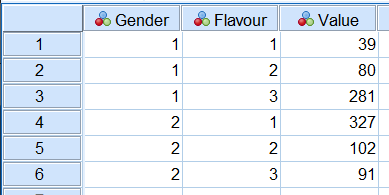
**Homework III**

**Test for Row-Column Independence and Homogeneous**

İbrahim Burak Tanrıkulu 21827852 V101(CX)

1) In this example, we seek to determine whether or not there is an association between gender and preference for ice cream flavour. The data come from a hypothetical survey of 920 people that ask for their preference of ice cream flavours. Test whether the claim is true at significance level 0.05 .

Input data:



H0: There is an association between gender and preference for ice cream flavour.

H1: There isn’t an association between gender and preference for ice cream flavour.

OUTPUTS:

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Gender \* Flavour Crosstabulation** | | | | | | |
|  | | | Flavour | | | Total |
| Chocolate | Vanilla | Strawberry |
| Gender | Men | Count | 39 | 80 | 281 | 400 |
| Expected Count | 159,1 | 79,1 | 161,7 | 400,0 |
| % within Gender | 9,8% | 20,0% | 70,3% | 100,0% |
| % within Flavour | 10,7% | 44,0% | 75,5% | 43,5% |
| % of Total | 4,2% | 8,7% | 30,5% | 43,5% |
| Women | Count | 327 | 102 | 91 | 520 |
| Expected Count | 206,9 | 102,9 | 210,3 | 520,0 |
| % within Gender | 62,9% | 19,6% | 17,5% | 100,0% |
| % within Flavour | 89,3% | 56,0% | 24,5% | 56,5% |
| % of Total | 35,5% | 11,1% | 9,9% | 56,5% |
| Total | | Count | 366 | 182 | 372 | 920 |
| Expected Count | 366,0 | 182,0 | 372,0 | 920,0 |
| % within Gender | 39,8% | 19,8% | 40,4% | 100,0% |
| % within Flavour | 100,0% | 100,0% | 100,0% | 100,0% |
| % of Total | 39,8% | 19,8% | 40,4% | 100,0% |

43,5% of people are men and 56,5% of people are women.

40,4% of people who are prefer strawberry flavoured ice cream.

39,8% of people who are prefer chocolate flavoured ice cream.

19,8% of people who are prefer vanilla flavoured ice cream.

Men prefer strawberry flavoured ice cream with 70,3% percentage.

Women prefer chocolate flavoured ice cream with 62,9% percentage.

35,5% of people who are women and prefer chocolate flavoured ice cream.

30,5% of people who are men and prefer strawberry flavoured ice cream.

9,9% of people who are women and prefer strawberry flavoured ice cream.

4,2% of people who are men and prefer chocolate flavoured ice cream.

89,3% of who prefer chocolate flavoured ice cream are women.

75,5% of who prefer strawberry flavoured ice cream are men.

56,0% of who prefer vanilla flovoured ice cream are women.

Men prefer strawberry flavoured ice cream more than expected

Men prefer chocolate flavoured ice cream less then expected.

Women prefer chocolate flavoured ice cream more then expected.

Women prefer strawberry flavoured ice cream less then expected.

|  |  |  |  |
| --- | --- | --- | --- |
| **Chi-Square Tests** | | | |
|  | Value | df | Asymptotic Significance (2-sided) |
| Pearson Chi-Square | 316,050a | 2 | ,000 |
| Likelihood Ratio | 347,793 | 2 | ,000 |
| Linear-by-Linear Association | 315,663 | 1 | ,000 |
| N of Valid Cases | 920 |  |  |
| a. 0 cells (0,0%) have expected count less than 5. The minimum expected count is 79,13. | | | |

Since 0 cells(0,0%) have expected count less than 5, also we have large sample size.

We will use Pearson Chi-Square Test.

Results give p-value=0,000 < 0.05 ( or = 316,050 > = 5,99) .

Gender and flavour are not independent. So H0 cannot be rejected. There is an association between gender and preference for ice cream flavour at the 0.05 significance level.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Symmetric Measures** | | | | | |
|  | | Value | Asymptotic Standard Errora | Approximate Tb | Approximate Significance |
| Nominal by Nominal | Phi | ,586 |  |  | ,000 |
| Cramer's V | ,586 |  |  | ,000 |
| Contingency Coefficient | ,506 |  |  | ,000 |
| Ordinal by Ordinal | Kendall's tau-b | -,556 | ,024 | -23,369 | ,000 |
| Kendall's tau-c | -,623 | ,027 | -23,369 | ,000 |
| Gamma | -,817 | ,022 | -23,369 | ,000 |
| N of Valid Cases | | 920 |  |  |  |
| a. Not assuming the null hypothesis. | | | | | |
| b. Using the asymptotic standard error assuming the null hypothesis. | | | | | |

Both gender and flavour variables are nominal.

We can look Cramer’s V (58,6%) or Contingency Coefficient (50,6%) values

also p value=0,000<0.05.

It could be mentioned that there is strong relationship between gender and flavour.