**Stat 301 – Mini-Project 3**

**Due at 5pm, March 18**

This project is to be completed **individually**.  The goal is to **design** two separate studies.  You should **not** carry out either study.  You are to turn in a **typed proposal** for each design.

You will be **assessed** on:

* the correctness of your designs and proposed methods of analysis,
* whether the designs are appropriate for the research question proposed,
* whether the designs would be feasible for a researcher to carry out,
* creativity in your research questions and designs,
* and quality of your writing.

For feasibility, it does not need to be feasible for you to carry out at Cal Poly, but for someone to carry out with more time and resources (e.g., comparing the mating patterns of African and European bees).  You should concentrate more on finding a research question of interest to you, justifying why it is of interest, and designing an appropriate study to answer that question.

 The **requirements** for the designs are:

* One should be a randomized comparative experiment and one should be an observational study with random sampling.
* One should involve comparing two groups on a quantitative response variable and one should involve comparing two groups on a categorical response variable.
* *One can be a paired design, but not both*
* You should consider how you would analyze the data obtained from your study using the statistical methods we have discussed this quarter. Be specific about which method(s) you would use and why.
* The two topics may or may not be related.

In your **report**, make sure you:

* State the research question for each design and why it is of interest.
* Provide extensive detail for each design.  This design protocol should be detailed enough that I could hand it to someone and they would be able to carry it out exactly to your specifications.
* Use appropriate statistical terminology (e.g., observational/experimental units, explanatory and response variables, randomization/random assignment and random sampling, sampling frame, sample size, affect (the verb) vs. effect (the noun)).
* Indicate the methods you would use to analyze the data both descriptively (numerical and graphical summaries) and inferentially (e.g., state your null and alternative hypotheses in symbols and in words, clearly identify by name or command or formula which test procedure and/or confidence interval procedure would you use, and any relevant validity conditions you would check once the data were collected).
* For each design, state the conclusions you would draw should the difference in groups prove to be statistically significant.  Clarify whether you would draw a cause and effect conclusion and to what population you would generalize the result.  If you do not feel a cause and effect conclusion is warranted, suggest a potential confounding variable.

**You are to work completely independently on this assignment and consult only with me.  If I find evidence of unauthorized collaboration, you will receive a zero on this assignment and an F in the course.**

**You should NOT include your name in your file(s).  I want to see if I can grade them blindly.**