

## 15.3.11: Chapter 12 Lab

### Chi-square tests for categorical data

Open MINITAB file lab11.mpj from the website.

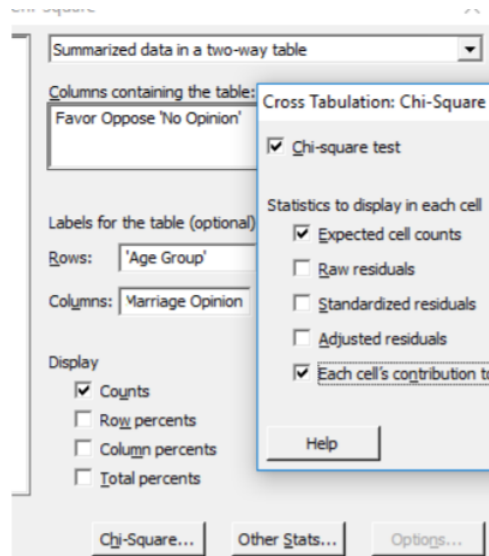
1. A sample of motor vehicle deaths for a recent year in Montana is broken down by day of the week. Test the claim that fatalities occur with equal frequency on the different days ( $\alpha = 5\%$ ).

Sun	Mon	Tue	Wed	Thu	Fri	Sat
35	21	22	18	23	29	45

- a. State the null and alternative hypotheses in words.
  - b. State the null and alternative hypotheses in population parameters.
  - c. What model are you choosing and what assumptions are needed?
  - d. The data is in the first 2 columns of the Minitab worksheet. Conduct the test at a significance level of 5%, using MINITAB command: **Stat>Table > Chi Square Goodness of Fit**. Set the Observed Counts to the column you just entered and choose Equal Proportions. Paste the results here.
  - e. Do you reject or fail to reject  $H_0$ ? Then state your conclusion in the context of the problem.
2. Pew Research conducted a poll of 2000 American adults asking whether they Favor or Oppose same-sex marriage. The data is summarized in the two-way table shown below. Conduct a hypothesis test to determine if Americans' opinions about same-sex marriage are age related?

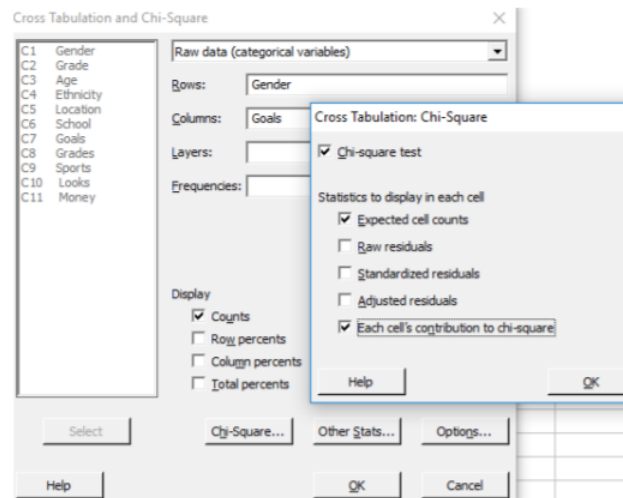
	Favor	Oppose	No Opinion
Age 18-29	311	104	35
Age 30-49	371	208	71
Age 50-65	259	237	54
Age 65+	140	179	31

- a. Before conducting the test, determine the percentage in each group that supports same sex marriage. Describe the trend.
- b. Now we will conduct the test. State the null and alternative hypotheses.
- c. What model are you choosing and what assumptions are needed?
- d. The table above has been entered in columns 4 to 7 of the Minitab file. Conduct the test at a significance level of 1%, using MINITAB command: **Stat>Table > Crosstabulation/Chi Square**. Choose Summarized Data. Highlight columns that contain the table. Paste the results here.



e. Do you reject or fail to reject  $H_o$ ? Then state your conclusion in the context of the problem.

For questions 3 and 4, the popular data starts in column 9. Use the **MINITAB command Stat>Table > Crosstabulation**. Choose Raw Data. To run the Chi Square test of independence, Click Chi-square and check the options as shown. Run these tests at a significance level of 5%.



3. Test for dependence between location and goal for elementary school students.
  - a. State the null and alternative hypotheses.
  - b. Run the test and paste the results here.
  - c. Do you reject or fail to reject  $H_o$ ? Then state your conclusion in the context of the problem.
4. Test for dependence between gender and goal for elementary school students.
  - a. State the null and alternative hypotheses.
  - b. Run the test and paste the results here.
  - c. Do you reject or fail to reject  $H_o$ ? Then state your conclusion in the context of the problem.

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