Mock exam

Exercise 1

The data set **cheating** contains dichotomous responses by 319 undergraduates to four questions about cheating behavior. Students responded either (0) no or (1) yes as to whether they had

- ever lied to avoid taking an exam (LIEEXAM)
- lied to avoid handing a term paper in on time (LIEPAPER)
- purchased a term paper to hand in as their own or had obtained a copy of an exam prior to taking the exam (FRAUD)
- or copied answers during an exam from someone sitting near to them (COPYEXAM)

1. Looking at the descriptive statistics reply to the following questions.
   (a) How many are the possible response patterns?
   (b) Which is the item with the highest proportion of no?
   (c) Which is the observed frequency of the response pattern (0,0,0,0)? And the observed frequency of the response pattern (1,1,1,1)?
   (d) Are there pairs of items that are not significantly associated? Which are they?
2. Describe the 2PL model and the latent trait model for binary data theoretically highlighting similarities and differences.
3. Fit the latent trait model for binary data with one factor.
   (a) Which is the most difficult item? And the easiest one? Report and comment the values of the difficulty parameters for these two items.
   (b) Rank the items according to the discrimination parameters reporting the values of these coefficients.
4. Compute and comment the standardized alpha's and the probabilities of the median individual.
5. Report the values of the goodness of fit tests, the degrees of freedom and the p-values and comment the goodness of fit of the model. Are the tests reliable? If not why?
6. Which alternative measures of fit can be considered? What do they suggest?
7. Give an interpretation of the latent variable, and illustrate the different methods for scaling individuals.

Exercise 2

1. Illustrate the specification of the normal linear factor model analytically reporting its GLLVM representation.
2. Illustrate the Heywood case, the possible causes and remedies.