# Factor Analysis : Personality Survey Data

2020150473 김지후

# Personality Survey Data
# collected online by Open Psychometrics

100 observations of 9 items (variables)
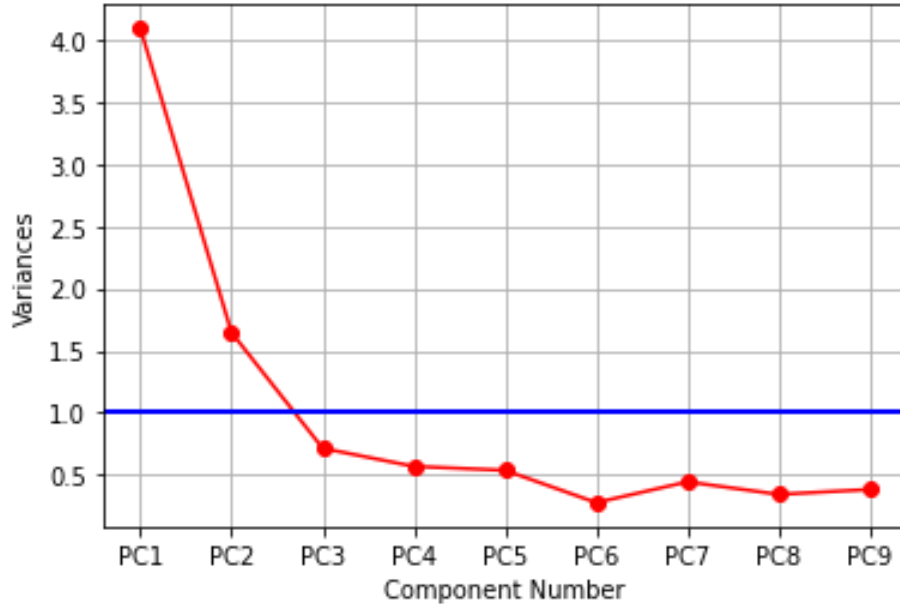
X1  I am the life of the party.
X2  I don't talk a lot. (*)
X3  I get stressed out easily. (*)
X4  I feel comfortable around people.
X5  I am relaxed most of the time.
X6  I keep in the background. (*)
X7  I start conversations.
X8  I have little to say. (*)
X9  I seldom feel blue.

|     | x1 | x2 | x3 | x4 | x5 | x6 | x7 | x8 | x9 |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **x1** | 1.000000 | 0.583683 | 0.179688 | 0.527016 | 0.214805 | 0.638727 | 0.555429 | 0.531468 | 0.190247 |
| **x2** | 0.583683 | 1.000000 | 0.136807 | 0.453297 | 0.149322 | 0.599856 | 0.649334 | 0.591518 | 0.162844 |
| **x3** | 0.179688 | 0.136807 | 1.000000 | 0.283804 | 0.499807 | 0.067863 | 0.118663 | 0.225566 | 0.363821 |
| **x4** | 0.527016 | 0.453297 | 0.283804 | 1.000000 | 0.389280 | 0.486107 | 0.596584 | 0.499787 | 0.202270 |
| **x5** | 0.214805 | 0.149322 | 0.499807 | 0.389280 | 1.000000 | 0.147760 | 0.158095 | 0.213359 | 0.373078 |
| **x6** | 0.638727 | 0.599856 | 0.067863 | 0.486107 | 0.147760 | 1.000000 | 0.594338 | 0.531567 | 0.065140 |
| **x7** | 0.555429 | 0.649334 | 0.118663 | 0.596584 | 0.158095 | 0.594338 | 1.000000 | 0.651886 | 0.141170 |
| **x8** | 0.531468 | 0.591518 | 0.225566 | 0.499787 | 0.213359 | 0.531567 | 0.651886 | 1.000000 | 0.194206 |
| **x9** | 0.190247 | 0.162844 | 0.363821 | 0.202270 | 0.373078 | 0.065140 | 0.141170 | 0.194206 | 1.000000 |

# Principal component analysis

Principal component analysis for choosing the number of factors



Covariance Scree Diagram

Components with eigenvalues less than 1 are excluded.

**2 factor model**

# Maximum Likelihood Factor Analysis test

**k=1**

The total number of observations was  100  with Likelihood Chi Square =  66.41  with prob <  3.6e-05
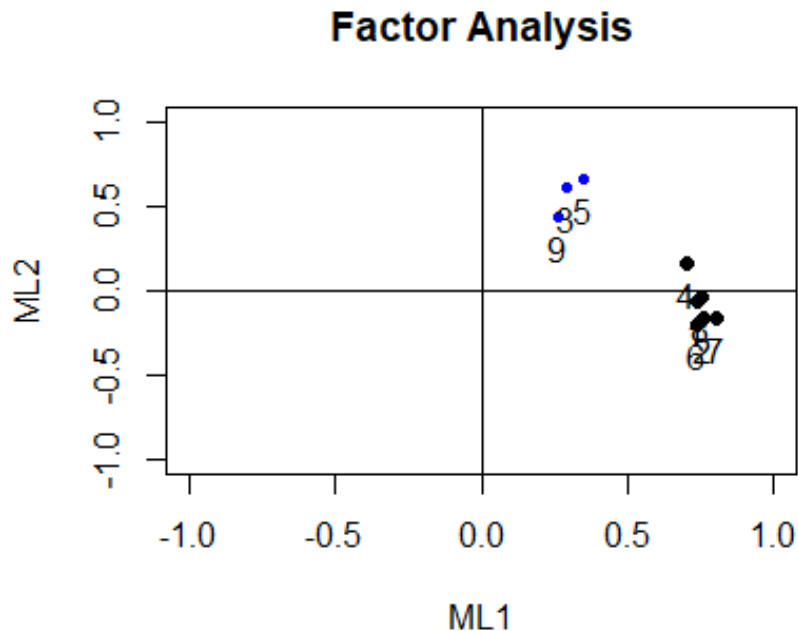
**k=2**

The total number of observations was  100  with Likelihood Chi Square =  15.7  with prob <  0.68

# Maximum Likelihood Factor Analysis
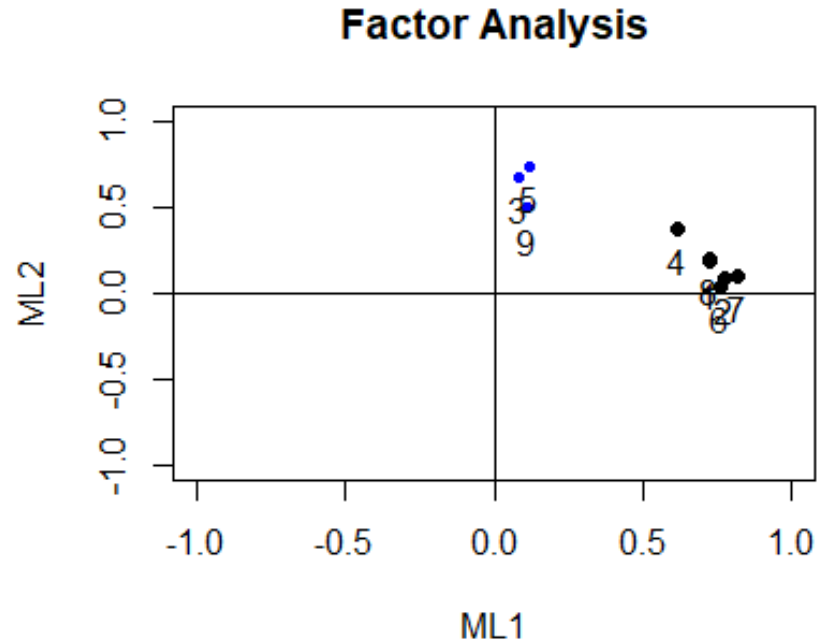## mle method without rotation

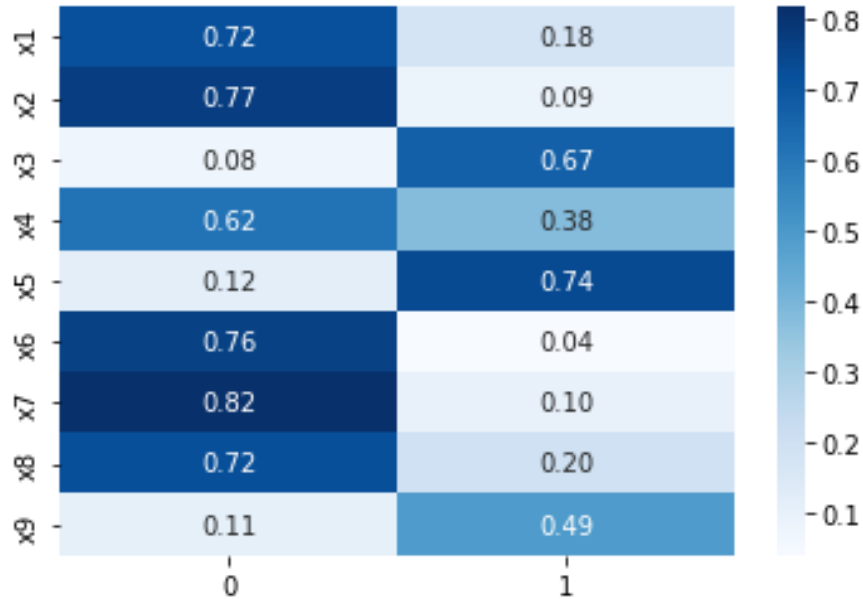|    | ML1  | ML2   | h2   | u2   | com |
|----|------|-------|------|------|-----|
| x1 | 0.74 | -0.06 | 0.55 | 0.45 | 1.0 |
| x2 | 0.76 | -0.16 | 0.61 | 0.39 | 1.1 |
| x3 | 0.29 | 0.61  | 0.46 | 0.54 | 1.4 |
| x4 | 0.71 | 0.16  | 0.52 | 0.48 | 1.1 |
| x5 | 0.35 | 0.66  | 0.56 | 0.44 | 1.5 |
| x6 | 0.74 | -0.20 | 0.59 | 0.41 | 1.1 |
| x7 | 0.81 | -0.16 | 0.68 | 0.32 | 1.1 |
| x8 | 0.75 | -0.04 | 0.56 | 0.44 | 1.0 |
| x9 | 0.26 | 0.43  | 0.26 | 0.74 | 1.6 |



Factor Analysis

# Maximum Likelihood Factor Analysis
## mle method with the Varimax rotation

```
     ML1   ML2    h2    u2  com
x1  0.72  0.18  0.55  0.45  1.1
x2  0.77  0.09  0.61  0.39  1.0
x3  0.08  0.67  0.46  0.54  1.0
x4  0.62  0.38  0.52  0.48  1.7
x5  0.12  0.74  0.56  0.44  1.1
x6  0.76  0.04  0.59  0.41  1.0
x7  0.82  0.10  0.68  0.32  1.0
x8  0.72  0.20  0.56  0.44  1.2
x9  0.11  0.49  0.26  0.74  1.1
```



Factor Analysis

# Maximum Likelihood Factor Analysis



|     | 0 | 1 |
|-----|------|------|
| x1  | 0.72 | 0.18 |
| x2  | 0.77 | 0.09 |
| x3  | 0.08 | 0.67 |
| x4  | 0.62 | 0.38 |
| x5  | 0.12 | 0.74 |
| x6  | 0.76 | 0.04 |
| x7  | 0.82 | 0.10 |
| x8  | 0.72 | 0.20 |
| x9  | 0.11 | 0.49 |

X1  I am the life of the party.
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X7  I start conversations.
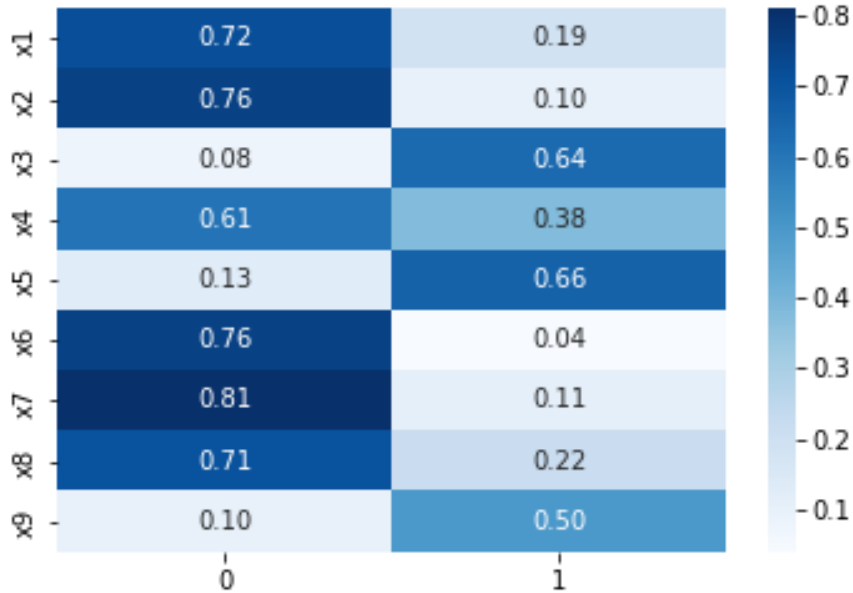X8  I have little to say. (*)
X9  I seldom feel blue.

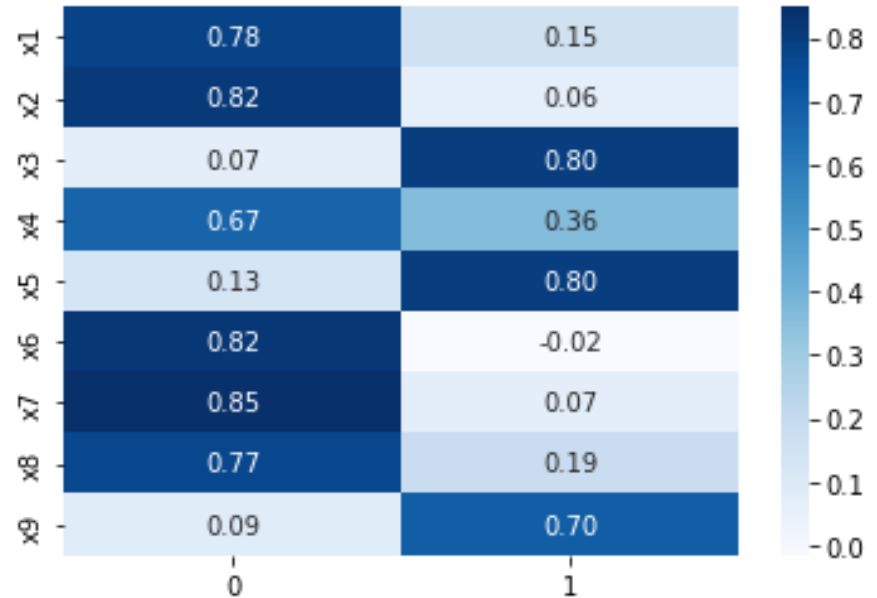**f1 (Extroversion** - ongoing / solitary**)** : variables 1, 2, 4, 6, 7, 8
**f2 (Sensitiveness** - sensitive / confident**)** : variables 3, 5, 9

# Principal Factor Method



principal factor

principal factor with iterative

**f1 (Extroversion** - ongoing / solitary**)** : variables 1, 2, 4, 6, 7, 8
**f2 (Sensitiveness** - sensitive / confident**)** : variables 3, 5, 9

# Thanks!