Median test -- Analysis of 2-Between-Group Data with a Quantitative Response Variable

Application: To compare the median score of a quantitative response variable (which is either ordinal, not normally distributed or from a small sample) obtained from 2 groups. The Median 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

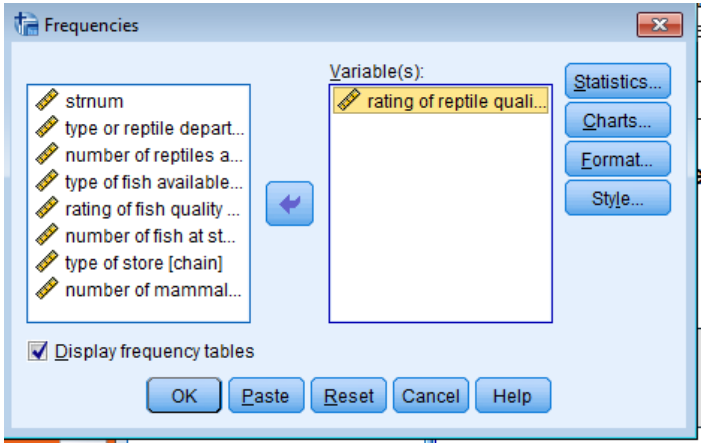
SPSS has no convenient way of getting nonparametric univariate stats for separate groups. What we have to do is to "split" fhe file into two subfiles, based on the grouping variable. Then we can get the nonparametric univariate statistics for each group. Then we have to "un-Split" the file.

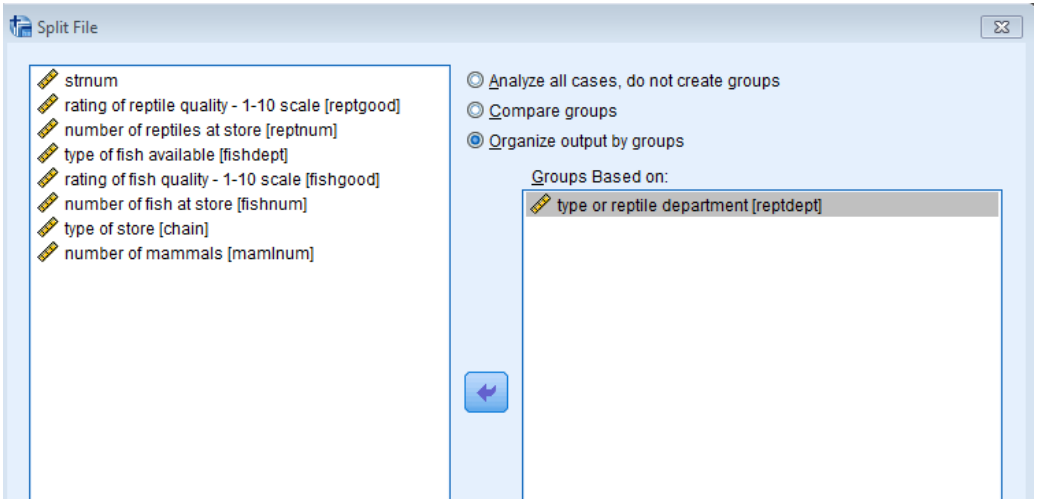
Data ➔ Split File

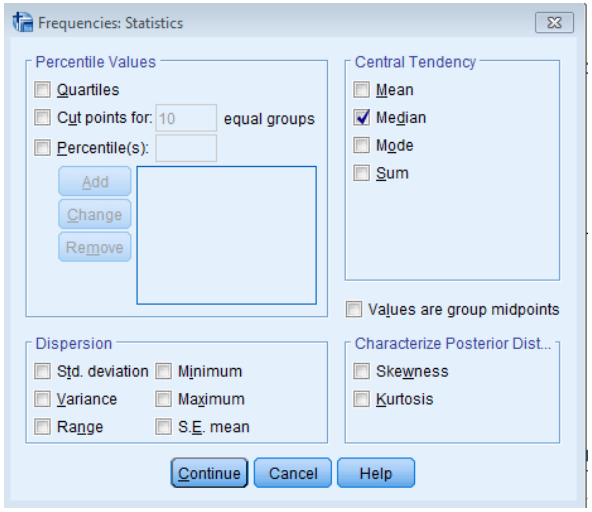
- click "Organize output by groups"
- highlight the grouping varible (IV) and click the arrow to move it into the "Groups based on" window

Analyze/Statistics ➔ Summarize ➔ Frequencies

- highlight the response variable and click the arrow button







'type of reptile department' = not separate

Statistics[a]

'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[a]

'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

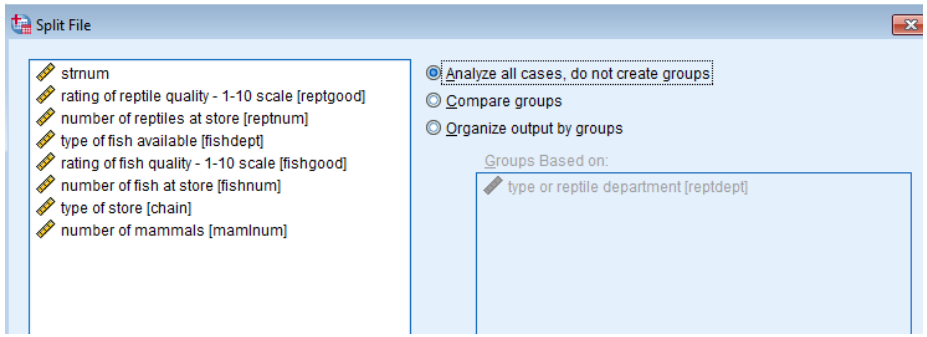
Step 2: Obtain the comparison of the two groups.

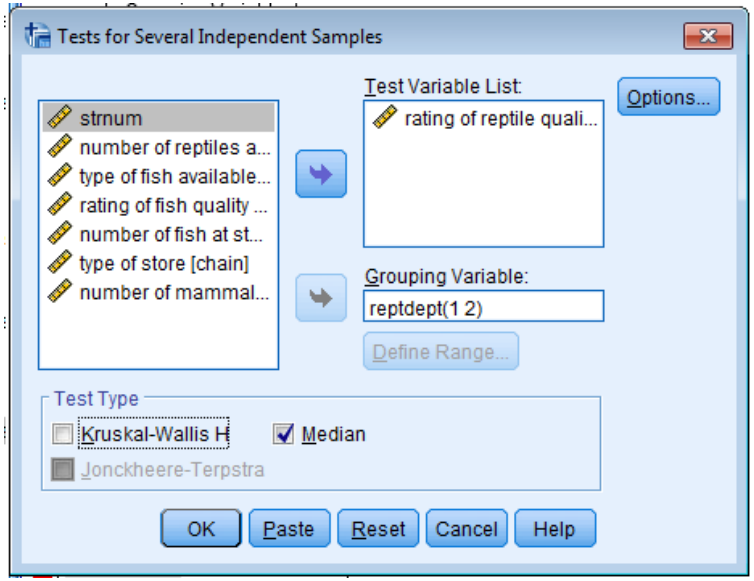
Data ➔ Split File

- click “Analyze all cases. Do not create groups.”

Analyze/Statistics ➔ Nonparametric Tests ➔ k Independent Samples

- highlight the quantitative response variable and click the arrow to move it to the “Test Variable List” window
- highlight the grouping variable and click the arrow to move it to the “Grouping Variable” window
- click the “Define Groups” button -- enter the values you gave each group and click “continue”
- be sure the “Median Test” is checked





Median Test

Frequencies

		type or reptile department	
		not separate	separate dept
rating of reptile quality - 1-10 scale	> Median	1	5
	<= Median	5	1

This statistic computes the overall median for all scores (ignoring group membership) and then divided the scores from each group into those above and below the overall median.

This is the resulting contingency table, which is then submitted to a X^2 test.

Test Statistics[a]

	rating of reptile quality - 1-10 scale
N	12
Median	6.00
Exact Sig.	.080

a. Grouping Variable: type or reptile department

One limitation to the median test is that it has less statistical power than the Mann-Whitney U-test or the Kruskal-Wallis, especially for 2-group designs with small N.

You will notice that ths same comparison was significant when using both of the other two the Mann-Whitney test and the Kruskal-Wallis test, but is not significant with this Median test.

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). Contrary to the hypothesis, pet stores with separate reptile departments tended to have equivalent ratings as those which did not (X^2 = 6.0, p = .080).