Al-Mustaqbal University College

Department of Anesthesia techniques

Third Stage

Lecture 6

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Non Parametric Second test
2.Chi-square

- It could be either:
- a **one-way Chi2 test**, which is basically a test that compares the observed frequency of a variable in a single group with what would be the expected by chance.
- a **two-way Chi2 test**, the most widely used, in which the observed frequencies for two or more groups are compared with expected frequencies by chance. In other words, in this case, the Chi2 tells you whether or not there is an association between 2 categorical variables.

- **To obtain a contingency table with SPSS, you go to:**

Analyze > Descriptive Statistics > Crosstabs.

- **An important thing to know about the $\chi 2$ is that it does not tell you anything about causality; it is simply measuring the strength of the association between 2 variables**
- **Traditionally in SPSS, the variable which you think is going to act on the other is put in rows. This variable is called the independent variable or the predictor as, in your hypothesis, its values will predict some of the variations of the other variable. The latter, also called the outcome or the dependent variable, as it depends on the values of the predictor, is in column.**

A bit of theory: the null hypothesis and the error types.

- **The null hypothesis (H0) corresponds to the absence of effect**
- the aim of a statistical test is to accept or to reject H0
- Traditionally, a test or a difference are said to be “significant” if the probability of type I error is:

$$\alpha =< 0.05.$$

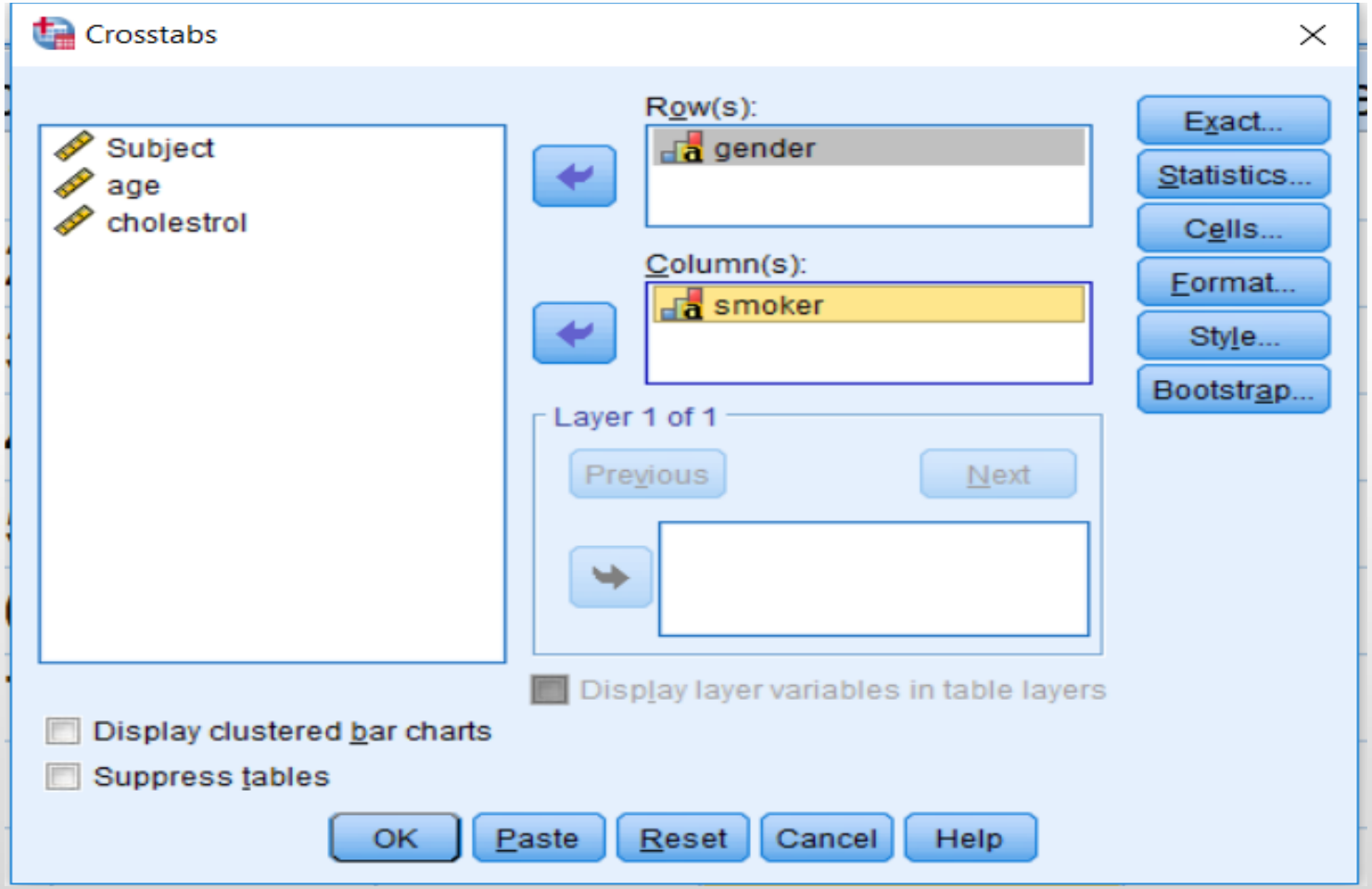
- It means that the level of uncertainty of a test usually accepted is 5%.

A bit of theory: the null hypothesis and the error types.

- It also means that there is a probability of 5% that you may be wrong when you say that your 2 means are different, for instance, or you can say that when you see an effect you want to be at least 95% sure that something is significantly happening.
- Example 1: A basic example
- The following data classify sample of 7 observations according to gender, age, smoker, and the cholesterol value as shown in Figure 6.
- Can we consider that the smoker is independent from age?

	Subject	gender	age	smoker	cholestrol	var	var
1	1	male	44.00	smoker	2.26		
2	2	male	20.00	non-smoker	6.00		
3	3	male	43.00	non-smoker	6.15		
4	4	male	43.00	non-smoker	6.15		
5	5	female	17.00	non-smoker	6.00		
6	6	female	17.00	non-smoker	7.83		
7	7	female	48.00	smoker	7.18		

- Select gender variable and add it to Rows area, then select smoker variable and add it to columns area
- Go to Analyze/ Descriptive statistics/ Cross tabs



• From statistics button check chi square then select continue > OK, you will get the cross tabulation of gender and smoker with their related values

gender * smoker Crosstabulation

Count

		smoker		
		non-smoker	smoker	Total
gender	female	2	1	3
	male	3	1	4
Total		5	2	7

The value of chi square is 0.058which is larger than alpha value (0.05), then we accept the null hypothesis, that means that smoker is independent from age.


Thank You