Analysis of Two-Way Tables

Two-way tables are used in statistical analysis to summarize the relationship between two categorical variables. Two-way tables are also known as contingency, cross-tabulation, or crosstab tables. The levels of one categorical variable are entered as the rows in the table and the levels of the other categorical variable are entered as the columns in the table.

 Contingency tables are especially helpful for figuring out whether events are dependent or independent.

In order to determine whether there is a significant association between the two variables a chi-square test for independence is conducted.

The assumptions of the Chi Square Test of independence are:

1. The sampling method is simple random sampling.
2. The variables under study are each categorical.
3. The expected frequency count for each cell of the table is at least 5.

Hypothesis:

Basically, the Null hypothesis assumes that there is no association between the two variables; the alternative hypothesis assumes that there is an association between the two variables.

Ho: Variable A and Variable B are independent.

Ha: Variable A and Variable B are not independent.

General Form of a Two-Way (Contingency) Table Analysis: A Test for Independence

Test Statistic: Chi- Square:

$$\chi_c^2 = \sum \frac{[n_{ij} - \hat{E}_{ij}]^2}{\hat{E}_{ij}}$$

Where,

$$\hat{E}_{ij} = \frac{R_i C_j}{n}$$

Statdisk.org:

Analysis, choose Contingency Table, reproduce the table using the appropriate number of columns and rows, choose significance level, Select the columns to include in the analysis, and hit Evaluate.

TI83, TI84:

2nd Matrix, choose EDIT matrix A, hit enter, update the number of rows by columns, enter the data.
2nd Quit. Press STAT, TESTS, X^2 – TEST, Calculate.

Casio 9750 GII:

F3 for TEST, F3 for CHI, F2 for 2WAY, F2 for MAT, F3 for DIM, update rows by columns, EXE, update data, press EXIT twice, hit EXE and you have the results.