

8.2: EFA versus CFA

Learning Objectives

At the end of this section you should be able to answer the following questions:

- What types of questions can be answered with EFA?
- What is the difference between EFA and CFA?

EFA vs CFA

There are two main schools of factory analyses: one that aims to explore a new measure and determine the factors within an unfactorized measure, and one that aims to confirm a pre-existing factor structure that has already been established. In this lesson we will be focusing on the first type, known as an exploratory factor analysis. As you can see here, there are differences between the EFA and the confirmatory factor analysis:

Exploratory FA (theory generating)	Confirmatory FA (theory testing)
Theory-weak literature base	Strong theory and/or strong empirical base
Determine the number of factors	Number of factors fixed a priori
Determine whether the factors are correlated or uncorrelated	Factors fixed a priori as correlated or uncorrelated
Variables are able to load on all factors	Variables must load on a specific factor or factors

Research Questions

You use exploratory factor analyses when you have questions like:

- How many reliable and interpretable factors/components are there in a set of variables?
- How many factors/components should be extracted?
- How much variance in a set of variables is accounted for by the retained factors/components?
- How are the factors/components interpreted?

This is a preliminary test, and is used primarily in the early stages of measurement or inventory development.

Variables & Level of Measurement

EFAs are different from most of the analyses we have covered here. “Independent variables” and “dependent variables” are not terms used in EFA. The set of variables are the set of items that need to be reduced for the final measures, as well as establishing factors for this measure.

The items should be measured on an interval, ordinal scale, or nominal scales. The level of measurement determines the correlation matrix (matrix of association for decomposition).

A few important words about Likert response format/rating scale: Likert scales are usually best used in EFA.

Sample Size

Sample size is very important in EFAs, with the minimum recommended sample generally being at least cases from 100 individuals (Kline, 1994). Some sources recommend at least five cases per item, so if you have a scale with 30 items you need at least 150 participants (Hatcher, 1994).

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