Week 14 In Class Lecture

Peyton Hall

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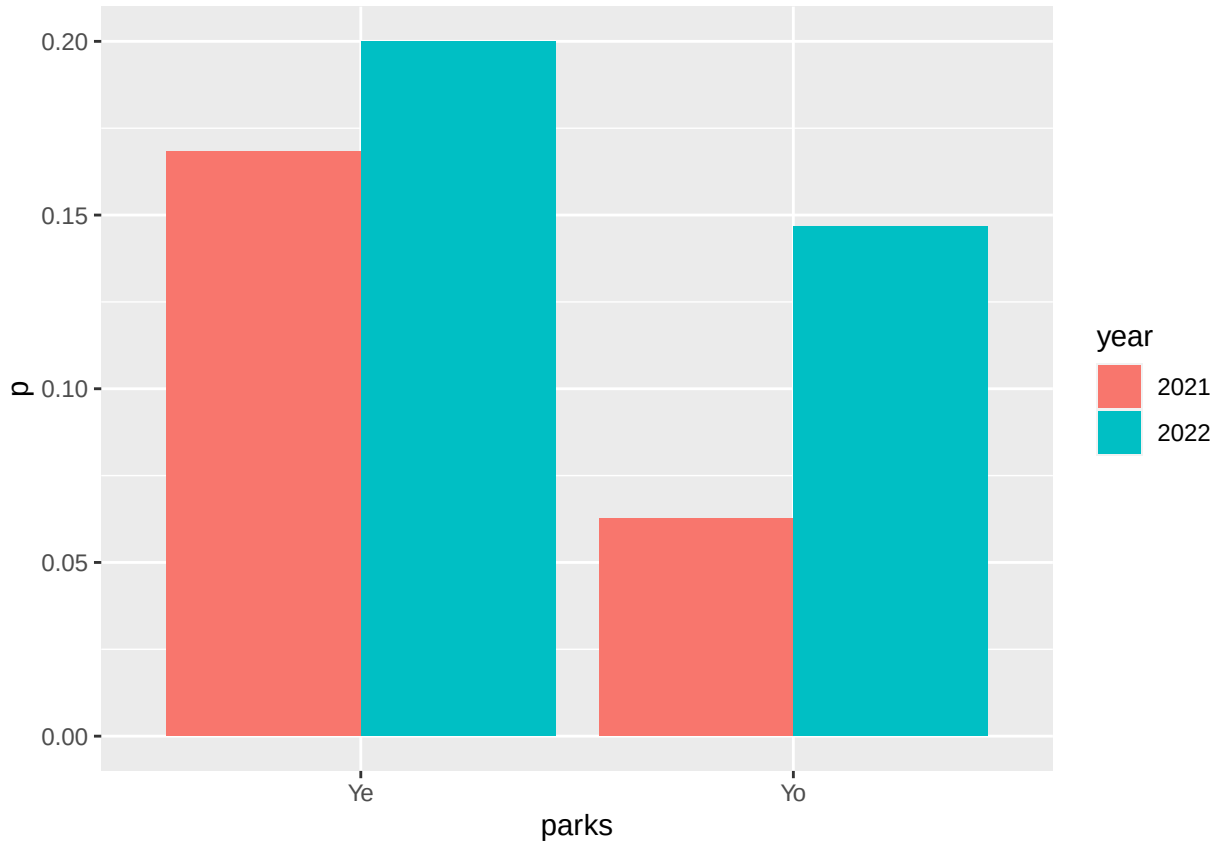
```
library(ggplot2)
library(readxl)
library(tidyverse)
```

```
## -- Attaching core tidyverse packages ------------------------ tidyverse 2.0.0 --
## v dplyr     1.1.4     v readr     2.1.5
## v forcats   1.0.0     v stringr   1.5.1
## v lubridate 1.9.3     v tibble    3.2.1
## v purrr     1.0.2     v tidyr     1.3.1
## -- Conflicts ---------------------------------------- tidyverse_conflicts() --
## x dplyr::filter() masks stats::filter()
## x dplyr::lag()    masks stats::lag()
## i Use the conflicted package (<http://conflicted.r-lib.org/>) to force all conflicts to become errors
```

```
parks<-c("Ye","Yo", "Ye","Yo")
year<-c("2021","2021","2022","2022")
p<-c(51/303,19/303,60/300,44/300)

mypark<-data.frame(parks,year,p)

ggplot(mypark, aes(x=parks,y=p))+geom_bar(stat = "identity", position
                                          ="dodge", aes(fill=year))
```




```
prop.test(c(51, 19),c(303,303),alternative="greater")
```

```
##
##  2-sample test for equality of proportions with continuity correction
##
## data:  c(51, 19) out of c(303, 303)
## X-squared = 15.521, df = 1, p-value = 4.079e-05
## alternative hypothesis: greater
## 95 percent confidence interval:
##  0.06018222 1.00000000
## sample estimates:
##     prop 1     prop 2
## 0.16831683 0.06270627
```

```
prop.test(c(60,44),c(300,300),alternative="greater")
```

```
##
##  2-sample test for equality of proportions with continuity correction
##
## data:  c(60, 44) out of c(300, 300)
## X-squared = 2.6171, df = 1, p-value = 0.05286
## alternative hypothesis: greater
## 95 percent confidence interval:
##  -0.0007116274  1.0000000000
```

```
## sample estimates:
##    prop 1    prop 2
## 0.2000000 0.1466667
```

```
prop.test(c(51+60,19+44),c(303+300,303+300),alternative="greater")
```

```
##
##  2-sample test for equality of proportions with continuity correction
##
## data:  c(51 + 60, 19 + 44) out of c(303 + 300, 303 + 300)
## X-squared = 14.836, df = 1, p-value = 5.864e-05
## alternative hypothesis: greater
## 95 percent confidence interval:
##  0.04487267 1.00000000
## sample estimates:
##    prop 1    prop 2
## 0.1840796 0.1044776
```

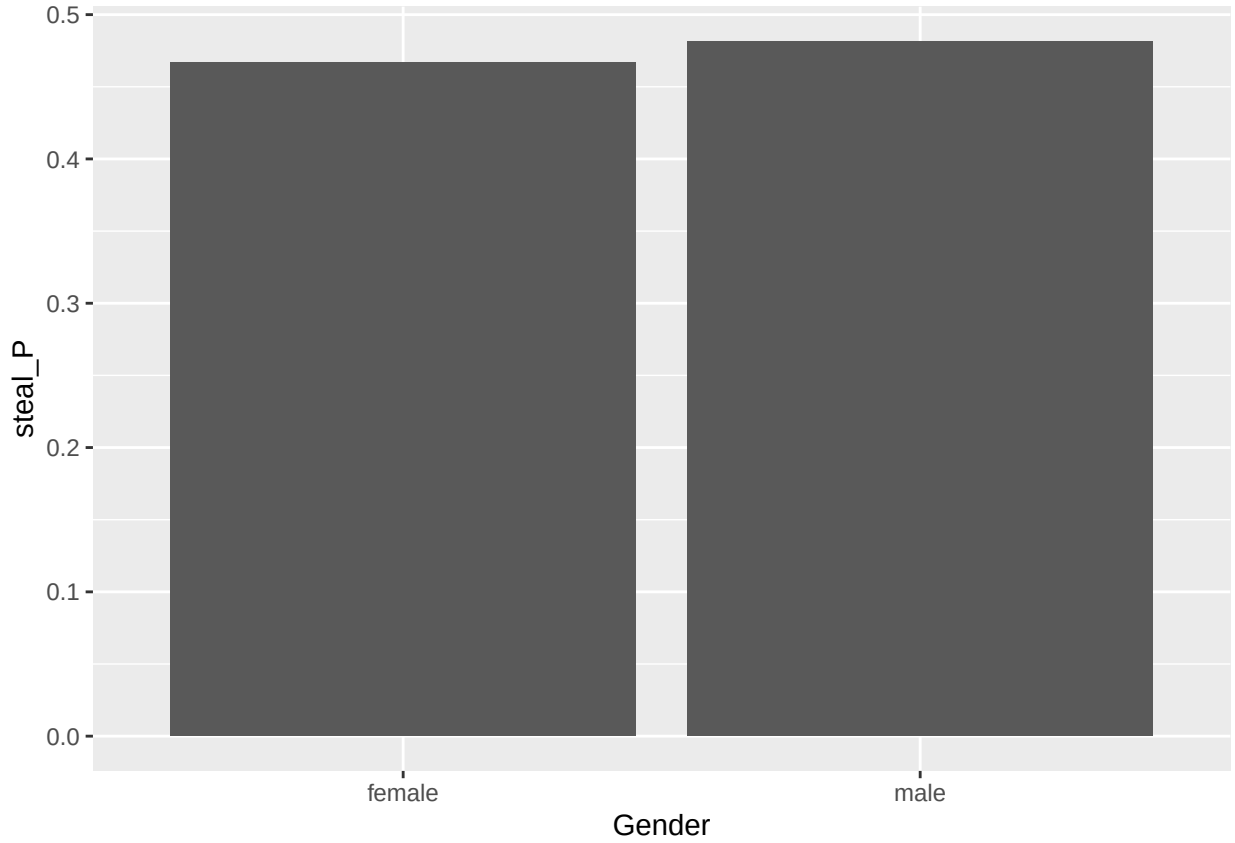
P_f: proportion of female who chose the decision to steal P_m: proportion of male who chose the decision to steal

$H_0 : P_f = P_m$ vs $H_a : P_f \neq P_m$

```
prop.test(c(140,130),c(300,270), alternative = "two.sided") #(x,n,p)
```

```
##
##  2-sample test for equality of proportions with continuity correction
##
## data:  c(140, 130) out of c(300, 270)
## X-squared = 0.072736, df = 1, p-value = 0.7874
## alternative hypothesis: two.sided
## 95 percent confidence interval:
##  -0.10042484  0.07079521
## sample estimates:
##    prop 1    prop 2
## 0.4666667 0.4814815
```

```
steal<-data.frame(Gender=c("female","male"),steal_P=c(140/300,130/270))
ggplot(steal, aes(x=Gender, y=steal_P))+geom_bar(stat="identity")
```



$H_0 : \mu = 400$ vs $H_a : \mu > 400$

```
Battery_Life <- read_excel("~/Desktop/Data211/Week 14/Battery Life.xlsx")
Battery_Life
```

```
## # A tibble: 21 x 1
##    Batterylife
##          <dbl>
##  1         342
##  2         426
##  3         317
##  4         545
##  5         264
##  6         451
##  7        1049
##  8         631
##  9         512
## 10         266
## # i 11 more rows
```

```
Battery_Life2<-filter(Battery_Life,Batterylife<1000)
t.test(Battery_Life2$Batterylife,mu=400,alternative="greater")
```

```
##
##  One Sample t-test
```

```
##
## data:  Battery_Life2$Batterylife
## t = 0.99207, df = 19, p-value = 0.1668
## alternative hypothesis: true mean is greater than 400
## 95 percent confidence interval:
##  376.1885      Inf
## sample estimates:
## mean of x
##    432.05
```

We fail to reject the H_0 so we do not have enough evidence to conclude that the mean battery life is greater than 400.

$H_0 : \mu_h \mu_m$ $H_0 : \mu_h < \mu_m$

```
IQ_data <- read_excel("~/Desktop/Data211/Week 14/IQ data.xlsx")
IQ_data
```

```
## # A tibble: 22 x 2
##    Lead      IQ
##    <chr>  <dbl>
##  1 medium   102
##  2 medium   100
##  3 medium    92
##  4 medium    85
##  5 medium    86
##  6 medium    97
##  7 medium    83
##  8 medium    92
##  9 medium   105
## 10 medium   111
## # i 12 more rows
```

```
t.test(IQ~Lead, data=IQ_data, alternative="less")
```

```
##
##  Welch Two Sample t-test
##
## data:  IQ by Lead
## t = -2.1847, df = 18.357, p-value = 0.02105
## alternative hypothesis: true difference in means between group high and group medium is less than 0
## 95 percent confidence interval:
##       -Inf -2.052296
## sample estimates:
##   mean in group high mean in group medium
##             85.00000             94.90909
```

$H_0 : \mu_l = \mu_A$ $H_A : \mu_l > \mu_A$

```
Books <- read_excel("~/Desktop/Data211/Week 14/Books.xlsx")
Books
```

```
## # A tibble: 15 x 3
##    Textbook                                    Bookstore Amazon
##    <chr>                                           <dbl>  <dbl>
##  1 Access2000 Guidebook                             52.2   43.8
##  2 HTML with Java                                   52.7   44.5
##  3 Designing the Physical Education Curriculum      39.0   40.5
##  4 Service Management                              101.    73.2
##  5 Fundamentals of Real Estate Appraisal            37.4   39.0
##  6 Investments                                     113.    95.4
##  7 Intermediate Financial Management               110.   110.
##  8 Calculus                                        101.    62.5
##  9 The automobile Age                               29.5   32.4
## 10 Geographic Information Systems                   70.1   70.4
## 11 Geosystems                                       83.9   83.8
## 12 Understanding Contemporary Africa                23.2   26.5
## 13 Early Childhood Education Today                  72.8   72.8
## 14 System of Transcendental Idealism                17.4   12.4
## 15 Principles and Labs for Fitness and Wellness     37.7   30.1
```

```
t.test(Books$Bookstore,Books$Amazon,alternative = "greater",paired=TRUE)
```

```
##
##  Paired t-test
##
## data:  Books$Bookstore and Books$Amazon
## t = 2.1909, df = 14, p-value = 0.02294
## alternative hypothesis: true mean difference is greater than 0
## 95 percent confidence interval:
##  1.36939     Inf
## sample estimates:
## mean difference
##        6.983333
```