CHAPTER 6

Exploratory Factor Analysis: State-of-the-Art Review and Contemporary Applications

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6.1 INTRODUCTION

Having a deep-seated drive to achieve a certain social position is one reason for why most people consume so much. For social scientists, these unseen variables are more intriguing than the quantitative measures that are actually taken. The exploratory/descriptive nature of factor analysis typically necessitates a great deal of subjective judgment. It is a commonly used technique that frequently sparks controversy since the models, methodologies, and subjectivity are so open to differing interpretations.

A collection of underlying variables called factors will serve as the basic assumption of factor analysis for determining whether a survey item has similar patterns. These underlying factors or variables are used to explain the interrelationships among those variables which finally lead to the creation of a construct.

Factor Analysis (FA) is a method for explaining observed variables and their covariance structure in terms of fewer underlying unobservable or latent factors where the factors are frequently viewed as general thoughts or ideas that may reflect

an observed phenomenon. The two different types of factor analysis are called Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA) as depicted in Table 6.1.

Table 6.1 Statistical methods and its definition

Statistical method	Description
FA	To translate variance among related, observable variables into a potentially smaller collection of unseen variables known as factors, a statistical approach known as factor analysis is performed.
EFA	A method for discovering complex relationships and looking into the underlying structure of a group of observable variables that make up unified ideas. The association between various elements is not predicated in advance by the researcher.
CFA	A technique for confirming a particular factor structure. It is a more intricate method for determining if certain elements are connected to certain products. With loading on the factors, CFA may assess the correlations between observed variables and unobserved variables in order to evaluate a measurement model.

EFA mainly is used to measure unobserved factors as probable causes of or explanations for observed behaviour as well as to assess the connections between a collection of observable variables. As a result, it is appropriate to pursue studies in several disciplines, including psychology, education, economics, and political science.

As one of multivariate statistical methods, EFA is well-known by many researchers as a primary software tool in the development and validation of the acceptable psychometric properties in a survey instrument or the psychological measurements of the items (Watson, 2017). Therefore, EFA is a

multi-component statistical method that serves as an essential tool to develop and verify psychological theories and measurements. It is a data-driven approach to factor analysis as well. Its primary goal is to identify fewer common factors that may explain the common variation of a larger group of manifest variables. In other words, EFA is conducted when someone has a general idea about what he/she thinks that he/she will find, but he/she has not yet settled on a specific hypothesis. Additionally, the ultimate number of factors in EFA is determined by the data and interpretation of the factors. For instance, while constructing scales, one may first test a new scale using, then go on to CFA to confirm the factor structure in a sample (Watkins, 2018; Steiner & Grieder, 2020). Table 6.2 depicts the differences between EFA and CFA and Table 6.3 summarizes the two statistical methods in factory analysis and its related software.

FA is a statistical method that analyse the associations between numerous factors and distinguish the fundamental components that clarify their affiliations. (Shrestha, 2021; Alavi et al., 2020). FA can be classified into two types namely EFA and CFA where both are valuable statistical methods that are appropriate for different research questions and contexts. EFA is valuable when the objective is to investigate the basic structure of a set of factors and produce theories for further investigation (Rasool et al., 2021), while CFA is appropriate when the goal is to test a specific theoretical model or set of hypotheses about the factor structure of the data (Taherdoost et al., 2022).