

CFA & SEM: Lab Exercise 1

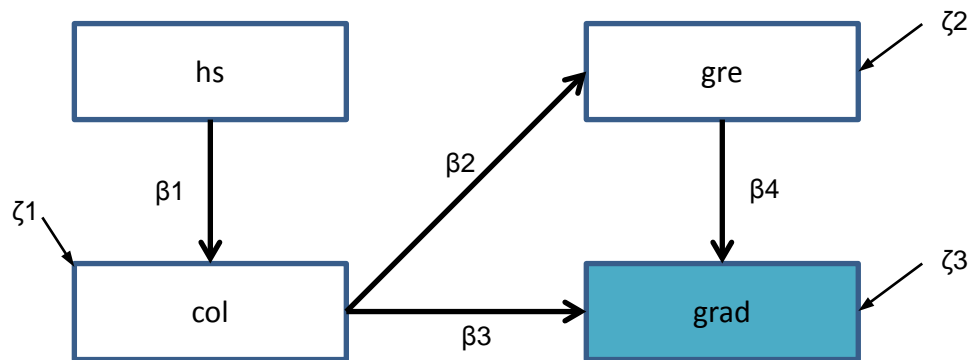
A researcher wants to examine the relationships among variables predicting success in graduate school, as assessed by measures of grade point average (gpa) in high school, and college/university, and the result of the Graduate Record Exam (gre). This exercise uses a dataset (path.csv) that contains four variables:

- the respondent's high school gpa (hs),
- college gpa (col),
- GRE score (gre), and
- graduate school gpa (grad).

The main outcome variable is graduate school gpa (grad)--- what are the relationships among these variables in predicting success in graduate school? The sample size is N=200.

The data is stored on the N:/ drive in the Hebb lab as N:/CFA-SEM Course/exercises/path.csv, but also available on the course web page, as <http://www.datavis.ca/courses/CFA-SEM/exercises/path.csv>.

1. The following path analysis model is contemplated to go beyond the simple multiple regression model, $\text{grad} \sim \text{hs} + \text{col} + \text{gre}$



2. Write out the 3 regression equations for this path analysis model.
3. Which variable(s) are exogenous (not explained within the model) and which are endogenous (explained in the model)
4. Use R (lavaan or sem) or AMOS to fit this model. In R, the data can be read in as

```
path <- read.csv("http://www.datavis.ca/courses/CFA-SEM/exercises/path.csv")
```
5. Compare with a smaller model: What happens if you delete the path $\text{col} \rightarrow \text{gre}$?
6. Compare with a larger model: What happens if you add a path: $\text{hs} \rightarrow \text{gre}$
7. Compare these models in terms of goodness of fit.