PSYC 4301: Psychological Tests and Measurements

Tarleton State University — Homework 7

1. Lawley and Maxwell (1971) reported the following two-factor model to account for the correlations among scores on six school subjects. The varimax rotated factor loadings are as follows:

	Factor Loadings	
Subject	1	2
1. Gaelic	.229	.659
2. English	.323	.551
3. History	.086	.591
4. Arithmetic	.771	.173
5. Algebra	.720	.215
6. Geometry	.577	.213

   (a) Use the factor loadings to plot each subject as a point in the two-dimensional factor space. Use Factor 1 for the x-axis and Factor 2 for the y-axis.

   (b) Based on the factor loadings, what is the estimated correlation between scores in Gaelic and scores in Arithmetic?

   (c) Compute the common variance for each subject.

   (d) Compute the unique variance for each subject.

2. For this exercise, you'll need to download the `hw7data.csv` file from Canvas and open it in JASP. Perform an exploratory factor analysis using the initial JASP defaults (Number of factors = parallel analysis, Rotation = Oblique/promax).

   (a) How many factors do you end up with?

   (b) Which items load on which factors? Only consider loadings > 0.4.

   (c) Verify the number given for unique variance ("Uniqueness") on one of the items. That is, pick ONE item and show me how the factor loadings are mathematically converted to the unique variance.

   (d) Which two factors are highly correlated with each other? What is the correlation?

   (e) What happens to the model fit when you manually choose one less factor? Is this "reduced" model acceptable? Cite the appropriate statistic(s) to justify your answer.