

Exercise 14

Analysis of Two-Way Tables

Students in grades 4-6 in selected schools in Michigan (USA), were asked what they would most like to do at school. There were three possibilities:

1. make good grades
2. be good at sports
3. be popular

These outcomes are given in the column Goal. The children came from rural, suburban and urban areas, this is indicated in the column Area. We investigate whether there is a relationship between area and goal.

(Reference: Chase, M. A., and Dummer, G. M. (1992), "The Role of Sports as a Social Determinant for Children," *Research Quarterly for Exercise and Sport*, 63, 418-424. Downloaded from *The Data and Story Library*, see <http://lib.stat.cmu.edu/DASL/>)

Download the table students.sav from: http://www.let.rug.nl/~heeringa/statistics/stat03_2013/ and load the table in SPSS.

1. Make a pie graph per area which shows the proportions of the three different goals. Would you expect a relationship between area and goal? Why?
2. Analyze the relationship between area and goal. Create a contingency table with both the observed and the expected counts. We expect that area determines the goal. Therefore the rows should represent area and the columns should represent Goal. Perform both the Chi-square test and Fisher's exact test. Cramer's V should also be obtained. Create also a clustered bar graph where for each area three bars are shown, each bar representing the counts of the goal.
3. What does the bar graph tell you?
4. Look at the table *Area * Goal Crosstabulation*. Does our data meet the assumptions of a chi-square test? Why or why not?
5. Look at the table *Chi-square tests*. Consider both the results of the chi-square test and Fisher's exact test. What do you conclude?
6. Look at the table *Symmetric Measures*. Report Cramer's *V*.