**Kruskal Wallace Anaysis of Variance by Ranks --** Analysis of 2-Between-Group Data with a Quantitative Response Variable

**Application:** To compare the distributions of scores on a quantitative response variable (which is either ordinal, not normally distributed or from a small sample) obtained from 2 groups. For two independtnt groups designs the Kruskal-Wallis test is often used as a nonparametric substitute for the between groups t-test.

**Research Hypothesis:** The researcher hypothesized that stores with separate reptile departments would have reptiles of better overall quality than stores that did not have separate reptile departments.

**H0:** Pet shops that do not have separate reptile departments have the same distribution of reptile quality ratings as shops that do have separate reptile departments.•

**Step 1 -- Getting the Univariate Statistics**
SPSS has no convenient way of getting nonparametric univariate stats for separate groups. What we have to do is to "split" fhe file into two subfiles, based on the grouping variable. Then we can get the nonparametric univariate statistics for each group. Then we have to "un-Split" the file.
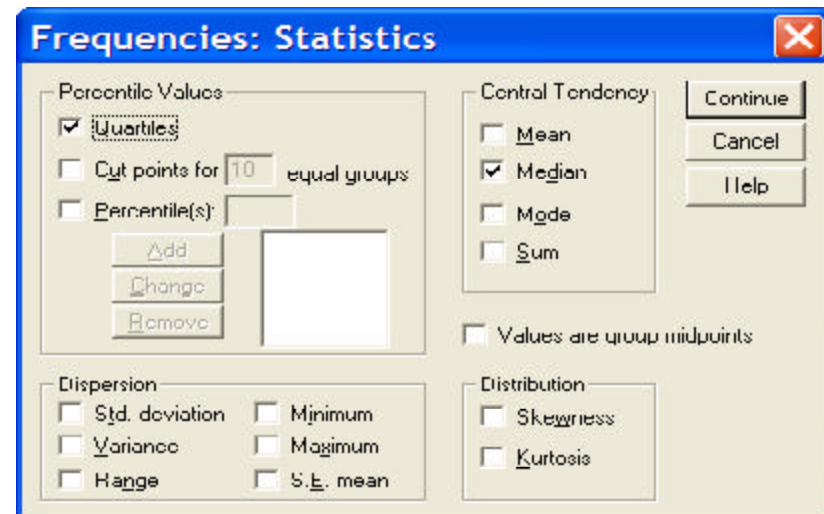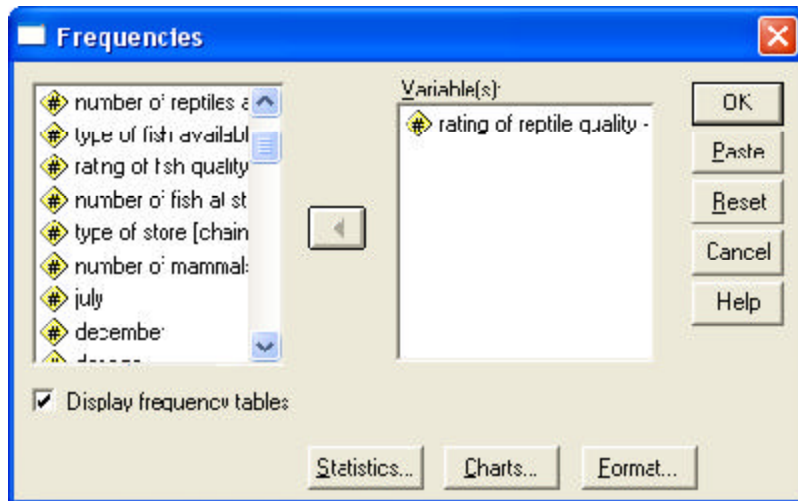
**Data ➜ Split File**
• click "Organize output by groups"
• highlight the grouping varible (IV) and click the arrow to move it into the "Groups based on" window
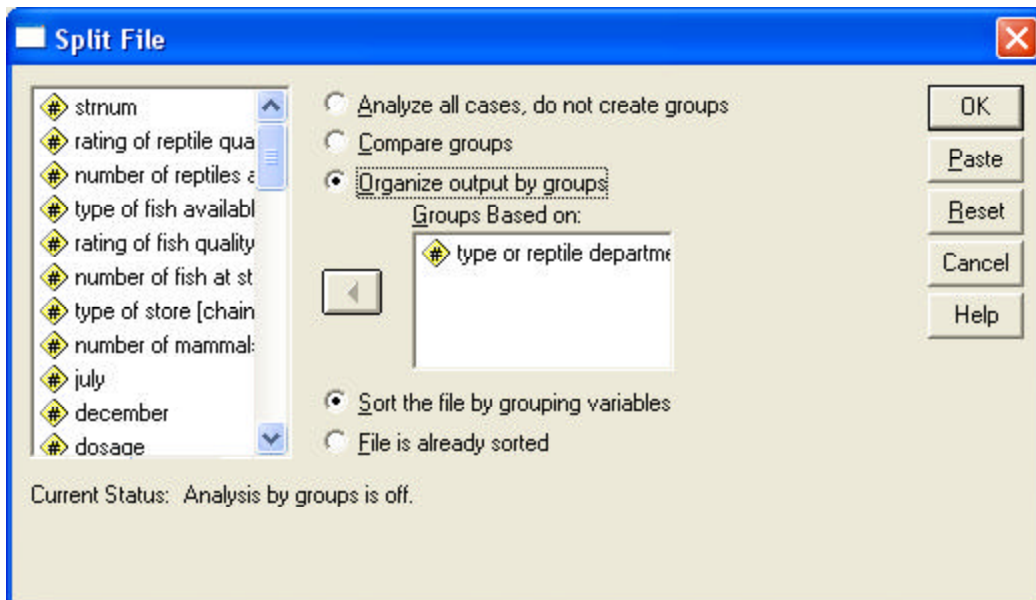
**Analyze/Statistics ➜ Descriptive Statistics ➜ Frequencies**
- highlight the response variable and click the arrow button
- Click "Statistics" — check "Quartiles" and "Median"





**'type of reptile department' = not separate**

**Statistics<sup>a</sup>**

'rating of reptile quality - 1-10 scale'

| N | Valid | 6 |
|---|---|---|
| | Missing | 0 |
| Median | | 4.00 |
| Percentiles | 25 | 2.00 |
| | 50 | 4.00 |
| | 75 | 5.50 |

a. 'type of reptile department' = not separate

**'type of reptile department' = separate**

**Statistics<sup>a</sup>**

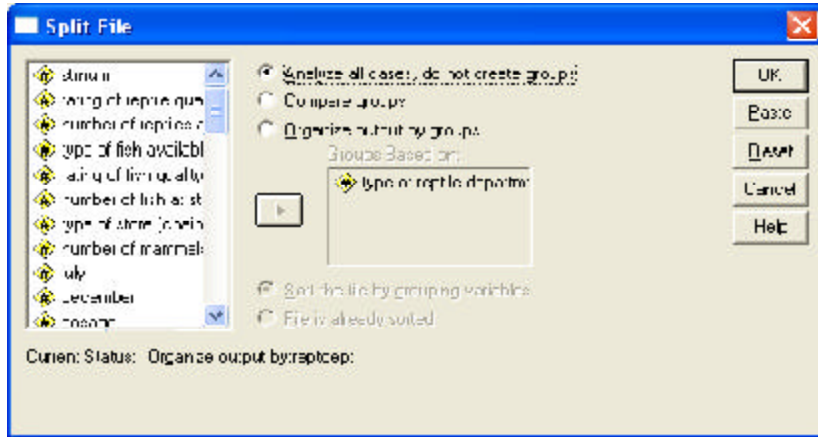'rating of reptile quality - 1-10 scale'

| N | Valid | 6 |
|---|---|---|
| | Missing | 0 |
| Median | | 7.50 |
| Percentiles | 25 | 6.25 |
| | 50 | 7.50 |
| | 75 | 9.00 |

a. 'type of reptile department' = separate

**Step 2:  Obtain the comparison of the two groups.**

**Data ➔ Split File**  (Need to analyze the full data set)
• click "Analyze all cases.  Do not create groups."



**Analyze/Statistics ➔ Nonparametric Tests ➔ K Indepdent Samples**
• highlight the quantitative response variable and click the arrow to move it to the "Test Variable List" window
• highlight the grouping variable (be sure there are only 2 groups) and click the arrow to move it to the "Grouping Variable" window
  • clck the "Define Groups" button -- enter the values you gave each group and click "continue"
• be sure the "Kruskal-Wallis H" is checked
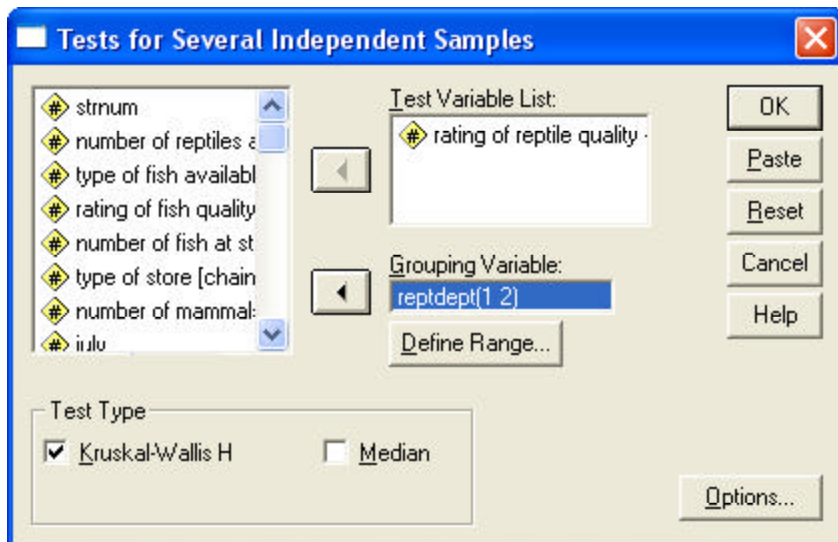


**Ranks**

|  | 'type of reptile department' | N | Mean Rank |
|---|---|---|---|
| 'rating of reptile quality - 1-10 scale' | not separate | 6 | 4.17 |
|  | separate | 6 | 8.83 |
|  | Total | 12 |  |

**Test Statistics**[a,b]

|  | 'rating of reptile quality - 1-10 scale' |
|---|---|
| Chi-Square | 5.208 |
| df | 1 |
| Asymp. Sig. | .022 |

a. Kruskal Wallis Test

b. Grouping Variable: 'type of reptile department'

The p-value

Shows that the groups have a differently distributed  quality ratings. Examine the group medians to decide which group has the larger and smaller values.

Reporting Results:

    Those stores without separate reptile departments displayed reptiles with a median quality rating of  4  (IQR = 2-5.5), whereas  those that did have separate departments displayed reptiles with a median rating of  7.5  (IQR = 6.25-9).  As hypothesized, pet stores with separate reptile departments tended to have higher ratings than those which did not, $X^2(1)$ = 5.208, $\underline{p}$ = .022..