Example: KRUSKAL WALLIS

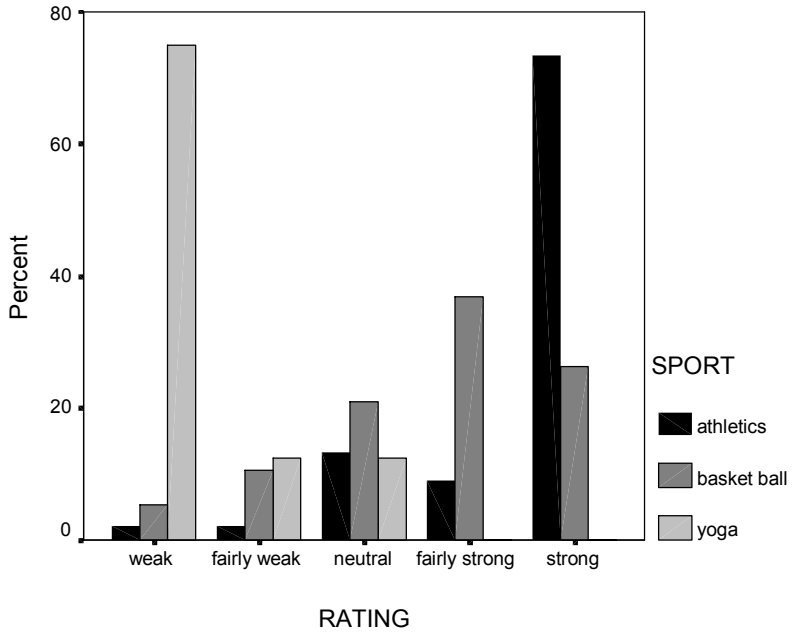
Is competition a motivating factor?

Data from Bonnie Kelinske, Brad W. Mayer and Kuo-Lane Chen (2001) Perceived benefits from participation in sports: a gender study, Women in management review, Vol. 16, No 2, pp 75-84

In a study of what motivates people to engage in sporting activity, students who regularly took part in a sport/fitness activity were asked to rate how strongly they were motivated by competition. The responses were recorded on a five-point scale:

1 = weak
2 = fairly weak
3 = neutral
4 = fairly strong
5 = strong

Here we compare the responses from students whose regular fitness activity was either yoga, athletics or baseball. Responses from students who took part in different sports/fitness activities are shown below. We can use this diagram to see how the students in the sample replied.



The diagram shows that, for the students in the sample, there were marked differences between those who regularly did athletics, basket ball and yoga in terms of their ratings of the importance of competition. The diagram allows us to explore the results for the students who took par tin the survey but to draw conclusions about the whole student population, we need to use a hypothesis test to see whether these differences are statistically significant or could have been produced by chance.

The Kruskal Wallis test is a suitable method because:

(1) three independent samples (people who do different activities) are being compared

(2) the measurement or response being compared (how motivated by competition) between the three groups is ordinal

Note that because the Kruskal Wallis is a non-parametric test, the hypotheses refer to the median rather than the mean. The hypotheses to be tested are:

Null (H_0): median ratings are the same for students following each sport

Alternative (H_1): median ratings are not the same for students following each sport

Using SPSS leads to the following output. The table gives the values of the test statistic (Chi-Square), degrees of freedom (df) and P-value (which SPSS labels 'Asymp.Sig.')

Kruskal-Wallis Test

Test Statistics[a,b]

	RATING
Chi-Square	78.733
df	2
Asymp. Sig.	.000

a. Kruskal Wallis Test

b. Grouping Variable: SPORT

Although all three elements of this table are usually reported, only the P-value is needed to reach a conclusion. SPSS reports P-values to 3 decimal places, so very small values shown as 0.000, these should be reported as '<0.001'. Since P < 0.001 is smaller than 0.05, the null hypothesis is rejected.

The hypothesis test allows you to say:
'The data provides statistically significant evidence that median ratings of the importance of competitiveness as a motivation to do sport differs between students who do yoga, athletics and basketball (Kruskall Wallis, χ^2 = 78.733, df = 2, P =0.075).'

Note. Alternative use of Kruskal Wallis
Another situation in which the Kruskal Wallis analysis can be used is for comparing three or more independent samples when the variable being compared between samples (dependent variable) is quantitative but does not mean one or both of the

Normality or equal variance assumptions required for one way analysis of variance. The test is applied and interpreted in the same way as for the analysis of ordinal data.