hw\_03

Abby Bergman

1/23/2019

setwd("/Users/AbigailBergman/Desktop/Grad School/Winter Quarter 2019/Data Science/datascience\_repo/week\_03")  
library(car) #run type III

## Loading required package: carData

library(Hmisc) #import SPSS file

## Loading required package: lattice

## Loading required package: survival

## Loading required package: Formula

## Loading required package: ggplot2

##   
## Attaching package: 'Hmisc'

## The following objects are masked from 'package:base':  
##   
## format.pval, units

library(heplots) # eta squared  
library(tidyverse)

## ── Attaching packages ─────────────────────────── tidyverse 1.2.1 ──

## ✔ tibble 1.4.2 ✔ purrr 0.2.5  
## ✔ tidyr 0.8.2 ✔ dplyr 0.7.7  
## ✔ readr 1.1.1 ✔ stringr 1.3.1  
## ✔ tibble 1.4.2 ✔ forcats 0.3.0

## ── Conflicts ────────────────────────────── tidyverse\_conflicts() ──  
## ✖ dplyr::filter() masks stats::filter()  
## ✖ dplyr::lag() masks stats::lag()  
## ✖ dplyr::recode() masks car::recode()  
## ✖ purrr::some() masks car::some()  
## ✖ dplyr::src() masks Hmisc::src()  
## ✖ dplyr::summarize() masks Hmisc::summarize()

library(dplyr)  
library(tidyr)  
library(granovaGG)

physics1 = spss.get("physics1.sav", use.value.labels = TRUE)

## re-encoding from latin1

physics2 = spss.get("physics2.sav", use.value.labels = TRUE)

## re-encoding from latin1

#study1  
  
action <- physics1 %>%  
 filter(group == "action")  
  
observation <- physics1 %>%  
 filter(group == "observation")  
  
#study1  
#pretest - "one way ANOVA"  
fit = aov(mag1 ~ group, data = physics1)  
summary(fit)

## Df Sum Sq Mean Sq F value Pr(>F)  
## group 1 0.0006 0.00058 0.015 0.903  
## Residuals 42 1.6390 0.03902

#post test - ANCOVA to control for pretest  
mod1 = lm(mag2 ~ group + mag1, data = physics1,  
 contrasts = list(group = contr.sum))  
fit1 = Anova(mod1, type = 3)  
fit1

## Anova Table (Type III tests)  
##   
## Response: mag2  
## Sum Sq Df F value Pr(>F)   
## (Intercept) 0.32268 1 16.6546 0.000202 \*\*\*  
## group 0.10099 1 5.2125 0.027679 \*   
## mag1 0.61941 1 31.9699 1.341e-06 \*\*\*  
## Residuals 0.79436 41   
## ---  
## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1

#eta squared  
etasq(mod1)

## Partial eta^2  
## group 0.1127946  
## mag1 0.4381241  
## Residuals NA

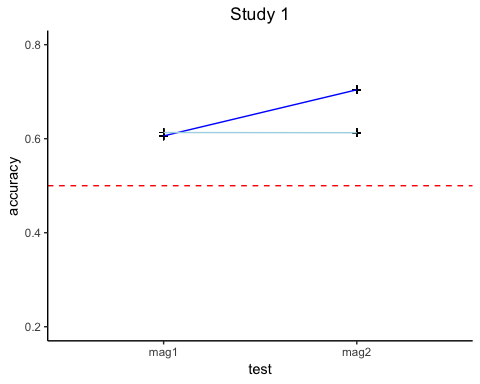
#t.test for action group change from pre to post  
t.test(action$mag.improvement)

##   
## One Sample t-test  
##   
## data: action$mag.improvement  
## t = 3.0668, df = 21, p-value = 0.005854  
## alternative hypothesis: true mean is not equal to 0  
## 95 percent confidence interval:  
## 0.03160329 0.16476035  
## sample estimates:  
## mean of x   
## 0.09818182

#t.test for obs group change from pre to post  
t.test(observation$mag.improvement)

##   
## One Sample t-test  
##   
## data: observation$mag.improvement  
## t = -0.013008, df = 21, p-value = 0.9897  
## alternative hypothesis: true mean is not equal to 0  
## 95 percent confidence interval:  
## -0.07312168 0.07221259  
## sample estimates:  
## mean of x   
## -0.0004545455

physics1 %>%  
 group\_by(group)%>%  
 mutate(mag1=mean(mag1),  
 mag2=mean(mag2))%>%  
 gather("test","accuracy", 3:4)%>%  
 mutate(test=as.factor(test)) %>%  
 ggplot() +  
 geom\_point(aes(test, accuracy, shape = 3))+  
 geom\_line(aes(group = interaction(group),test, accuracy, color = group))+  
 geom\_hline(aes(yintercept = .5, color = "red"), linetype = "dashed")+  
 ylim(c(.2,.8))+  
 theme(panel.grid.major = element\_blank(), panel.grid.minor = element\_blank(),  
panel.background = element\_blank(), axis.line = element\_line(colour = "black"),   
legend.position="none",   
plot.title = element\_text(hjust=0.5))+  
 scale\_shape\_identity()+  
 labs(title = "Study 1")+  
 scale\_color\_manual(values=c("blue", "light blue", "red"))



action1 <- physics1 %>%  
 filter(group == "action")  
  
observation1 <- physics1 %>%  
 filter(group == "observation")  
  
#study 2  
#pretest - "one way ANOVA"  
fit2 = aov(accuracy.pre ~ group, data = physics2)  
summary(fit)

## Df Sum Sq Mean Sq F value Pr(>F)  
## group 1 0.0006 0.00058 0.015 0.903  
## Residuals 42 1.6390 0.03902

#posttest - ANCOVA  
mod3 = lm(accuracy.post ~ group + accuracy.pre, data = physics2,  
 contrasts = list(group = contr.sum))  
fit3 = Anova(mod3, type = 3)  
fit3

## Anova Table (Type III tests)  
##   
## Response: accuracy.post  
## Sum Sq Df F value Pr(>F)   
## (Intercept) 0.24921 1 13.5620 0.0008201 \*\*\*  
## group 0.09357 1 5.0923 0.0307783 \*   
## accuracy.pre 0.06223 1 3.3865 0.0747412 .   
## Residuals 0.60640 33   
## ---  
## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1

#eta squared  
etasq(mod3)

## Partial eta^2  
## group 0.13368253  
## accuracy.pre 0.09307002  
## Residuals NA

#vector dependent trials  
mod4 = lm(accuracy.posttest.newVC ~ group + accuracy.pretest.newVC, data = physics2,  
 contrasts = list(group = contr.sum))  
fit4 = Anova(mod4, type = 3)  
fit4

## Anova Table (Type III tests)  
##   
## Response: accuracy.posttest.newVC  
## Sum Sq Df F value Pr(>F)   
## (Intercept) 0.45684 1 13.0269 0.001005 \*\*  
## group 0.19868 1 5.6653 0.023236 \*   
## accuracy.pretest.newVC 0.03265 1 0.9310 0.341622   
## Residuals 1.15727 33   
## ---  
## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1

etasq(mod4)

## Partial eta^2  
## group 0.14652180  
## accuracy.pretest.newVC 0.02743797  
## Residuals NA

#magnitude dependent trials  
mod5 = lm(accuracy.posttest.newNONVC ~ group + accuracy.pretest.newNONVC, data = physics2,  
 contrasts = list(group = contr.sum))  
fit5 = Anova(mod5, type = 3)  
fit5

## Anova Table (Type III tests)  
##   
## Response: accuracy.posttest.newNONVC  
## Sum Sq Df F value Pr(>F)   
## (Intercept) 1.05437 1 53.2239 2.261e-08 \*\*\*  
## group 0.00694 1 0.3502 0.5580   
## accuracy.pretest.newNONVC 0.03350 1 1.6909 0.2025   
## Residuals 0.65373 33   
## ---  
## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1

physics2 %>%  
 group\_by(group)%>%  
 mutate(accuracy.pre=mean(accuracy.pre),  
 accuracy.post=mean(accuracy.post))%>%  
 gather("test","accuracy", 3:4)%>%  
 mutate(test=as.factor(test)) %>%  
 ggplot() +  
 geom\_point(aes(test, accuracy, shape = 3))+  
 scale\_x\_discrete(limits = c("accuracy.pre", "accuracy.post"))+  
 geom\_hline(aes(yintercept = .32, color = "red"), linetype = "dashed")+  
 geom\_line(aes(group = interaction(group),test, accuracy, color = group))+  
 ylim(c(.2,.8))+  
 theme(panel.grid.major = element\_blank(), panel.grid.minor = element\_blank(),  
panel.background = element\_blank(), axis.line = element\_line(colour = "black"),  
legend.position="none",  
plot.title = element\_text(hjust=0.5)) +  
 scale\_shape\_identity()+  
 labs(title = "Study 2") +  
 scale\_color\_manual(values=c("blue", "light blue", "red"))

