

Crosstab on Minitab (Categorical Data Analysis I) Crosstabs

A clinical trial is conducted to evaluate a diagnostic screening test designed to detect chromosomal fetal abnormalities. Chromosomal fetal abnormalities are confirmed using amniocentesis. The diagnostic test is performed on a random sample of 200 pregnant women, who later undergo an amniocentesis. The following 2 x 2 cross-tabulation table summarizes the data:

| Amniocentesis | Diagnostic Test | | Total |
|--------------------|-----------------|----------|-------|
| | Positive | Negative | |
| Abnormal(Disease) | 14 | 6 | 20 |
| Normal(No Disease) | 64 | 116 | 180 |
| Total | 78 | 122 | 200 |

Entering the data

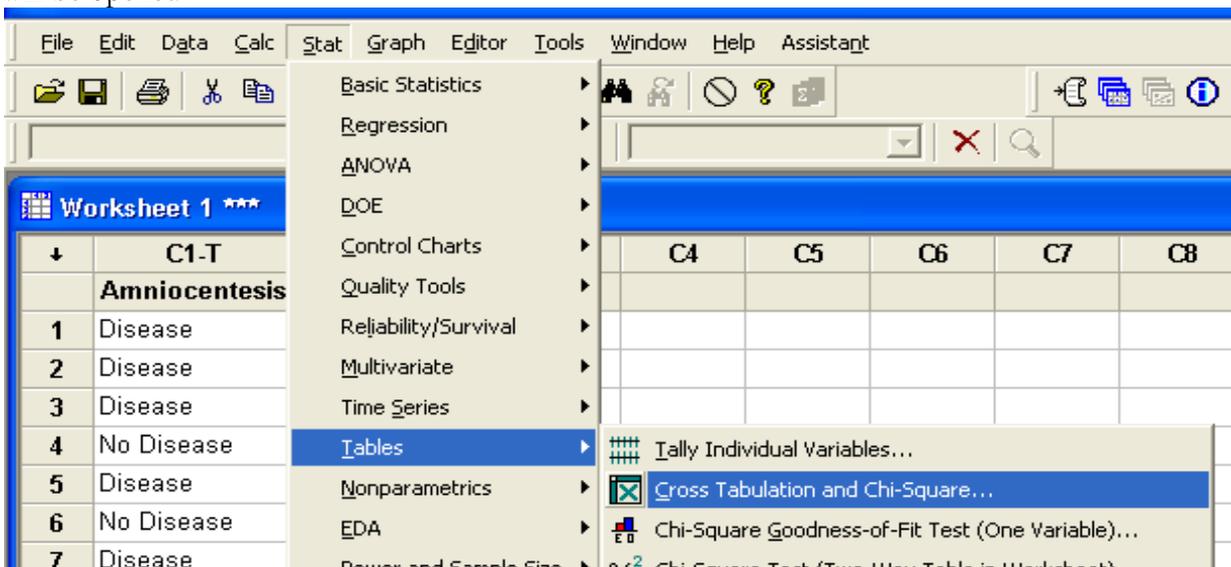
A sample the data entry is shown below. The data is also available at U:_MT Student File Area\hjkim\STAT380\Minitab tutorial\chromosomalabnormalities.mtw.

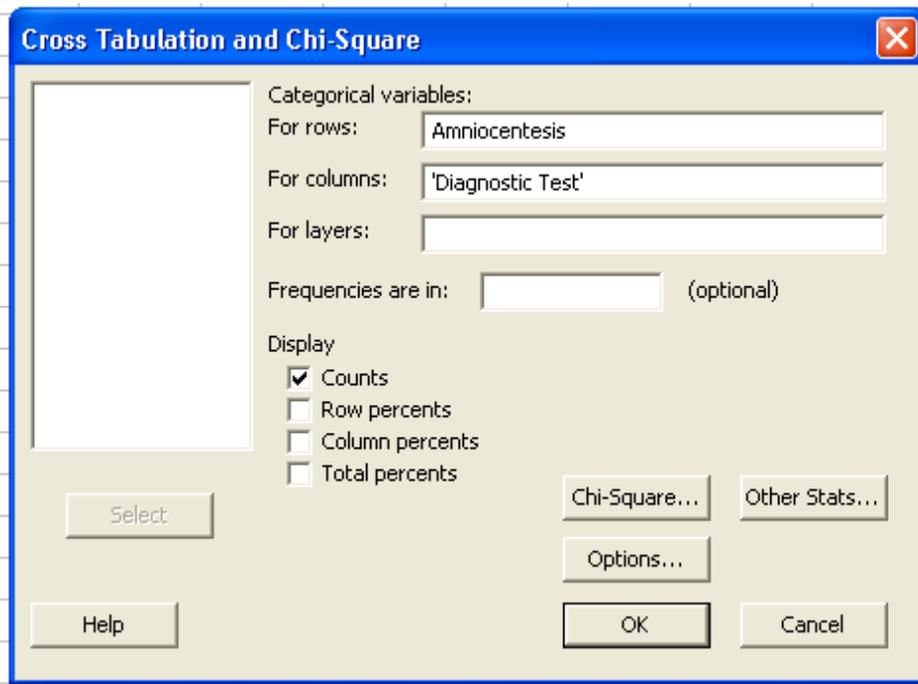
| | C1-T | C2-T |
|---|---------------|-----------------|
| | Amniocentesis | Diagnostic Test |
| 1 | Disease | Positive |
| 2 | Disease | Negative |
| 3 | Disease | Positive |
| 4 | No Disease | Positive |
| 5 | Disease | Positive |
| 6 | No Disease | Negative |
| 7 | Disease | Negative |

Creating a Cross-Tabulation Table

In applications involving discrete variables, cross-tabulation tables are often constructed to display the data. Cross-tabulation tables are also called R×C (“R by C”) tables, where R denotes the number of rows in the table and C denotes the number of columns.

By clicking on the **Stats** and **Tables** and **Cross Tabulation and Chi-Square**, the crosstabs window will be opened.





We then move the variables into the appropriate areas (For rows or For columns) and click Ok. The cross tabulation table will appear in the output window. This is the simplest thing we can do with crosstabs.

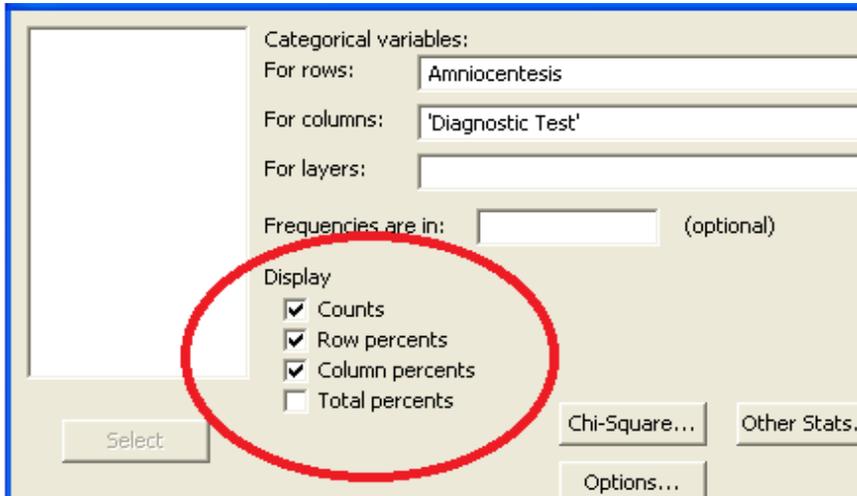
Tabulated statistics: Amniocentesis, Diagnostic Test

Rows: Amniocentesis Columns: Diagnostic Test

| | Negative | Positive | All |
|------------|----------|----------|-----|
| Disease | 6 | 14 | 20 |
| No Disease | 116 | 64 | 180 |
| All | 122 | 78 | 200 |

Cell Contents: Count

Using the checklist under “Display” in the Cross Tabulation and Chi-Square window, clicking Row and Column percents...



The following cross tabulation table will appear in the output window.

Tabulated statistics: Amniocentesis, Diagnostic Test

Rows: Amniocentesis Columns: Diagnostic Test

| | Negative | Positive | All |
|------------|------------------------|-----------------------|-------------------------|
| Disease | 6 30.00 4.92 | 14 70.00 17.95 | 20 100.00 10.00 |
| No Disease | 116 64.44 95.08 | 64 35.56 82.05 | 180 100.00 90.00 |
| All | 122 61.00 100.00 | 78 39.00 100.00 | 200 100.00 100.00 |

Cell Contents: Count
% of Row
% of Column

The circled figure will tell us what the numbers in each cell mean. Here, the sensitivity = $P(\text{Positive test} | \text{Disease}) = 14/20$, which is 70%. This is the Row Percent in the top left cell of the table. The specificity = $P(\text{Negative test} | \text{No disease}) = 116/180$, which is 64.4%. This is the Row Percentage of the bottom right cell of the table.