

Take home exam KLMED8008
Analysis of Repeated Measurements

Friday June 1th – Friday 8th of June 2012

ECTS credits: 5
Number of pages (included front-page): 2

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Examination results are announced on <http://studweb.ntnu.no/>

Consider the dataset "family1", available on the course website as fam1.dta (Stata), fam1.sav (SPSS format) or fam1.dat (tab-separated format). It consists of 3000 observations of the following variables:

Family identifier (variable "family"), birth weight of the family member (variable "bwt"), whether the person is male or not (variable "male", 1: male, 0: female), and successive numbering of persons within family (variable "member").

The research question we will consider here is to what extent birth weight depends on sex.

1. Describe the data material in terms of grouping variable(s), predictor variable(s)/covariate(s) and outcome variable(s). Can the outcome be reasonably assumed to be normally distributed?
2. Obtain relevant descriptive statistics and graphical plots for the predictor variable(s)/covariate(s) and outcome variable(s).
3. Describe the data material in terms of levels, nesting, and/or any clustering that might indicate dependency between observations.
4. State a regression model using "male" as the predictor variable; *without* taking any clustering into consideration. Estimate the parameters of the model and interpret them.
5. Repeat the analysis in 4, now taking any clustering explicitly into consideration via a random intercept model. Interpret the parameter estimates and compare with the model estimates in 4; comment on similarities and differences.
6. Assess the normality assumption for any random effect(s) and the error term.
7. Estimate the intraclass correlation coefficient, if any, and interpret the result.
8. Consider including a random slope for the predictor variable "male". State this model including the covariance between the random slope and the random intercept, and estimate the parameters. Interpret the model and decide if it is better than the simpler model above.