hw 5

2022-11-01

```
setwd("~/Documents/GitHub/stats100")
```

```
library(tidyverse)
```

```
## -- Attaching packages --------------------------------------- tidyverse 1.3.2 --
## v ggplot2 3.3.6      v purrr   0.3.5
## v tibble  3.1.8      v dplyr   1.0.10
## v tidyr   1.2.1      v stringr 1.4.1
## v readr   2.1.3      v forcats 0.5.2
## -- Conflicts ------------------------------------------ tidyverse_conflicts() --
## x dplyr::filter() masks stats::filter()
## x dplyr::lag()    masks stats::lag()
```

```
library(ggplot2)
library(scales)
```

```
##
## Attaching package: 'scales'
##
## The following object is masked from 'package:purrr':
##
##     discard
##
## The following object is masked from 'package:readr':
##
##     col_factor
```

```
library(RColorBrewer)
library(stats)
```

```
drp<- read.csv("drp.csv")
drp
```

```
##    Treatment Response
## 1    Treated       24
## 2    Treated       43
## 3    Treated       58
## 4    Treated       71
## 5    Treated       43
## 6    Treated       49
## 7    Treated       61
```

```
## 8    Treated       44
## 9    Treated       67
## 10   Treated       49
## 11   Treated       53
## 12   Treated       56
## 13   Treated       59
## 14   Treated       52
## 15   Treated       62
## 16   Treated       54
## 17   Treated       57
## 18   Treated       33
## 19   Treated       46
## 20   Treated       43
## 21   Treated       57
## 22   Control       42
## 23   Control       43
## 24   Control       55
## 25   Control       26
## 26   Control       62
## 27   Control       37
## 28   Control       33
## 29   Control       41
## 30   Control       19
## 31   Control       54
## 32   Control       20
## 33   Control       85
## 34   Control       46
## 35   Control       10
## 36   Control       17
## 37   Control       60
## 38   Control       53
## 39   Control       42
## 40   Control       37
## 41   Control       42
## 42   Control       55
## 43   Control       28
## 44   Control       48
```

A treatment class of 21 third-grade students participated in these activities for eight weeks, and a control class of 23 third-graders fol- lowed the same curriculum without the activities. After the eight-week period, students in both classes took a Degree of Reading Power (DRP) test which measures the aspects of reading ability that the treatment is de- signed to improve. The first column is the group (treatment or control), and the second is the DRP score (the higher the better).

(a) Find the 95% confidence interval for the difference in average DRP score.

```
controlt<- drp %>%
  filter(Treatment == "Control") %>%
  summarise(Treatment, Response)
controlt
```

```
##    Treatment Response
## 1    Control       42
```

```
## 2    Control       43
## 3    Control       55
## 4    Control       26
## 5    Control       62
## 6    Control       37
## 7    Control       33
## 8    Control       41
## 9    Control       19
## 10   Control       54
## 11   Control       20
## 12   Control       85
## 13   Control       46
## 14   Control       10
## 15   Control       17
## 16   Control       60
## 17   Control       53
## 18   Control       42
## 19   Control       37
## 20   Control       42
## 21   Control       55
## 22   Control       28
## 23   Control       48
```

```
treatedt<- drp %>%
  filter(Treatment == "Treated") %>%
  summarise(Treatment, Response)
treatedt
```

```
##    Treatment Response
## 1    Treated       24
## 2    Treated       43
## 3    Treated       58
## 4    Treated       71
## 5    Treated       43
## 6    Treated       49
## 7    Treated       61
## 8    Treated       44
## 9    Treated       67
## 10   Treated       49
## 11   Treated       53
## 12   Treated       56
## 13   Treated       59
## 14   Treated       52
## 15   Treated       62
## 16   Treated       54
## 17   Treated       57
## 18   Treated       33
## 19   Treated       46
## 20   Treated       43
## 21   Treated       57
```

```
t.test(controlt$Response, treatedt$Response, conf.level = 0.95)
```

```
##
```

```
##  Welch Two Sample t-test
##
## data:  controlt$Response and treatedt$Response
## t = -2.3109, df = 37.855, p-value = 0.02638
## alternative hypothesis: true difference in means is not equal to 0
## 95 percent confidence interval:
##  -18.67588  -1.23302
## sample estimates:
## mean of x mean of y
##  41.52174  51.47619
```

Answer = (-18.67588, -1.23302)

(b) If the experimenter is interested in if the treatment group has a higher average than the control group, find the test-statistic.

```
t.test(controlt$Response, treatedt$Response, alternative = "less")
```

```
##
##  Welch Two Sample t-test
##
## data:  controlt$Response and treatedt$Response
## t = -2.3109, df = 37.855, p-value = 0.01319
## alternative hypothesis: true difference in means is less than 0
## 95 percent confidence interval:
##       -Inf -2.691293
## sample estimates:
## mean of x mean of y
##  41.52174  51.47619
```