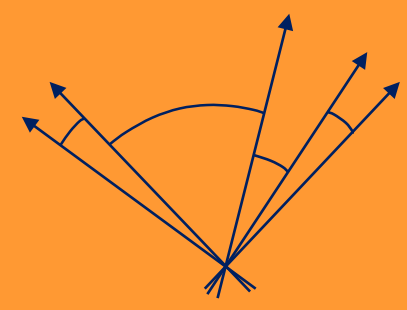
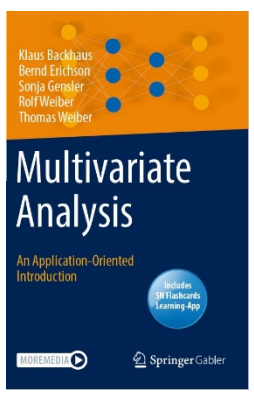
Factor Analysis



Main research question	Can various variables be combined to (latent) factors?
Example	Reduce the different technical attributes of vehicles to a few dimensions, such as performance or safety
Type of analysis	Structure-discovering method
Measurement level	metric
Recommendations	▪ The number of observations should be at least three times the number of variables, and at least 50 observations. ▪ Assess the suitability of the data with the help of different measures. The Bartlett test should be significant. ▪ Decide whether to perform a principal component analysis or a principal axis factoring. Next to principal axis factoring, the maximum likelihood method is frequently used to estimate the communalities and factor loadings. ▪ Use the Kaiser criterion and scree test to decide on the number of factors. ▪ The VARIMAX rotation is frequently used to ease the interpretation of the factor solution and since it keeps the assumption of orthogonal (uncorrelated) factors. ▪ Variables that belong to a factor should have a factor loading above 0.5. ▪ Summated scales are frequently used in academic literature since the original scale is kept.
Keywords	Anti-image covariance matrix, Bartlett test, Communality, Confirmatory factor analysis, Cross-loadings, Eigenvalue (Criterion), (Rotated) Factor loading matrix, Factor loadings, Oblique factor rotation, Rectangular (varimax) Rotation, Factor score coefficients, Summated scales, Surrogates, Factor scores, GLS method, Image factoring, Kaiser criterion, Kaiser-Meyer-Olkin (kmo) criterion, Measure of sampling adequacy (msa), Principal axis factoring (paf), Principal component analysis (pca), Scree plot/test, Unique variance



Backhaus, Klaus; Erichson, Bernd; Gensler, Sonja; Weiber, Rolf; Weiber, Thomas (2021)
Multivariate Analysis – An Application-oriented Introduction, Springer: Berlin

www.multivariate-methods.info