Lesson X Practical Exercise

STUDENT NAME

School of Public Affairs: Pennsylvania State University

PADM 504, Section 001: Data Analysis for Policy and Administration

Professor Lauren Azevedo

DATE

**Purpose**

Orient the reader to the purpose of your analysis. Provide the research question and how you are answering it.

**Method**

**Equality of two variance (F-test)**

An F-test (Snedecor and Cochran, 1983) is used to determine if two populations' variances are equal. This test can be either two-tailed or one-tailed. The two-tailed version compares the variances against the alternative that they are not equal. The F hypothesis test is defined as,

: vs :

Where, are population variance of two groups.

The test statistics for this test procedure is,

F = ~ if is true.

Where, are sample variance of two groups.

The F test indicates that there is enough evidence to reject the null hypothesis that the two group variances are equal at the 0.05 significance level if the p-value of the corresponding F statistic is less than 0.05 (significance level).

**Independent sample t-test**

The independent sample t-test is a statistical technique used to compare the means of two independent groups. By using the independent samples t-test, we may take two samples from the same population and compare their means. When samples are taken from two different populations, the sample mean may differ. It is utilized in this situation to draw inferences about the means of two populations and to determine whether they are similar.

**Assumptions in independent samples t-test:**

1. Assumes that the dependent variable is normally distributed.
2. Observations are independent of each other.

The t test hypothesis is,

(The means of the two groups are not significantly different)

(The means of the two groups are significantly different)

Where, are two populations mean.

If the variance of the two groups is equal, then the test statistic for the above hypothesis is defined as,

t = ~ if the is true.

Where, = is the pooled variance of two sample and are sample means of two groups.

If the variance of the two groups is not equal, then the test statistic for the above hypothesis is defined as,

t = ~ if the is true.

where, v = .

The t test indicates that there is enough evidence to reject the null hypothesis that the two group means are equal at the 0.05 significance level if the p-value of the corresponding t statistic is less than 0.05 (significance level).

Missing value

In the presence of missing value, t-test can provide misleading result. The missing values are excluded using R programming language (version 4.2.2) for the purpose of correct result.

**Results**

To compare the workers who feel respected by their supervisors are less likely to express that they are considering leaving their organization within the next year, firstly, it should be determined that the variance of the two groups are equal or not. Based on the result of variance test, independent sample t test should be performed. A same procedure will be followed to compare the workers who satisfied with their payment are less likely to express that they are considering leaving their organization within the next year.

Table-01: F test to compare two variances

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Variables | Considering leaving the organization within the next year | Variances | df | F statistic | p-value |
| My supervisor treats me with respect. | No | 0.67 | 464 | 0.54561 | 0.0000\*\*\* |
| Yes | 1.22 | 269 |  |  |
| Satisfy with your payment | No | 1.20 | 464 | 0.79899 | 0.0359\* |
| Yes | 1.50 | 269 |  |  |

Note: \*\*\*p-value < 0.0001. \*\*p-value < 0.01. \*p-value < 0.05.

It is observed from the above table that the variance of the “My supervisor treats me with respect” in two different groups, such as, those who are not considering for leaving the organization & those who are considering for leaving the organization is significantly different at 5% level of significance. Similarly, the variance of the “Satisfy with your payment” is also significantly different in two groups at 5% level of significance.

Since it is obtained that the variance of the two groups is significantly different at 5% level of significance, independent sample t-test with unequal variance should be used to compare the workers who feel respected by their supervisors are less likely to express that they are considering leaving their organization within the next year and to compare the workers who satisfied with their payment are less likely to express that they are considering leaving their organization within the next year.

Table-02: Two sample t-test for equality of two groups.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Variables | Considering leaving the organization within the next year | Means | t statistic | df | p-value |
| My supervisor treats me with respect | No | 4.37 | 5.0171 | 440 | 0.0000\*\*\* |
| Yes | 3.99 |  |  |  |
| Satisfy with your payment | No | 3.86 | 8.6776 | 512 | 0.0000\*\*\* |
| Yes | 3.08 |  |  |  |

Note: \*\*\*p-value < 0.0001. \*\*p-value < 0.01. \*p-value < 0.05.

It is observed from the above table that mean of the “My supervisor treats me with respect” in two different groups, such as, are not considering for leaving the organization & considering for leaving the organization is significantly different at 5% level of significance. That means, those who are not considering for leaving the organization get more respect from the supervisor than those who are considering for leaving the organization.

Again, it is also observed from the above table that mean of the “Satisfy with your payment” in two different groups, such as, are not considering for leaving the organization & considering for leaving the organization is significantly different at 5% level of significance. That means, those who are not considering for leaving the organization is satisfied with their payment than those who are considering for leaving the organization.

**Discussion and Policy Implications/Recommendations**

Most of the practical exercises ask you to offer policy implications or recommendations based on your findings. First discuss the overall meaning of your analysis and then present your policy implications and recommendations to the reader.

**References** (if used)