1.)

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Length | Min | 1Q | Median | Mean | 3Q | Max | Standard Dev |
| Participants | 25 | 211 | 298.4 | 424.9 | 410.1 | 456.3 | 635.2 | 121.5138 |
| Non-Participants | 22 | 137.9 | 296.4 | 374.7 | 374.1 | 445.6 | 688.8 | 133.1393 |

Looking at both of the histograms, they cover the same spread of data and they are basically bell shaped with the highest point in the middle. The largest concentration for the non-participants is in the center where the participants have a higher proportion to the far left, but I would not describe it as skewed.

Chart, histogram

Description automatically generated

Chart, histogram

Description automatically generated

2.)

**Step 1**

H0 : Mean Calorie Consumption for participants = 425

H1 : Mean Calorie Consumption for participants does not equal 425

Alpha = .05

**Step 2**

T-test statistic since the number of participants is 25 which is less than 30

**Step 3**

Alpha/2 = .025

Critical value is 2.064

Decision Rule : Reject H0 if t is greater than or equal to 2.064

Otherwise Fail to reject H0 (accept)

**Step 4**

T statistic = 0.6139386

P Value = 0.545032

**Step 5**

Since the P-Value is large, and the T statistic isn’t greater that the critical value, we accept, aka fail to reject the null Hypothesis that the mean calorie consumption is 425.

3.)

Confidence Interval is (368.5208, 451.6792)

There is a 90% chance that the mean calorie intake is between those two numbers.

The null value is in this confidence interval.

4.

**Step 1**

H0 : Non participants consumed more calories than participants, greater than the mean of participants is > 410

H1 : Non participants did not consume more calories than participants

Alpha = .05

**Step 2**

T-test statistic since the number of participants is 25 and the number of non-participants is 22, both are less than 30

**Step 3**

The minimum of the two samples is 22, so the degrees of freedom are 21

Critical value is 2.080

Decision Rule : Reject H0 if t-statistic is greater than or equal to 2.080

Otherwise Fail to reject H0 (accept)

**Step 4**

T statistic = -.9636

P Value = 0.8297

**Step 5**

Since the P-Value is large, and the T statistic isn’t greater that the critical value we fail to reject the null hypothesis

5.)

The sample populations are independent, you can be both a participant and a non-participant. The calories were measured in the same way, and they have somewhat similar distributions over the same range/spread. Yes, the assumptions are met.

R CODE:

Graphical user interface, text, application

Description automatically generated

rm(list=ls()); cat("\014")

#Set directory

setwd("C:/Users/HP/Documents/555")

getwd()

#1

#Import spreadsheet

yes = read.csv("hw2\_yes.csv", header = TRUE)

no = read.csv("hw2\_no.csv", header = TRUE)

participants <- yes$ï..Yes

non\_participants <-no$ï..No

participants

non\_participants

hist(non\_participants, col = "green")

hist(participants, col = "blue")

summary(participants)

summary(non\_participants)

mean(participants)

sd(participants)

length(participants)

mean(non\_participants)

sd(non\_participants)

length(non\_participants)

#2

#Critical Value

qt(1-(.05/2),24)

#Calculate T Statistic

u = mean(participants)

s = sd(participants)

n = length(participants)

t = (425-u)/(s/sqrt(n))

t

#Calculate P Value

2\*pt(-t,n-1)

#3 Calculate 90% confidence interval

# The sample size is less than 30, so we perform t-test instead z-test.

x.bar <- 410.1

sd <- 121.5138

n <- 25

# We need to use degree of freedom sample size - 1

df <- n - 1

t <- qt(1-(0.1/2), df)

t

# Calculate lower confidence interval.

lower.interval <- x.bar - t \* (sd / sqrt(n))

# Calculate higher confidence interval.

upper.interval <- x.bar + t \* (sd / sqrt(n))

lower.interval

upper.interval

# 4.)

# Perform t test for two sample test.

x.bar1 <- 374.1

x.bar2 <- 410.1

n1 <- 22

n2 <- 25

sd1 <- 133.1393

sd2 <- 121.5138

# Calculate t statistic

t <- (x.bar1 - x.bar2) / sqrt((sd1\*\*2/n1) + (sd2\*\*2/n2))

t

t.test(non\_participants, participants, alternative = "greater", conf.level = .95)