Wiscsemdata

```
#Library
library(readxl)
library(psych)
```

```
#Baca data
data <- read_excel("F:/8. Applied Mulitivariate Analysis KP A (3 SKS)/Tugas/Week 10/Tugas FA  - WiscsemData.xlsx"
)
head(data)
```

```
## # A tibble: 6 x 13
##   client agemate  info  comp arith simil vocab digit pictcomp parang block
##    <dbl>   <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl>    <dbl>  <dbl> <dbl>
## 1      3       3     8     7    13     9    12     9        6     11    12
## 2      4       3     9     6     8     7    11    12        6      8     7
## 3      5       3    13    18    11    16    15     6       18      8    11
## 4      6       3     8    11     6    12     9     7       13      4     7
## 5      7       2    10     3     8     9    12     9        7      7    11
## 6      8       3    11     7    15    12    10    12        6     12    10
## # ... with 2 more variables: object <dbl>, coding <dbl>
```

```
str(data)
```

```
## tibble [175 x 13] (S3: tbl_df/tbl/data.frame)
##  $ client  : num [1:175] 3 4 5 6 7 8 9 10 12 13 ...
##  $ agemate : num [1:175] 3 3 3 3 2 3 3 2 3 3 ...
##  $ info    : num [1:175] 8 9 13 8 10 11 6 7 10 9 ...
##  $ comp    : num [1:175] 7 6 18 11 3 7 13 10 8 10 ...
##  $ arith   : num [1:175] 13 8 11 6 8 15 7 10 8 8 ...
##  $ simil   : num [1:175] 9 7 16 12 9 12 8 15 14 11 ...
##  $ vocab   : num [1:175] 12 11 15 9 12 10 11 10 9 9 ...
##  $ digit   : num [1:175] 9 12 6 7 9 12 6 7 9 11 ...
##  $ pictcomp: num [1:175] 6 6 18 13 7 6 14 8 10 10 ...
##  $ parang  : num [1:175] 11 8 8 4 7 12 9 14 11 12 ...
##  $ block   : num [1:175] 12 7 11 7 11 10 14 11 10 9 ...
##  $ object  : num [1:175] 7 12 12 12 4 5 14 10 9 13 ...
##  $ coding  : num [1:175] 9 14 9 11 10 10 10 12 6 13 ...
```

```
#ada 241 data dari client,  agemate,   info,   comp,   arith,  simil,  vocab,  digit,  pictcomp,   parang, bloc
k,  object, coding
```

```
#Fungsi factanal
data.fa <- factanal(data, factors = 2)
data.fa
```

```
##
## Call:
## factanal(x = data, factors = 2)
##
## Uniquenesses:
##   client  agemate     info     comp    arith    simil    vocab    digit
##    0.913    0.990    0.377    0.495    0.673    0.507    0.388    0.824
## pictcomp   parang    block   object   coding
##    0.600    0.794    0.594    0.637    0.995
##
## Loadings:
##          Factor1 Factor2
## client   -0.137   0.262
## agemate
## info      0.783   0.103
## comp      0.584   0.405
## arith     0.561   0.111
## simil     0.629   0.311
## vocab     0.767   0.155
## digit     0.419
## pictcomp  0.236   0.587
## parang    0.173   0.420
## block     0.233   0.593
## object    0.123   0.590
## coding
##
##                Factor1 Factor2
## SS loadings      2.615   1.598
## Proportion Var   0.201   0.123
## Cumulative Var   0.201   0.324
##
## Test of the hypothesis that 2 factors are sufficient.
## The chi square statistic is 60.64 on 53 degrees of freedom.
## The p-value is 0.22
```

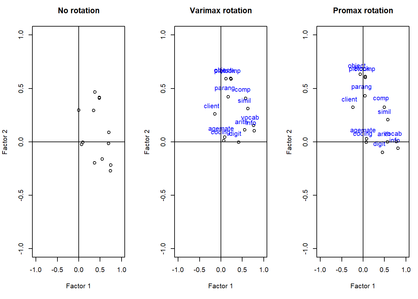
```
#Dalam Funsi factanal kami hanya membuat tebakan dan mengatur jumlah faktornya menjadi 2
```

```
#Recall faktor analisis
Lambda <- data.fa$loadings
Psi <- diag(data.fa$uniquenesses)
S <- data.fa$correlation
Sigma <- Lambda %*% t(Lambda) + Psi

round(S - Sigma, 6)
```

```
##             client   agemate      info      comp     arith     simil     vocab
## client   -0.000004 -0.019702  0.049265 -0.003239  0.048952 -0.058838 -0.062429
## agemate  -0.019702 -0.000007  0.012512 -0.026414  0.003222  0.028482 -0.027633
## info      0.049265  0.012512  0.000000 -0.031865  0.043776 -0.011534  0.008957
## comp     -0.003239 -0.026414 -0.031865  0.000001  0.019502  0.016516  0.020664
## arith     0.048952  0.003222  0.043776  0.019502  0.000000 -0.018323 -0.059999
## simil    -0.058838  0.028482 -0.011534  0.016516 -0.018323  0.000000  0.007215
## vocab    -0.062429 -0.027633  0.008957  0.020664 -0.059999  0.007215  0.000000
## digit     0.071475  0.017703  0.017902 -0.007236  0.034404 -0.002839 -0.026284
## pictcomp  0.034710 -0.001490 -0.015680  0.031023 -0.042579  0.038057  0.013138
## parang    0.093647  0.058533  0.023174 -0.084523  0.083095  0.058887 -0.065357
## block    -0.018556  0.038439 -0.014601 -0.007412  0.075264 -0.069736  0.026662
## object   -0.023418 -0.053720  0.028045  0.011676 -0.091542  0.008147 -0.000226
## coding    0.000224 -0.098880 -0.050038  0.014445  0.048866 -0.089121  0.043453
##                digit  pictcomp    parang     block    object    coding
## client    0.071475  0.034710  0.093647 -0.018556 -0.023418  0.000224
## agemate   0.017703 -0.001490  0.058533  0.038439 -0.053720 -0.098880
## info      0.017902 -0.015680  0.023174 -0.014601  0.028045 -0.050038
## comp     -0.007236  0.031023 -0.084523 -0.007412  0.011676  0.014445
## arith     0.034404 -0.042579  0.083095  0.075264 -0.091542  0.048866
## simil    -0.002839  0.038057  0.058887 -0.069736  0.008147 -0.089121
## vocab    -0.026284  0.013138 -0.065357  0.026662 -0.000226  0.043453
## digit     0.000004 -0.021306  0.077656 -0.022505 -0.014221  0.143097
## pictcomp -0.021306  0.000000 -0.038432 -0.020656 -0.011536 -0.095270
## parang    0.077656 -0.038432 -0.000001  0.062131 -0.015625  0.020833
## block    -0.022505 -0.020656  0.062131 -0.000001  0.021191  0.083628
## object   -0.014221 -0.011536 -0.015625  0.021191  0.000001  0.037621
## coding    0.143097 -0.095270  0.020833  0.083628  0.037621  0.000006
```

```
#Dalam hal ini kami membandingkan matriks korelasinya angkanya mendekati 0 menunjukan bahwa data yang kami gunaka
n baik
```

```
#Interpretation faktor
data.fa.none <- factanal(data, factors = 2, rotation = "none")
data.fa.varimax <- factanal(data, factors = 2, rotation = "varimax")
data.fa.promax <- factanal(data, factors = 2, rotation = "promax")

par(mfrow = c(1,3))

plot(data.fa.none$loadings[,1],
     data.fa.none$loadings[,2],
     xlab = "Factor 1",
     ylab = "Factor 2",
     ylim = c(-1,1),
     xlim = c(-1,1),
     main = "No rotation")
abline(h = 0, v = 0)

plot(data.fa.varimax$loadings[,1],
     data.fa.varimax$loadings[,2],
     xlab = "Factor 1",
     ylab = "Factor 2",
     ylim = c(-1,1),
     xlim = c(-1,1),
     main = "Varimax rotation")


text(data.fa.varimax$loadings[,1]-0.08,
     data.fa.varimax$loadings[,2]+0.08,
     colnames(data),
     col="blue")
abline(h = 0, v = 0)

plot(data.fa.promax$loadings[,1],
     data.fa.promax$loadings[,2],
     xlab = "Factor 1",
     ylab = "Factor 2",
     ylim = c(-1,1),
     xlim = c(-1,1),
     main = "Promax rotation")
abline(h = 0, v = 0)

text(data.fa.promax$loadings[,1]-0.08,
     data.fa.promax$loadings[,2]+0.08,
     colnames(data),
     col="blue")
abline(h = 0, v = 0)
```




```
#Melihat gambar diatas terlihat bahwa faktor 1 semua data saling mempengaruhi dari no rotation, varimax rotation,
promax rotation.
```