R Assignment 4

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Vital capacity is a measure of the amount of air that someone can exhale after taking a deep breath, Data was collected on brass players and a control group.

|  |  |
| --- | --- |
| Brass Player | Control Group |
| 4.7 | 4.2 |
| 4.6 | 4.7 |
| 4.3 | 5.1 |
| 4.5 | 4.7 |
| 5.5 | 5.0 |
| 4.9 | - |
| 5.3 | - |

1. Put the data into a “long format” data frame. Recommended website reading is <https://seananderson.ca/2013/10/19/reshape/> (Links to an external site.) .That is one column labeled “Vital” for vital measure and second character or factor column labeled “Group” with the group labels of “Brass” or “Control”.

VC = data.frame(Vital = c(4.7, 4.6, 4.3, 4.5, 5.5, 4.9, 5.3, 4.2, 4.7, 5.1, 4.7, 5.0),   
 Group = c(rep(x="Brass", times = 7), rep(x="Control", times = 5)))  
VC

## Vital Group  
## 1 4.7 Brass  
## 2 4.6 Brass  
## 3 4.3 Brass  
## 4 4.5 Brass  
## 5 5.5 Brass  
## 6 4.9 Brass  
## 7 5.3 Brass  
## 8 4.2 Control  
## 9 4.7 Control  
## 10 5.1 Control  
## 11 4.7 Control  
## 12 5.0 Control

1. Conduct a test using “t.test” using the S3 method for class ‘formula’, i.e. t.test(Vital~Group, data, …) to determine whether the population mean for brass is larger than that for control. Do NOT use t.test(Brass,Control,data) which is the default S3 method.

t.test(Vital~Group, VC, alternative = "greater")

##   
## Welch Two Sample t-test  
##   
## data: Vital by Group  
## t = 0.38989, df = 9.7609, p-value = 0.3525  
## alternative hypothesis: true difference in means is greater than 0  
## 95 percent confidence interval:  
## -0.3241937 Inf  
## sample estimates:  
## mean in group Brass mean in group Control   
## 4.828571 4.740000

Assuming alpha = 0.05

p-value = 0.3525 > 0.05

Therefore there is insufficient evidence that the population mean for brass is larger than that for control.

1. Provide the equivalent 95% confidence interval for the difference of two population means.

t.test(Vital~Group, VC, alternative = "two.sided")

##   
## Welch Two Sample t-test  
##   
## data: Vital by Group  
## t = 0.38989, df = 9.7609, p-value = 0.705  
## alternative hypothesis: true difference in means is not equal to 0  
## 95 percent confidence interval:  
## -0.4192838 0.5964267  
## sample estimates:  
## mean in group Brass mean in group Control   
## 4.828571 4.740000

95% CI: (-0.4193, 0.5964)

1. A researcher claims that in theory the “spread/variance” in the two populations is the same. Repeat step 2 utilizing this assumption with the argument “var.equal” within the “t.test” function.

t.test(Vital~Group, VC, alternative = "greater", var.equal = TRUE)

##   
## Two Sample t-test  
##   
## data: Vital by Group  
## t = 0.37509, df = 10, p-value = 0.3577  
## alternative hypothesis: true difference in means is greater than 0  
## 95 percent confidence interval:  
## -0.3394088 Inf  
## sample estimates:  
## mean in group Brass mean in group Control   
## 4.828571 4.740000

p-value = 0.3577 > 0.05

Therefore there is insufficient evidence that the population mean for brass is larger than that for control.