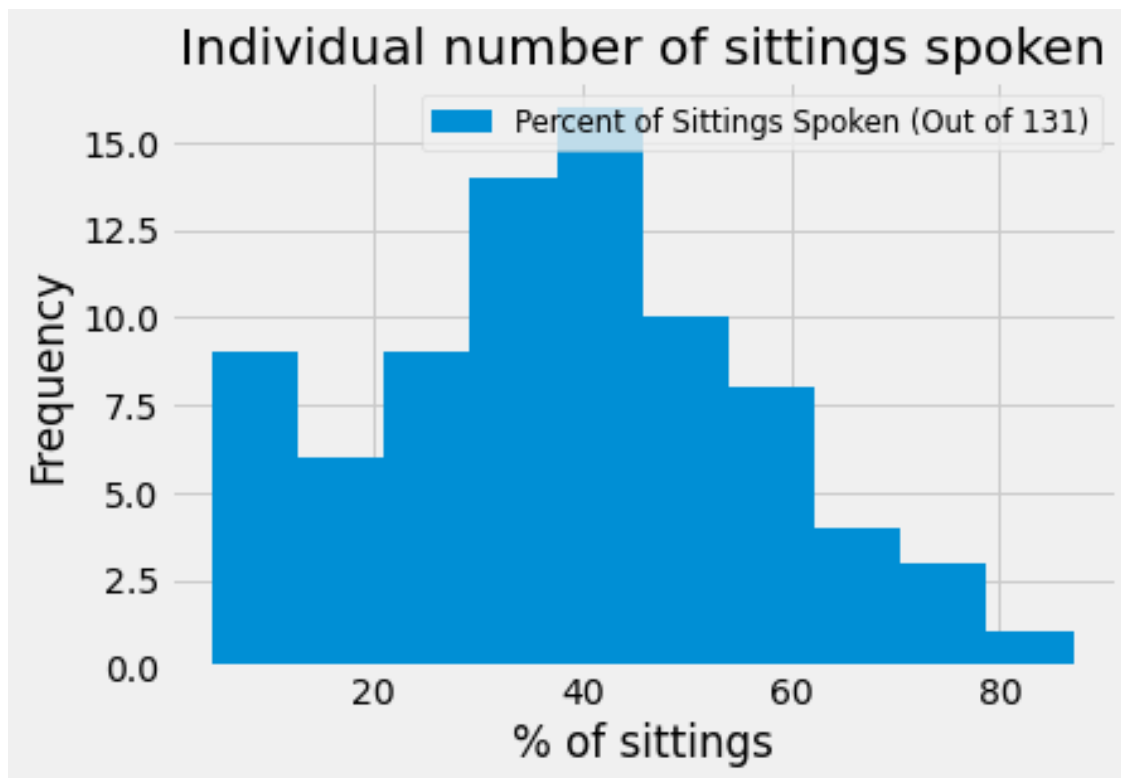
4.2.3 Individual number of sittings spoken

```
[40]: speaking.drop('Number of Sittings Spoken (Out of 131)',axis=1).\
        sort_values('Percent of Sittings Spoken (Out of 131)',ascending=False).\
        set_index(['Party', 'Constituency', 'Name']).\
        plot.hist(bins=10)
plt.xlabel('% of sittings'), plt.title('Individual number of sittings spoken')
plt.legend(fontsize='small')

speaking.drop('Number of Sittings Spoken (Out of 131)',axis=1).\
        sort_values('Percent of Sittings Spoken (Out of 131)',ascending=False).\
        set_index(['Party', 'Constituency', 'Name']).describe().T
```

```
[40]:
```

	count	mean	std	min	\
Percent of Sittings Spoken (Out of 131)	80.0	38.263125	18.383296	4.58	
		25%	50%	75%	max
Percent of Sittings Spoken (Out of 131)	24.2375	40.46	49.62	87.02	



Spoke the most

```
[41]: speaking.drop('Number of Sittings Spoken (Out of 131)',axis=1).\
      sort_values('Percent of Sittings Spoken (Out of 131)',ascending=False).\
      set_index(['Party', 'Constituency', 'Name']).head(10)
```

```
[41]:
```

Sittings Spoken (Out of 131)		Percent of
Party	Constituency	Name
People's Action Party	Nee Soon GRC	Louis Ng Kok Kwang
87.02		
Workers' Party	Non-Constituency MPs	Leon Perera
75.57		
		Dennis Tan Lip Fong
73.28		
	Aljunied GRC	Pritam Singh
71.76		
People's Action Party	Nee Soon GRC	Lee Bee Wah
70.23		
	Tanjong Pagar GRC	Joan Pereira
66.41		
	Ang Mo Kio GRC	Gan Thiam Poh
65.65		

Workers' Party	Aljunied GRC	Sylvia Lim
62.60		
People's Action Party	Tampines GRC	Desmond Choo
60.31		
	Bishan-Toa Payoh GRC	Saktiandi Supaat
58.78		

Spoke the least

```
[42]: speaking.drop('Number of Sittings Spoken (Out of 131)',axis=1).\
      sort_values('Percent of Sittings Spoken (Out of 131)',ascending=False).\
      set_index(['Party', 'Constituency','Name']).tail(10)
```

```
[42]:
```

Sittings Spoken (Out of 131)		Percent of
Party	Constituency	Name
Nominated MPs	Nominated MPs	Lim Sun Sun
15.27		
People's Action Party	West Coast GRC	Lim Hng Kiang
10.69		
Nominated MPs	Nominated MPs	Terence Ho Wee San
10.69		
People's Action Party	Jalan Besar GRC	Heng Chee How
10.69		
	Punggol East SMC	Charles Chong
10.69		
Nominated MPs	Nominated MPs	Arasu Duraisamy
9.16		
		Douglas Foo
9.16		
People's Action Party	East Coast GRC	Lee Yi Shyan
6.11		
Nominated MPs	Nominated MPs	Yip Pin Xiu
6.11		
People's Action Party	Pasir Ris-Punggol GRC	Teo Ser Luck
4.58		

4.3 Spoke while attending meeting

We might also be interested to know how many times parties spoke while they are present for the meeting

```
[43]: attendance_spaking = pd.merge(
      attendance[[
          'Party', 'Constituency', 'Name',
          'Number of Sittings Attended (Out of 132)'
      ]],
      speaking[['Name', 'Number of Sittings Spoken (Out of 131)']],
```

```
on='Name')
```

```
[44]: attendance_speaking['Spoke per meeting (Out of 131)'] =  
      ↳((attendance_speaking['Number of Sittings Attended (Out of 132)']-1)\  
          / attendance_speaking['Number of_  
      ↳Sittings Spoken (Out of 131)'])\  
          .round(2)
```

```
[45]: attendance_speaking = attendance_speaking.drop([  
      'Number of Sittings Attended (Out of 132)',  
      'Number of Sittings Spoken (Out of 131)'  
      ],axis=1)
```

```
[46]: attendance_speaking.head()
```

```
[46]:
```

	Party	Constituency	Name \
0	Workers' Party	Aljunied GRC	Low Thia Khiang
1	Workers' Party	Aljunied GRC	Pritam Singh
2	People's Action Party	Holland-Bukit Timah GRC	Christopher De Souza
3	People's Action Party	Jalan Besar GRC	Denise Phua Lay Peng
4	People's Action Party	Nee Soon GRC	Louis Ng Kok Kwang

	Spoke per meeting (Out of 131)
0	2.17
1	1.36
2	1.72
3	2.43
4	1.15

4.3.1 Spoke while attending meeting by Party

```
[47]: (attendance_speaking.groupby('Party')[['Spoke per meeting (Out of 131)']].  
      ↳mean() / 131 * 100).\  
      sort_values(['Spoke per meeting (Out of 131)'],ascending=False).round(2)
```

```
[47]:
```

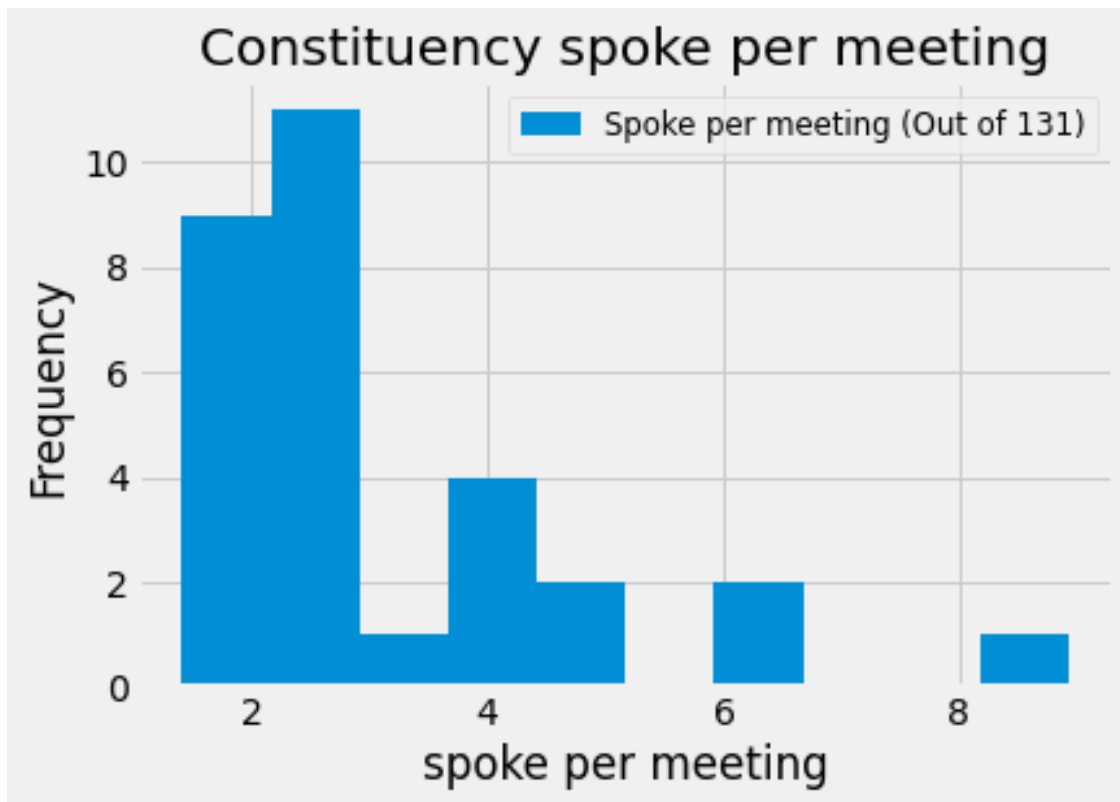
	Spoke per meeting (Out of 131)
Party	
People's Action Party	2.53
Nominated MPs	1.96
Workers' Party	1.48

4.3.2 Spoke while attending by Constituency

```
[48]: (attendance_speaking.groupby(['Constituency', 'Party']))[['Spoke per meeting (Out of 131)']].mean()\n      .sort_values('Spoke per meeting (Out of 131)', ascending=False).round(2).\n      plot.hist(bins=10)\nplt.xlabel('spoke per meeting'), plt.title('Constituency spoke per meeting')\nplt.legend(fontsize='small')\n\n(attendance_speaking.groupby(['Constituency', 'Party']))[['Spoke per meeting (Out of 131)']].mean()\n      .sort_values('Spoke per meeting (Out of 131)', ascending=False).round(2).\n      describe().T
```

```
[48]:
```

	count	mean	std	min	25%	50%	\
Spoke per meeting (Out of 131)	30.0	3.110333	1.666461	1.41	2.1425	2.45	
		75%	max				
Spoke per meeting (Out of 131)	3.8825	8.93					



Constituency that spoke the most during sittings

```
[49]: (attendance_speaking.groupby(['Constituency', 'Party']))[['Spoke per meeting (Out of 131)']].mean()\
      .sort_values('Spoke per meeting (Out of 131)', ascending=False).round(2).head()
```

```
[49]:
```

Constituency	Party	Spoke per meeting (Out of 131)
Punggol East SMC	People's Action Party	8.93
East Coast GRC	People's Action Party	6.51
Pasir Ris-Punggol GRC	People's Action Party	6.12
Jalan Besar GRC	People's Action Party	4.60
West Coast GRC	People's Action Party	4.50

Constituency that spoke the least during sittings

```
[50]: (attendance_speaking.groupby(['Constituency', 'Party']))[['Spoke per meeting (Out of 131)']].mean()\
      .sort_values('Spoke per meeting (Out of 131)', ascending=False).round(2).tail()
```

```
[50]:
```

Constituency	Party	Spoke per meeting (Out of 131)
Jurong GRC	People's Action Party	1.95
Mountbatten SMC	People's Action Party	1.93
Nee Soon GRC	People's Action Party	1.75
Bukit Batok SMC	People's Action Party	1.54
Non-Constituency MPs	Workers' Party	1.41

4.3.3 Spoke while attending sittings by individual

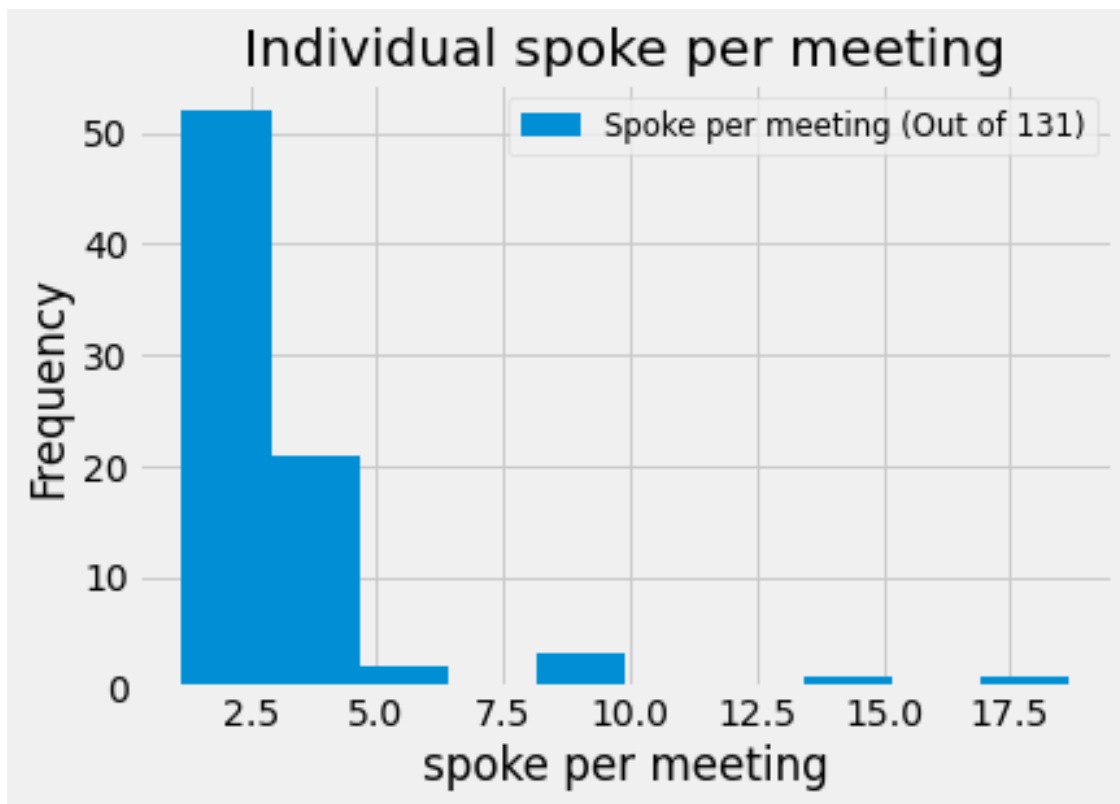
```
[51]: (attendance_speaking[['Party', 'Constituency', 'Name', 'Spoke per meeting (Out of 131)']].\
      sort_values('Spoke per meeting (Out of 131)', ascending=False).\
      set_index(['Party', 'Constituency', 'Name'])).round(2).\
      plot.hist(bins=10)
plt.xlabel('spoke per meeting'), plt.title('Individual spoke per meeting')
plt.legend(fontsize='small')

(attendance_speaking[['Party', 'Constituency', 'Name', 'Spoke per meeting (Out of 131)']].\
 sort_values('Spoke per meeting (Out of 131)', ascending=False).\
 set_index(['Party', 'Constituency', 'Name'])).round(2).describe().T
```

```
[51]:
```

	count	mean	std	min	25%	50%	\
Spoke per meeting (Out of 131)	80.0	3.0785	2.670466	1.15	1.9025	2.215	

75% max
 Spoke per meeting (Out of 131) 3.2575 18.67



Individual who spoke the most during their time in parliament sittings

```
[52]: (attendance_speaking[['Party', 'Constituency', 'Name', 'Spoke per meeting (Out of 131)']].\
      sort_values('Spoke per meeting (Out of 131)', ascending=False).\
      set_index(['Party', 'Constituency', 'Name'])).round(2).head(10)
```

```
[52]:
```

per meeting (Out of 131)	Party	Constituency	Name
18.67	People's Action Party	Pasir Ris-Punggol GRC	Teo Ser Luck
14.12		East Coast GRC	Lee Yi Shyan
8.93		Jalan Besar GRC	Heng Chee How
8.93		Punggol East SMC	Charles Chong

8.86	West Coast GRC	Lim Hng Kiang
5.81	Marine Parade GRC	Tan Chuan-Jin
5.00	East Coast GRC	Mohamad Maliki Bin Osman
4.32		Lim Swee Say
4.17	Holland-Bukit Timah GRC	Sim Ann
Nominated MPs	Nominated MPs	Arasu Duraisamy
4.08		

Individual who spoke the least during their time in parliament sittings

```
[53]: (attendance_speaking[['Party', 'Constituency', 'Name', 'Spoke per meeting (Out of 131)']].\
      sort_values('Spoke per meeting (Out of 131)', ascending=False).\
      set_index(['Party', 'Constituency', 'Name'])).round(2).tail(10)
```

```
[53]:
```

meeting (Out of 131)		Spoke per
Party	Constituency	Name
1.54	People's Action Party Bukit Batok SMC	Murali Pillai
1.49	Tanjong Pagar GRC	Joan Pereira
1.47	Ang Mo Kio GRC	Gan Thiam Poh
1.38	Nee Soon GRC	Lee Bee Wah
1.36	Workers' Party Non-Constituency MPs	Dennis Tan Lip Fong
1.36	Aljunied GRC	Pritam Singh
1.29	Non-Constituency MPs	Leon Perera
1.17	Nominated MPs	Anthea Ong
1.17		Dr Walter Theseira
1.15	People's Action Party Nee Soon GRC	Louis Ng Kok Kwang

5 Overall

We will display the full rows here

```
[54]: pd.set_option('display.max_rows', None)
```

5.1 Party performance

```
[55]: party_performance = pd.merge(
    (attendance.groupby('Party')[['Percent of Sittings Attended (Out of 132)']
      ].mean()).round(2).reset_index(),
    pd.merge(
        (speaking.groupby('Party')[['Percent of Sittings Spoken (Out of 131)']
          ].mean()).round(2).reset_index(),
        (attendance_speaking.groupby('Party')[[
            'Spoke per meeting (Out of 131)']
          ].mean()).round(2).reset_index())
    party_performance = party_performance.set_index('Party')
```

```
[56]: party_performance
```

```
[56]:
```

	Percent of Sittings Attended (Out of 132) \
Party	
Nominated MPs	34.43
People's Action Party	93.28
Workers' Party	96.13

	Percent of Sittings Spoken (Out of 131) \
Party	
Nominated MPs	16.62
People's Action Party	38.92
Workers' Party	55.39

	Spoke per meeting (Out of 131)
Party	
Nominated MPs	2.57
People's Action Party	3.32
Workers' Party	1.93

5.2 Constituency performance

```
[57]: constituency_performance = pd.merge((attendance.
    ↳groupby(['Constituency', 'Party'])[['Percent of Sittings Attended (Out of 132)']
    ↳.mean())\
        .sort_values('Percent of Sittings Attended (Out of 132)', ascending=False).round(2).reset_index(),
    pd.merge(
        (speaking.
    ↳groupby(['Constituency', 'Party'])[['Percent of Sittings Spoken (Out of 131)']
    ↳.mean())\
```

```

        .sort_values('Percent of Sittings Spoken (Out of 131)',ascending=False).round(2).reset_index(),
        (attendance_speaking.
        ↳groupby(['Constituency','Party'])[['Spoke per meeting (Out of 131)']]).
        ↳mean())\
        .sort_values('Spoke per meeting (Out of 131)',ascending=False).round(2).reset_index(),
        on=['Constituency','Party'],
        ↳how='outer'),on=['Constituency','Party'], how='outer')
constituency_performance = constituency_performance.fillna(0, axis=1).
↳set_index(['Party','Constituency'])

```

```
[58]: constituency_performance
```

```
[58]:                                     Percent of Sittings Attended (Out
```

```

of 132) \
Party      Constituency
Workers' Party      Hougang SMC
98.48
People's Action Party Mountbatten SMC
98.48
                                Marsiling-Yew Tee GRC
97.98
                                Tanjong Pagar GRC
97.27
                                Potong Pasir SMC
96.97
                                Chua Chu Kang GRC
96.97
                                Jalan Besar GRC
96.78
Workers' Party      Non-Constituency MPs
96.47
People's Action Party Ang Mo Kio GRC
96.08
                                Jurong GRC
95.76
Workers' Party      Aljunied GRC
95.45
People's Action Party Punggol East SMC
95.45
                                MacPherson SMC
94.70
                                Holland-Bukit Timah GRC
94.51
                                Sembawang GRC
94.09

```

93.94	Nee Soon GRC
	Bukit Panjang SMC
93.18	
	West Coast GRC
92.61	
	Sengkang West SMC
92.42	
	Pioneer SMC
91.67	
	Yuhua SMC
91.67	
	Fengshan SMC
91.67	
	Bishan-Toa Payoh GRC
91.51	
	Tampines GRC
91.51	
	Marine Parade GRC
91.06	
	Hong Kah North SMC
90.91	
	Pasir Ris-Punggol GRC
90.15	
	Radin Mas SMC
87.12	
	Bukit Batok SMC
83.33	
	East Coast GRC
82.77	
Nominated MPs	Nominated MPs
34.43	

Percent of Sitzings Spoken (Out

of 131) \	
Party	Constituency
Workers' Party	Hougang SMC
45.80	
People's Action Party	Mountbatten SMC
51.15	
	Marsiling-Yew Tee GRC
38.54	
	Tanjong Pagar GRC
50.38	
	Potong Pasir SMC
25.95	
	Chua Chu Kang GRC

42.49	Jalan Besar GRC
26.91	
Workers' Party	Non-Constituency MPs
68.96	
People's Action Party	Ang Mo Kio GRC
44.58	
	Jurong GRC
50.13	
Workers' Party	Aljunied GRC
49.16	
People's Action Party	Punggol East SMC
10.69	
	MacPherson SMC
40.46	
	Holland-Bukit Timah GRC
43.26	
	Sembawang GRC
40.46	
	Nee Soon GRC
60.50	
	Bukit Panjang SMC
23.66	
	West Coast GRC
33.84	
	Sengkang West SMC
41.98	
	Pioneer SMC
22.90	
	Yuhua SMC
0.00	
	Fengshan SMC
42.75	
	Bishan-Toa Payoh GRC
40.20	
	Tampines GRC
44.28	
	Marine Parade GRC
31.49	
	Hong Kah North SMC
43.51	
	Pasir Ris-Punggol GRC
37.41	
	Radin Mas SMC
22.14	
	Bukit Batok SMC
54.20	

18.32	East Coast GRC	
Nominated MPs	Nominated MPs	
16.62		
		Spoke per meeting (Out of 131)
Party	Constituency	
Workers' Party	Hougang SMC	2.15
People's Action Party	Mountbatten SMC	1.93
	Marsiling-Yew Tee GRC	2.60
	Tanjong Pagar GRC	2.04
	Potong Pasir SMC	3.74
	Chua Chu Kang GRC	2.36
	Jalan Besar GRC	4.60
Workers' Party	Non-Constituency MPs	1.41
People's Action Party	Ang Mo Kio GRC	2.33
	Jurong GRC	1.95
Workers' Party	Aljunied GRC	2.21
People's Action Party	Punggol East SMC	8.93
	MacPherson SMC	2.34
	Holland-Bukit Timah GRC	2.61
	Sembawang GRC	2.37
	Nee Soon GRC	1.75
	Bukit Panjang SMC	3.94
	West Coast GRC	4.50
	Sengkang West SMC	2.20
	Pioneer SMC	4.00
	Yuhua SMC	0.00
	Fengshan SMC	2.14
	Bishan-Toa Payoh GRC	2.63
	Tampines GRC	2.53
	Marine Parade GRC	3.29
	Hong Kah North SMC	2.09
	Pasir Ris-Punggol GRC	6.12
	Radin Mas SMC	3.93
	Bukit Batok SMC	1.54
	East Coast GRC	6.51
Nominated MPs	Nominated MPs	2.57

5.3 Individual performance

```
[59]: individual_performance = pd.merge((attendance.drop('Number of Sitzings Attended',
→(Out of 132)', axis=1).\
    sort_values('Percent of Sitzings Attended (Out of 132)',ascending=False).\
        set_index(['Party', 'Constituency','Name'])).round(2),
    pd.merge(speaking.drop('Number of Sitzings Spoken (Out of 131)',axis=1).
→\
```

```

    sort_values('Percent of Sittings Spoken (Out of 131)',ascending=False).\
    set_index(['Party', 'Constituency','Name']),
    (attendance_speaking[['Party', 'Constituency','Name','Spoke per
meeting (Out of 131)']]).\
    sort_values('Spoke per meeting (Out of 131)',ascending=False).\
    set_index(['Party', 'Constituency','Name'])).round(2),
    on=['Party','Constituency','Name'], how='outer'),\
on=['Party','Constituency','Name'], how='outer')
individual_performance = individual_performance.fillna(0, axis=1)

```

```
[60]: individual_performance
```

```

[60]:      Percent of Sittings Attended (Out of 132)  \
Party      Constituency      Name
People's Action Party Holland-Bukit Timah GRC Christopher De Souza
100.00
      Jalan Besar GRC      Denise Phua Lay Peng
100.00
      Nee Soon GRC      Louis Ng Kok Kwang
100.00
      Tampines GRC      Desmond Choo
100.00
      Tanjong Pagar GRC      Melvin Yong Yik Chye
100.00
      West Coast GRC      Patrick Tay Teck Guan
100.00
Workers' Party      Non-Constituency MPs      Dennis Tan Lip Fong
100.00
People's Action Party Chua Chu Kang GRC      Low Yen Ling
99.24
      Ang Mo Kio GRC      Lee Hsien Loong
99.24
      Chua Chu Kang GRC      Yee Chia Hsing
99.24
      Tanjong Pagar GRC      Joan Pereira
99.24
      Marine Parade GRC      Goh Chok Tong
98.48
      Marsiling-Yew Tee GRC      Lawrence Wong
98.48
      Ong Teng Koon
98.48
      Mountbatten SMC      Lim Biow Chuan
98.48
Workers' Party      Hougang SMC      Png Eng Huat
98.48
People's Action Party Ang Mo Kio GRC      Ang Hin Kee

```

98.48	Jurong GRC	Rahayu Mahzam
97.73		
Workers' Party	Non-Constituency MPs	Leon Perera
97.73		
People's Action Party	Tanjong Pagar GRC	Chan Chun Sing
97.73		
Workers' Party	Aljunied GRC	Pritam Singh
97.73		
People's Action Party	Bishan-Toa Payoh GRC	Chong Kee Hiong
97.73		
	Tanjong Pagar GRC	Indranee Rajah
97.73		
Workers' Party	Aljunied GRC	Sylvia Lim
96.97		
People's Action Party	Holland-Bukit Timah GRC	Liang Eng Hwa
96.97		
	Jurong GRC	Ang Wei Neng
96.97		
		Desmond Lee
96.97		
		Tan Wu Meng
96.97		
	Marsiling-Yew Tee GRC	Alex Yam Ziming
96.97		
	Nee Soon GRC	Dr Muhammad Faishal Ibrahim
96.97		
		Lee Bee Wah
96.97		
	Potong Pasir SMC	Sitoh Yih Pin
96.97		
	Sembawang GRC	Vikram Nair
96.97		
	Chua Chu Kang GRC	Gan Kim Yong
96.21		
	Tampines GRC	Cheng Li Hui
96.21		
		Baey Yam Keng
96.21		
	Jalan Besar GRC	Yaacob Ibrahim
96.21		
Workers' Party	Aljunied GRC	Low Thia Khiong
96.21		
People's Action Party	Ang Mo Kio GRC	Gan Thiam Poh
96.21		
		Intan Azura Mokhtar
96.21		

		Darryl David
96.21		
	Bishan-Toa Payoh GRC	Saktiandi Supaat
96.21		
Workers' Party	Aljunied GRC	Muhamad Faisal Bin Abdul Manap
95.45		
People's Action Party	Bishan-Toa Payoh GRC	Chee Hong Tat
95.45		
	Jalan Besar GRC	Heng Chee How
95.45		
		Lily Neo
95.45		
	Marine Parade GRC	Seah Kian Peng
95.45		
	Punggol East SMC	Charles Chong
95.45		
	West Coast GRC	Foo Mee Har
95.45		
	Sembawang GRC	Lim Wee Kiak
94.70		
	West Coast GRC	Lim Hng Kiang
94.70		
	MacPherson SMC	Tin Pei Ling
94.70		
	Sembawang GRC	Amrin Amin
94.70		
	Pasir Ris-Punggol GRC	Janil Puthucheary
94.70		
	Marine Parade GRC	Edwin Tong Chun Fai
93.94		
	Sembawang GRC	Ong Ye Kung
93.94		
	Bukit Panjang SMC	Teo Ho Pin
93.18		
	Chua Chu Kang GRC	Zaqy Mohamad
93.18		
	Marine Parade GRC	Tan Chuan-Jin
93.18		
	Sengkang West SMC	Lam Pin Min
92.42		
	Holland-Bukit Timah GRC	Sim Ann
92.42		
	Nee Soon GRC	Kwek Hian Chuan Henry
92.42		
	Yuhua SMC	Grace Fu Hai Yien
91.67		
	Tanjong Pagar GRC	Chia Shi-Lu

91.67	Fengshan SMC	Cheryl Chan Wei Ling
91.67		
Workers' Party	Non-Constituency MPs	Daniel Goh Pei Siong
91.67		
People's Action Party	Pioneer SMC	Cedric Foo Chee Keng
91.67		
Workers' Party	Aljunied GRC	Chen Show Mao
90.91		
People's Action Party	Hong Kah North SMC	Amy Khor Lean Suan
90.91		
	Pasir Ris-Punggol GRC	Sun Xueling
90.91		
		Zainal Sapari
90.91		
	Ang Mo Kio GRC	Koh Poh Koon
90.15		
	Jurong GRC	Tharman Shanmugaratnam
90.15		
	Sembawang GRC	Khaw Boon Wan
90.15		
	Pasir Ris-Punggol GRC	Ng Chee Meng
89.39		
		Teo Chee Hean
89.39		
	Holland-Bukit Timah GRC	Vivian Balakrishnan
88.64		
	East Coast GRC	Jessica Tan Soon Neo
87.88		
	Radin Mas SMC	Sam Tan Chin Siong
87.12		
	East Coast GRC	Lee Yi Shyan
86.36		
	Pasir Ris-Punggol GRC	Teo Ser Luck
85.61		
	Bishan-Toa Payoh GRC	Josephine Teo
84.09		
		Ng Eng Hen
84.09		
	East Coast GRC	Mohamad Maliki Bin Osman
84.09		
	Tampines GRC	Heng Swee Keat
84.09		
	Bukit Batok SMC	Murali Pillai
83.33		
	Nee Soon GRC	K Shanmugam
83.33		

Mohamad	Tampines GRC	Masagos Zulkifli Bin Masagos
80.30	West Coast GRC	81.06 S Iswaran
74.24	Marine Parade GRC	Fatimah Lateef
72.73	East Coast GRC	Lim Swee Say
Nominated MPs	Nominated MPs	Arasu Duraisamy
37.88		Mohamed Irshad
37.88		Anthea Ong
37.88		Terence Ho Wee San
37.12		Dr Walter Theseira
37.12		Lim Sun Sun
34.85		Irene Quay Siew Ching
32.58		Douglas Foo
29.55		Yip Pin Xiu
25.00		

Party	Constituency	Name
Percent of Sittings Spoken (Out of 131) \		
People's Action Party	Holland-Bukit Timah GRC	Christopher De Souza
58.02	Jalan Besar GRC	Denise Phua Lay Peng
41.22	Nee Soon GRC	Louis Ng Kok Kwang
87.02	Tampines GRC	Desmond Choo
60.31	Tanjong Pagar GRC	Melvin Yong Yik Chye
49.62	West Coast GRC	Patrick Tay Teck Guan
58.02	Non-Constituency MPs	Dennis Tan Lip Fong
Workers' Party	Chua Chu Kang GRC	Low Yen Ling
73.28	Ang Mo Kio GRC	Lee Hsien Loong
33.59		
0.00		

44.27	Chua Chu Kang GRC	Yee Chia Hsing
66.41	Tanjong Pagar GRC	Joan Pereira
0.00	Marine Parade GRC	Goh Chok Tong
0.00	Marsiling-Yew Tee GRC	Lawrence Wong
32.82		Ong Teng Koon
51.15	Mountbatten SMC	Lim Biow Chuan
Workers' Party	Hougang SMC	Png Eng Huat
45.80		
People's Action Party	Ang Mo Kio GRC	Ang Hin Kee
37.40		
55.73	Jurong GRC	Rahayu Mahzam
Workers' Party	Non-Constituency MPs	Leon Perera
75.57		
People's Action Party	Tanjong Pagar GRC	Chan Chun Sing
0.00		
Workers' Party	Aljunied GRC	Pritam Singh
71.76		
People's Action Party	Bishan-Toa Payoh GRC	Chong Kee Hiong
30.53		
0.00	Tanjong Pagar GRC	Indranee Rajah
Workers' Party	Aljunied GRC	Sylvia Lim
62.60		
People's Action Party	Holland-Bukit Timah GRC	Liang Eng Hwa
49.62		
50.38	Jurong GRC	Ang Wei Neng
0.00		Desmond Lee
44.27		Tan Wu Meng
44.27	Marsiling-Yew Tee GRC	Alex Yam Ziming
41.22	Nee Soon GRC	Dr Muhammad Faishal Ibrahim
70.23		Lee Bee Wah
25.95	Potong Pasir SMC	Sitoh Yih Pin
	Sembawang GRC	Vikram Nair

39.69	Chua Chu Kang GRC	Gan Kim Yong
0.00	Tampines GRC	Cheng Li Hui
48.09		Baey Yam Keng
24.43	Jalan Besar GRC	Yaacob Ibrahim
32.06		
Workers' Party	Aljunied GRC	Low Thia Khiong
44.27		
People's Action Party	Ang Mo Kio GRC	Gan Thiam Poh
65.65		Intan Azura Mokhtar
48.09		Darryl David
45.80	Bishan-Toa Payoh GRC	Saktiandi Supaat
58.78		
Workers' Party	Aljunied GRC	Muhamad Faisal Bin Abdul Manap
42.75		
People's Action Party	Bishan-Toa Payoh GRC	Chee Hong Tat
31.30	Jalan Besar GRC	Heng Chee How
10.69		Lily Neo
23.66	Marine Parade GRC	Seah Kian Peng
45.04	Punggol East SMC	Charles Chong
10.69	West Coast GRC	Foo Mee Har
32.82	Sembawang GRC	Lim Wee Kiak
36.64	West Coast GRC	Lim Hng Kiang
10.69	MacPherson SMC	Tin Pei Ling
40.46	Sembawang GRC	Amrin Amin
45.04	Pasir Ris-Punggol GRC	Janil Puthuchery
40.46	Marine Parade GRC	Edwin Tong Chun Fai
30.53	Sembawang GRC	Ong Ye Kung
0.00		

23.66	Bukit Panjang SMC	Teo Ho Pin
49.62	Chua Chu Kang GRC	Zaqy Mohamad
16.03	Marine Parade GRC	Tan Chuan-Jin
41.98	Sengkang West SMC	Lam Pin Min
22.14	Holland-Bukit Timah GRC	Sim Ann
43.51	Nee Soon GRC	Kwek Hian Chuan Henry
0.00	Yuhua SMC	Grace Fu Hai Yien
35.11	Tanjong Pagar GRC	Chia Shi-Lu
42.75	Fengshan SMC	Cheryl Chan Wei Ling
Workers' Party	Non-Constituency MPs	Daniel Goh Pei Siong
58.02	People's Action Party Pioneer SMC	Cedric Foo Chee Keng
22.90	Workers' Party	Aljunied GRC
24.43	People's Action Party Hong Kah North SMC	Amy Khor Lean Suan
43.51	Pasir Ris-Punggol GRC	Sun Xueling
54.20		Zainal Sapari
50.38	Ang Mo Kio GRC	Koh Poh Koon
25.95	Jurong GRC	Tharman Shanmugaratnam
0.00	Sembawang GRC	Khaw Boon Wan
0.00	Pasir Ris-Punggol GRC	Ng Chee Meng
0.00		Teo Chee Hean
0.00	Holland-Bukit Timah GRC	Vivian Balakrishnan
0.00	East Coast GRC	Jessica Tan Soon Neo
33.59	Radin Mas SMC	Sam Tan Chin Siong
22.14	East Coast GRC	Lee Yi Shyan

6.11	Pasir Ris-Punggol GRC	Teo Ser Luck
4.58	Bishan-Toa Payoh GRC	Josephine Teo
0.00		Ng Eng Hen
0.00	East Coast GRC	Mohamad Maliki Bin Osman
16.79	Tampines GRC	Heng Swee Keat
0.00	Bukit Batok SMC	Murali Pillai
54.20	Nee Soon GRC	K Shanmugam
0.00	Tampines GRC	Masagos Zulkifli Bin Masagos
Mohamad	West Coast GRC	0.00 S Iswaran
0.00	Marine Parade GRC	Fatimah Lateef
34.35	East Coast GRC	Lim Swee Say
16.79	Nominated MPs	Arasu Duraisamy
Nominated MPs		Mohamed Irshad
9.16		Anthea Ong
19.08		Terence Ho Wee San
32.06		Dr Walter Theseira
10.69		Lim Sun Sun
31.30		Irene Quay Siew Ching
15.27		Douglas Foo
16.79		Yip Pin Xiu
9.16		
6.11		

Spoke per meeting (Out of 131)	Party	Constituency	Name
	People's Action Party	Holland-Bukit Timah GRC	Christopher De Souza
1.72		Jalan Besar GRC	Denise Phua Lay Peng

2.43	Nee Soon GRC	Louis Ng Kok Kwang
1.15	Tampines GRC	Desmond Choo
1.66	Tanjong Pagar GRC	Melvin Yong Yik Chye
2.02	West Coast GRC	Patrick Tay Teck Guan
1.72		
Workers' Party	Non-Constituency MPs	Dennis Tan Lip Fong
1.36		
People's Action Party	Chua Chu Kang GRC	Low Yen Ling
2.95	Ang Mo Kio GRC	Lee Hsien Loong
0.00	Chua Chu Kang GRC	Yee Chia Hsing
2.24	Tanjong Pagar GRC	Joan Pereira
1.49	Marine Parade GRC	Goh Chok Tong
0.00	Marsiling-Yew Tee GRC	Lawrence Wong
0.00		Ong Teng Koon
3.00	Mountbatten SMC	Lim Biow Chuan
1.93	Hougang SMC	Png Eng Huat
Workers' Party		
2.15	Ang Mo Kio GRC	Ang Hin Kee
People's Action Party		
2.63	Jurong GRC	Rahayu Mahzam
1.75	Non-Constituency MPs	Leon Perera
Workers' Party		
1.29	Tanjong Pagar GRC	Chan Chun Sing
People's Action Party		
0.00	Aljunied GRC	Pritam Singh
Workers' Party		
1.36	Bishan-Toa Payoh GRC	Chong Kee Hiong
People's Action Party		
3.20	Tanjong Pagar GRC	Indranee Rajah
0.00	Aljunied GRC	Sylvia Lim
Workers' Party		
1.55	Holland-Bukit Timah GRC	Liang Eng Hwa
People's Action Party		
1.95		

1.92	Jurong GRC	Ang Wei Neng
0.00		Desmond Lee
2.19		Tan Wu Meng
2.19	Marsiling-Yew Tee GRC	Alex Yam Ziming
2.35	Nee Soon GRC	Dr Muhammad Faishal Ibrahim
1.38		Lee Bee Wah
3.74	Potong Pasir SMC	Sitoh Yih Pin
2.44	Sembawang GRC	Vikram Nair
0.00	Chua Chu Kang GRC	Gan Kim Yong
2.00	Tampines GRC	Cheng Li Hui
3.94		Baey Yam Keng
3.00	Jalan Besar GRC	Yaacob Ibrahim
Workers' Party	Aljunied GRC	Low Thia Khian
2.17		
People's Action Party	Ang Mo Kio GRC	Gan Thiam Poh
1.47		Intan Azura Mokhtar
2.00		Darryl David
2.10	Bishan-Toa Payoh GRC	Saktiandi Supaat
1.64		
Workers' Party	Aljunied GRC	Muhamad Faisal Bin Abdul Manap
2.23		
People's Action Party	Bishan-Toa Payoh GRC	Chee Hong Tat
3.05	Jalan Besar GRC	Heng Chee How
8.93		Lily Neo
4.03	Marine Parade GRC	Seah Kian Peng
2.12	Punggol East SMC	Charles Chong
8.93	West Coast GRC	Foo Mee Har

2.91	Sembawang GRC	Lim Wee Kiak
2.58	West Coast GRC	Lim Hng Kiang
8.86	MacPherson SMC	Tin Pei Ling
2.34	Sembawang GRC	Amrin Amin
2.10	Pasir Ris-Punggol GRC	Janil Puthucheary
2.34	Marine Parade GRC	Edwin Tong Chun Fai
3.08	Sembawang GRC	Ong Ye Kung
0.00	Bukit Panjang SMC	Teo Ho Pin
3.94	Chua Chu Kang GRC	Zaqy Mohamad
1.88	Marine Parade GRC	Tan Chuan-Jin
5.81	Sengkang West SMC	Lam Pin Min
2.20	Holland-Bukit Timah GRC	Sim Ann
4.17	Nee Soon GRC	Kwek Hian Chuan Henry
2.12	Yuhua SMC	Grace Fu Hai Yien
0.00	Tanjong Pagar GRC	Chia Shi-Lu
2.61	Fengshan SMC	Cheryl Chan Wei Ling
2.14	Non-Constituency MPs	Daniel Goh Pei Siong
Workers' Party	Pioneer SMC	Cedric Foo Chee Keng
1.58		
4.00	Aljunied GRC	Chen Show Mao
Workers' Party	Hong Kah North SMC	Amy Khor Lean Suan
3.72		
2.09	Pasir Ris-Punggol GRC	Sun Xueling
1.68		Zainal Sapari
1.80	Ang Mo Kio GRC	Koh Poh Koon
3.47		

0.00	Jurong GRC	Tharman Shanmugaratnam
0.00	Sembawang GRC	Khaw Boon Wan
0.00	Pasir Ris-Punggol GRC	Ng Chee Meng
0.00		Teo Chee Hean
0.00	Holland-Bukit Timah GRC	Vivian Balakrishnan
0.00	East Coast GRC	Jessica Tan Soon Neo
2.61	Radin Mas SMC	Sam Tan Chin Siong
3.93	East Coast GRC	Lee Yi Shyan
14.12	Pasir Ris-Punggol GRC	Teo Ser Luck
18.67	Bishan-Toa Payoh GRC	Josephine Teo
0.00		Ng Eng Hen
0.00	East Coast GRC	Mohamad Maliki Bin Osman
5.00	Tampines GRC	Heng Swee Keat
0.00	Bukit Batok SMC	Murali Pillai
1.54	Nee Soon GRC	K Shanmugam
0.00	Tampines GRC	Masagos Zulkifli Bin Masagos
Mohamad	0.00	
0.00	West Coast GRC	S Iswaran
0.00	Marine Parade GRC	Fatimah Lateef
2.16	East Coast GRC	Lim Swee Say
4.32	Nominated MPs	Arasu Duraisamy
Nominated MPs		Mohamed Irshad
4.08		Anthea Ong
1.96		Terence Ho Wee San
1.17		Dr Walter Theseira
3.43		

1.17	Lim Sun Sun
2.25	Irene Quay Siew Ching
1.91	Douglas Foo
3.17	Yip Pin Xiu
4.00	

5.4 Dashboard

```
[ ]: fig = plt.figure(figsize=(25,13))
gs = fig.add_gridspec(3,3, hspace=0.5, wspace=0.3)
ax1 = fig.add_subplot(gs[0,0:])
ax2 = fig.add_subplot(gs[1,0])
ax3 = fig.add_subplot(gs[1,1])
ax4 = fig.add_subplot(gs[1,2])
ax5 = fig.add_subplot(gs[2,0])
ax6 = fig.add_subplot(gs[2,1])
ax7 = fig.add_subplot(gs[2,2])

party_performance.plot(kind='barh', ax=ax1);
pd.plotting.boxplot(constituency_performance.drop(['Percent of Sitzings Spoken',
→(Out of 131)'],
→'Spoke per meeting (Out of 131)'], axis=1), vert=False, by='Party',
→ax=ax2);
pd.plotting.boxplot(constituency_performance.drop(['Percent of Sitzings
→Attended (Out of 132)'],
→'Spoke per meeting (Out of 131)'], axis=1), vert=False, by='Party',
→ax=ax3);
pd.plotting.boxplot(constituency_performance.drop(['Percent of Sitzings
→Attended (Out of 132)'],
→'Percent of Sitzings Spoken (Out of 131)'], axis=1), vert=False,
→by='Party', ax=ax4);
pd.plotting.boxplot(individual_performance.drop(['Percent of Sitzings Spoken',
→(Out of 131)'],
→'Spoke per meeting (Out of 131)'], axis=1), vert=False, by='Party',
→ax=ax5);
pd.plotting.boxplot(individual_performance.drop(['Percent of Sitzings Attended',
→(Out of 132)'],
→'Spoke per meeting (Out of 131)'], axis=1), vert=False, by='Party',
→ax=ax6);
pd.plotting.boxplot(individual_performance.drop(['Percent of Sitzings Attended',
→(Out of 132)'],
```

```

        'Percent of Sittings Spoken (Out of 131)'], axis=1), vert=False,
        by='Party', ax=ax7);

for ax in [ax2, ax3, ax4, ax5, ax6, ax7]:
    ax.set_xlabel(None)
    ax.label_outer()
    ax.set_title(label=ax.title._text, fontsize=12)

fig.suptitle('13th Parliament of Singapore attendance\ntendance and speaking\ncount',
             fontsize=20)
ax1.set_title('Overall metrics', fontsize=15), ax1.set_ylabel(None), ax1.
    legend(fontsize='small')
fig.text(0.03, 0.65, 'Group by Constituency', fontsize=15,
        backgroundcolor='lightgrey')
fig.text(0.03, 0.37, 'Group by Individual', fontsize=15,
        backgroundcolor='lightgrey');

fig.savefig('output/dashboard.png')

```

6 Remarks

We note that cabinet members do not speak in sittings. Perhaps it's because parliament is an opportunity to hear alternate views on the bills been presented. But I'm not sure about the details of parliament sittings.

As a result of the cabinet members, PAP's speaking percentage is an underestimated performance of the party.

```
[ ]: individual_performance[(individual_performance['Spoke per meeting (Out of
    ↳131)'] == 0)]
```

```
[ ]: pd.set_option('display.max_rows', 10)
```