Goals of the presentation:

1. Brief introduction to Exploratory Factor Analysis
2. Demonstrate ShinyEFA as a tool to learn FA
   1. Conduct FA is about deciding and interpreting, not about coding and computing
3. I want to conduct EFA on your own.

What is factor analysis?

What is it good for and

How to do it.

Most obvious use: MANY variables into a FEW factors

[NEO](http://en.wikipedia.org/wiki/Revised_NEO_Personality_Inventory) personality inventory contains 240 items – hard to interpret, 5 factors

Debate, whether factors are real, or statistical artifact

Basic example

[ DATA tab] – Cognitive Abilities, explain variables

To analyze = split into parts

What are we splitting into parts? – Correlation matrix

So let’s take a look at correlation

[ go to CORRELATION tab]

Based on corrgram how should we cluster the variables?

Does such clustering makes sense - look at the names

[ distribute road map]

To analyze = split into parts

Two methods – principal components and common factors

Eigen decomposition = tautological system

Scree test – how many factors to retain

Eigen value = how many variables in this factor

RMSEA – Root Mean Square of Approximation

Measures how well your results in this sample approximate the picture in the population

[ COMPONENTS tab]

Here’s how correlation matrix can be decomposed (analyzed)

Does it make sense? Not really.

Besides, there is no reduction.

We can keep only the first few components, but then info in the rest will be lost

The value of the weight show HOW MUCH of the VARIABLE contributes to the factor

Decision/Questions

1. How many factors?
2. What rotation?
3. What should factors be called?

What is a factor?

* cluster of variables. It’s be nice just to group variable together. But what if one variable can

How can variables be grouped together?

* Factor pattern is an instruction how to group variables together.

What is an Eigen value?

* Eigen value measures the number of variables in a component

What is factor pattern?

* If you had to quantify a complexity of a factor pattern, how would you do that?

What is rotation?