# Statistical Exercises Unit 8 and 9

# Unit 8

## Exercise 8.4G

|  |  |  |
| --- | --- | --- |
| t-Test: Paired Two Sample for Means | |  |
|  |  |  |
|  | *Agent1* | *Agent2* |
| 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 |  |
| Difference in means | -0.433333333 |  |

The hypothesis tested was;

H0: the two-population means are equal.

H0: the two-population means are not equal. Our significance level was 0.05.

The results indicate that agent 1 and agent 2 had a mean of 8.25 and 8.683 respectively. Also, we obtained a t-stat= -3.2639 with 11 degrees of freedom.

Since our hypothesis was two-tailed, our p-value is 0.0075. Hence, since 0.0075 < 0.05, we shall reject the H0 and conclude that the two-population means are significantly different. Finally, the data show cases significant differences (-0.4333) between the two means with agent 2 being better than agent 1.

## Exercise 8.6C

|  |  |  |
| --- | --- | --- |
| F-Test Two-Sample for Variances | | |
|  | *Variable 1* | *Variable 2* |
| Mean | 52.91333333 | 44.23333333 |
| Variance | 233.1289718 | 190.1758192 |
| Observations | 60 | 60 |
| df | 59 | 59 |
| F | 1.225860221 |  |
| P(F<=f) one-tail | 0.21824624 |  |
| F Critical one-tail | 1.539956607 |  |
| Two-tailed p-value | 0.43649248 |  |
| F Critical two-tail | 3.079913215 |  |
| t-stat Two-tailed p-value | 0.00141947 |  |

According to the table above, males had a mean of (M= 52.913, S2= 233.129) while females had a mean of (M= 44.233, S2= 190.176). The observed F-statistic was 1.2259 with 59 and 59 degrees of freedom. The two-tailed p-value was 0.4365. Hence, the observed F-ratio was not statistically significant. The income dataset is therefore consistent with the assumption of equal variances between males and females which we validated by independent samples t-test with equal variances.

We therefore calculated the t-test two-tailed p-value, 0.0014, which was statistically significant at 5%. Hence, there is sufficient evidence to conclude that male’s mean income (M= 52.913, S2= 233.129) was greater than females (M= 44.233, S2= 190.176) at 5% by 52.913- 44.233= 8.680. Hence, males had higher income than females.

# Unit 9.

## Exercise 9.1D

According to the chart below, brand preference in Area 2 was least in brand A (21.1%) followed by brand B (33.3%). However, most respondents preferred other brands (45.6%). Hence, the patterns of brand preference in both areas is the same.

## Exercise 9.2E

According to the chart below, location A brand preference is increasing from absent to sparse to abundant while simultaneously decreasing for location B. This indicates that location B has a higher absenteeism than location A. However, location B has higher sparsity and abundance than location A.

## **Exercise 9.3B**

According to chart above, individuals who used Diet B depicted a normally distributed weigh loss. However, there was a slight positive skewness. Hence, we conclude that both diets followed a normally distributed weight loss with slight negative skewness in diet A and slight positive skewness in diet B.