

Instructions for carrying out statistical procedures and tests using Minitab

These instructions are closely linked to the author's book:

Essential Statistics for the Pharmaceutical Sciences
John Wiley & Sons Ltd <http://eu.wiley.com>
2007
ISBN: 978-0-470-03468-2

For all references to chapters or tables, see the above book.

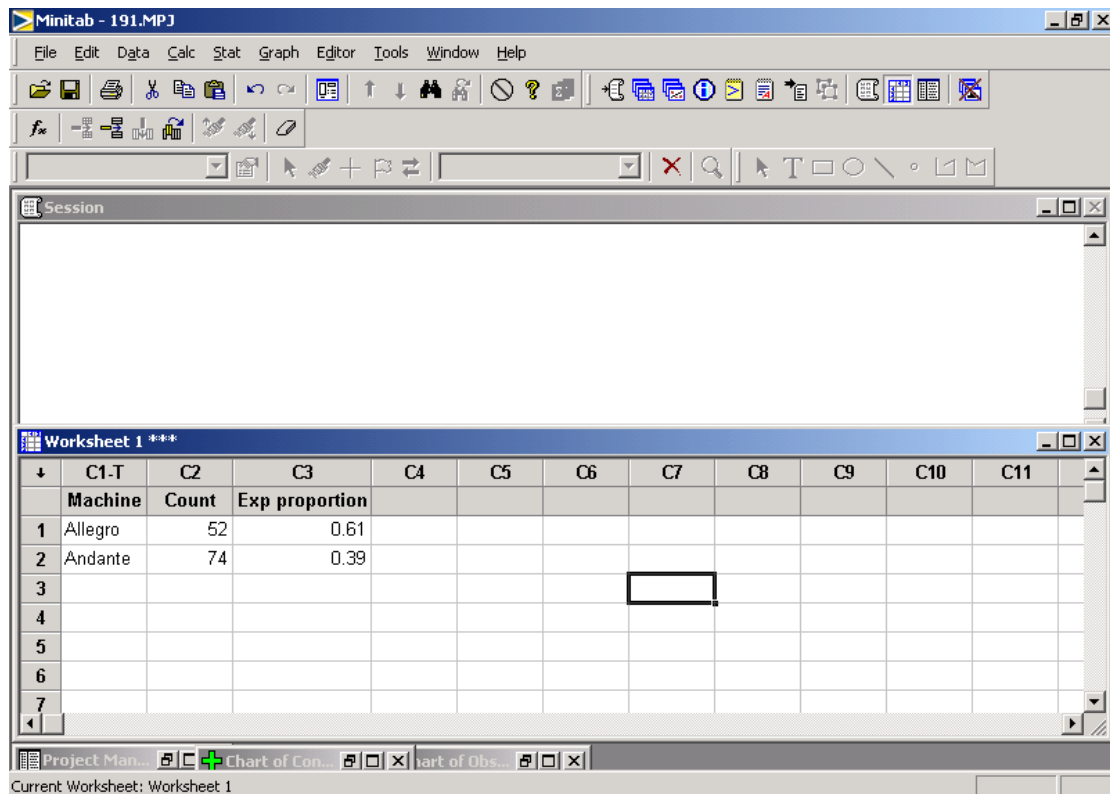
Using Minitab to perform a goodness-of-fit chi-square test

Using Minitab to perform a goodness-of-fit chi-square test

For example considered, see Section 15.2.3 of book

Two machines ('Allegro' and 'Andante') produce 61% and 39% of a factory's output of pressurised drug canisters. Returned faulty canisters consist of 52 made on Allegro and 74 on the Andante machine. Is there evidence of a disproportionately high rate of returns from the Andante machine relative to the Allegro?

The data is entered into Minitab as below, with a column showing the actual counts observed (C2) and the proportions that would be expected based on a null hypothesis that the two machines produce equally reliable canisters (C3). Column 1 containing labels is useful but not essential.



The screenshot shows the Minitab interface with a worksheet containing the following data:

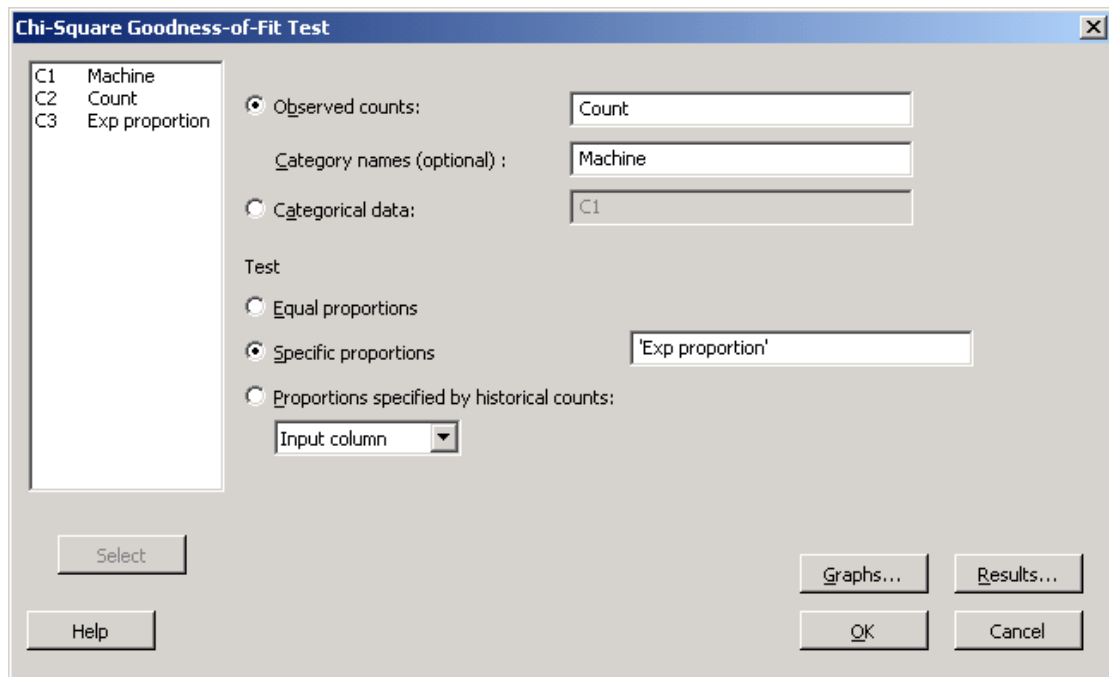
	C1-T	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11
	Machine	Count	Exp proportion								
1	Allegro	52	0.61								
2	Andante	74	0.39								
3											
4											
5											
6											
7											

Follow the menus:

Stat / Tables / Chi-Square Goodness-of-Fit Test (One Variable) ...

- 1) Enter the column containing the actual numbers of returned canisters in the 'Observed counts' box
- 2) Enter the column containing the names of the machines in the 'Category names' box
- 3) Select the 'Specific proportions' button to indicate that we will supply the expected proportions and enter the name of the column containing the relevant proportions into the box that appears.

Window should then appear as ...



The output will be:

Chi-Square Goodness-of-Fit Test for Observed Counts in Variable: Count				
Using category names in Machine				
		Test		Contribution
Category	Observed	Proportion	Expected	to Chi-Sq
Allegro	52	0.61	76.86	8.0408
Andante	74	0.39	49.14	12.5767
N	DF	Chi-Sq	P-Value	
126	1	20.6176	0.000	

The P value is provided on the last line and is significant (<0.001). The chi-square value and P value agree with those manually calculated in the book in Table 15.2.

Note that Minitab only provides the P value without the Yates correction. The above analysis concerns a situation with only two categories and many would have preferred the corrected value (See Section 15.2.4 in book) which is not available.