

# Choice based conjoint analysis (CBC) with XLSTAT-Conjoint

[demoCBC.xls](#)

## Conjoint analysis

Conjoint analysis is a marketing method that allows to know the expectations of consumers about a product and to model their choices.

The conjoint analysis method is now extremely common in marketing. Modeling of consumer choice is a key area of marketing.

Conjoint analysis is used to simulate competitive markets using a single analysis; it is its biggest advantage.

Conjoint analysis is a method that helps you to find out the expectations of consumers towards new products and to model their choices - both crucial steps of a marketing analysis. Two methods of conjoint analysis are available: full profile conjoint analysis and choice based conjoint analysis (CBC).

XLSTAT-Conjoint is a complete statistical program which allows you to run through all the analytical steps of conjoint analysis which can be divided in five steps:

1. Choice of the relevant factors and their modalities to describe the products.
2. Generation of design of experiments based on full factorial, fractional factorial, D-optimal and incomplete block designs.
3. Collection of the results in Microsoft Excel sheets.
4. Data analysis with specific regression methods - MONANOVA (monotone regression), multinomial logit, conditional logit, etc.
5. Simulation of new markets with various methods: first choice, logit, Bradley-Terry-Luce, randomized first choice.

These steps can be carried out both for a full profile conjoint analysis and for a choice based conjoint analysis (CBC).

In this tutorial, we will detail the steps necessary for the implementation and interpretation of a conjoint analysis with XLSTAT-Conjoint.

## Dataset to conduct a conjoint analysis

An Excel spreadsheet containing the results of this example can be downloaded by clicking [here](#)

The results are divided into different sheets:

1. Factors: this sheet contains the characteristics of the selected factors.

2. CBC Design: this sheet contains the profiles generated, and the choices given by the 10 individuals.
3. CBC: this sheet contains the results of conjoint analysis (CBC).
4. Simulated market: this sheet contains the complete market to simulate.
5. Market Simulation: this sheet contains the results of the market simulation.

## **First step: the choice of the factors**

In this tutorial we will look at a classic case of conjoint analysis on the introduction of a new product in a competitive market. This product is a drink based on tea.

A brand of soft drink want to introduce a new product and in order to answer two questions, a conjoint analysis is applied. What are the characteristics that should bring the drink in order to, first, please the greatest number of people, and, secondly, to gain market shares in an already competitive market?

The first step in the conjoint analysis is done in collaboration with experts in the beverage market. It is the choice of the important characteristics to define a drink.

The selected factors are:

1. temperature (very hot, hot, iced)
2. sugar (no sugar, 1 sugar, 2 sugar)
3. Lemon (yes, no)
4. intensity (strong, medium, light)

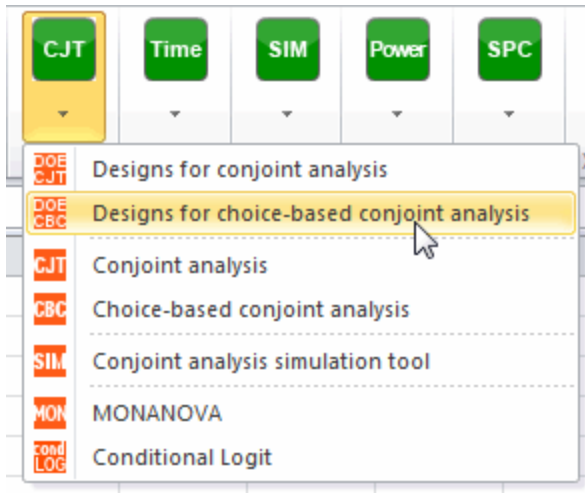
From these factors, you can get 54 different products. Judges will not be able to evaluate all these products. So we will use experimental designs to reduce the number of products presented to the respondents.

In addition, in the choice based conjoint analysis (CBC), selections of products are presented to the individuals who will choose the one they would buy.

## **Second step: the selection of profiles and generation of the comparisons**

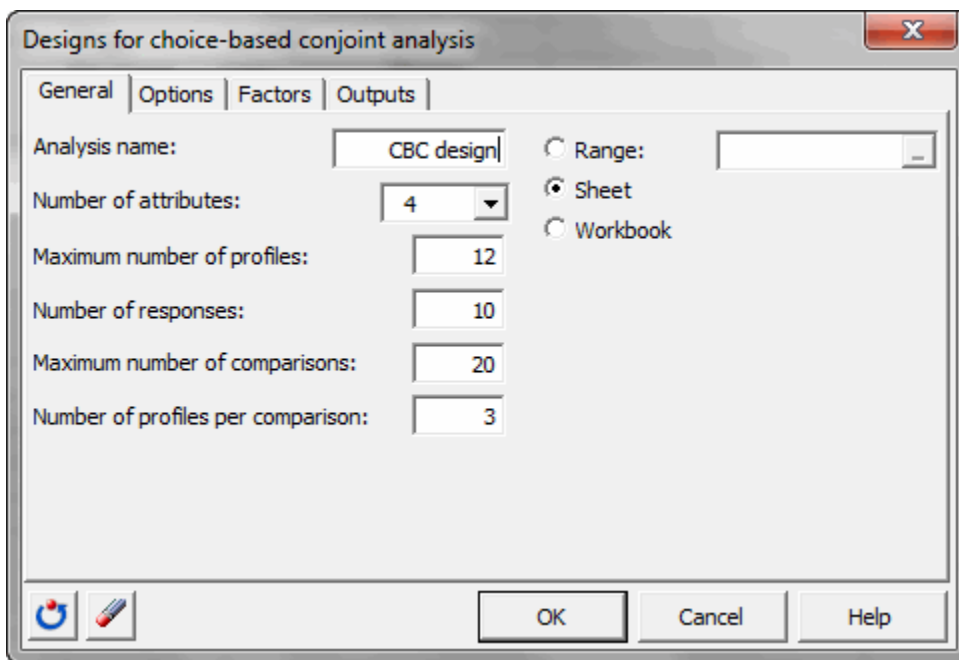
XLSTAT-Conjoint so you can select a number of profiles defined to gather them in the form of comparisons and thus allow those interviewed to make choices.

Once XLSTAT is started, click on the **CJT** icon and choose the function **Design for choice based conjoint analysis**.

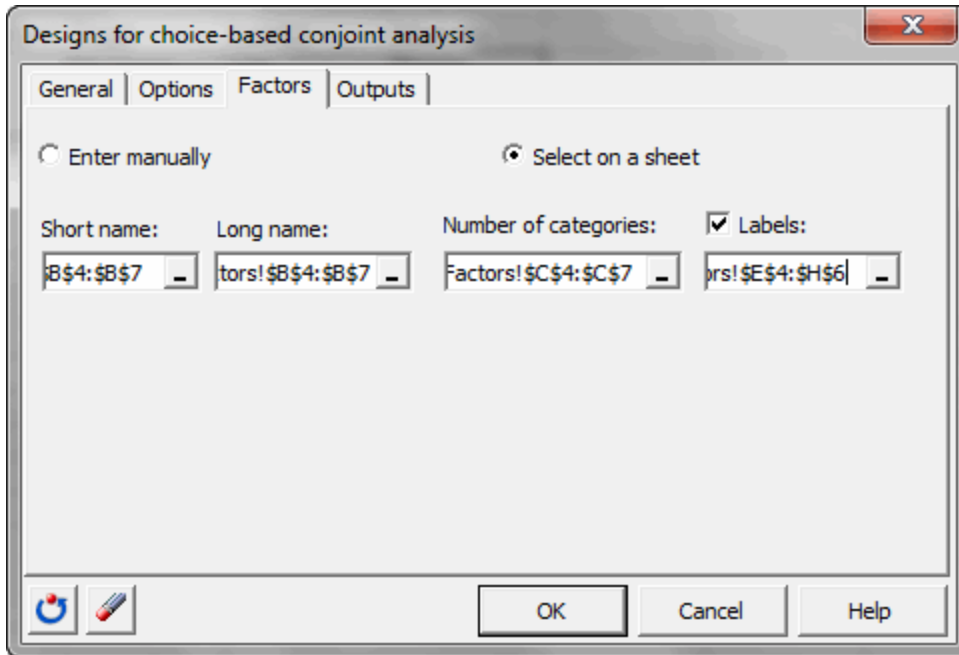


Once the button is clicked, the dialog box appears.

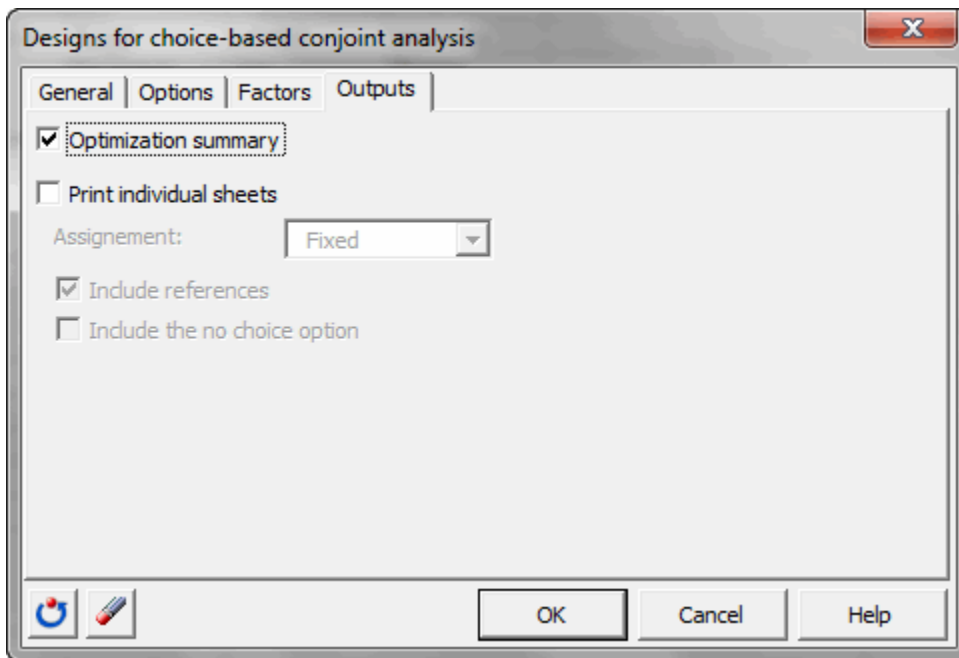
You can then enter the name of the analysis, the number of factors (four in our case), the number of profiles to classify (12), the number of comparisons (20, this number has to be greater than the number of profiles) and the number of profiles per comparison (3).



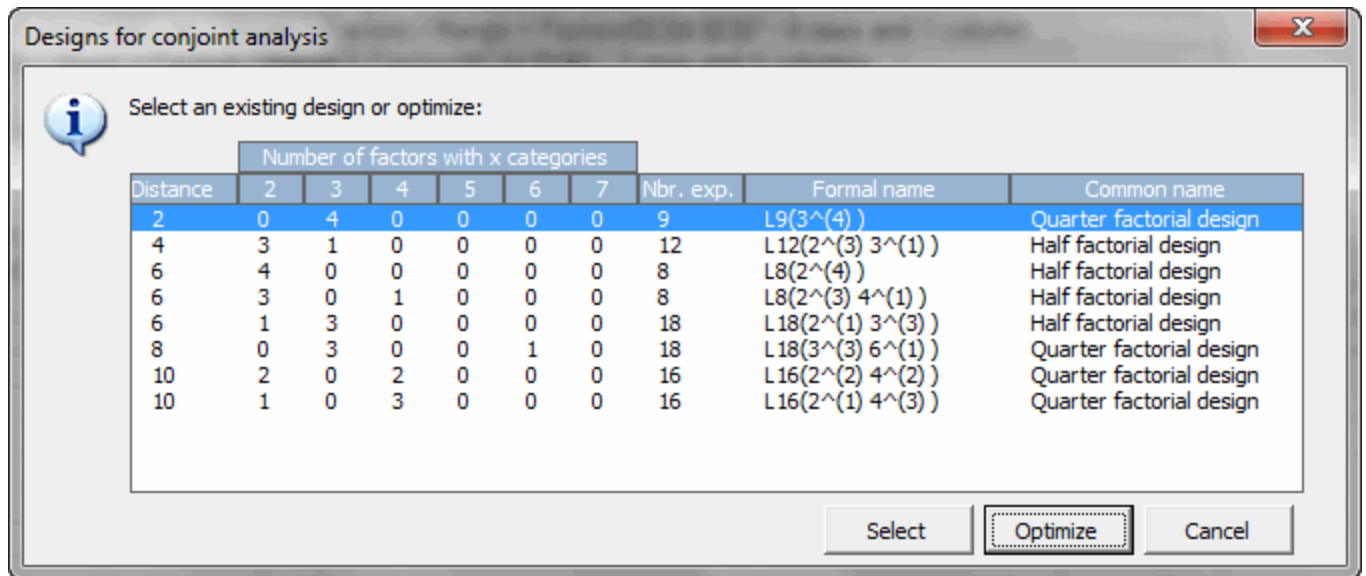
In the "Factors" tab, use the option of "selecting data in the worksheet" and select the data in the "Factors" sheet. Do not select labels associated to each column.



In the Output tab, do not activate the individual sheets in the case of this example because the generation of these sheets is not necessary. In a comprehensive analysis, they can be very useful in order to fill the results directly by individuals.



Once you click the OK button, a new dialog box appears. This allows you to select the fractional factorial design of experiments or to optimize the design (D-optimal). We use the "optimize" option.



Once you click the Optimize button, the calculations are made, then the results are displayed.

The first table summarizes the generated model. The second table is the table of profiles

Profiles (Optimized):				
Observation	Temperature	Sugar	Lemon	Intensity
Profile1	Warm	2 sugar	no	Medium
Profile2	Very warm	No sugar	yes	Medium
Profile3	Warm	1 sugar	no	Strong
Profile4	Warm	No sugar	yes	Low
Profile5	Ice	2 sugar	yes	Strong
Profile6	Ice	1 sugar	no	Low
Profile7	Warm	No sugar	no	Strong
Profile8	Warm	1 sugar	yes	Medium
Profile9	Warm	2 sugar	yes	Low
Profile10	Very warm	1 sugar	yes	Strong
Profile11	Ice	No sugar	no	Medium
Profile12	Very warm	2 sugar	no	Low

The following table is the table of choice, it is in the sheet "CBC" and must be completed after individuals have been interviewed. The choices are between 1 and 3 for each individual. The numbers on the left of the table are associated with profiles of the profile table.

### Step 3: Fill the conjoint analysis of tables

Designs for conjoint analysis:								
Comparisons	Choice 1	Choice 2	Choice 3	Individual 1	Individual 2	Individual 3	Individual 4	Individual 5
Comparison 1	5	3	11					
Comparison 2	9	2	12					
Comparison 3	1	6	10					
Comparison 4	12	4	8					
Comparison 5	3	2	9					
Comparison 6	7	1	11					
Comparison 7	10	6	5					
Comparison 8	7	12	5					
Comparison 9	11	8	6					
Comparison 1	4	3	10					
Comparison 1	6	7	3					
Comparison 1	2	5	8					
Comparison 1	9	10	4					
Comparison 1	5	7	4					
Comparison 1	3	9	1					
Comparison 1	11	12	2					
Comparison 1	2	4	1					
Comparison 1	8	1	12					
Comparison 1	8	9	6					
Comparison 2	10	11	7					
<i>Enter the code associated to the choice made (from 1 to 3).</i>								
<i>Enter the 0 value if none of the choices have been selected.</i>								

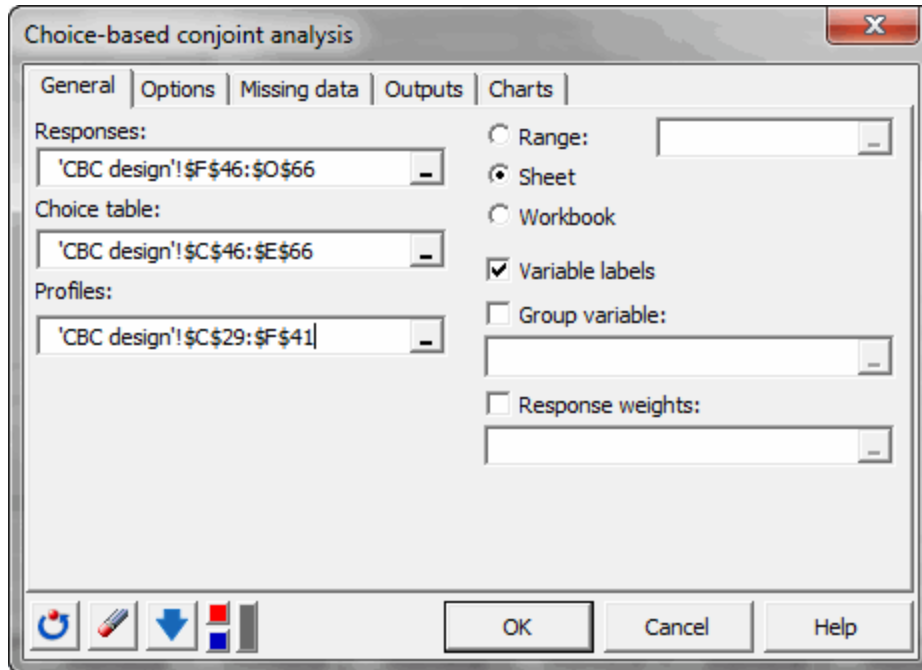
The conjoint analysis tables can either be filled directly after interviewing individuals about their choices externally or directly using the individual sheets and automatic referencing of results. This is especially interesting in the context of CBC analysis because completing the overall table can be complex.

### Step 4: Results of the analysis

As part of this analysis, 10 individuals have been questioned about their preferences in terms of tea. The results are in the CBC sheet.

To start the analysis, click the icon **CJT** and choose the function **conjoint analysis based on the choice** . You can then select the data.

Select the 10 columns of the table of responses completed by individuals as answers. Select the three columns of the numbers of choice (without the names of the selections) as a table of choices and select the profile table as profiles (without the names of the profiles).



Once you click the OK button, the computations are performed and the results are displayed.

A multinomial logit model derived from a specific conditional logit model is used for estimation. The most important results are the utilities and importances. They can be found in the first tables. We see that the utilities are not individual but related to all individuals.

<b>Utilities:</b>		
Source	Utilities	Standard deviation
Temperature-Ice	0,327	0,135
Temperature-Very warm	0,104	0,129
Temperature-Warm	-0,431	0,113
Sugar-1 sugar	-0,072	0,137
Sugar-2 sugar	0,000	0,121
Sugar-No sugar	0,072	0,131
Lemon-no	0,228	0,090
Lemon-yes	-0,228	0,090
Intensity-Low	0,045	0,119
Intensity-Medium	0,022	0,134
Intensity-Strong	-0,067	0,135
<b>Importances:</b>		
Temperature	51,523	
Sugar	9,750	
Lemon	31,045	
Intensity	7,682	

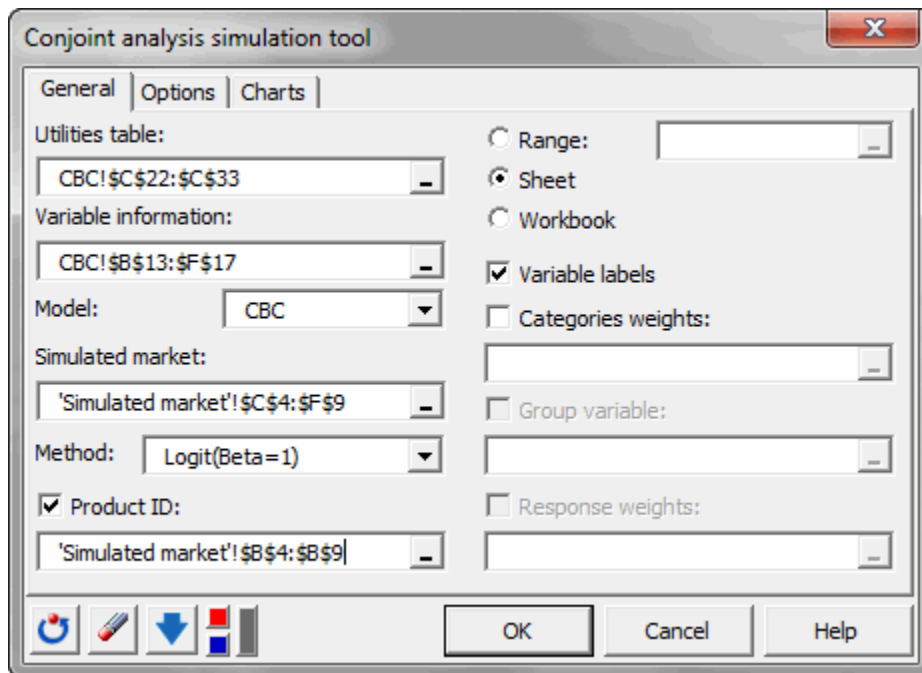
This shows that the temperature factor is the most important factor in the analysis with an importance of more than 50%, then the lemon has an importance of 30%. Concerning utilities, we see that the iced temperature has a positive effect on choice. The choice of individuals will therefore be to a frozen light drink, without lemon and sugar.

## Step 5: Simulation of the market

The main advantage of conjoint analysis is to simulate a market even if the products in the market have not been tested by the individuals.

In our case, the market for tea-based beverages is analyzed and we would like to know the impact and market shares associated to a new product.

This product is a strong iced tea with lemon and no sugar. We know that in today's market there are 4 tea-based beverages that have different characteristics, the following table shows the simulated market:



To start the simulation, click the **CJT** icon and choose the function **conjoint analysis simulation**. You can then select the data.

Utilities are those obtained in the CBC sheet, the table of information about variables is that obtained in the CBC sheet. The simulated market is in the simulated market sheet (do not select the names of products). You can also select the name of the product just behind the Product ID button.

Select the CBC model and the logit method for simulation.

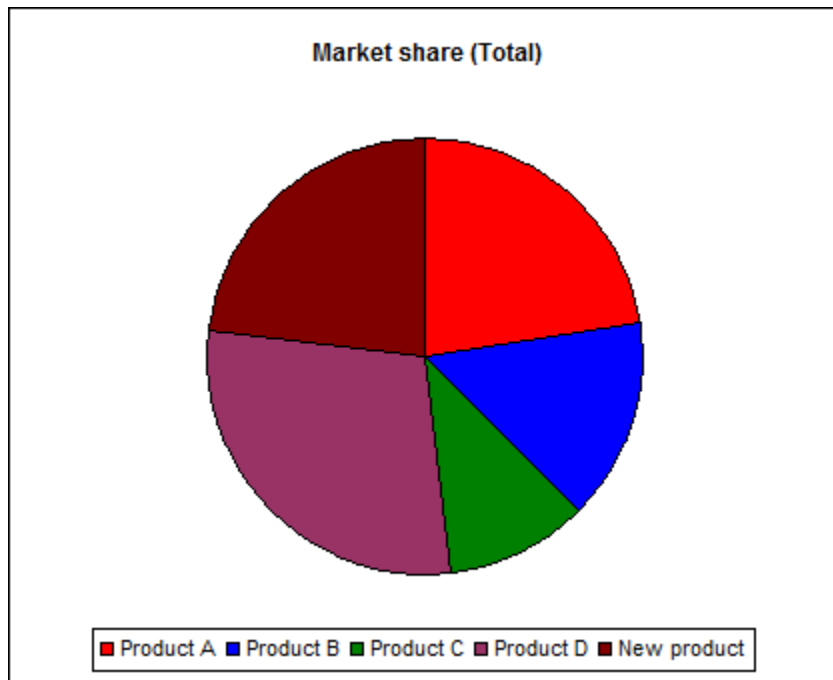
Simulated market:				
Product ID	Temperature	Sugar	Lemon	Intensity
Product A	Ice	2 sugar	yes	Low
Product B	Warm	1 sugar	no	Medium
Product C	Warm	2 sugar	yes	Low
Product D	Very warm	No sugar	no	Strong
New product	Ice	No sugar	yes	Strong

Once you click the OK button, the calculations are performed and the results are displayed.

The table shows that the market share for the new product is greater than 20%. This result seems satisfactory in order to launch the product on the market.

Market share:	
Product ID	Market share (Total)
Product A	22,397
Product B	15,070
Product C	10,498
Product D	29,041
New product	22,994

The associated pie chart validates our interpretation.



Much more advanced analyses are possible with XLSTAT-Conjoint (use of segmentation variables, weights...).