SPSS: Single-Sample Median Test

Application: To test a hypothesis about the median of a single quantitative variable.

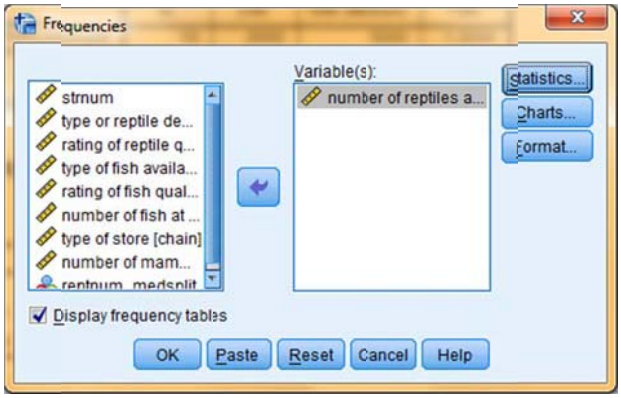
Research Hypothesis (it is often the case that the researcher's hypothesis is the statistical null, something more common for this statistical model than for most others): The researcher hypothesized that the median number of reptiles for the population of stores represented by these pet stores was 10.

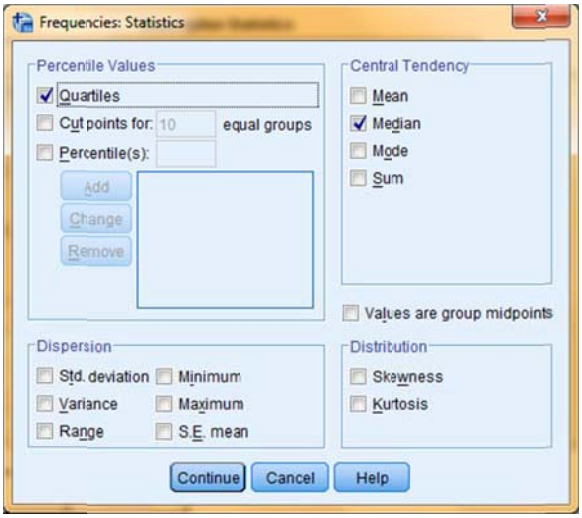
H0: The sample represents a population of pet stores that has median of 10 reptiles.

Getting the univariate statistics:

Analyze → Descriptives → Frequencies

- Highlight the variable to be analyzed & move it into the "Variable(s)" window
- In the "Statistics" window check "Quartiles" and "Median>






```
FREQUENCIES VARIABLES=reptnum
  /NTILES=4
  /STATISTICS=MEDIAN.
```

Statistics

number of reptiles at store

N	Valid	12
	Missing	0
Median		10.00
Percentiles	25	4.25
	50	10.00
	75	13.50

The median is given (50th percentile also tells the median)

The most common index of variation for rank order data is the Interquartile Range (IQR).

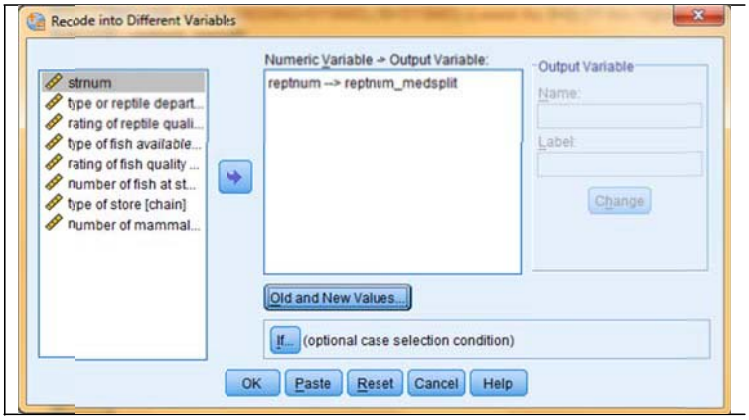
It is calculated as Q3 – Q1, or 75th Percentile value – 25th Percentile value.

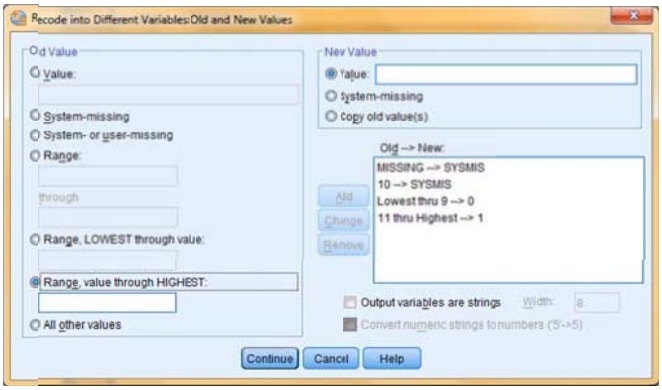
For these data the value would be 13.5 – 4.25 = 9.25.

The IQR tells the range within which the middle 50% of the scores fall.

Getting the significance test

To prepare the data for analysis, recode the target variable into those cases with values greater than the hypothesized median and those with values less than the hypothesized median. Cases with values that are the hypothesized median are set to a missing value, so they are not involved in the analysis.

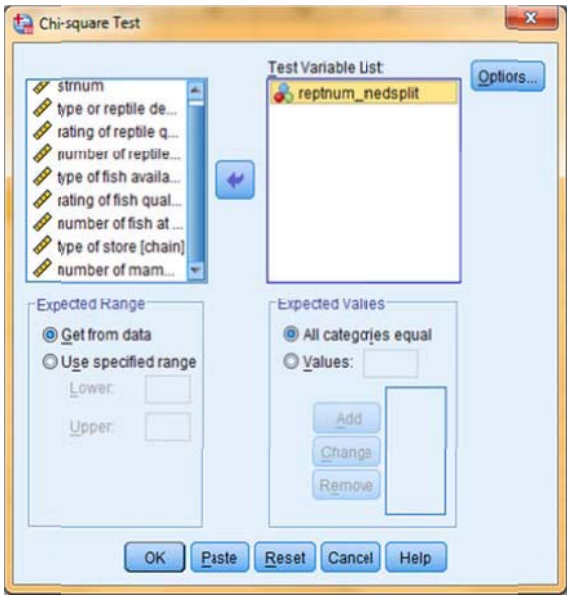




Then, perform a 2-cell goodness-of-fit Chi-square, testing the hypothesis of equal proportions in each (i.e., equal proportions of cases above and below the median).

Analyze ➔ Nonparametric Tests ➔ Legacy Dialogs → Chi-square

- highlight the variable (be sure it is quantitative) and press the arrow to put it into the "Test Variable(s)" box
- use the default of "All categories equal"



SPSS Syntax

```
RECODE reptnum                ← name starting variable
(MISSING=SYSMIS)              ← set missing values to missing
(10=SYSMIS)                   ← set hypothesized median to missing
(Lowest thru 9=0)             ← set values below median to "0"
(11 thru Highest=1)           ← sett values above median to "1"
INTO reptnum_medsplit.        ← name resulting variable

NPAR TESTS
  /CHISQUARE=reptnum_medsplit ← name target variable
  /EXPECTED=EQUAL.            ←set hypothesis to equal
                                proportion in each cell
```

reptnum_medsplit

	Observed N	Expected N	Residual
.00	5	5.0	.0
1.00	5	5.0	.0
Total	10		

Test Statistics

	reptnum_medsplit
Chi-Square	.000[a]
df	1
Asymp. Sig.	1.000

a. 0 cells (.0%) have expected frequencies less than 5. The minimum expected cell frequency is 5.0.

The p-value of 1.00 means there is a near certainty of a Type I error, if we reject H0: based on these results.

Remember, even if the printout shows it, never report p = .000, because that would suggest there is no possibility of a Type 1 error. Instead report "p<.001"

Reporting the Results:

The median number of reptiles in the sampled stores (Mdn = 10, IQR = 9.25, 4.25-13.5) was not significantly different from the hypothesized value of 10, X^2 (1) = 0, p = 1.00.

It is important to show the sample mean and standard deviation before presenting the t-test results.

As in the example, be sure to communicate:

- The research hypothesis (if there is one)
- The statistical results
- Whether or not those results support the research hypothesis