Multivariate Analysis for the Behavioral Sciences, Second Edition (Chapman and Hall/CRC, 2019)
Solutions to Exercises of Chapter 15: Exploratory Factor Analysis

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Solutions

Exercise 15.1

Now, the equations given in the text become

$$\hat{\lambda}_1\hat{\lambda}_2 = 0.84$$

$$\hat{\lambda}_1\hat{\lambda}_3 = 0.60$$

$$\hat{\lambda}_2\hat{\lambda}_3 = 0.35$$

$$\hat{\psi}_1 = 1.0 - \hat{\lambda}_1^2$$

$$\hat{\psi}_2 = 1.0 - \hat{\lambda}_2^2$$

$$\hat{\psi}_3 = 1.0 - \hat{\lambda}_3^2$$

In this case, the solution for the parameters of a single-factor model is

$$\hat{\lambda}_1 = 1.2,\ \hat{\lambda}_2 = 0.7,\ \hat{\lambda}_3 = 0.5$$

$$\hat{\psi}_1 = -0.44,\ \hat{\psi}_2 = 0.51,\ \hat{\psi}_3 = 0.75$$

Clearly, this solution is unacceptable because of the negative estimate for the first specific variance.