

# Conjoint analysis with XLSTAT-Conjoint

[demoConjoint.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 allows you to run through all the analytical steps of conjoint analysis which can be divided into five steps:

1. Choice of the relevant factors and their modalities to describe the products.
2. Generation of a design of experiments based on full factorial, fractional factorial, or D-optimal.
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 full profile 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. CA Design: this sheet contains the profiles generated, and the rankings given by the 10 individuals.
3. Conjoint Analysis: 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 have the drink in order to, first, please the greatest number of people, and, secondly, 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)

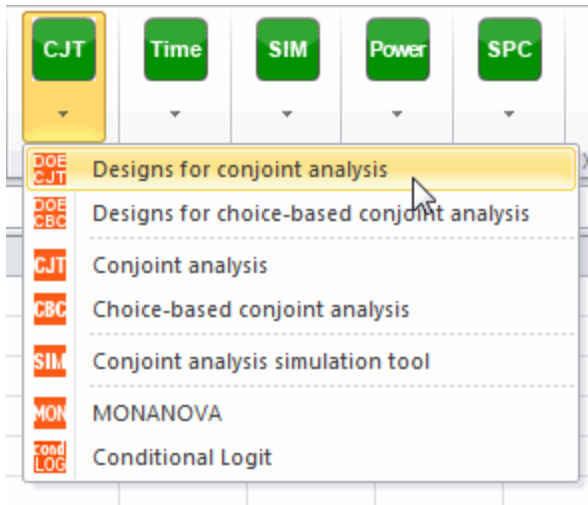
From these factors, you can get 54 different products. Judges will not be able to evaluate all these products. So we will use experimental designs to reduce the number of products presented to the respondents.

The obtained profiles will be ranked by 10 interviewed people.

## **Second step: the selection of the profiles**

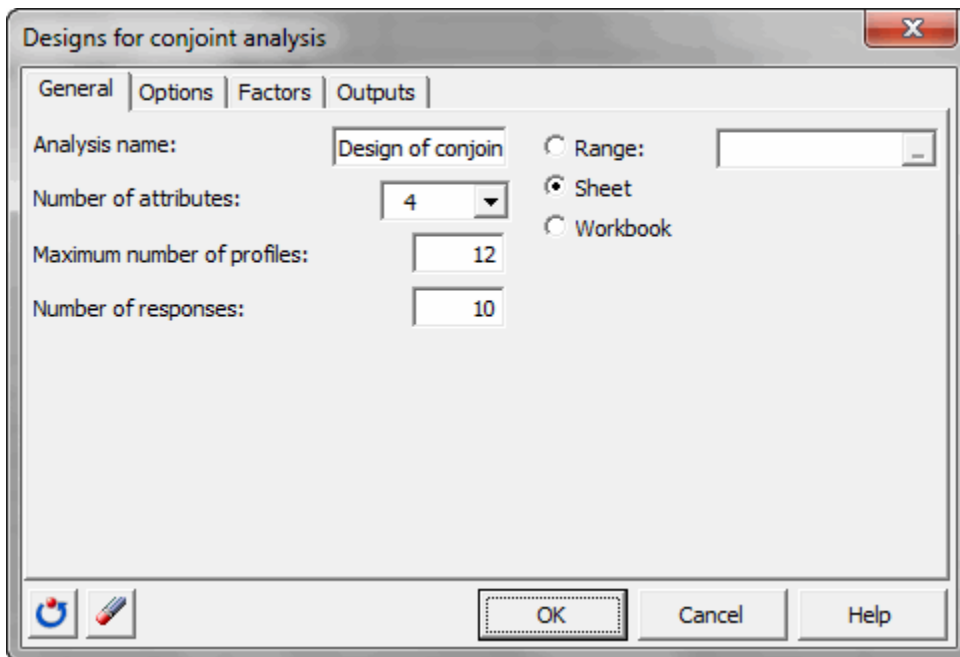
XLSTAT-Conjoint uses experimental designs to select a number of profiles and allow interviewed people to make their rankings.

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

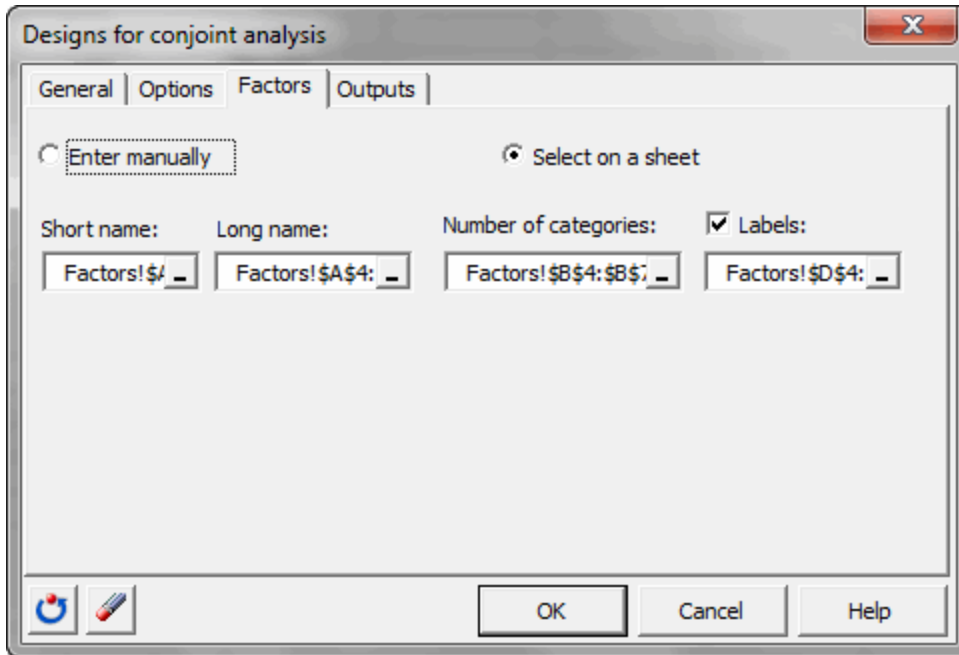


Once the button is clicked, the dialog box appears.

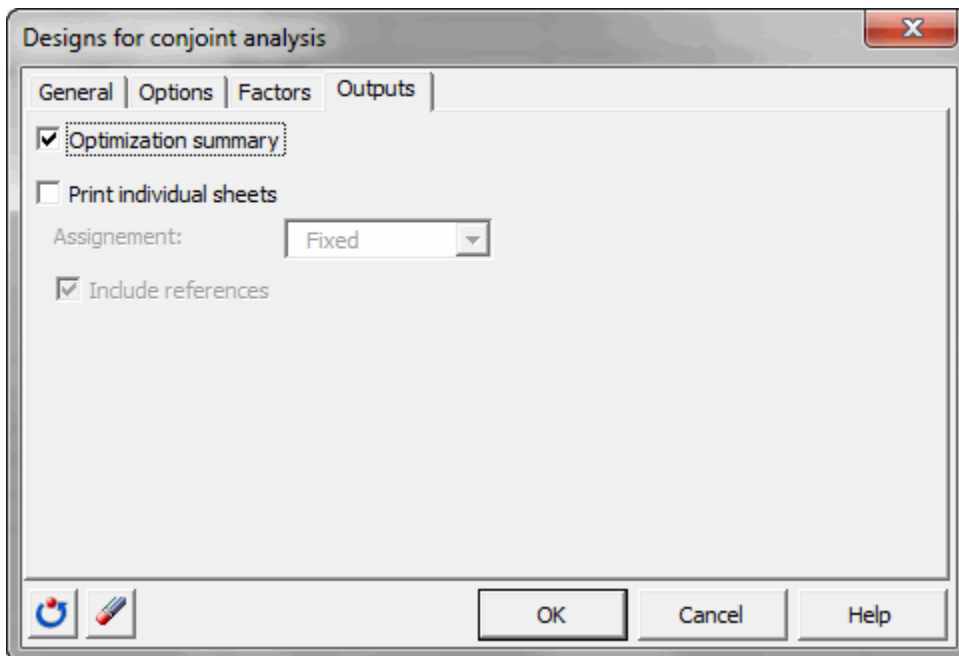
You can then enter the name of the analysis, the number of factors (four in our case) and the number of profiles to be generated (12).



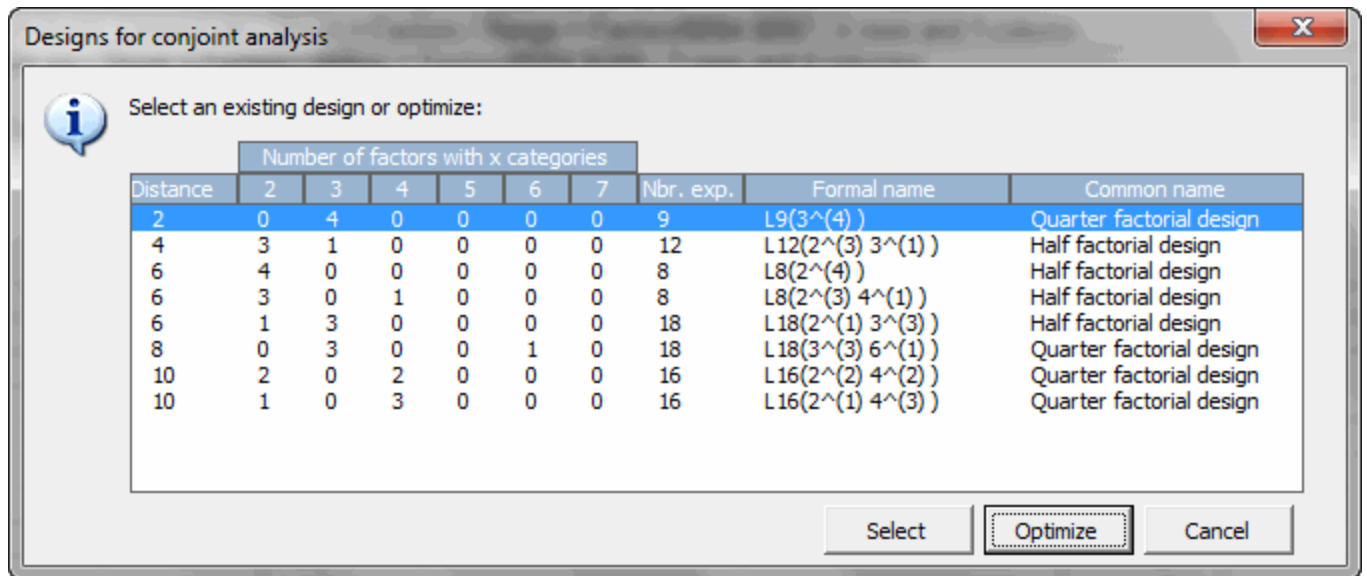
In the "Factors" tab, use the option of "select on a sheet" and select the data in the "Factors" sheet. Do not select labels associated to each column.



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.

Variable information:					
Short name	Long name	o. of categories	Category 1	Category 2	Category 3
Temperature	Temperature	3	Ice	Warm	Very warm
Sugar	Sugar	3	No sugar	1 sugar	2 sugar
Lemon	Lemon	2	yes	no	
Intensity	Intensity	3	Strong	Medium	Low

The second table is the table of the conjoint analysis with the profiles on the left. The right part of the table has to be filled with the rankings of the respondents.

Designs for conjoint analysis (Optimized):									
Observation	Temperature	Sugar	Lemon	Intensity	Individual 1	Individual 2	Individual 3	Individual 4	Individual 5
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					

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

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.

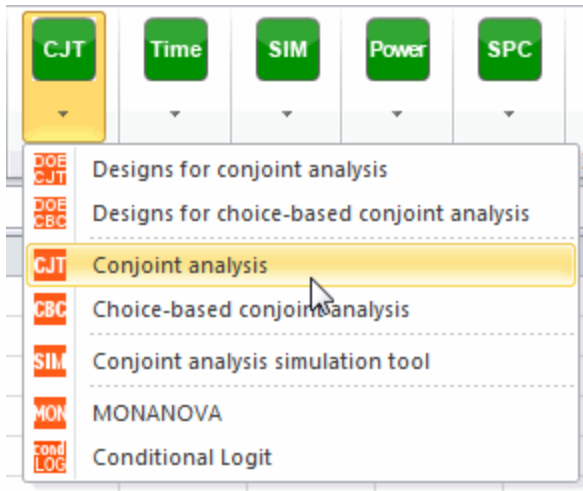
XLSTAT 2011.3.01 - Designs for conjoint analysis - on 19/07/2011 at 17:04:45					
Analysis name: Design of conjoint analysis					
Individual: 1 / 10					
Please rank / rate these profiles:					
Profile	Temperature	Sugar	Lemon	Intensity	Ranking/Rating
Profile 1	Warm	2 sugar	no	Medium	
Profile 2	Very warm	No sugar	yes	Medium	
Profile 3	Warm	1 sugar	no	Strong	
Profile 4	Warm	No sugar	yes	Low	
Profile 5	Ice	2 sugar	yes	Strong	
Profile 6	Ice	1 sugar	no	Low	
Profile 7	Warm	No sugar	no	Strong	
Profile 8	Warm	1 sugar	yes	Medium	
Profile 9	Warm	2 sugar	yes	Low	
Profile 10	Very warm	1 sugar	yes	Strong	
Profile 11	Ice	No sugar	no	Medium	
Profile 12	Very warm	2 sugar	no	Low	

### Step 4: Results of the analysis

As part of this analysis, 10 individuals have been questioned about their preferences in terms of tea.

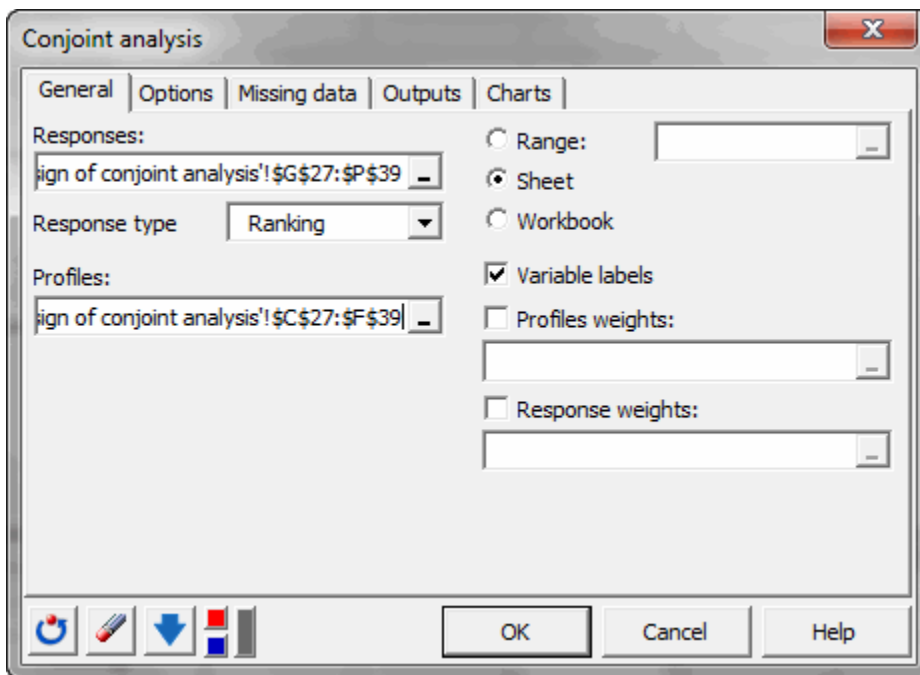
The results are in the "Conjoint Analysis" sheet.

To start the analysis, click the icon **CJT** and choose the function **conjoint analysis**.

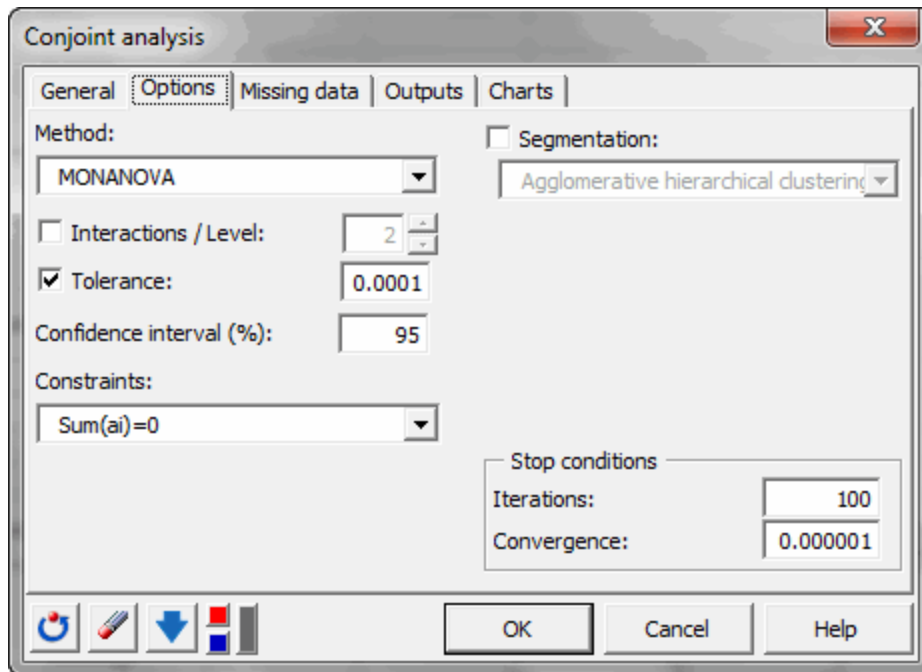


You can then select the data.

Select the 10 columns of the conjoint analysis table completed using the rankings of the individuals (right part of the table) as responses. Select the four columns associated to the profiles as profiles (without the names of the profiles). Choose the ranking option as response type.



In the options tab, select the MONANOVA method in order to apply a monotone transformation to the responses.



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

The most important results are the partial utilities as well as the individual importances. They can be found in the first tables.

We see that the utilities are individual as well as importance.

Their averages are calculated and give an idea of the importance of each factor.

<b>Utilities (Individual data):</b>										
Source	Individual 1	Individual 2	Individual 3	Individual 4	Individual 5	Individual 6	Individual 7	Individual 8	Individual 9	Individual 10
Intercept	6,988	6,445	5,916	6,822	6,855	6,093	6,500	6,500	5,766	6,724
Temperature-Ice	5,406	-1,566	0,686	3,290	4,473	0,048	4,979	2,610	-1,107	4,056
Temperature-Very warm	-3,454	1,348	-3,020	-2,002	-3,055	-1,675	-4,979	-2,610	-1,830	-3,162
Temperature-Warm	-1,952	0,218	2,334	-1,287	-1,418	1,627	0,000	0,000	2,937	-0,894
Sugar-1 sugar	0,375	0,284	-0,934	1,068	0,919	-2,441	0,073	0,069	0,434	-0,603
Sugar-2 sugar	-0,627	-3,378	2,334	0,639	-1,835	-0,488	-0,325	0,969	0,231	2,481
Sugar-No sugar	0,252	3,093	-1,400	-1,707	0,916	2,929	0,252	-1,038	-0,665	-1,877
Lemon-no	-0,285	0,243	-2,059	0,525	0,813	1,077	-0,595	2,026	2,142	-0,266
Lemon-yes	0,285	-0,243	2,059	-0,525	-0,813	-1,077	0,595	-2,026	-2,142	0,266
Intensity-Low	-0,305	-1,714	0,000	0,639	0,542	-0,488	0,377	-1,885	1,146	1,140
Intensity-Medium	0,117	1,751	0,934	-1,671	0,538	0,488	0,074	0,169	0,751	0,469
Intensity-Strong	0,188	-0,037	-0,934	1,032	-1,081	0,000	-0,452	1,716	-1,897	-1,609
<b>Importances (Individual data):</b>										
Source	Individual 1	Individual 2	Individual 3	Individual 4	Individual 5	Individual 6	Individual 7	Individual 8	Individual 9	Individual 10
Temperature	81,098	21,853	35,519	44,777	55,632	27,981	79,318	35,074	36,135	48,580
Sugar	9,172	48,519	24,772	23,477	20,356	45,499	4,593	13,489	8,327	29,334
Lemon	5,222	3,642	27,322	8,876	12,017	18,248	9,485	27,236	32,477	3,584
Intensity	4,508	25,985	12,386	22,869	11,994	8,273	6,604	24,200	23,062	18,503

Source	Minimum	Maximum	Mean	Std. deviation
Intercept	5,766	6,988	6,461	0,415
Temperature-Ice	-1,566	5,406	2,287	2,581
Temperature-Very warm	-4,979	1,348	-2,444	1,641
Temperature-Warm	-1,952	2,937	0,157	1,660
Sugar-1 sugar	-2,441	1,068	-0,076	1,030
Sugar-2 sugar	-3,378	2,481	0,000	1,780
Sugar-No sugar	-1,877	3,093	0,075	1,794
Lemon-no	-2,059	2,142	0,362	1,260
Lemon-yes	-2,142	2,059	-0,362	1,260
Intensity-Low	-1,885	1,146	-0,055	1,067
Intensity-Medium	-1,671	1,751	0,362	0,868
Intensity-Strong	-1,897	1,716	-0,307	1,132
Importances (Descriptive statistics):				
Source	Minimum	Maximum	Mean	Std. deviation
Temperature	21,853	81,098	46,597	20,203
Sugar	4,593	48,519	22,754	15,067
Lemon	3,584	32,477	14,811	10,796
Intensity	4,508	25,985	15,839	8,022

These first results show that temperature is the most important factor both at the individual level and at the average level. The fact that the drink is ice has a largely positive utility (in terms of averages).

XLSTAT-Conjoint allows you to make segmentations of the individuals by using statistical clustering methods. This option allows you to see if homogeneous groups of individuals emerge.

## Step 5: Simulation of the market

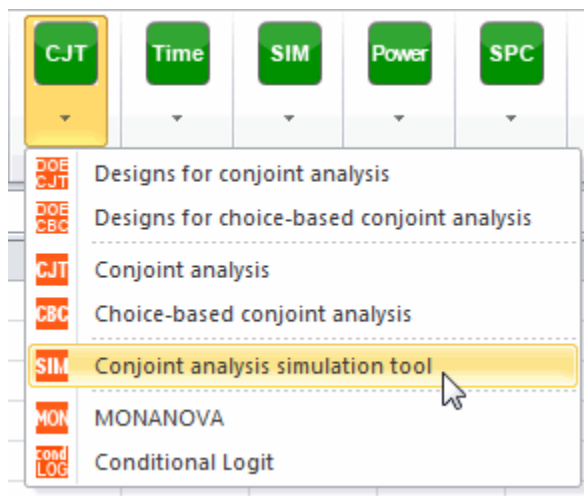
The main advantage of conjoint analysis is to simulate a market even if the products in the market have not been tested by the individuals.

In our case, the market for a 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:

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

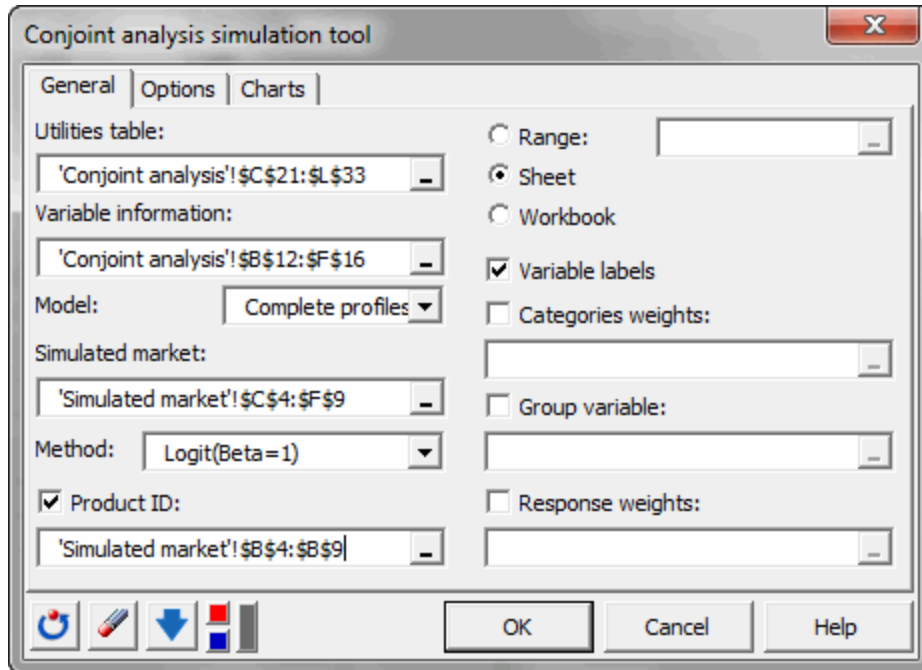
To start the simulation, click the **CJT** icon and choose the function **conjoint analysis simulation**



You can then select the data.

Utilities are those obtained in the "Conjoint analysis" sheet, the table of information about variables is that obtained in the "Conjoint analysis" 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 Full profile model and the logit method for simulation.

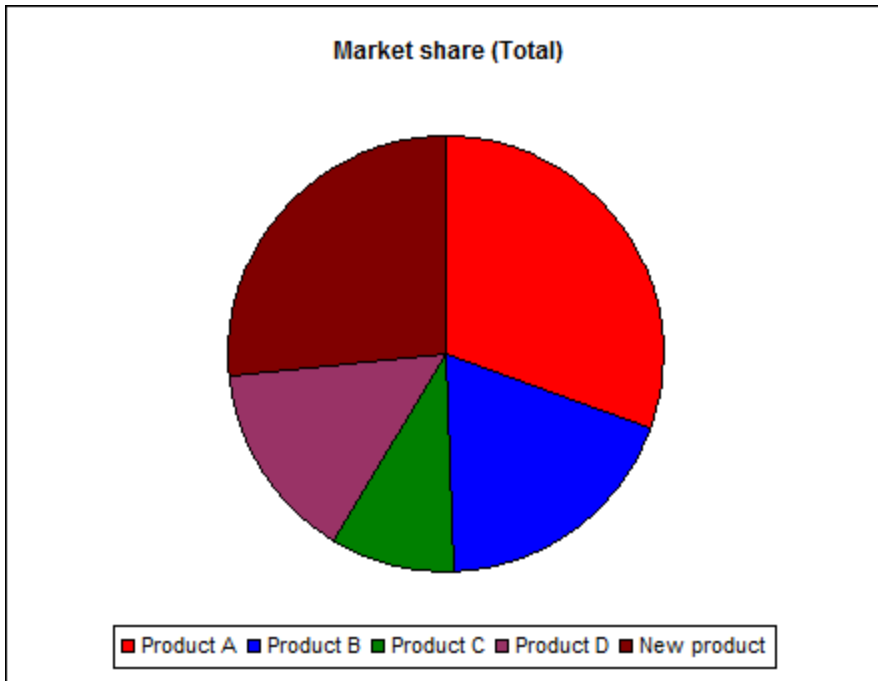


Once you click the OK button, the calculations are performed and the results are displayed.

The table shows that the market share for the new product are almost 30%. This result seems satisfactory in order to launch the product on the market.

Market share:	
Product ID	Market share (Total)
Product A	30,645
Product B	18,892
Product C	9,095
Product D	14,644
New product	26,724

The associated pie chart validates our interpretation.



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