

# PSYC 4301: Psychological Tests and Measurements

Tarleton State University

Homework 8

Spring 2020

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:

Subject	Factor Loadings	
	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 `hw8data.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, show me how the three 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.