Week 11 Pre-Live

This week’s pre-live assignment is very simple and will just piggyback off of Unit 10.

Below is some SAS code utilizing a data set involving two fictional colleges. For our purposes, 4,000 students from CRANE and EAGLE colleges had a friendly competition to see who had the better science knowledge from their respective student bodies. The 4,000 students were randomly selected and then administered a science exam of which they were given a pass/fail score. Does a student’s overall science knowledge differ between the two schools?

# Questions to Address

1. What is the response and what is the explanatory variable?
   * **Response: score**
   * **Explanatory: college**
2. What type of sampling scheme/ study design is this?
   * **Multinomial Sampling**
3. From the SAS output provided by the code below, find the Fisher’s exact table and make note of the test result. What is the decision and conclusion of the test?
   * **One-sided p-value = 0.0134**
   * **There is substantial evidence to suggest that the overall science knowledge differs between CRANE and EAGLE colleges.**
4. Output is provided for CI’s for proportions as well as odds ratios and relative risk. Make note of the odds ratio value and CI — can you interpret it?
   * **Odds Ratio: 0.9048**
   * **Odds Ratio Confidence Interval: (0.8288, 0.9877)**
   * **Relative Risk: 0.9524**
   * **Relative Risk: Students from CRANE are 0.9524 times less likely to pass than students from EAGLE.**
5. Take a look at the second set of SAS code. It turns out that the students who participated were sitting in either a math or physics class. The second analysis takes into account this additional factor as a covariate. Compare the ODDS ratio result of the first model with that of the second. What is this saying? Provide some thoughts and explore based on what you got from the videos on the Mantel-Haenszel test. Look at the summary statistics.
   * **Odds Ratio: 1.6223**
   * **Odds Ratio Confidence Interval: (1.4590, 1.8038)**
   * **Before taking classes into account, students at EAGLE had slightly higher odds of passing. However, when looking at the math and physics classes separately, more CRANE students passed both classes.**

# SAS Code

**proc** **format**;

value ExpFmt **1** = 'Crane C.'

**0** = 'Eagle C.';

value RspFmt **1** = 'Pass'

**0** = 'Fail';

**run**;

**data** CH19\_9;

input Exposure Response Count;

label Response = 'Exam Status';

datalines;

0 0 1900

0 1 2100

1 0 2000

1 1 2000

;

**proc** **sort** data = CH19\_9;

by descending Exposure descending Response;

**run**;

**proc** **freq** data=CH19\_9 order=data;

format Exposure ExpFmt. Response RspFmt.;

tables Exposure\*Response / chisq riskdiff(equal var=null) relrisk;

exact pchi or fisher;

weight Count;

title 'Prospective Study';

**run**;

**data** CH19\_92;

input Exposure Response Count Subject $;

label Response = 'Exam Status';

datalines;

0 0 1600 Math

0 1 2000 Math

1 0 600 Math

1 1 1200 Math

0 0 300 Physics

0 1 100 Physics

1 0 1400 Physics

1 1 800 Physics

;

**proc** **sort** data=CH19\_92;

by descending Exposure descending Response;

**run**;

**proc** **freq** data = CH19\_92 order = data;

format Exposure ExpFmt. Response RspFmt.;

tables Subject\*Exposure\*Response / CMH chisq riskdiff(equal var=null) relrisk;

exact pchi or fisher;

weight Count;

title 'Prospective Study';

**run**;