1st assignment

General Linear Model

Consider the "Lead" data set (lead2.dta). A short description of the data can be found in the Appendix.

1) Perform a preliminary EDA (Exploratory Data Analysis) in order to describe the data and present the results in tabular form. You may need to include some graphs if you think that this will help the presentation of the data.

2) Check for differences in children's lead levels and head circumference by town. Comment on the results.

3) Perform a univariate analysis to identify potentially significant relationships between the outcome variable (children's head circumference) and the rest of the variables in the dataset.

4) Proceed with multivariate analyses in order to identify prognostic or confounding factors and derive a final model. You may consider transforming the "lead" variable to obtain a better fit of the final model (This transformation can be off course used also in previous steps of the analysis). Check if the effect of lead levels is modified by children's gender (interaction).

5) Perform model checking procedures.

6) Present the results of the final model in tabular form and comment on your findings.

Appendix

Lead data

To investigate the adverse effects of blood lead concentration on children's head circumference, 300 children aged 6-9 years were studied. The study was contacted in three Greek cities: Lavrion, Elefsina and Loutraki. Lavrion is a historical center of lead and silver mining and smelting, Elefsina is a heavily industrialized city and Loutraki is a resort area and recipient of an environmental protection award from the European community.

The code is as follows:

Variable	*Description*
code	Children's' code
sex	Gender; 0: boys, 1: girls
town	1: Loutraki; 2: Lavrio; 3: Elefsina
jobfa	Father's job; 1: Unskilled, 2: Skilled, 3: Professional
edufa	Father's education (in years)
edumo	Mother's education (in years)
famil	Marital status; 1: married, 3: divorced, 4: splitted
broth	Brother'sister; 0:No, 1: Yes
nobro	Total number of brothers/sisters
nochil	Birth order of the child involved in the study
figger	sucking fingers; 0:No, 1: Yes
neil	biting nails; 0:No, 1: Yes
pipil	putting objects into the mouth; 0:No, 1: Yes
thylasm	breast feeding; 0:No, 1: Yes
faheig	Father's height (cm)
faweig	Father's weight (Kgr)
moheig	Mother's height (cm)
moweig	Mother's weight (Kgr)
f7	Hb (g/dl)
f44	Fe (μg/dl)
age	Children's age (years)
moage	Mother's age (years)
foage	Father's age (years)
pprot	Protein (%)
lead	Pb (μg/dl)
g13	Children's head circumference (cm)