HW 4

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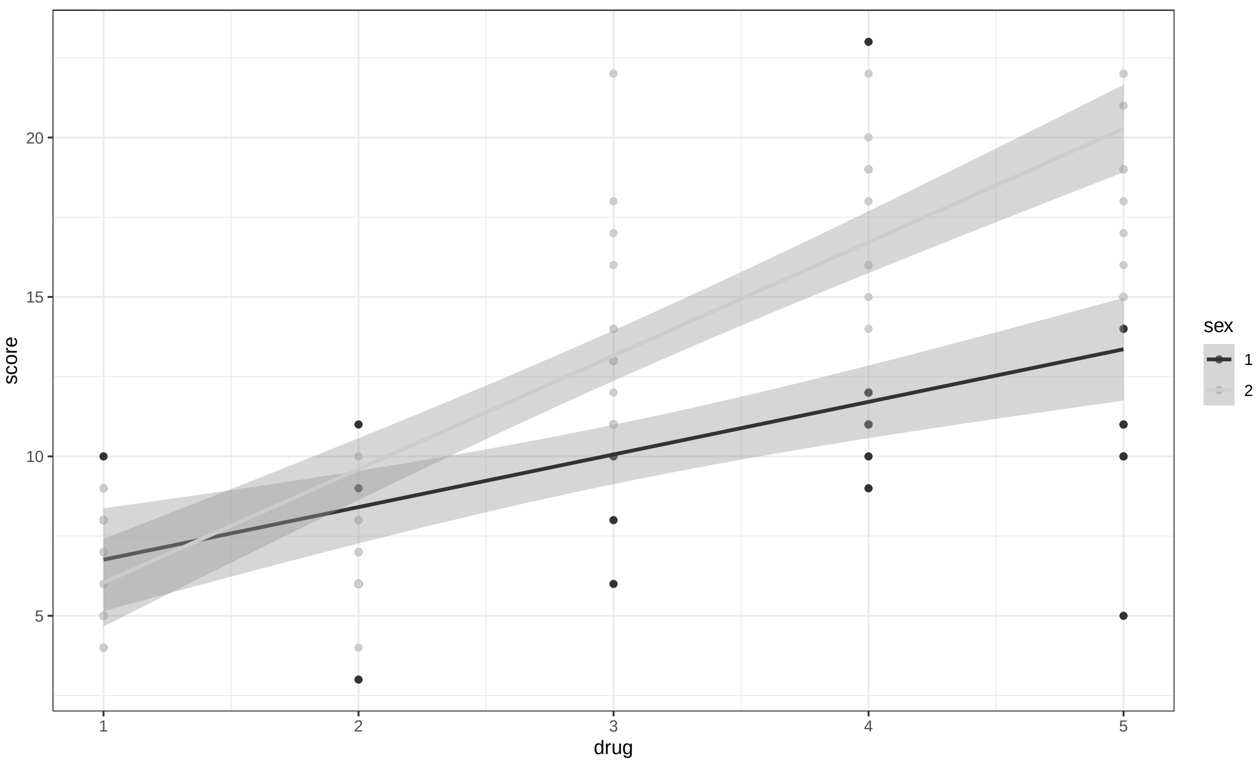
Question 1

Sex	1	2	3	4	5	Means
Male	7 (1.83)	6.9 (2.13)	11 (2.49)	13.4 (4.5)	12 (3.74)	10.06
Female	6.5 (1.43)	7.6 (1.96)	14.8 (3.49)	17.6 (2.59)	19.3 (2.67)	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,)
out.model <- aov(score ~ sex + drug + 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

```r
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 with greater values indicating greater dosage, sex was coded as a two level factor. The resultant interaction was found to be significant (F(4,99)=5.9, p<.001) indicating the sexes respond differentially to level of the drug. It is important to note that under increased dosage both sexes did display greater scores and sex was shown to be a significant main effect too (F_sex=29.94, p<0.001; F_dosage=47.2, P<0.001). 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.