t-test(2)

2024-02-17

Independent sampls t test(equal variance) independent samples(unpaired) t test

H0: population means are equal H1: population means are unequal alpha =.05

df <- read.csv("C:/Users/SCIENCE/Downloads/Advertising (1).csv")  
summary(df)

## X TV Radio Newspaper   
## Min. : 1.00 Min. : 0.70 Min. : 0.000 Min. : 0.30   
## 1st Qu.: 50.75 1st Qu.: 74.38 1st Qu.: 9.975 1st Qu.: 12.75   
## Median :100.50 Median :149.75 Median :22.900 Median : 25.75   
## Mean :100.50 Mean :147.04 Mean :23.264 Mean : 30.55   
## 3rd Qu.:150.25 3rd Qu.:218.82 3rd Qu.:36.525 3rd Qu.: 45.10   
## Max. :200.00 Max. :296.40 Max. :49.600 Max. :114.00   
## Sales   
## Min. : 1.60   
## 1st Qu.:10.38   
## Median :12.90   
## Mean :14.02   
## 3rd Qu.:17.40   
## Max. :27.00

shapiro.test(df$Newspaper)

##   
## Shapiro-Wilk normality test  
##   
## data: df$Newspaper  
## W = 0.9364, p-value = 1.127e-07

it is normally distributed since > .05

shapiro.test(df$Radio)

##   
## Shapiro-Wilk normality test  
##   
## data: df$Radio  
## W = 0.94401, p-value = 5.198e-07

it is normally distributed since > .05

var.test(df$Radio, df$Newspaper)

##   
## F test to compare two variances  
##   
## data: df$Radio and df$Newspaper  
## F = 0.46474, num df = 199, denom df = 199, p-value = 9.593e-08  
## alternative hypothesis: true ratio of variances is not equal to 1  
## 95 percent confidence interval:  
## 0.3517053 0.6140901  
## sample estimates:  
## ratio of variances   
## 0.4647351

t.test(df$Radio, df$Newspaper,  
 alternative = "two.sided",  
 paired= FALSE,  
 var.equal= TRUE,)

##   
## Two Sample t-test  
##   
## data: df$Radio and df$Newspaper  
## t = -3.9114, df = 398, p-value = 0.0001079  
## alternative hypothesis: true difference in means is not equal to 0  
## 95 percent confidence interval:  
## -10.954086 -3.625914  
## sample estimates:  
## mean of x mean of y   
## 23.264 30.554

we reject the null hypothesis and conclude that population means are unequal