

Problem 8

```
[13]: from sklearn.decomposition import PCA
import matplotlib.pyplot as plt
import numpy as np

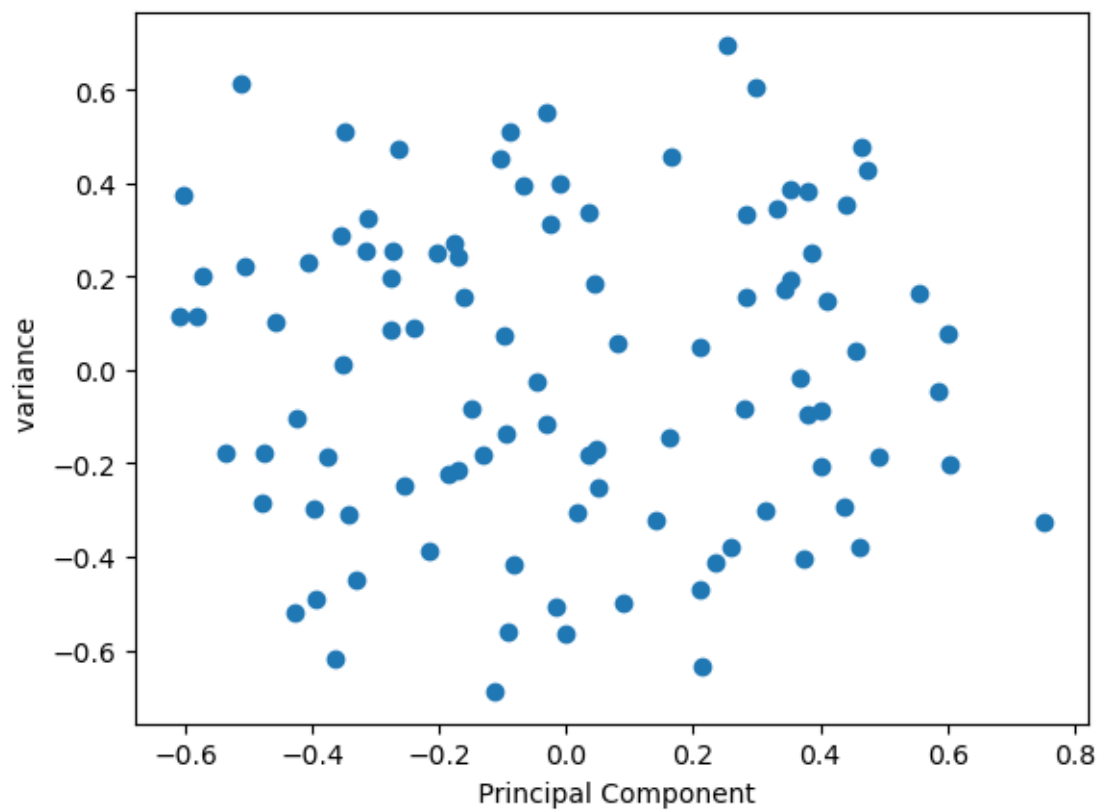
# matrix given by the problem
for i in np.arange(0,1,0.05):
    data = np.random.rand(100,5)

    # PCA
    pca = PCA(n_components=2)
    pca_data = pca.fit_transform(data)

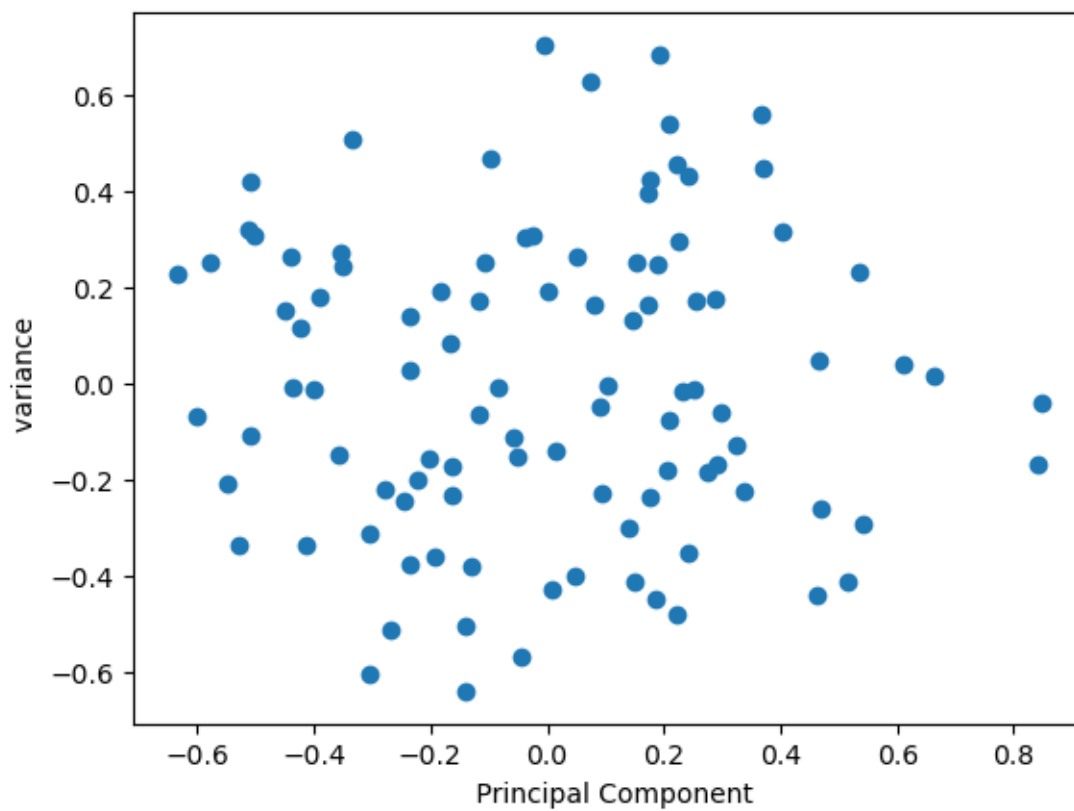
    # (eigenvectors)
    print(pca.components_)

    # Visualize
    plt.scatter(pca_data[:, 0], pca_data[:, 1])
    plt.xlabel(" Principal Component")
    plt.ylabel("variance ")
    plt.show()
```

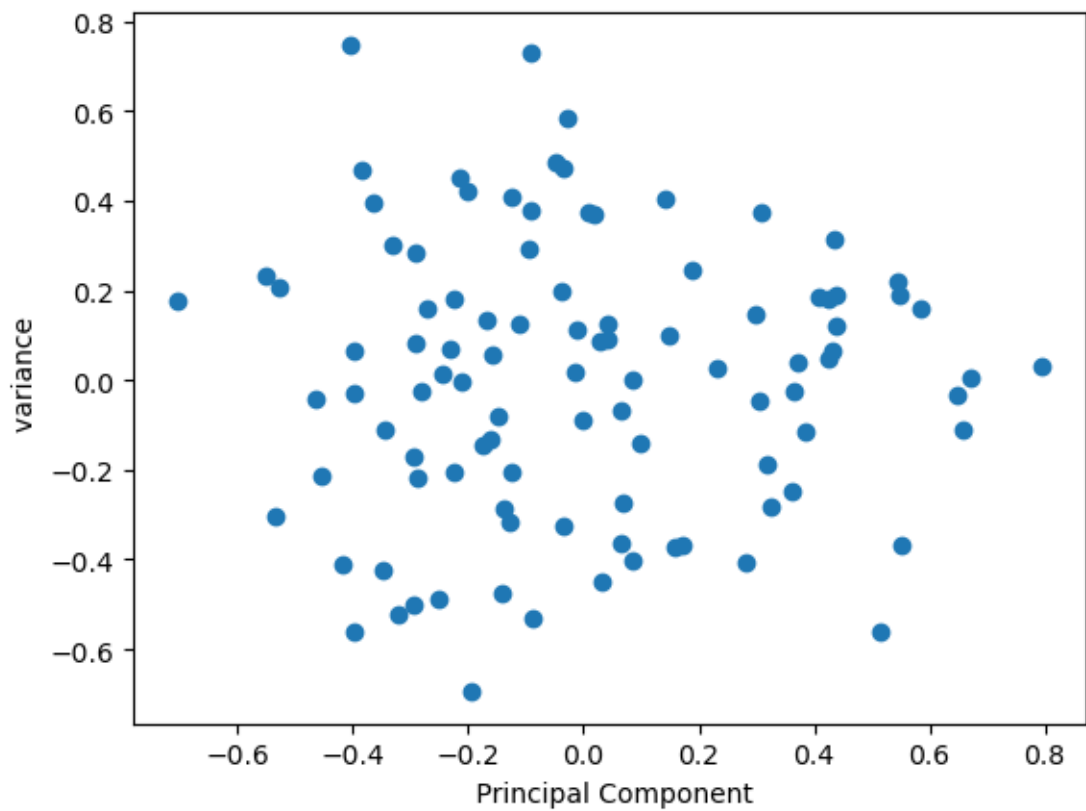
```
[[-0.08664116 -0.11656508  0.23669094 -0.69236246  0.66597111]
 [ 0.73338855 -0.61565276 -0.07402005 -0.20001471 -0.19397955]]
```



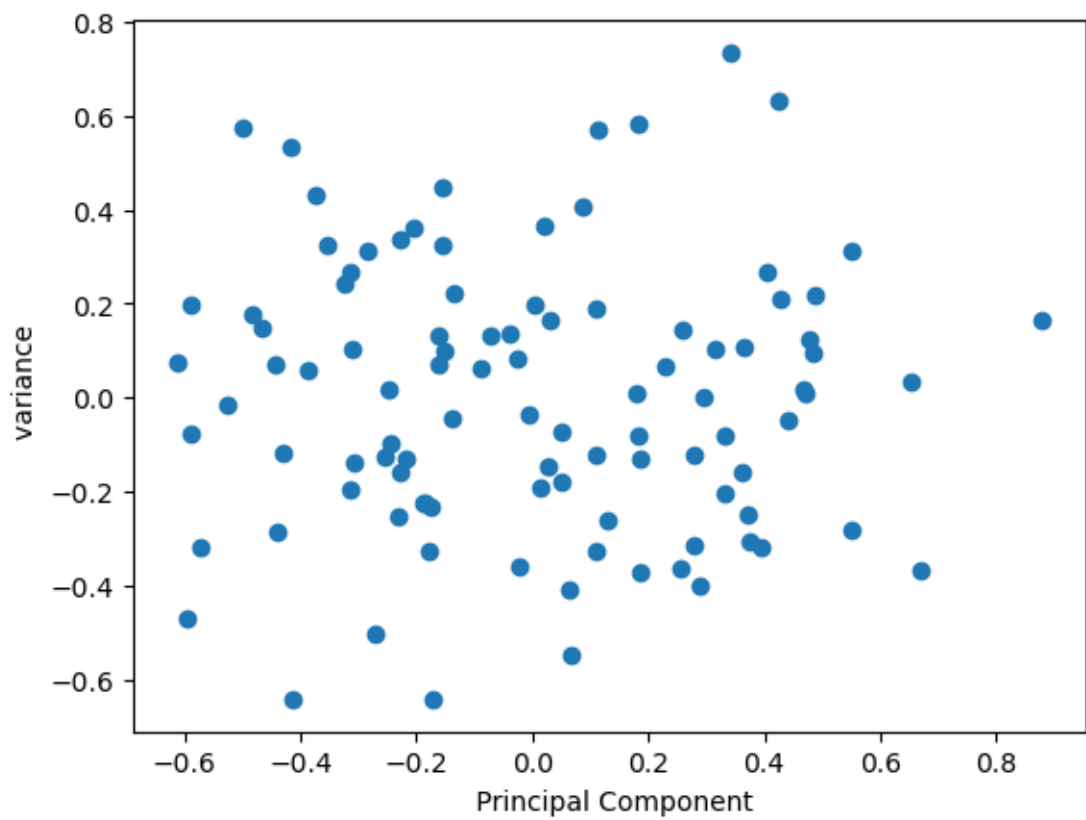
```
[[ 0.31166912  0.24592832  0.26816304  0.62915893  0.61206964]
 [-0.80893586 -0.32871474 -0.03094542  0.07482163  0.48063863]]
```



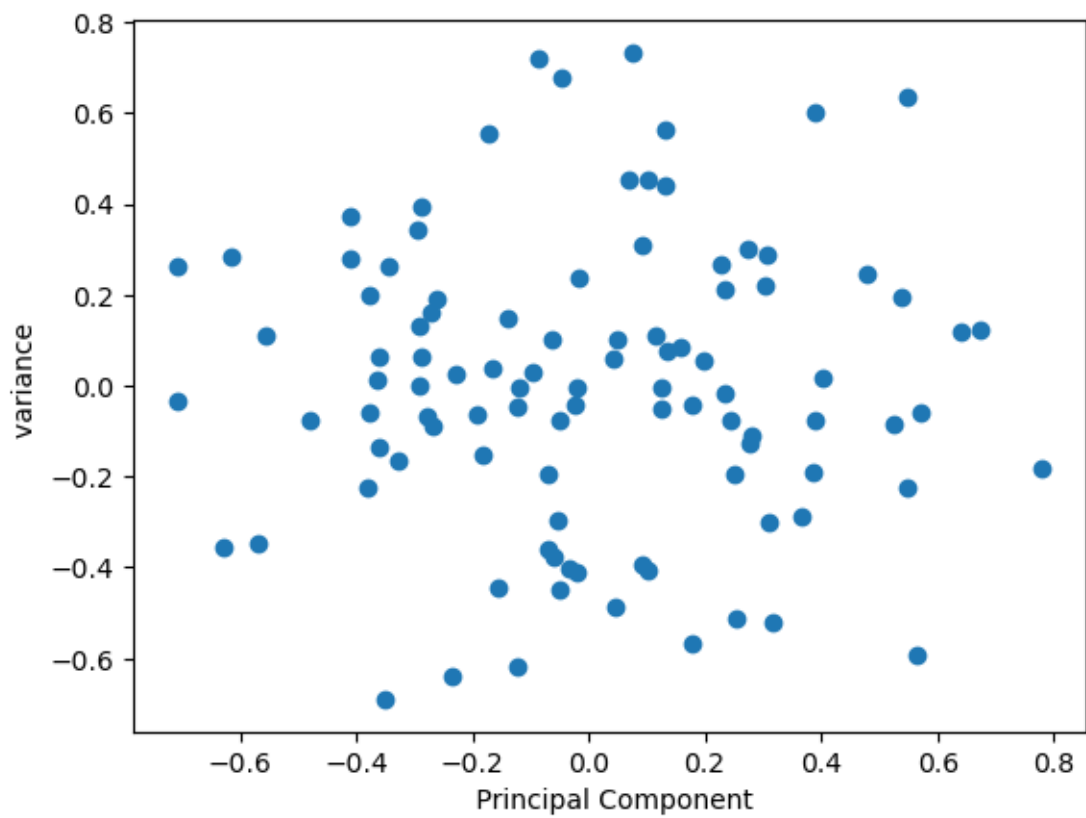
```
[[-0.43525593  0.36713812  0.69172542 -0.25440039 -0.36408552]  
 [-0.57483722 -0.45718297  0.18711386  0.63802202  0.13587571]]
```



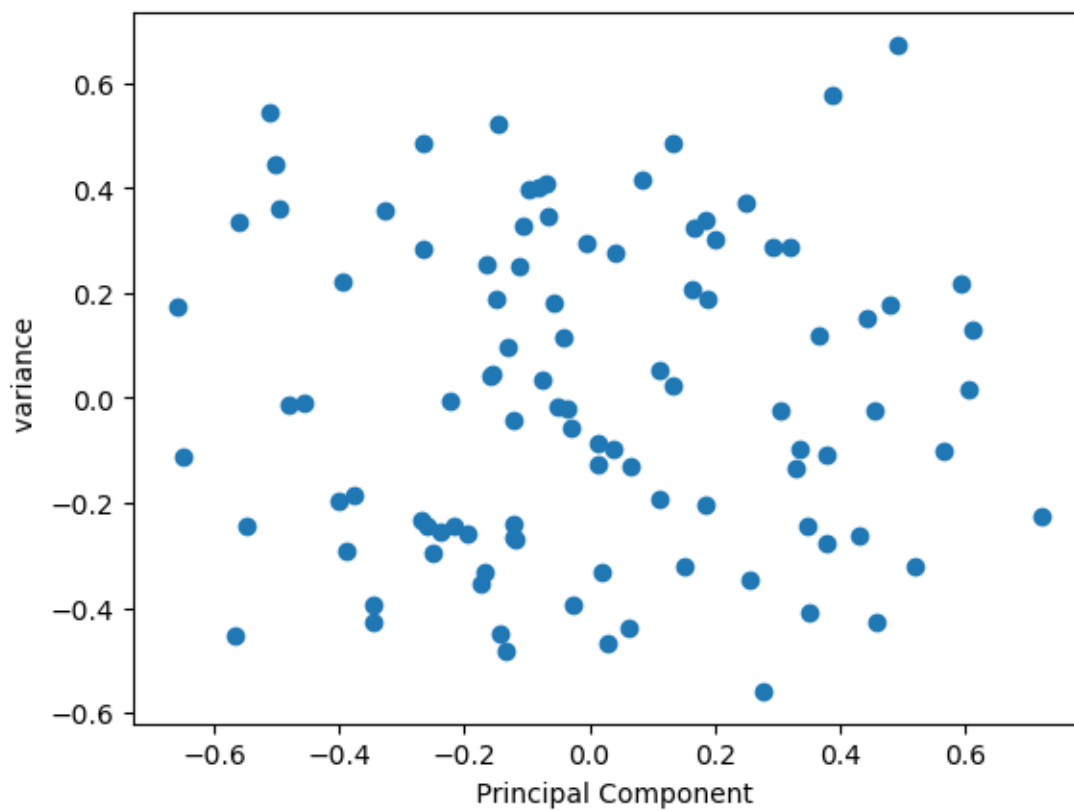
```
[[-0.53511769  0.50501369  0.11854168 -0.46632695  0.47654725]  
 [ 0.05923641 -0.04380806  0.48630579 -0.61827237 -0.61303984]]
```



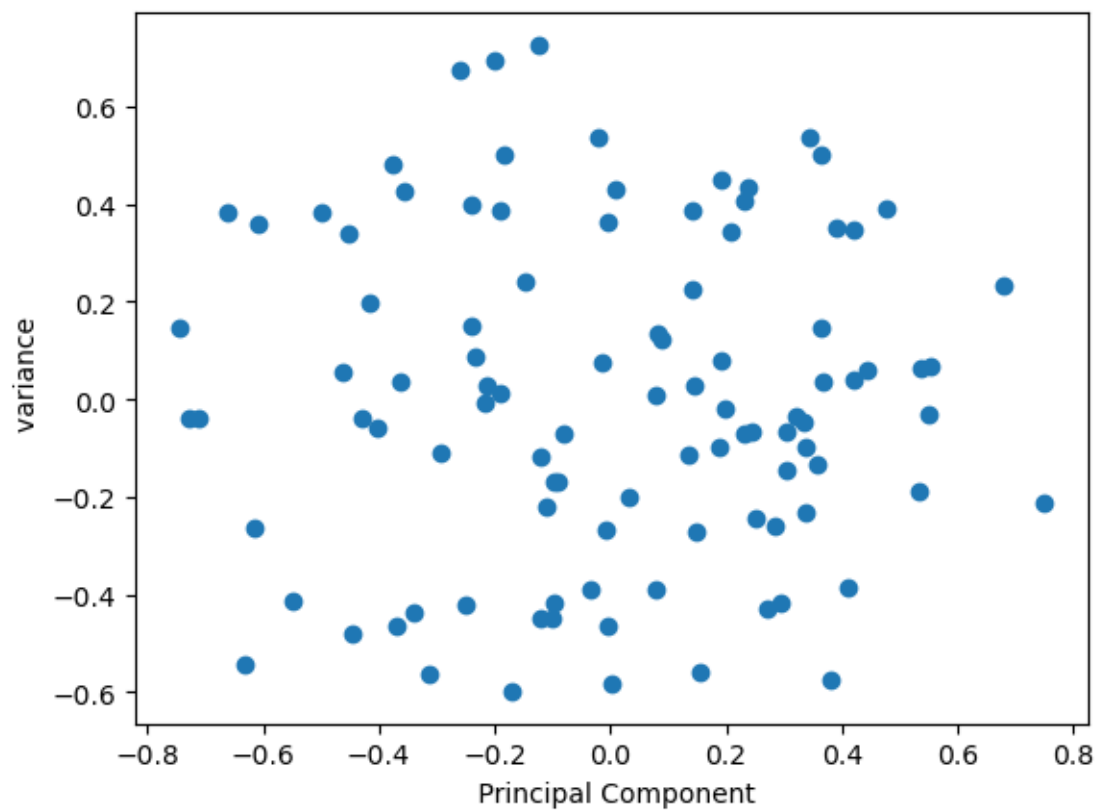
```
[[-0.39331635  0.55888608 -0.13300778  0.69255893 -0.18873167]  
 [ 0.65104629 -0.07123178 -0.69660071  0.25337728 -0.14701077]]
```



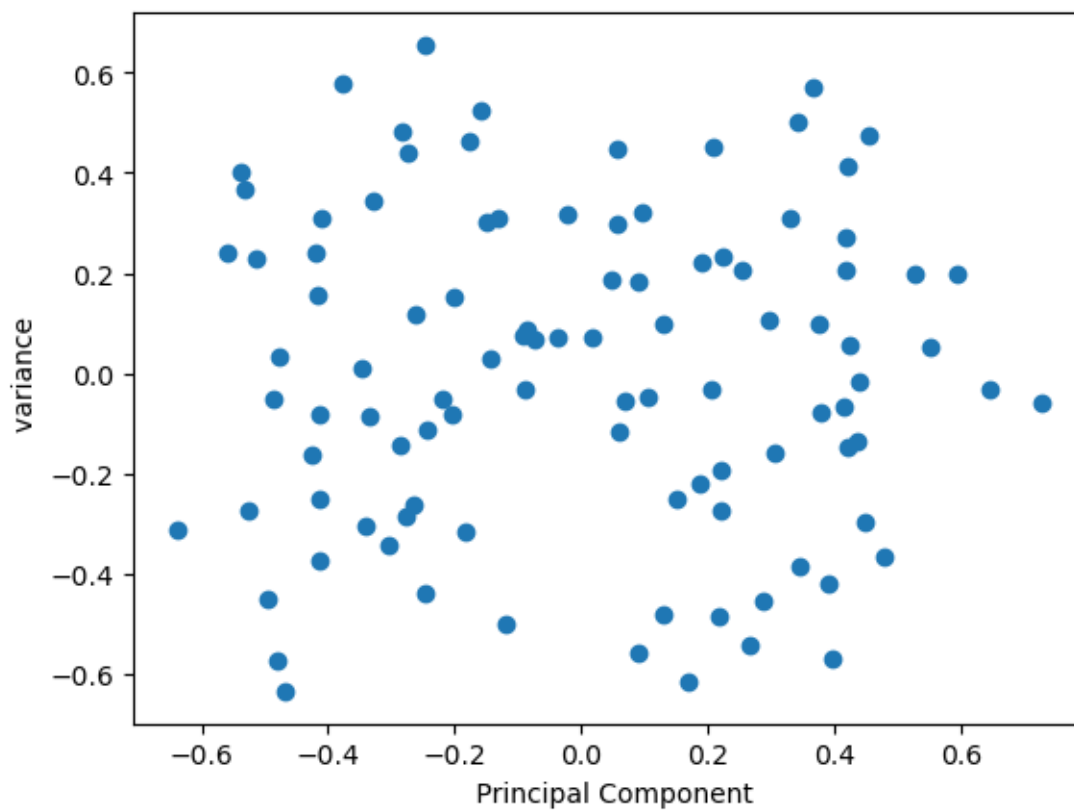
```
[[ 0.59908408 -0.74087213 -0.21811766 -0.15308746  0.14558735]
 [-0.04382214 -0.01108035 -0.71933432  0.32449228 -0.61255182]]
```



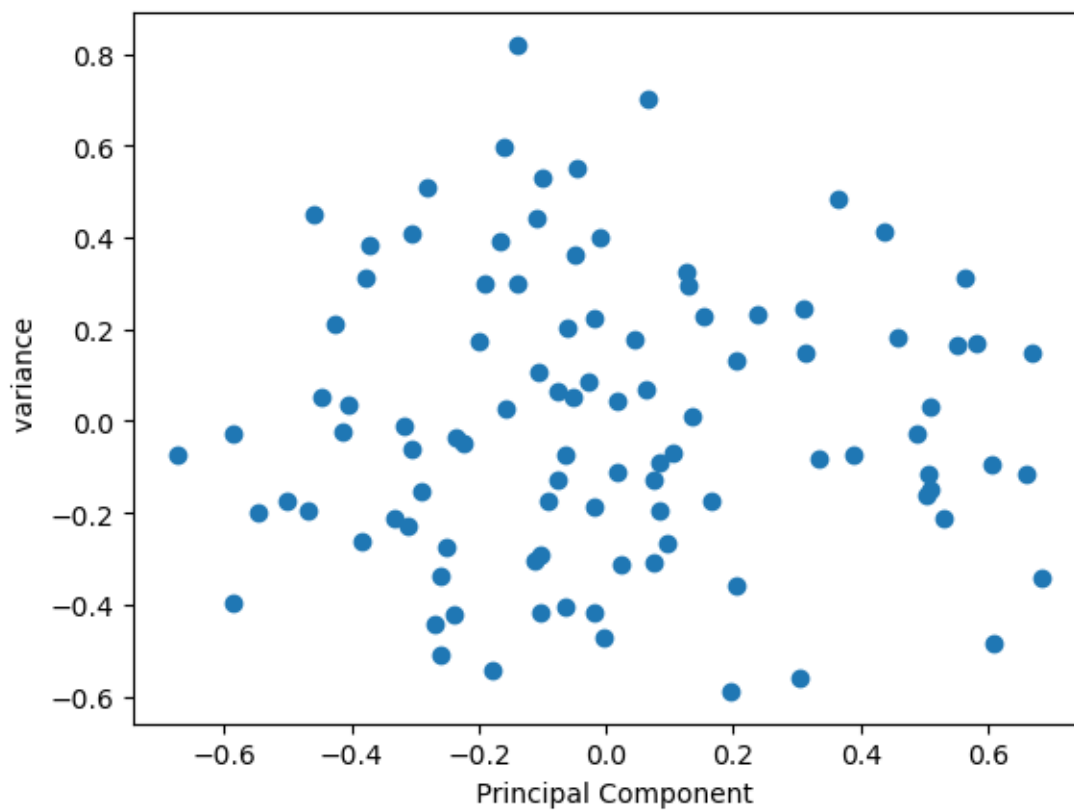
```
[[-0.74237282 -0.02093543  0.28477825  0.45461207 -0.40084102]
 [ 0.06595199 -0.5493012  -0.70919525  0.41987314 -0.12110811]]
```



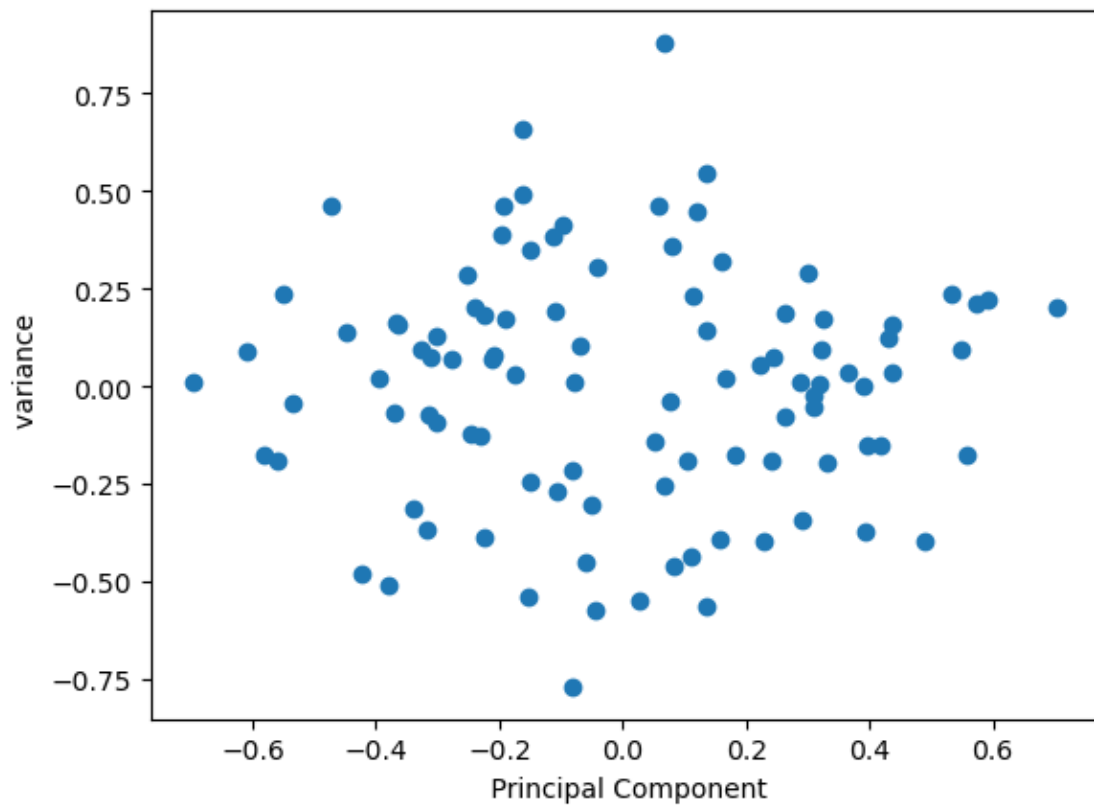
```
[[-0.68095018 -0.22980644  0.03284119 -0.68136119 -0.13477476]  
 [ 0.0633359  -0.74505561  0.0026622  0.05727176  0.66150855]]
```

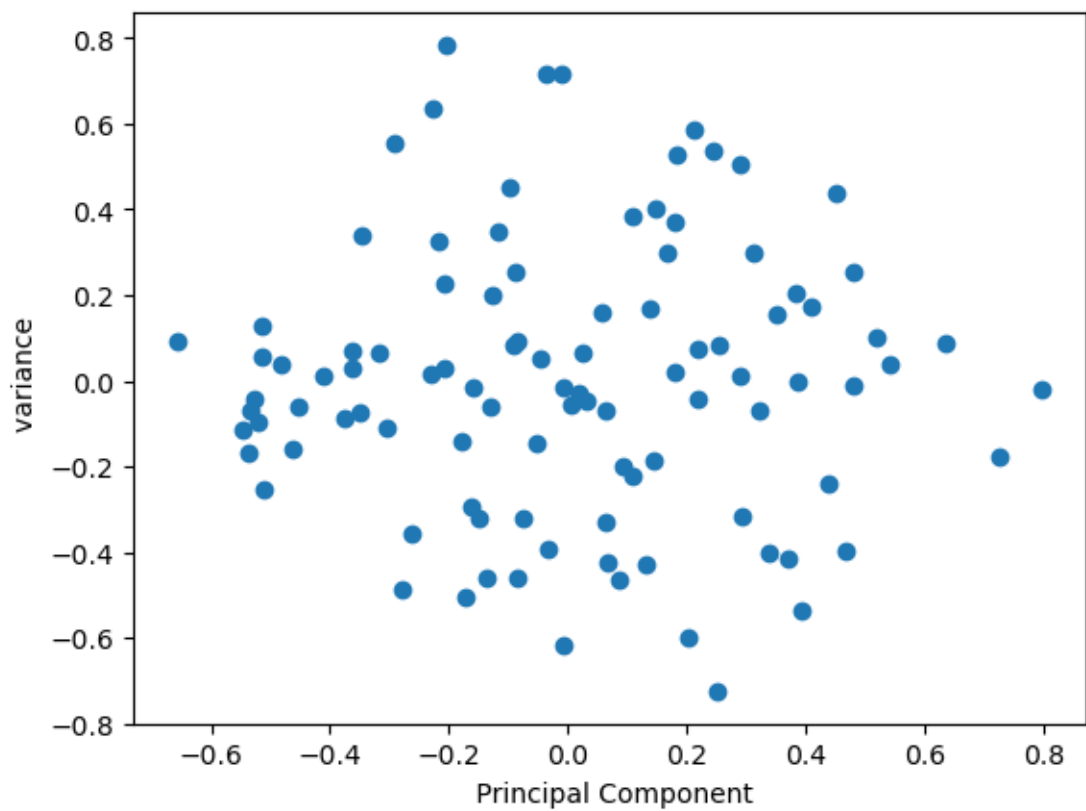
```
[[ 0.644933  0.00313552  0.66688584 -0.3723555 -0.02581183]
 [-0.29567575 -0.67393879  0.50133995  0.39567499 -0.2246818 ]]
```



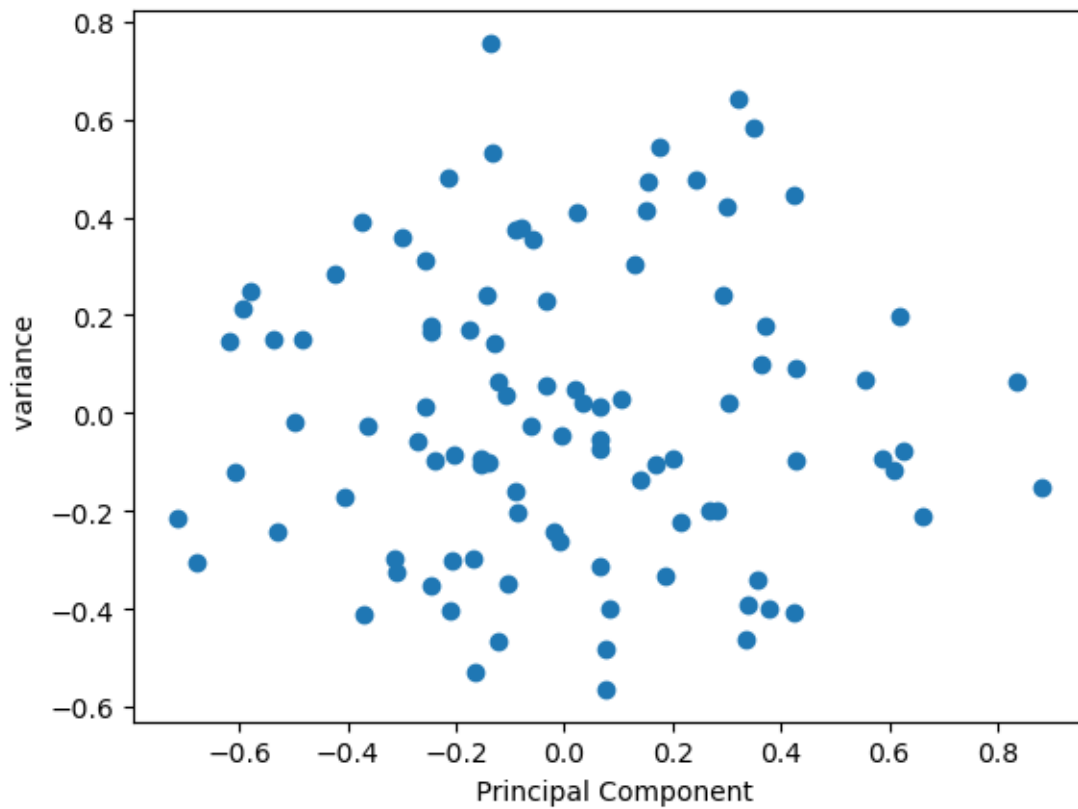
```
[[-0.06912738  0.20695443  0.64020671  0.25989143 -0.68919017]
 [ 0.2839972   0.54822123  0.45282591  0.16919277  0.62058164]]
```



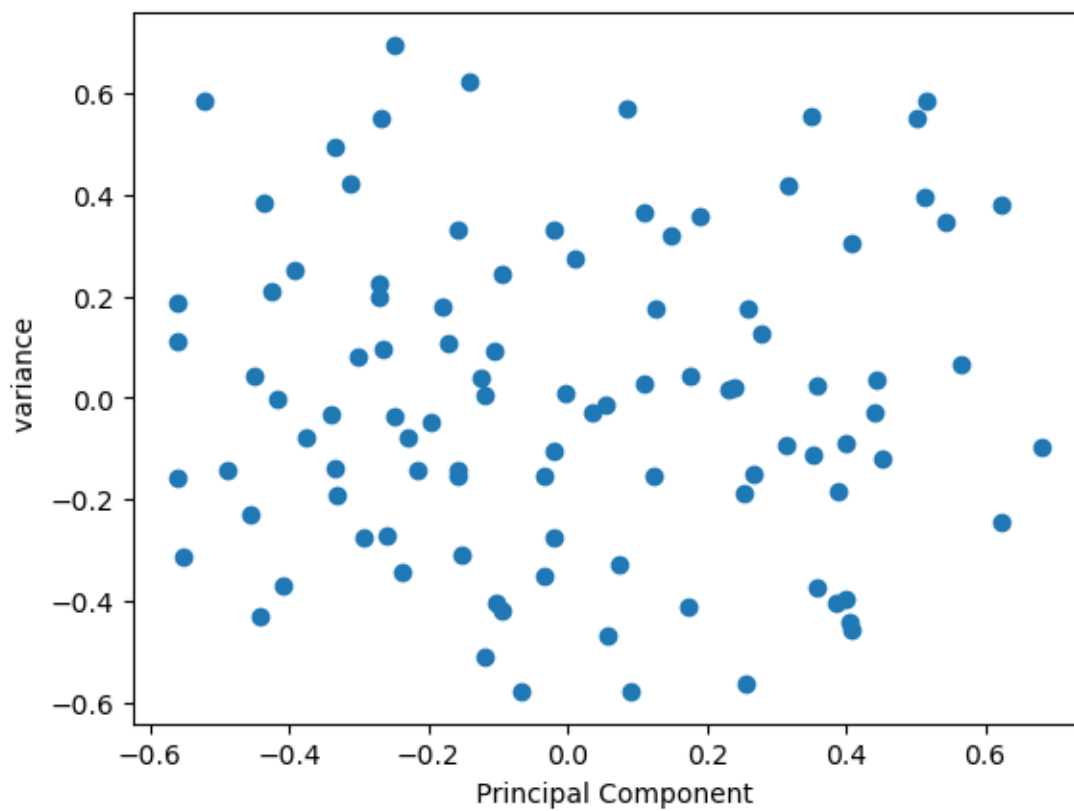
```
[[-0.47028548  0.29531375  0.2107215   0.48675133  0.64053957]  
 [-0.18496193 -0.54359782 -0.14732511  0.71146583 -0.37736213]]
```



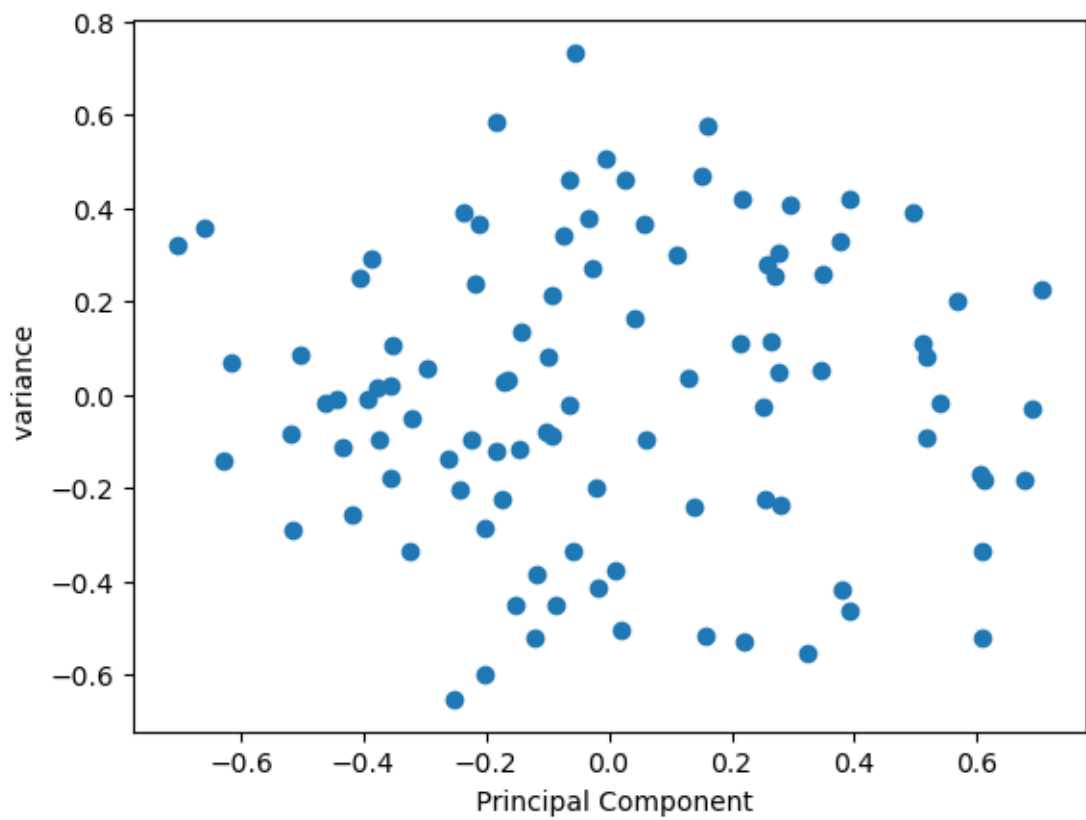
```
[[-0.45747144 -0.24827266 -0.52973251 -0.40229669 -0.53537035]  
 [ 0.32634476  0.64260399  0.23116171 -0.4757435  -0.44809774]]
```



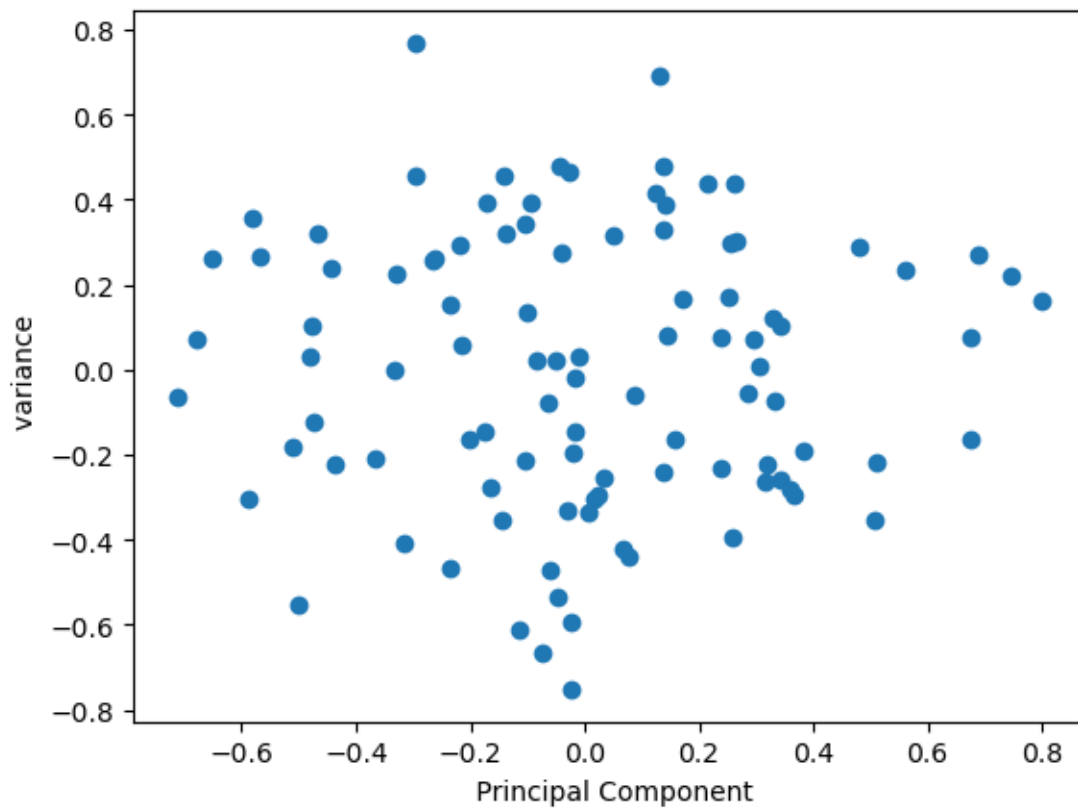
```
[[ 0.04296435 -0.09008319  0.58929353  0.79902978  0.0657543 ]  
 [ 0.71267849 -0.6221977  0.19566438 -0.25571971  0.03580881]]
```



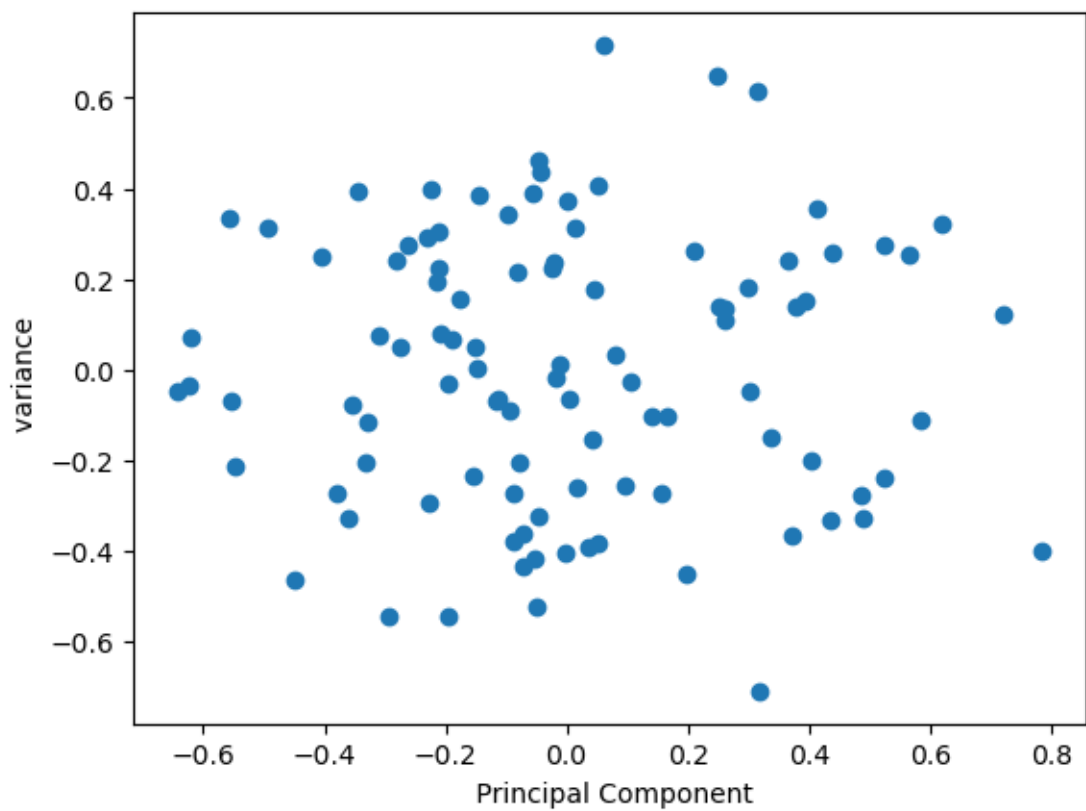
```
[[ 0.62379837  0.5998202   0.15998875 -0.17543076 -0.44126973]
 [ 0.43867208  0.09903464 -0.45514904  0.70312133  0.31019139]]
```



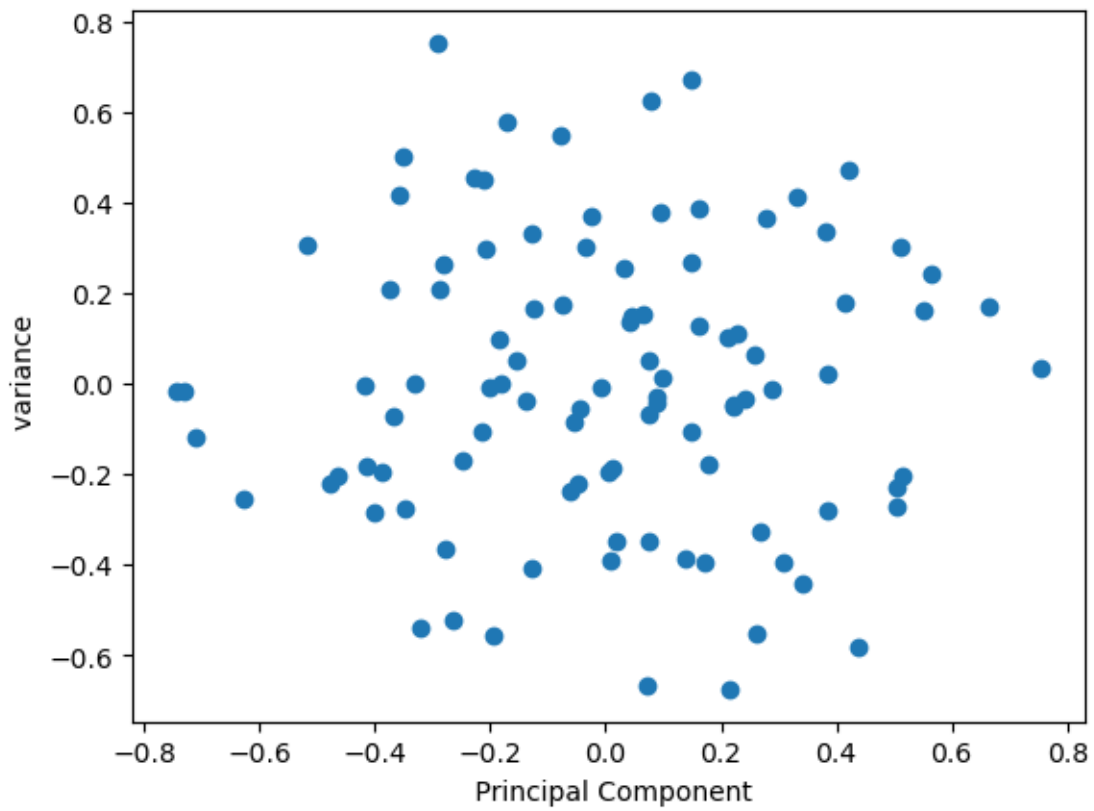
```
[[-0.67685071 -0.05927142 -0.66487125 -0.29159371  0.10620425]  
 [-0.12746279  0.51787783  0.41740406 -0.73112215  0.08240174]]
```



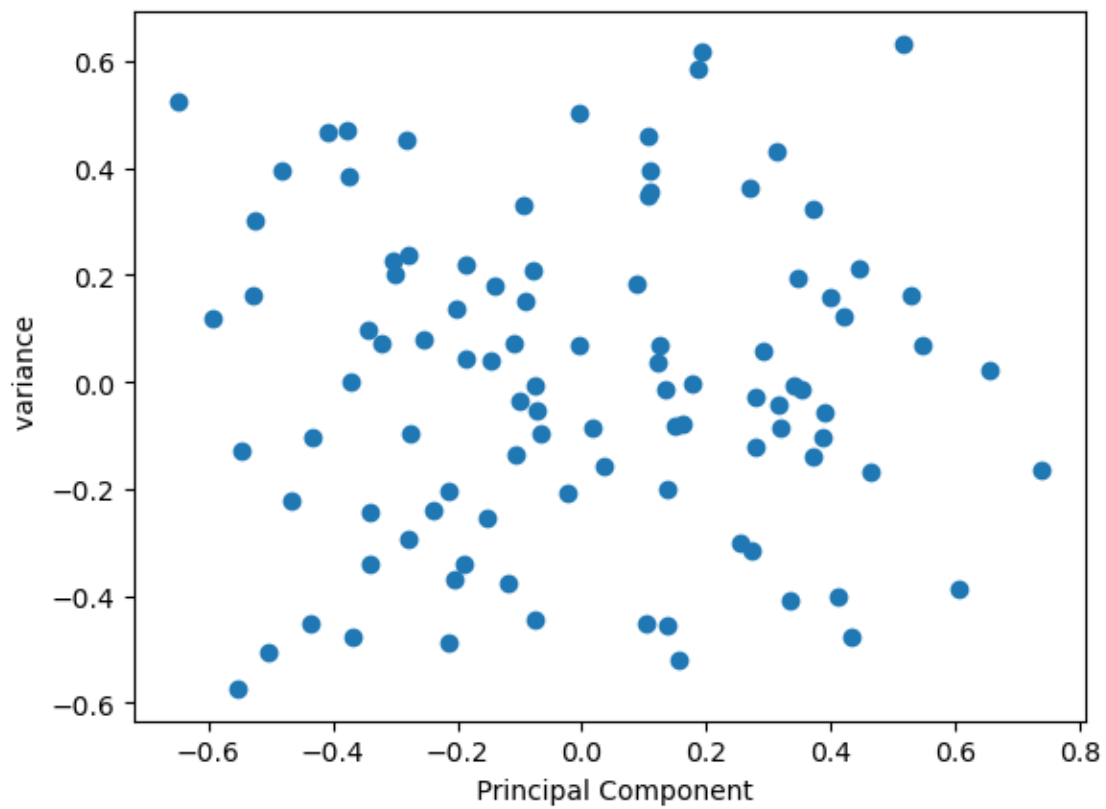
```
[[ 0.38244225  0.50741065  0.60790566 -0.07627396 -0.47000569]
 [ 0.44365926  0.01898885  0.14680985  0.76210727  0.44771114]]
```

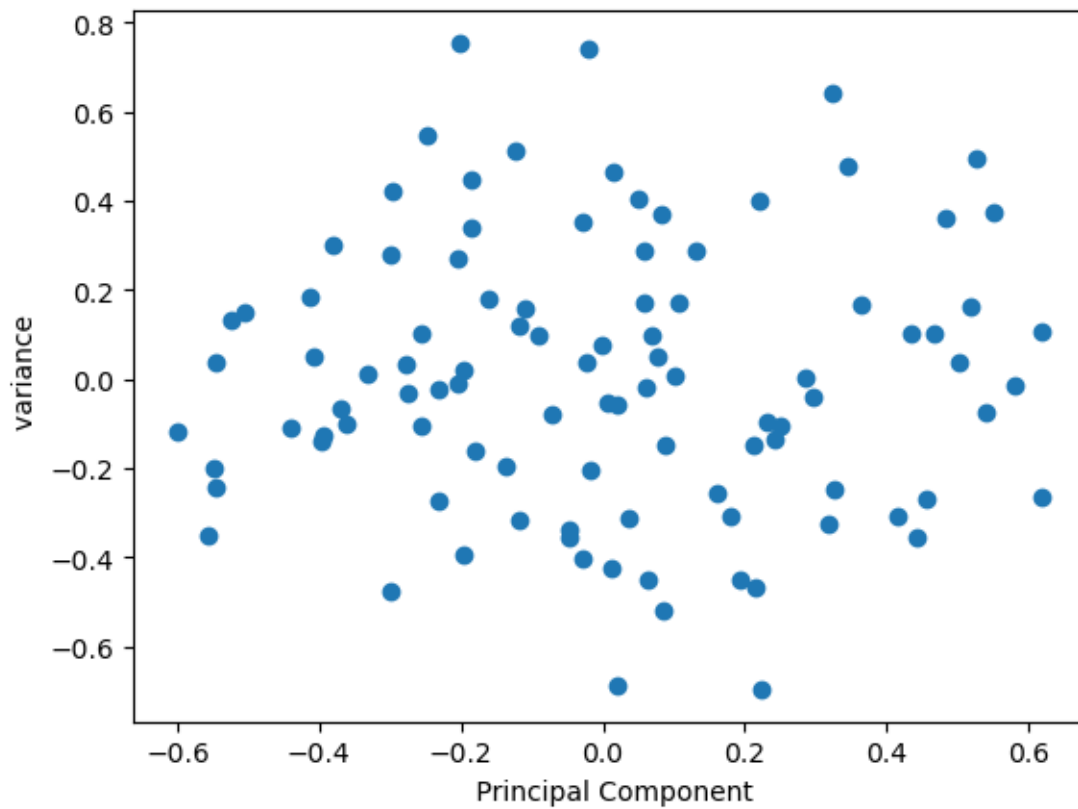
```
[[-0.10217456 -0.63669029  0.46682146 -0.26472541  0.54422791]  
 [ 0.29617212  0.51834679  0.00092399 -0.74438993  0.29913451]]
```



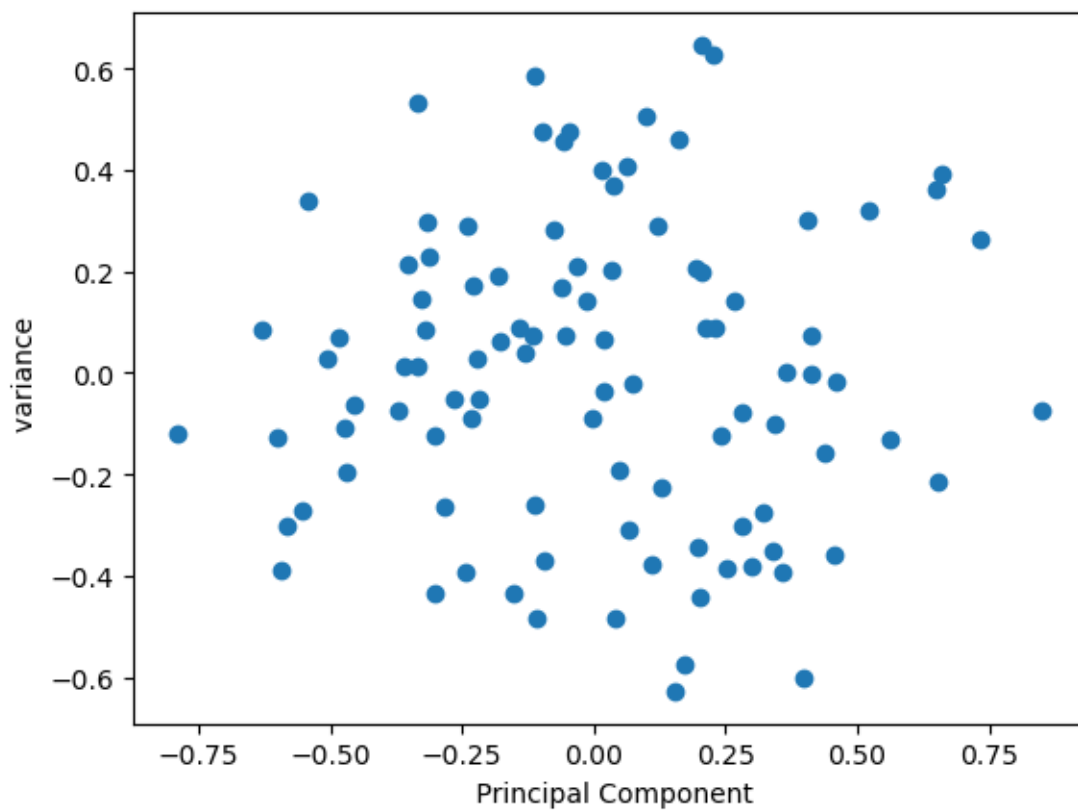
```
[[ 0.04600932  0.28896408 -0.04592317 -0.60608562 -0.73819658]
 [-0.85222085 -0.06556622 -0.49262365  0.09946823 -0.12980257]]
```



```
[[-0.48787926 -0.03844426  0.18431272 -0.13038108  0.84233335]  
 [-0.63943338  0.5078011   0.38700664  0.10152742 -0.41615026]]
```



```
[[ 0.33972601  0.19046118  0.34123843  0.46583463  0.71754108]
 [ 0.40116751 -0.69528357  0.29792952  0.35360098 -0.37662943]]
```



[]: