Reflection

Science, Statistics

Reflection A) The steps in testing a research hypothesis can be described as per the following. a) Describing the research question b) Specifying thenull and alternative hypothesis with a significance level

c) Computing test statistic

d) Finding probability of test statistic or rejection region

e) Analyzing findings or deriving conclusion

B)

Comparing the Means of Two or More Groups

It could begin with formulating null and alternative hypothesis in its simplest form

H0 : $\mu 1 = \mu 2$

H1: $\mu 1 \neq \mu 2$

When samples are related:

Before going ahead for hypothesis testing between two sample means, it is required to find whether the samples are related in some way. If a relation exists, then they are dependent samples and the data of both the samples could be paired and the hypothesis test of two dependent means can be found through the student t-distribution.

When samples are not related:

If the samples are not related or independent to each other then the pertinent question is whether the variances of both populations are known. If the population variance is known and the sample size is greater than 30, then the z-test can be conducted.

When variances of both populations are not known:

In the above circumstances, an F-test on the sample variances can be conducted.

C)

Calculating the Correlation between Two Variables

It is often required to compute correlation between two variables. Whether they are related or not can be defined through correlation coefficient. It is a ratio and not a percentage. Mathematically, for two variables x and y, it can be defined as (Correlation between Variables, 2012)

$\rho = Sxy / (\sqrt{SxxSyy})$

Where, Sxx, Sxy, and Syy are derived as per the following equation.

$Sxx = \Sigma x2 - (\Sigma x)2/n$

$Sxy = \Sigma xy - (\Sigma x)(\Sigma y)/n$

$Syy = \Sigma y2 - (\Sigma y)2/n$

Here, n is number of data points.

(Correlation between Variables, 2012)

Interpreting the Results

It should be noted that correlation coefficient is always between -1. 0 and +1. 0. When the correlation coefficient is close to -1. 0, it implies that a strong negative linear relationship between x and y exists. That is to say, when x decreases, y will increase. When the correlation coefficient is close to zero, there is either a weak or no relationship exists between x and y. When the correlation coefficient is near to +1. 0, it is an indication of strong positive linear relationship between x and y. That is to say, with the decrease in x, y will also decrease.

References

Correlation between Variables, (2012). Retrieved January 19, 2013 from http://pirate. shu. edu/~wachsmut/Teaching/MATH1101/Relations/correlation. html

Tests Comparing Two Means (2012). Retrieved January 19, 2013 from http://mips. stanford. edu/courses/stats_data_analsys/lesson_5/234_7_b. html