

Chi-square for Goodness of Fit

Suppose it is known that in a particular community the residents in the past have typically voted 2/3rds (i.e. .67) for the Republican Party Candidate and only 1/3rd (i.e. .33) for the Democratic Party Candidate. Suppose that due to a set of political circumstances you believe that the voting preferences in that community are going to be altered and will no longer be 2/3rds Republican. To find out you take a survey of a random sample of 18 people from the community and ask them how they intend to vote. You ask them to check whether they intend to vote Republican in the upcoming election (scored as a 1) or whether they intend to vote Democratic (scored as a 2). You record your data and obtained the following results.
(1,2,2,2,1,2,2,1,1,2,2,2,1,1,2,2,2,2).

1. Logon to system
2. **Click Start > Programs > SPSS for Windows > SPSS 10.1 for Windows.** At this point a window will appear asking you what you would like to do. Click on the circle next to Type in Data (2nd option in list) and then click **OK** at the bottom of the window.
3. A Data Editor will appear. Look in the lower left corner of the screen. You should see a **Data View** tab and to the right of it a **Variable View** tab. The **Variable View** tab will be used first for the **Data Definition** Phase of creating a data file. The **Data View** tab will be used to actually enter the raw numbers listed above. (See pages 1-3 for a more detailed explanation of creating data files.)

DATA DEFINITION PHASE

4. Click on the **Variable View** tab in the lower left corner. A new screen will appear with the following words at the top of each column.
Name Type Width Decimals **Label** **Values** Missing Columns Align Measure
5. Click on the white cell in **Row 1** under the word **Name** and type in the word **Party**
6. Click on the white cell in **Row 1** under the word **Label** and type in **Political Party**. (Doing this will provide you with a more expansive label in the results output).
7. Click on the white cell in **Row 1** under the word **Value**. The word none will appear along with a small grey box to the right.
 - a. Click on the small grey box and a Value Labels window will appear
 - b. Click on the white box next to the word **Value**, type in the number **1**
 - c. Click on the white box next to the word **Value Label** and type in **Republican**
 - d. Click on **Add** button: 1 = "Republican" will appear in bottom white box
 - e. Click on the white box next to the word **Value**, type in the number **2**
 - f. Click on the white box next to the word **Value Label** and type in **Democrat**
 - g. Click on **Add** button: 2 = "Democrat" will appear in bottom white box also
 - h. Click on **Ok**

DATA ENTRY PHASE

8. Click on the **Data View** tab in the lower left corner. The data **view** screen will now appear with Column 1 named **Party** (for Political Party).
9. Enter the data for each of the 18 participants as follows. Mouse to the top cell under the first column which is party and enter the numbers straight on down the column.

1
2

2
2
1
2
2
1
1
2
2
2
1
1
2
2
2
2

Data Analysis

1. Click **Analyze** at top of screen then
 - a. Click on **Non-Parametric** Tests then
 - b. Click on **Chi-Square**
2. Highlight **Party** by clicking on it then
 - a. Click on **arrow >** to transfer this name to the **Test Variable List** box
3. Click **Circle** adjacent to **Values** in the Expected Values box. A dot will appear in circle
4. Click white square next to **Value** then
 - a. Type in **.67** then
 - b. Click **add** button then
 - c. Type in **.33** then
 - d. Click **add** button
5. Click **Options** button then
 - a. Click white square next to **descriptives**
 - b. Click **continue** button
6. Click **Ok**. The analysis will be conducted with the results below.

The .67 and the .33 are expected values if the null hypothesis is true. These value will change depending on the specific null hypothesis of the problem.

political party

	Observed N	Expected N	Residual
Republican	6	12.1	-6.1
Democrat	12	5.9	6.1
Total	18		

Test Statistics

	Political Party
Chi-Square ^a	9.227
df	1
Asymp. Sig.	.002

a. 0 cells (.0%) have expected frequencies less than 5. The minimum expected cell frequency is 5.9.

7. For the problem above the null and alternative hypothesis are spelled out below:

H_{null}: There will be no change in the proportion of people voting Republican and Democrat. In other words, the proportion of people voting Republican and Democrat will respectively be .67 and .33.

H_{alt}: There will be a change in the proportion of people voting Republican and Democrat. The proportion of people voting Republican and Democrat will no longer be .67 and .33 respectively.

8. **Interpretation and APA writing template for Results Above:**

A Chi-square goodness of fit test was conducted to determine whether the political party voting preferences of people in the community had changed. Results of the analysis indicated that a shift in voting preference had occurred with a larger proportion of people now voting for the Democratic party candidate, $\chi^2(1) = 9.22, p < .05$.