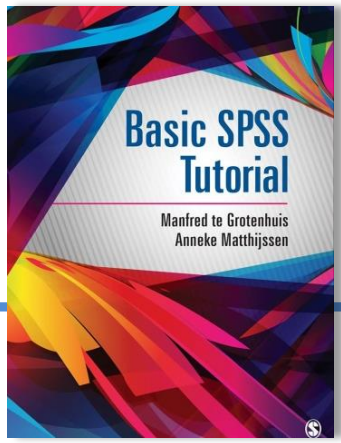
Basic SPSS Tutorial: chapter 5 Inferential Statistics, extra assignments



This is a third set of extra assignments (1-8) related to inferential statistics in *Basic SPSS Tutorial*. All computer related operations are placed in a blue-shaded box with the 💻 symbol. References to Basic SPSS Tutorial are indicated with BST.

In the previous series of assignments the mean difference between two independent groups was statistically tested. However, quite often researchers like to compare the means of three or more independent groups. One of the research questions then may be whether all group means are equal or not (with 'not' we mean that at least one mean differs from all the others). For instance it is quite conceivable that in India the mean life expectancy within social classes (so called 'castes') even today differs. Another example is that the mean number of children per family differs across educational levels within African countries like Mali.

To statistically test whether the means of three or more independent groups differ from each other, the 'analysis of variance' (ANOVA) is often used. Most central statistical measurement within this type of analysis is the F-test. The larger the F-value, the more the data differ from the null hypothesis, which states that all group means are equal in the population.

This time the research question is about traditional family values, like the importance of being married. The idea is that these family values are not found equally important across four religious groups. To determine these religious groups, we use the attendance of religious services. The first group does not attend religious services, the second group attends church once a year on average, the third group consists of monthly church attendees, while the last group attends religious services on a weekly basis. It seems safe to hypothesize that across these four groups we will find mean differences with regard to the importance of family values. More specifically, one may expect that weekly attendees deem these values most important, while monthly churchgoers find it less important, yearly attendees might find it even less important while people who never go to church (i.e., the non-affiliated) find family values least important. To test these hypotheses we use a random sample from the Netherlands taken in 1995.

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Download the data set FAMILY.SAV from the web page: http://study.sagepub.com/basicspss.
Start SPSS and open FAMILY.SAV (BST: section 2.2).
Open also a text file in the program Word or any other word processor where you store your answers to the questions below.

Take a look at the mean score on the variable *Family* for each of the four categories of the variable *Church_attendance*. (Tip you may use a frequency table and check the mean and the variance (see BST: section 4.2) after you split the data (BST: section 3.5). You may also use Analyse → Compare Means → Means… and use *Church_attendance* as independent variable.

1. Which group finds traditional family values most important on average and which group finds it the least important? (Note that a high score on *Family* indicates high importance).

Create box plots (BST: section 4.4) which show the distribution of the variable *Family* for all four categories of *Church_attendance*. (Make sure that the x-variable (i.e., church attendance is on the x-axis).

2. According to the box plots, how would you describe the relationship between church attendance and traditional family values?

Use SPSS to do a ANOVA analysis with *Family (dependent variable)* and *Church Attendance* (independent variable), see BST: section 5.6.

5. How large is the within variance (in SPSS it is called 'Within Groups') and how large is the between variance (SPSS: 'Between Groups')?

6. When we divide the between variance by the within variance we get the F-value (BST: Table 5.6). The larger this F-value is, the more the group means differ. How large is F and – more importantly – is this a significant outcome when we use a level of significance of .05? Please explain.

7. What is the final conclusion: is it likely that all categories of church attendance find traditional family values equally important? Please explain on which information your answer is based.

In BST (section 5.6) we briefly describe that there are also tests for the mean difference between all sets of two groups when one has 3 or more groups. One possibility is the Bonferroni test (see BST: p. 90 and further). Use this test for all 6 combinations of two groups that belong to the variable *Church_attendance*.

8. Describe which groups differ from each other with regard to the (mean) traditional family values (please use a level of significance of .05).Note that the hypotheses are directional (the less church attendance, the less important traditional family values).