A02x

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# Overview

This report discusses the initial analysis of the W2017T2 data from the Physics 101 course. In this course, 4 questions were used to look at the effect of asking students to explain their answer after a multiple-choice question. This used a crossover protocol, where there were 2 versions of the test and each version had 2 explain your answer questions that the other group did not.

# Setup

## Loading required package: Matrix

## Loading required package: xts

## Loading required package: zoo

##   
## Attaching package: 'zoo'

## The following objects are masked from 'package:base':  
##   
## as.Date, as.Date.numeric

##   
## Attaching package: 'PerformanceAnalytics'

## The following object is masked from 'package:graphics':  
##   
## legend

##   
## Attaching package: 'dplyr'

## The following objects are masked from 'package:xts':  
##   
## first, last

## The following objects are masked from 'package:plyr':  
##   
## arrange, count, desc, failwith, id, mutate, rename, summarise,  
## summarize

## The following objects are masked from 'package:stats':  
##   
## filter, lag

## The following objects are masked from 'package:base':  
##   
## intersect, setdiff, setequal, union

### Add additional calculated values

The following is a summary of the variables present in the data file. The final 4 were caculated in this notebook. “Fix” refers to removing from the overall score on the test, the score of the specific question.

names(dat.raw)

## [1] "ID" "QNUM" "QCORRECT"   
## [4] "TREATMENT" "f.Atot40" "f.Btot38"   
## [7] "f.tot78" "course.grade" "d.version"   
## [10] "f.version" "NCRT" "Gender"   
## [13] "EYAfinal" "course.grade.frac" "CRT.medsplit"   
## [16] "final.grade.LMH" "final.grade.fix" "final.gradeA.fix"   
## [19] "f.tot100"

#dat.trt

# Data description

### How well was each question answered?

Note that Final Exam V1 had questions 5 & 9 as treatment and V2 had questions 6 & 10 as treatment. Thus both of the questions where we are seeing a difference are from the same version. We need to confirm that these two populations are not performing differently overall. This is likely done most effectively by controlling for version, gender and other differences within the logistic regression. There are too many confounding factors to be able to see through them using bar charts.

## TREATMENT QNUM N QCORRECT median sd se ci  
## 1 0 5 323 0.6904025 1 0.4630450 0.02576452 0.05068804  
## 2 0 6 327 0.4740061 0 0.5000891 0.02765499 0.05440477  
## 3 0 9 323 0.7027864 1 0.4577405 0.02546936 0.05010737  
## 4 0 10 327 0.5596330 1 0.4971920 0.02749478 0.05408959  
## 5 1 5 327 0.7155963 1 0.4518213 0.02498578 0.04915371  
## 6 1 6 323 0.5665635 1 0.4963184 0.02761589 0.05433037  
## 7 1 9 327 0.7064220 1 0.4560988 0.02522232 0.04961905  
## 8 1 10 323 0.6284830 1 0.4839600 0.02692825 0.05297753  
## binomial.error  
## 1 0.02572460  
## 2 0.02761267  
## 3 0.02542991  
## 4 0.02745271  
## 5 0.02494754  
## 6 0.02757311  
## 7 0.02518373  
## 8 0.02688654