Assignment #4 – STA305/1004 Homemade Factorial Experiment

Due Date: Wednesday, April 1, 2015 at 11:10AM

Each student (no groups allowed) will plan and perform a homemade factorial experiment. This includes collecting and analyzing the data in R. I leave it to each individual student to decide what he or she wants to study. The number of possible topics is very large. It's very important you pick a topic that you are interested in and will enjoy working on.

STA1004 students: If you are working on a research project where a factorial design can be implemented then I encourage you to use this project as your topic.

The report should **not be longer than 4 pages** including tables and plots. An example report can be found in BHH pgs. 215–219. Feel free to use this report as a template.

The report should include the following three sections:

1. Description of the design. (One page maximum)

   The design should be a replicated or unreplicated 2^2 or 2^3 full factorial. Include details on how and why you conducted the experiment. What do you hope to learn by doing this experiment?

   Grade:

   5 – Excellent: Strong evidence of original thinking and a clear explanation of how and why they conducted the experiment.

   4- Good: Grasped the basics of designing a factorial study; a good explanation of how and why they did the experiment.

   3- Adequate: Understood the basics of designing a factorial study, but may not have designed a 2^k experiment. Provided an adequate explanation of the design.

   2- Marginal: Some evidence of understanding the basic design of a factorial study. Provided a poor explanation of their design.

   1- Inadequate: Little evidence of even a superficial understanding of a factorial design. Little explanation about how or why the design was chosen.

2. Analysis of the data. (Two pages maximum)

   Include appropriate plots and calculations such as: estimated variance of the observations; main effects and interactions; estimated variance of the effect; confidence intervals for true values of effects; Lenth plot; or half normal plot.

   Grade:

   5 – Excellent: Strong evidence of data analysis skills. Probably used R to do calculations and plots, but calculations and plots might also be done neatly by hand.

   4- Good: Good evidence of data analysis skills. Appropriate calculations were done, and maybe appropriate plots were included.

   3- Adequate: Understood the basics of required data analysis.

   2- Marginal: Some evidence of understanding the basic data analysis required, but might not have carried out all the appropriate calculations and plots.

   1- Inadequate: Little evidence of even a superficial understanding of the data analysis required to analyse a factorial design.

3. Conclusions. (One page maximum)

What conclusions can you make based on the results of your experiment? Write a paragraph or two outlining these conclusions.

Grade:

5 – Excellent: Conclusions are highly appropriate given the experiment conducted. Clearly written.

4- Good: Conclusions are appropriate given the experimental context. Writing is good.

3- Adequate: Some conclusions are appropriate; other obvious conclusions might be missing.

2- Marginal: Some evidence that there was an understanding of the basic conclusions, but several obvious conclusions not stated.

1- Inadequate: Little evidence of even a superficial understanding of the conclusions that can be drawn from the experiment.