Experiment-VIII

Student's t-Test

One Sample t-test

**Problem 1:** A random sample of 10 boys had the following I.Qs: 70,120,110,101, 88, 83, 95, 98, 107, and 100. Do these data support the assumption of a population mean I.Q. of 100.

Solution :

**Aim :** To test whether the data support the assumption of a population mean I.Q. of 100 or not

**Null Hypothesis H0** : data support the assumption of a population mean I.Q. of 100

**Alternative Hypothesis H1** : data not supports the assumption of a population mean I.Q. of

100

Test statistic

R-Commands:

x=c(70,120,110,101, 88, 83, 95, 98, 107, 100)

> x

[1] 70 120 110 101 88 83 95 98 107 100

> t.test(x)

One Sample t-test

data: x

t = 21.535, df = 9, p-value = 4.726e-09

alternative hypothesis: true mean is not equal to 0

95 percent confidence interval:

86.98934 107.41066

sample estimates:

mean of x

97.2

p-value = 4.726e-09

p-value

4.726e-09

alpha=0.05

alpha

0.05

**if(p-value < alpha){print("Null Hypothesis is Rejected")}else{print("Null Hypothesis is Accepted ")}**

**Null Hypothesis is Rejected**

( Or )

p-value = 4.726e-09 < 0.05, so H0: is Rejected

Conclusion : **Null Hypothesis is Rejected**

**i.e.,given** data not supports the assumption of a population mean I.Q. of 100

Two Sample t-test

**Problem 2 :** To examine the hypothesis that the husbands are more intelligent than the wives, an investigator took a sample of 10 couples and administrated them a test which measures the I.Q. The results are as follows:

Husbands : 117 105 97 105 123 109 86 78 103 107

Wives : 106 98 87 104 116 95 90 69 108 85

Test the hypothesis with a reasonable test at the level of significance of 0.05.

**Aim:** To test the IQ levels of the Couples are admissible or not

**Null Hypothesis H0**: The results of the data of IQ levels of the Couples are admissible

**Null Hypothesis H1:** The results of the data of IQ levels of the Couples are not admissible

Test statistic

R-Commands:

> x=c(117,105,97,105,123,109,86,78,103,107)

> x

[1] 117,105,97,105,123,109,86,78,103,107

> y=c(106,98,87,104,116,95,90,69,108,85)

> y

[1] 106,98,87,104,116,95,90,69,108,85> t.test(x,y)

Welch Two Sample t-test

data: x and y

**t = 1.1916**, df = 17.991, p-value = 0.2489

alternative hypothesis: true difference in means is not equal to

95 percent confidence interval:

-5.494384 19.894384

sample estimates:

mean of x mean of y

103.0 95.8

p-value = 0.2489

p-value

0.2489

alpha=0.05

alpha

0.05

**if(p-value <** alpha**){print("Null Hypothesis is Rejected")}else{print("Null Hypothesis is Accepted ")}**

**Null Hypothesis is Accepted**

(or)

p-value = 0.2489 > 0.05 , so H0: is Accepted

Conclusion : **Null Hypothesis H0**  Accepted

i.e., The results of the data of IQ levels of the Couples are admissible