JMP assignment 4

A study was conducted on n=97 non smoking males to examine factors that may influence their semen volume (svol) in ml. The investigators were primarily interested in age (in years), but also considered alcohol use (1=yes or 0=no), whether the subject had abstained from sexual activity for 2 days or more (astn2d-1=yes or 0=no) and whether the subject had hypertension (htn-1=yes or 0=no).

Use the “svol.xls” dataset to determine how age, alcohol use, abstinence and hypertension are simultaneously related to semen volume. You need only consider interactions (if any) with age. Report on which of the variables are related to semen volume and the magnitude and direction of their effect. Be sure to report and interpret the final regression equation and its R square value. Be sure to consider whether the relation with age is linear.

Note for JMP: If a 0, 1 coded variable is declared to be “nominal”, it is internally recoded using effect coding, -1, 1. The 0 is recoded to 1 and the 1 is recoded to -1!!

If the “cross” button in the “fit model” panel is used to make an interaction variable between two continuous variables, unless one deactivates the “center polynomial” JMP will first subtract the mean from each variable. Thus for the interaction of X1 with X2, JMP creates (X1-M1)(X2-M2) where M1 is the mean for X1 and M2 is the mean for X2.

Note that:  (X1-M1)(X2-M2) = X1X2 + X1M2+ X2M1 + M1M2

To get around this, one can either turn off the “center polynomial” option or “manually” make a new variable by multiplying X1 times X2. That is, in the formula panel make X3 = X1 x X2 and put X3 in the model as a continuous variable. X3 corresponds to the first term only in the expression above. Using X3 instead of the variable created by the cross option may make the interaction and results easier to interpret.

Write a brief report explaining how age, alcohol use, abstension and having hypertension affect semen volume in your “final” model. You do NOT have to report intermediate models, only the final model. Be sure to comment on whether each factor is associated with an increase or decrease in semen volume or has no effect on semen volume and if this result must be qualified or is conditional on other factors (ie interpret any significant interactions). If regression coefficients are quoted, be sure they have the correct units. Report standard errors and p values for your estimates. (Make a table).

JMP Hints:
- Analyze -> Fit Model
- Remove “Center Polynomials” from Model Specification