In [71]:

```
import pandas as pd

sim = pd.read_json("/Users/massoudmaher/data/tpois_ran_walk.json")
```

In [72]:

```
def cast_n_sort(df_dict):
    df = pd.DataFrame(df_dict)
    df.index = df.index.astype("int")
    return df.sort_index()

sim["cn_data"] = [cast_n_sort(x) for x in sim["cn_data"]]
sim["plinkage"] = [cast_n_sort(x) for x in sim["plinkage"]]
sim["clustering"] = [cast_n_sort(x) for x in sim["clustering"]]
#
#display(sim.columns)
print(sim.shape)
```

```
(100, 17)
```

Example clustering

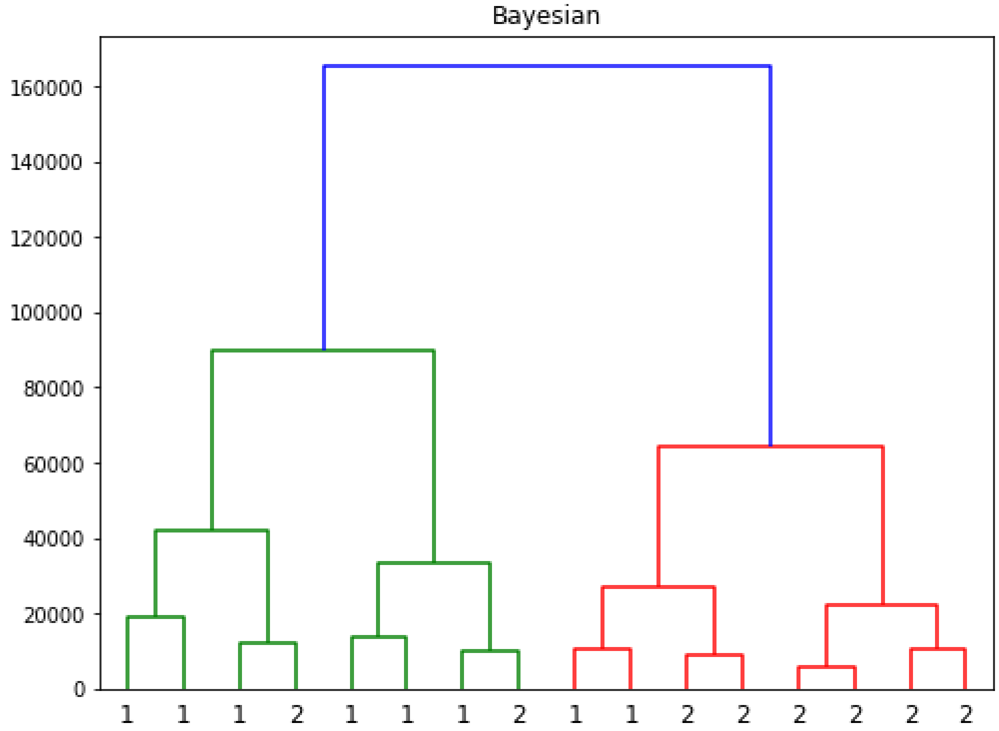
In [73]:

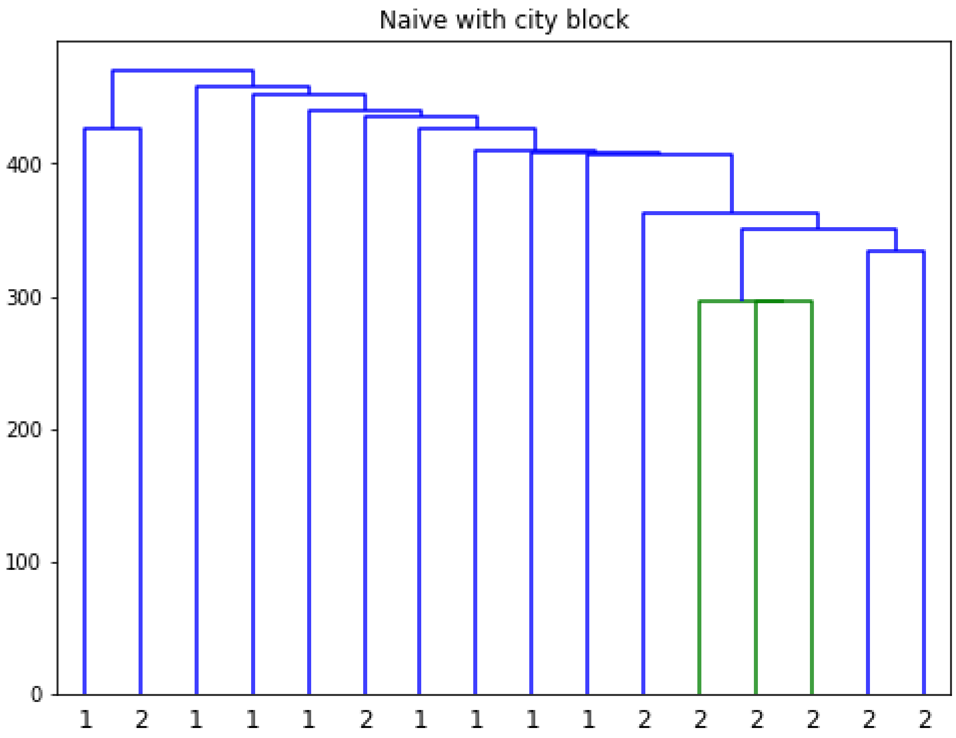
```
# Bayesian hierarchical
from scipy.cluster.hierarchy import dendrogram
from scgenome.cncluster import bayesian_cluster
from scgenome.simulation import get_plot_data
import matplotlib.pyplot as plt
import numpy as np

eg_ind = 50
cn_data = sim.loc[eg_ind,"cn_data"].copy()
n_states = sim.loc[eg_ind,"max_cn"]
alpha = sim.loc[eg_ind,"alpha"]
bhc_linkage = sim.loc[eg_ind,"plot_data"]
bhc_plinkage = sim.loc[eg_ind,"plinkage"]
naive_linkage = sim.loc[eg_ind,"naive_linkage"]
cluster_ids = list(pd.Series(sim.loc[eg_ind,"cell_id"]).str[2])

fig = plt.figure(figsize=(8, 6))
f = dendrogram(bhc_linkage, labels=cluster_ids)
txt = fig.axes[0].set_title("Bayesian")

fig = plt.figure(figsize=(8, 6))
f = dendrogram(naive_linkage, labels=cluster_ids)
txt = fig.axes[0].set_title("Naive with city block")
```


Bayesian
160000
140000
120000
100000
80000
60000
40000
20000
0
1 1 1 2 1 1 1 2 1 1 2 2 2 2 2 2



In [74]:

```
all_sim = pd.concat(list(sim["plinkage"]))
all_sim.head()
```

Out[74]:

	i	j	r_merge	naive_dist	log_like	i_count	j_count	merge_count	dist
0	9	11	-5594.562331	28.193182	-5597.167501	1	1	2	5594.562331
1	8	12	-6778.561168	24.120467	-6781.166338	1	1	2	6778.561168
2	10	14	-7547.105025	27.789437	-7549.710195	1	1	2	7547.105025
3	7	13	-9479.377614	34.107227	-9481.982784	1	1	2	9479.377614
4	1	15	-9797.192799	35.982038	-9799.797970	1	1	2	9797.192799

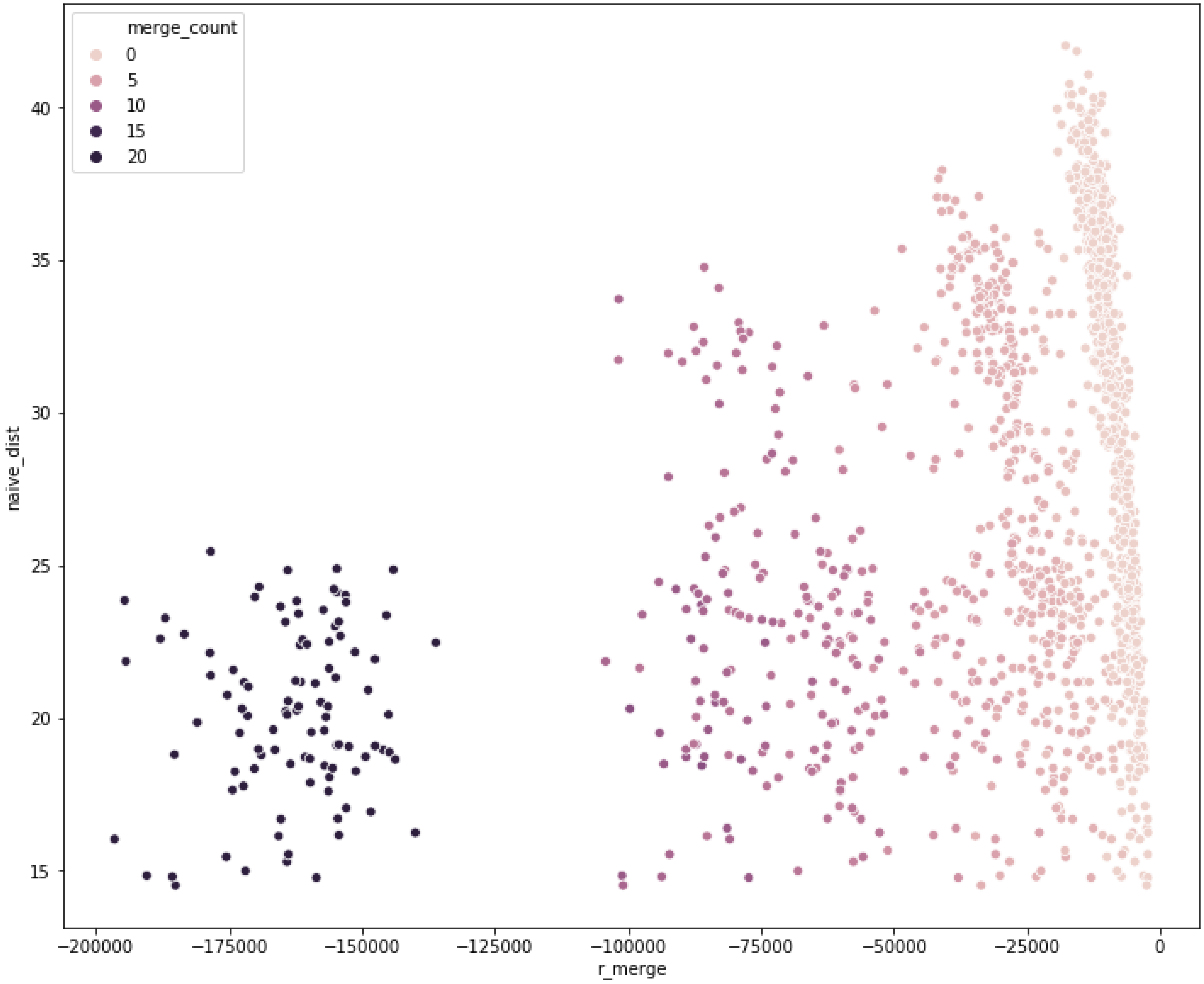
In [75]:

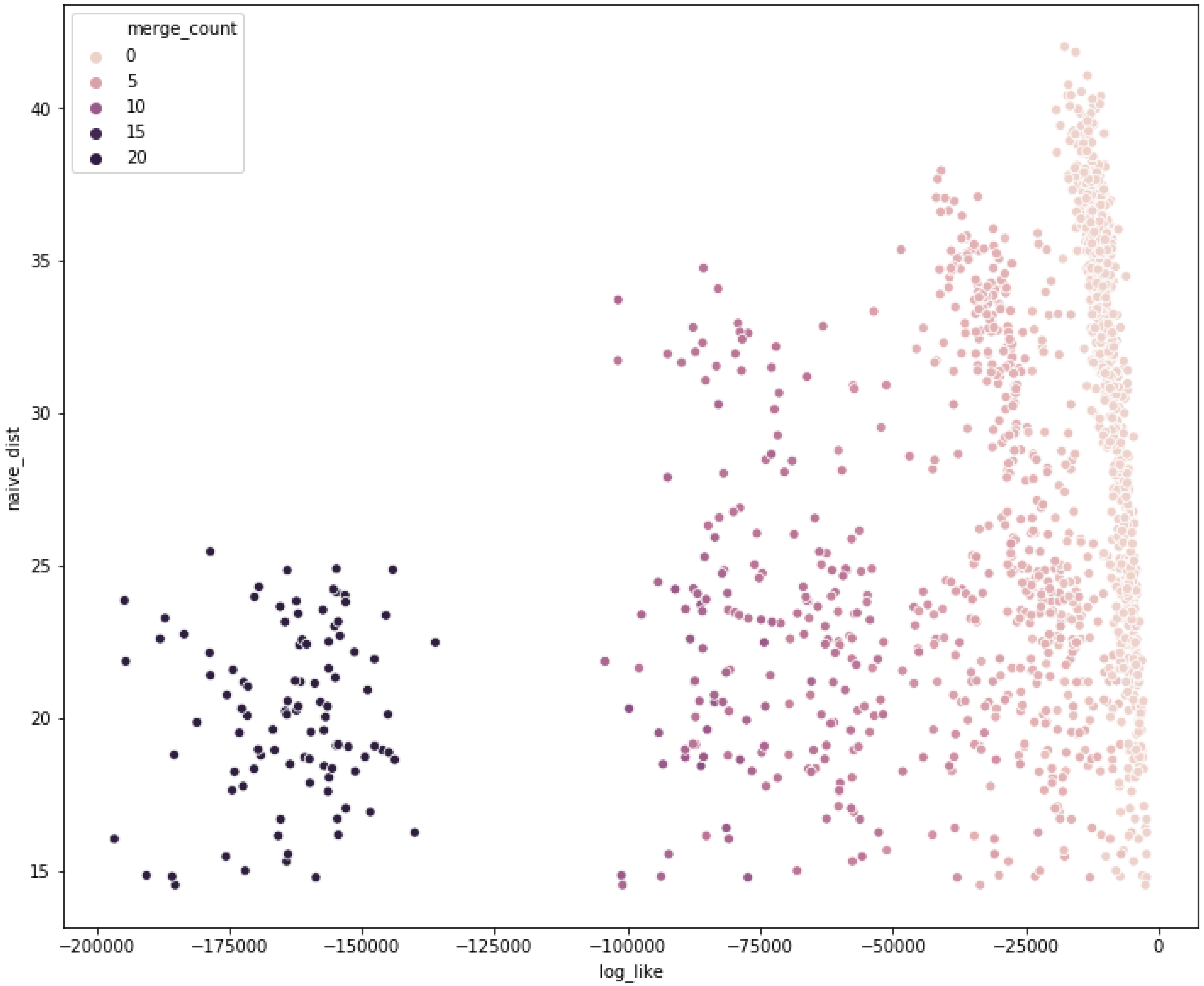
```
import seaborn as sns
import matplotlib.pyplot as plt

fig = plt.figure(figsize=(12,10))
ax = sns.scatterplot(data=all_sim, x="r_merge", y="naive_dist", hue="merge_count")

fig = plt.figure(figsize=(12,10))
sns.scatterplot(data=all_sim, x="log_like", y="naive_dist", hue="merge_count")
```

```
Out[75]: <matplotlib.axes._subplots.AxesSubplot at 0x14dec7f10>
```


merge_count
● 0
● 5
● 10
● 15
● 20
naive_dist
40
35
30
25
20
15
r_merge
−200000
−175000
−150000
−125000
−100000
−75000
−50000
−25000
0



```
In [76]: from scipy.stats import pearsonr
         print(pearsonr(all_sim["r_merge"], all_sim["naive_dist"])[0]**2 )
         print(pearsonr(all_sim["log_like"], all_sim["naive_dist"])[0]**2)
```

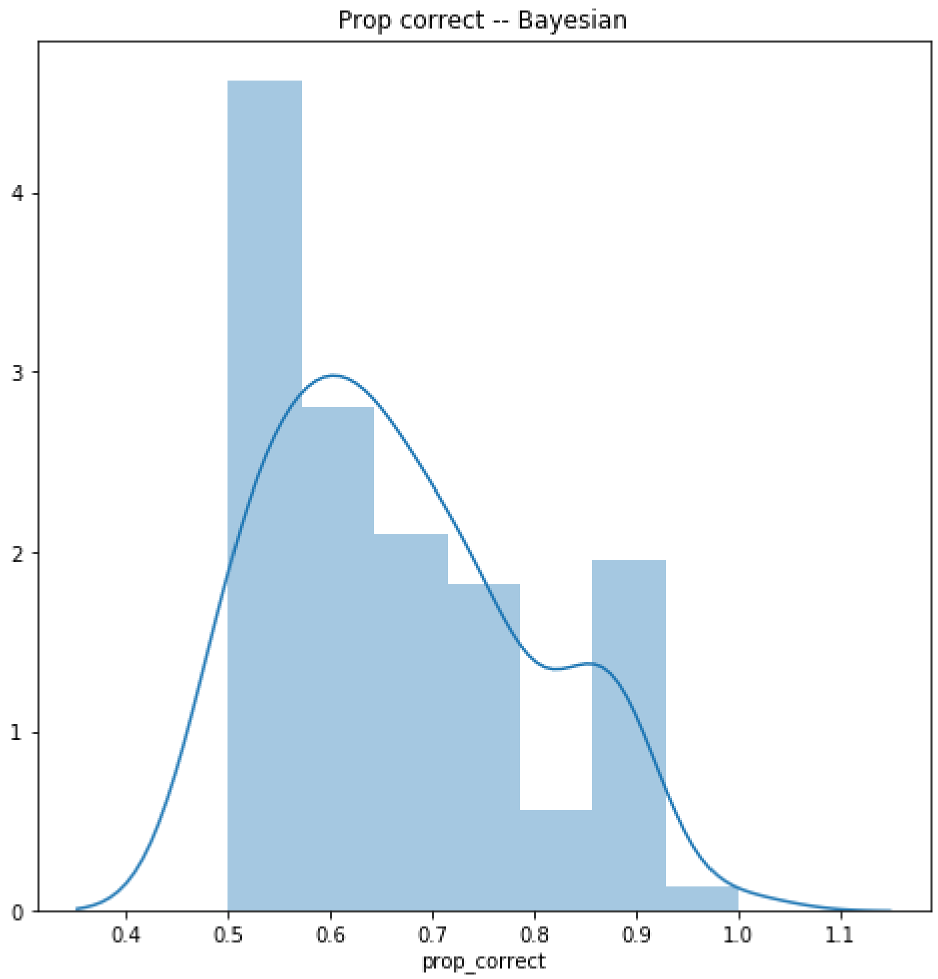
```
0.13313831584341068
0.13316749727381114
```

For ease, going to only use 500 bin

In [78]:
```
import seaborn as sns
fig = plt.figure(figsize=(8,8))
sns.distplot(sim["prop_correct"])
plt.title("Prop correct -- Bayesian")
```

```
/Users/massoudmaher/Documents/Code/scgenome/venv/lib/python3.7/site-packages/scipy/stats/stats.py:17
13: FutureWarning: Using a non-tuple sequence for multidimensional indexing is deprecated; use `arr
[tuple(seq)]` instead of `arr[seq]`. In the future this will be interpreted as an array index, `arr
[np.array(seq)]`, which will result either in an error or a different result.
  return np.add.reduce(sorted[indexer] * weights, axis=axis) / sumval
```

Out[78]:
```
Text(0.5,1,'Prop correct -- Bayesian')
```



In [79]:

```
Out[79]: 0       0.8750
         1       0.6250
         10      0.6250
         11      0.6250
         12      0.5000
         13      0.6250
         14      0.6250
         15      0.5000
         16      0.5625
         17      0.7500
         18      0.8750
         19      0.6250
         2       0.5625
         20      0.5625
         21      0.6250
         22      0.7500
         23      0.6250
         24      0.6875
         25      0.6875
         26      0.6250
         27      0.8750
         28      0.6250
         29      0.5000
         3       0.6875
         30      0.5625
         31      0.7500
         32      0.5000
         33      0.8750
         34      0.5625
         35      1.0000
                  ...
         72      0.8750
         73      0.5000
         74      0.7500
         75      0.6250
         76      0.8750
         77      0.5000
         78      0.6250
         79      0.6875
         8       0.8750
         80      0.5625
         81      0.6250
         82      0.5625
```

```
83    0.5000
84    0.8125
85    0.8750
86    0.7500
87    0.5000
88    0.6875
89    0.7500
9     0.5000
90    0.7500
91    0.5625
92    0.6250
93    0.6250
94    0.6250
95    0.5000
96    0.8750
97    0.7500
98    0.5625
99    0.8750
Name: prop_correct, Length: 100, dtype: float64
```

In [ ]: