

## The Pearson's Chi-Square Test of Independence -- Analysis of 2-Between-Group Data with a Qualitative DV or Analysis of Pattern of Relationship Between Two 2-category Qualitative Variables

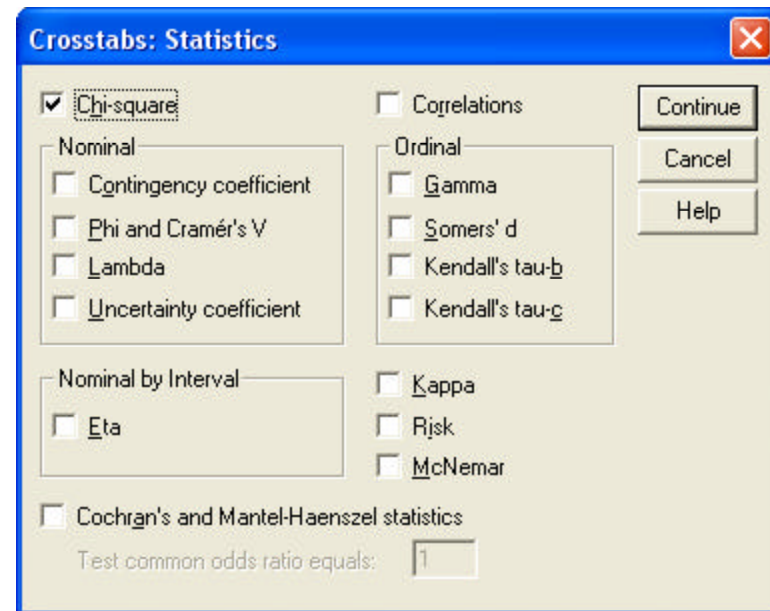
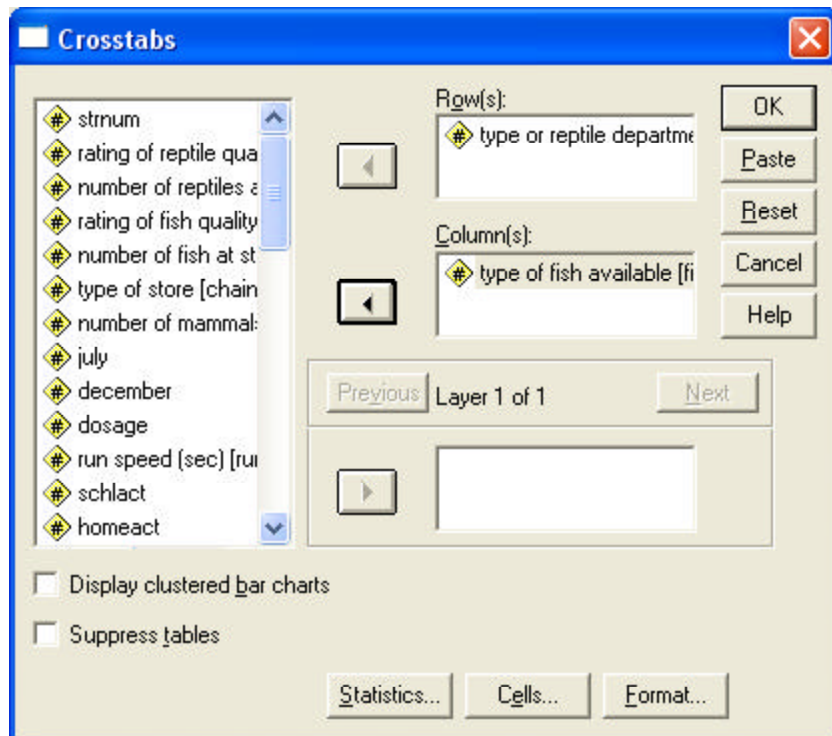
**Application:** To test if two or more populations have different patterns of response to a qualitative DV. This can also be characterized as a test of a pattern of relationship between two qualitative variables.

**Research Hypothesis:** The researcher hypothesized that those stores that did not have a separate reptile department would tend to display only freshwater fish, whereas those stores that did have a separate reptile department would tend to display both freshwater and saltwater fish. (The researcher is characterizing this as an analysis between two qualitative variables within a single population).

**H<sub>0</sub>:** There is no pattern of relationship between whether or not pet stores have separate reptile departments and whether they display only freshwater fish or both saltwater and freshwater fish.

### Analyze → Descriptive Statistics → Crosstabs

- highlight the variable you want to define the rows (be sure it is qualitative) and click arrow
- highlight the variable you want to define the columns (be sure it is qualitative) and click arrow
- “Statistics” — check that you want a “Chi-square analysis”



**type of fish available' \* 'type of reptile department' Crosstabulation**

Count

		'type of reptile department'		Total
		not separate	separate	
'type of fish available'	freshwater only	5	1	6
	fresh- and saltwater	1	5	6
Total		6	6	12

**Chi-Square Tests**

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	5.333 <sup>b</sup>	1	.021

- a. Computed only for a 2x2 table
- b. 4 cells (100.0%) have expected count less than 5. The minimum expected count is 3.00.

**Reporting the Results:**

Table 1 shows the 2x2 table of these variables. The sample of stores was evenly divided between the two types of reptile departments and also evenly divided between the two types of fish departments. As hypothesized, those stores with separate reptile departments tended to have both fresh- and saltwater fish, whereas, those stores without separate reptile departments tended to have only freshwater fish,  $\chi^2(1) = 5.33, p = .021$ .

Table 1  
Relationship between Type of Reptile Department and Type of Fish Available

Type of Fish Available	Type of Reptile Department		total
	Not separate Department	Separate Department	
Freshwater Fish Only	5	1	6
Fresh- and Saltwater Fish	1	5	6
total	6	6	12

This is the p-value  
There is a pattern of relationship between the two variables.

Chi-square results are "suspicious" if more than about 15% of the cells have expected frequencies less than 5, like this does. You would want "way more" than 12 cases to do this analysis for real.