HW 4

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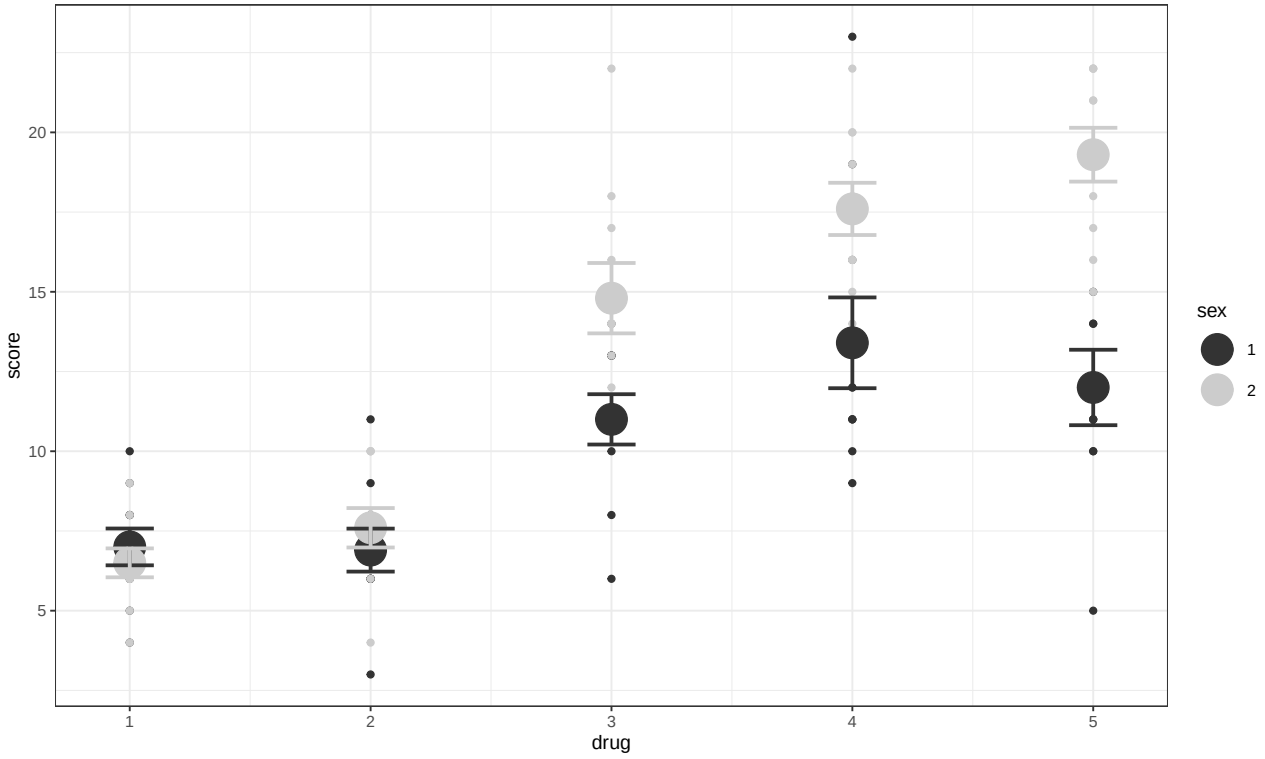
Question 1

Sex	1	2	3	4	5	Means
Male	7	6.9	11	13.4	12	10.06
Female	6.5	7.6	14.8	17.6	19.3	13.16
Means	6.75	7.25	12.9	15.5	15.65	11.61

Question 2



Question 6

```
in.data$sex <- factor(in.data$sex)
in.data$drug <- factor(in.data$drug)
out.model <- aov(score ~ sex * drug, data=in.data,)
summary(out.model)
```

```
            Df Sum Sq Mean Sq F value   Pr(>F)
```

```
sex          1  240.2   240.2  29.936 3.98e-07 ***
drug         4 1514.9   378.7  47.191  < 2e-16 ***
sex:drug     4  190.3    47.6   5.928 0.000279 ***
Residuals   90  722.3     8.0
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

Question 7

```
run.1 <- t.test(score ~ sex, in.data[which(in.data$drug==1),], var.equal=T)
run.2 <- t.test(score ~ sex, in.data[which(in.data$drug==2),], var.equal=T)
run.3 <- t.test(score ~ sex, in.data[which(in.data$drug==3),], var.equal=T)
run.4 <- t.test(score ~ sex, in.data[which(in.data$drug==4),], var.equal=T)
run.5 <- t.test(score ~ sex, in.data[which(in.data$drug==5),], var.equal=T)
for(i in 1:5){print(get(paste("run.", i, sep='')))}
```

```
    Two Sample t-test

data:  score by sex
t = 0.68111, df = 18, p-value = 0.5045
alternative hypothesis: true difference in means is not equal to 0
95 percent confidence interval:
 -1.042267  2.042267
sample estimates:
mean in group 1 mean in group 2
            7.0             6.5


    Two Sample t-test

data:  score by sex
t = -0.76528, df = 18, p-value = 0.454
alternative hypothesis: true difference in means is not equal to 0
95 percent confidence interval:
 -2.621703  1.221703
sample estimates:
mean in group 1 mean in group 2
            6.9             7.6


    Two Sample t-test

data:  score by sex
t = -2.8014, df = 18, p-value = 0.0118
alternative hypothesis: true difference in means is not equal to 0
95 percent confidence interval:
 -6.6498293 -0.9501707
sample estimates:
mean in group 1 mean in group 2
           11.0            14.8
```

```
    Two Sample t-test

data:  score by sex
t = -2.5571, df = 18, p-value = 0.0198
alternative hypothesis: true difference in means is not equal to 0
95 percent confidence interval:
 -7.6507462 -0.7492538
sample estimates:
mean in group 1 mean in group 2
           13.4            17.6


    Two Sample t-test

data:  score by sex
t = -5.0229, df = 18, p-value = 8.836e-05
alternative hypothesis: true difference in means is not equal to 0
95 percent confidence interval:
 -10.353372  -4.246628
sample estimates:
mean in group 1 mean in group 2
           12.0            19.3
```

Question 8

Differences in drug dosage effects were tested differentially across the sexes utilizing a two way analysis of variance. Dosage was coded as a five level factor, and sex was coded as a two level factor between male and female. The resultant interaction was found to be significant ($F(4,99)=5.9$, $p<.001$) indicating the sexes respond differentially to dose level of the drug. Further post-hoc t-tests were used to test where the differences emerged across the discrete dose categorizations. While lower levels of does (levels 1,2) did not display significant differences between the sexes ($t\_1(18)=.68$, $p>0.05$; $t\_2(18)=-.76$, $p>0.05$), differences in greater dose levels were observed ($t\_3(18)=-2.80$, $p=0.01$; $t\_4(18)=-2.56$, $p=0.02$; $t\_5(18)=-5.02$, $p<.001$). These results suggest greater scores were observed in the female cohort under greater dosage levels than the male cohorts.