

Unit 8

Exercise 7.1

Recall that in the previous unit exercises, a two-tailed test was undertaken whether the population mean impurity differed between the two filtration agents in Data Set G. Suppose instead a one-tailed test had been conducted to determine whether Filter Agent 1 was the more effective. What would your conclusions have been?

Answer

After completing a two-sample the interpretation for a one-tailed test shows that Filter Agent 1 is more effective than Filter Agent 2 as it is more effective for the reduction in impurity which is shown by the p-Value showing a significance of 0.003 meaning the null hypothesis can be rejected.

t-Test: Paired Two Sample for Means

	<i>Agent1</i>	<i>Agent2</i>
Mean	8.25	8.683333333
Variance	1.059090909	1.077878788
Observations	12	12
Pearson Correlation	0.901055812	
Hypothesized Mean Difference	0	
df	11	
	-	
t Stat	3.263938591	
P(T<=t) one-tail	0.003772997	
t Critical one-tail	1.795884819	
P(T<=t) two-tail	0.007545995	
t Critical two-tail	2.20098516	

Dataset:

Batch	Agent1	Agent2
1	7.7	8.5
2	9.2	9.6
3	6.8	6.4
4	9.5	9.8
5	8.7	9.3
6	6.9	7.6
7	7.5	8.2
8	7.1	7.7
9	8.7	9.4
10	9.4	8.9
11	9.4	9.7
12	8.1	9.1

Exercise 7.2

Consider the bank cardholder data of Data Set C. Open the Excel workbook Exa8.6C.xlsx which contains this data from the Exercises folder. Assuming the data to be suitably distributed,

complete an appropriate test of whether the population mean income for males exceeds that of females and interpret your findings. What assumptions underpin the validity of your analysis, and how could you validate them?

Answer

The one-tail test shows that it is significant due to a p-Value of less than 0.05 which means the null hypotheses can be rejected meaning that the mean income for males is higher than females statistically.

t-Test: Two-Sample Assuming Unequal Variances

	<i>Male Income</i>	<i>Female Income</i>
Mean	52.91333333	44.23333333
Variance	233.1289718	190.1758192
Observations	60	60
Hypothesized Mean Difference	0	
df	117	
t Stat	3.267900001	
P(T<=t) one-tail	0.000711286	
t Critical one-tail	1.657981659	
P(T<=t) two-tail	0.001422572	
t Critical two-tail	1.980447599	

Dataset

Sex	Income
M	40.6
M	54.6
M	38.6
M	58.2
M	34.6
M	42.9
M	67.5
M	79.8
M	54.4
M	47.3
M	66.4
M	69.0
M	62.0
M	52.5
M	72.6
M	52.4
M	59.5
M	59.1
M	36.7
M	54.6

M	52.1
M	49.9
M	52.0
M	47.1
M	40.8
M	36.5
M	57.1
M	54.1
M	32.4
M	34.9
M	64.1
M	54.0
M	51.5
M	50.8
M	45.1
M	81.5
M	70.4
M	39.2
M	45.2
M	80.9
M	48.6
M	31.0
M	32.1
M	33.9
M	31.3
M	51.0
M	53.4
M	58.3
M	31.4
M	56.3
M	41.0
M	47.9
M	51.4
M	33.1
M	74.9
M	77.2
M	57.9
M	80.1
M	40.2
M	100.9
F	33.1
F	35.8
F	68.8
F	31.6
F	38.2
F	42.0
F	33.4
F	50.3
F	39.6
F	30.7

F	31.3
F	61.3
F	30.0
F	38.1
F	56.4
F	35.7
F	31.3
F	40.4
F	32.1
F	66.4
F	36.9
F	35.9
F	49.6
F	62.8
F	44.6
F	32.5
F	33.4
F	55.3
F	62.7
F	54.4
F	30.8
F	49.1
F	41.9
F	32.5
F	35.2
F	47.4
F	60.7
F	33.0
F	43.3
F	34.8
F	36.0
F	51.6
F	31.9
F	34.1
F	78.4
F	30.4
F	45.3
F	52.6
F	30.3
F	36.6
F	53.1
F	36.5
F	37.8
F	34.0
F	69.3
F	77.2
F	32.6
F	82.9
F	42.3
F	57.8

