Workshop:
The basics of Factor Analysis and PCA

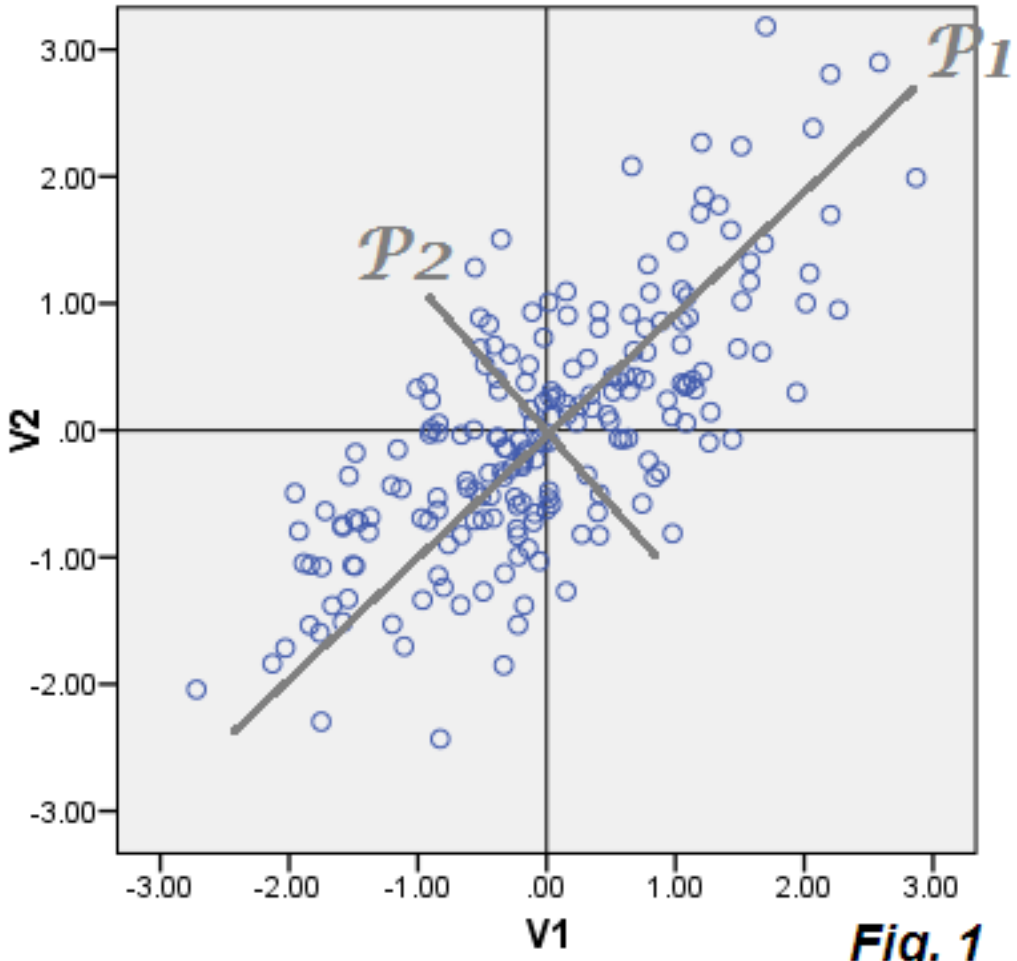

Fig. 1

March 4 2020

Today's topics

1) How to run it on Stata or R?

2) Interpreting the outputs.

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How to run it on Stata or R?

Factor analysis:

- factor *varlist, method("pf, pcf, ipf, ml") factors(#) - optional*
- *rotate, ("varimax or promax") #blanks()#*
- scree
- predict f1 f2 f3 … fn #whatever name you want to each factor

Polychoric:

- polychoric varlist #categorical
- global N = r(sum_w)
- matrix r = r(R)
- factormat r, n($N) *method("pf, pcf, ipf, ml")*
- rotate, *("varimax or promax")* blanks(.3)
- predict plc1 plc2 #whatever name you want to each factor

Tetrachoric:

- tetrachoric varlist #dummy variables
- matrix C = r(corr)
- matrix symeigen eigenvectors eigenvalues = C
- matrix list eigenvalues
- factormat C, n(300) *method("pf, pcf, ipf, ml")*
- rotate, *("varimax or promax")* blanks(.3)
- predict tc1 tc2 #whatever name you want to each factor

How to run it on Stata or R?

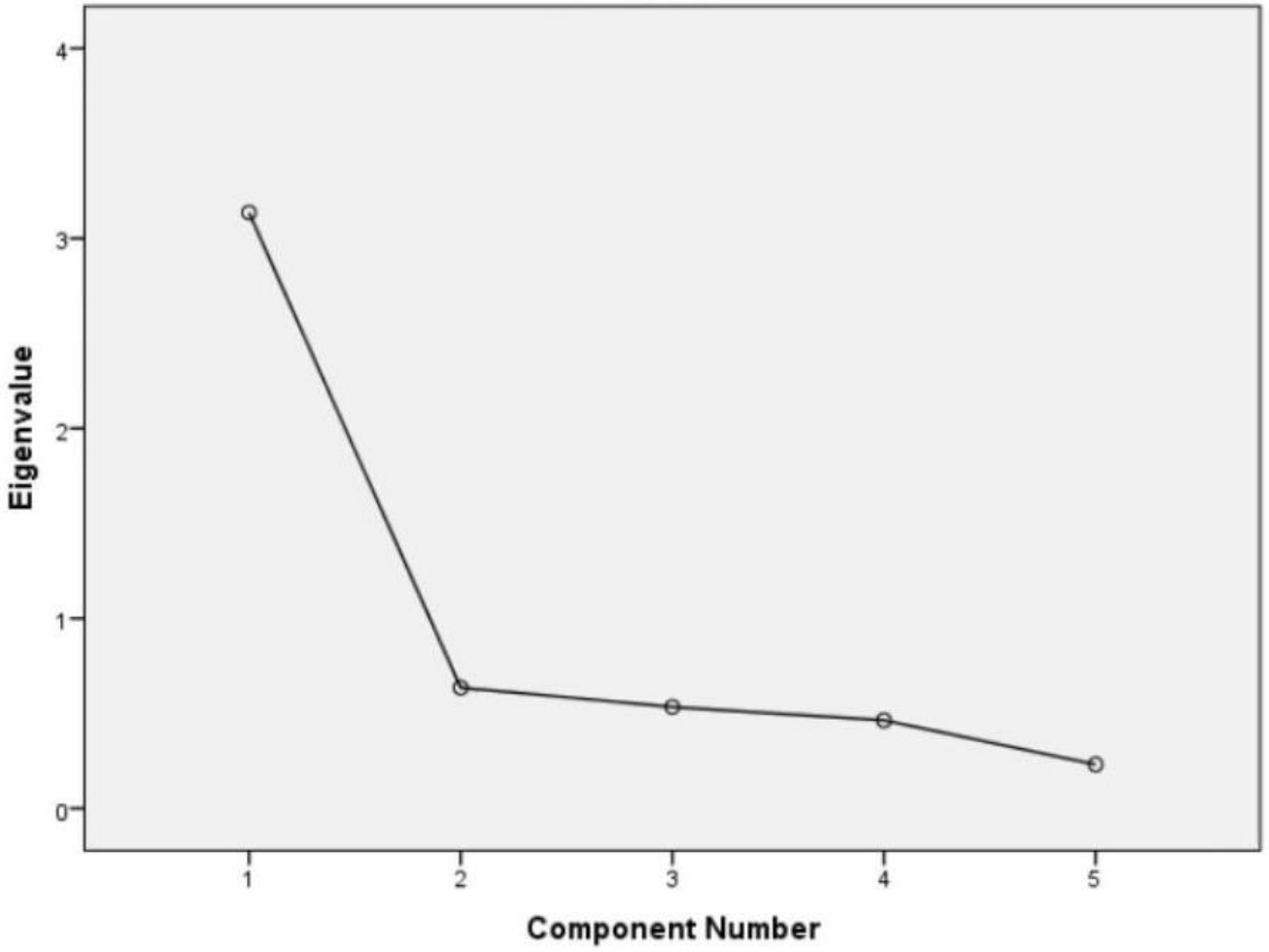
Factor analysis:

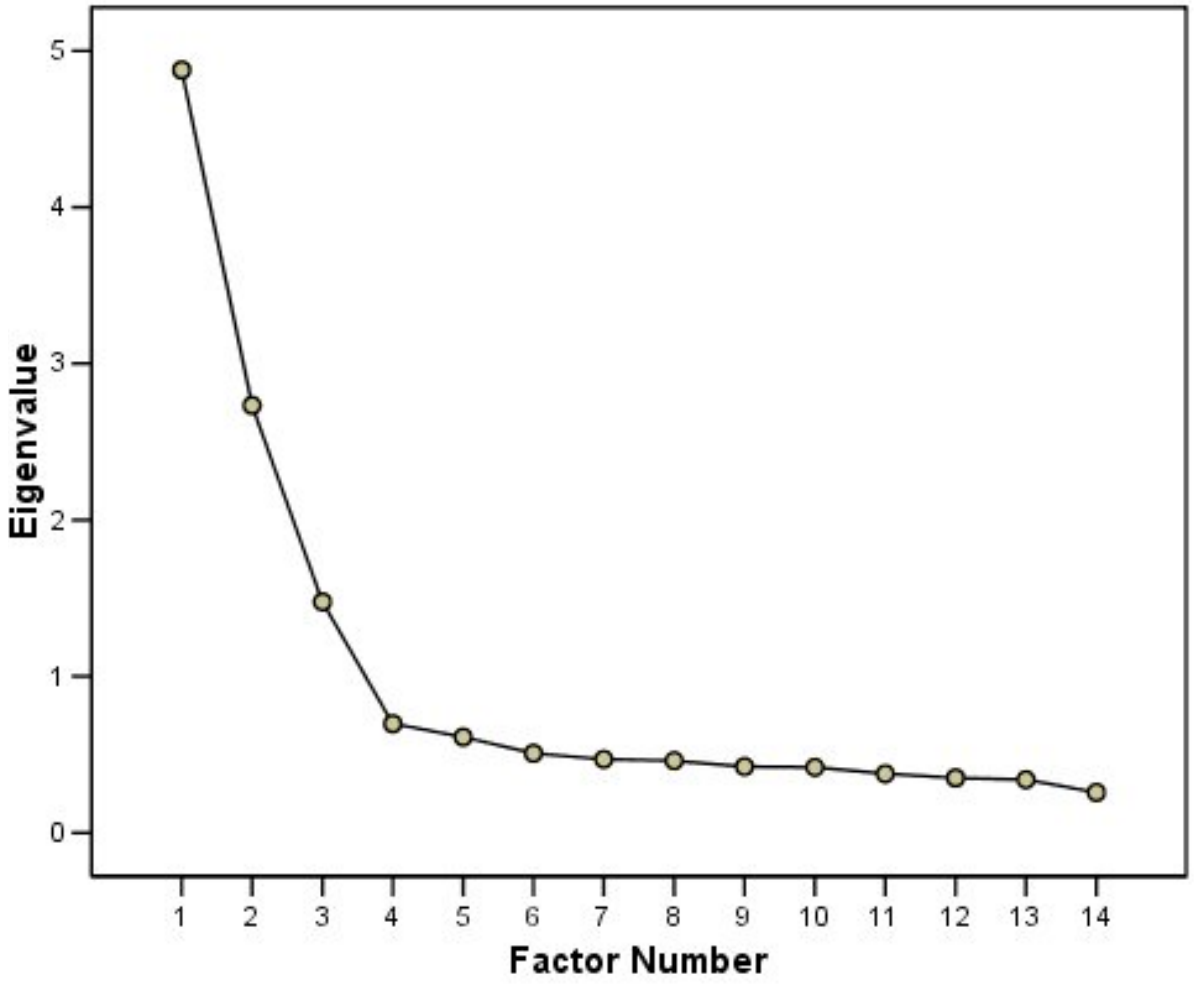
- library(psych)
- fa(r = DATA, nfactors = #Factors, rotate = “Rotation", covar = “Correlation or Covariance matrix”, fm = “Estimation procedure", scores = "regression")
- ev <- eigen(“correlation matrix”)
- plot(ev$values, las = 1, type = "b") – #scree plot

Polychoric:

- poly_data <- polychoric(DATA)
- matrix_poly <- poly_data$rho
- poly_results <- fa(r = matrix_poly, n.obs = n, nfactors = 2, rotate = "promax", fm = "pa", covar = FALSE)
- poly_results_pysch <- fa.poly(x = DATA, nfactors = 2, rotate = "promax", fm = "pa", covar = F, scores = "regression")
- plot(poly_results_pyschfae.values, las = 1, type = "b") # scree plot
- print(loadings(poly_results_pysch$fa), cutoff=0)
- Fscores_poly <- factor.scores(x = DATA,
  f = poly_results_pyschfaStructure,
  method = "regression",
  rho = poly_results_pysch$rho)$scores

What is a scree plot?





And, go!

Groups of three:
Work with your own data (nice!) or
Use provided data (easier)

http://bit.ly/factor_WS_2019

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Thank you!

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