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LESSON 17 - CONTINGENCY TABLES

In this lesson we will learn how to have Minitab do the computations necessary to do a chi-square test on a contingency table. As an example we will do Problem 23 on page 575. We will let Minitab do the computations for us, then write up the result using the classical approach.

Type the contingency table into C1, C2, and C3 in the data window. Since we have no way of putting in row titles, we will dispense with the column titles also in this case. Now clear the Session Window below the date/time stamp then type your name, Lesson 17, and Example. Now click on Stat > Tables > Chi-square Test (Two-Way Table in Worksheet). Select C1, C2 and C3 into the box labeled "Columns containing the table:" and click on "OK". The results are shown below.

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----- 7/21/2007 1:02:02 PM -----
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Lesson 17
Example

Chi-Square Test: C1, C2, C3

Expected counts are printed below observed counts
Chi-Square contributions are printed below expected counts

      C1      C2      C3      Total
1      47      44      50      141
  47.00  47.00  47.00
  0.000  0.191  0.191

      17       9      16      42
  14.00  14.00  14.00
  0.643  1.786  0.286

      36      47      34      117
  39.00  39.00  39.00
  0.231  1.641  0.641

Total    100     100     100     300

Chi-Sq = 5.610, DF = 4, P-Value = 0.230
```

Notice that the expected value for each cell is typed below the observed value, but not in parentheses as is customary. Below that appears the quantity $(O - E)^2/E$ for each cell. The row and column totals for the observed values and the overall total appear where we would expect them. The chi-square value, the degrees of freedom, and the P-Value are listed at the bottom. When writing up the 5-step classical method, use what you need of this information for the "For our Sample" step, but make it look the way we learned to do it in class. An example of the write-up for this problem is on the next page.

SAMPLE WRITE-UP

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 July 20, 2007
 Lesson 17
 Example

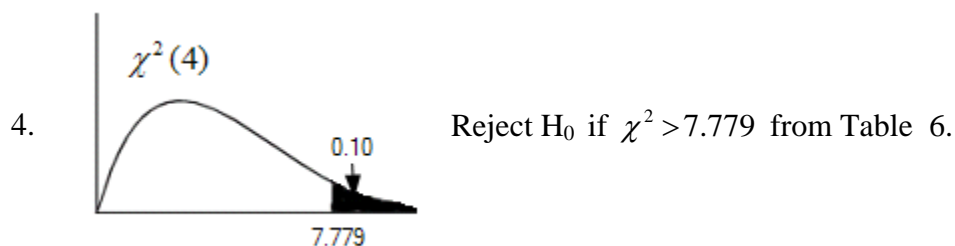
Variables: Rows = Coauthorship.
 Columns = Subject matter.

1. H_0 : Co-authorship and subject matter are independent.
 H_a : The subject matters are dependent on Co-authorship.
2. $\alpha = 0.10$
3. Assume H_0 is true.

For our sample:

	Engineering	Psychology	Biology	
Coauthored	47 (47)	44 (47)	50 (47)	141
Internationally coauthored	17 (14)	9 (14)	16 (14)	42
Not coauthored	36 (39)	47 (39)	34 (39)	117
	100	100	100	300

$$\chi^2(4) = 5.610$$



5. Decision: Since χ^2 is not greater than 7.779, we fail to reject H_0 .
 Conclusion: There is not a significant relationship between co-authorship and subject matters at the 0.10 level of significance.

MINITAB ASSIGNMENT 17

See instructions on page 8.

1. Do Problem 18 on page 573 as the example was done above.

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