Factor Analyzing a Polychoric Correlation Matrix

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This post includes the **R** code for conducting exploratory factor analysis using a polychoric correlation matrix within the `psych` package. This post only includes the code and output.

1 Read in the data

```
efa<-read.table("C:\\Users\\grant_morgan\\Box Sync\\Teaching\\EDP 6337 - Psychometric Theory\\S
```
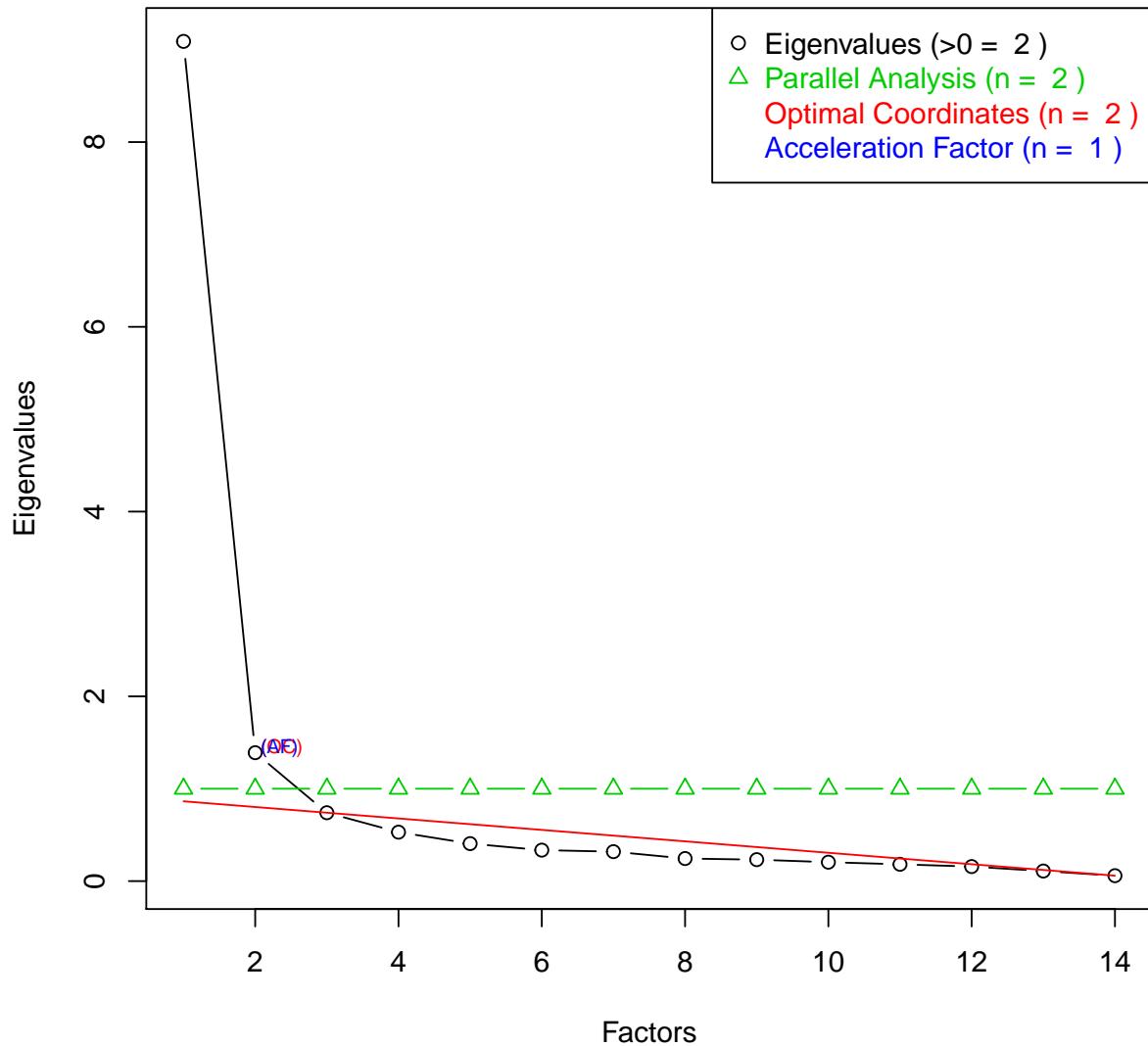
2 Obtain eigenvalues

```
library(psych)
evalues<-eigen(polychoric(efa)$rho)$values
evalues

##  [1] 9.08970 1.39027 0.74029 0.53001 0.40600 0.33542 0.31919 0.24448
##  [9] 0.23247 0.20489 0.18204 0.15731 0.10899 0.05893
```

3 Generate screen plot & Conduct parallel analysis

```
library(nFactors)
plotnScree(nScree(evalues, model="factors"), main="Scree Plot & Parallel Analysis")
```

Scree Plot & Parallel Analysis

4   Extract factors using principal axis factoring

I will extract two factors for the reasons we discussed in class.

```
efa.out<-fa.poly(x=efa, fm="pa", nfactors=2, rotate="promax", residual=TRUE)
print(efa.out$fa$loadings, cutoff=0)

##
## Loadings:
##      PA1    PA2
## v1   0.842  0.051
## v2   0.837 -0.087
```

```
## v3    0.981 -0.199
## v4    0.581  0.305
## v5    0.557  0.363
## v6    0.659  0.139
## v7    0.527  0.144
## v8    0.679  0.193
## v9    0.892 -0.087
## v10   0.026  0.882
## v11   0.001  0.900
## v12   0.008  0.931
## v13  -0.066  0.898
## v14   0.077  0.853
##
##                   PA1   PA2
## SS loadings     5.001 4.345
## Proportion Var  0.357 0.310
## Cumulative Var  0.357 0.668
```

```
efa.out$fa$Phi
```

```
##           [,1]   [,2]
## [1,] 1.0000 0.7322
## [2,] 0.7322 1.0000
```