



The Nose Knows



What will you learn and practice in this Assignment?

- Obtain aggregate and segment-specific Conjoint part-worth estimates
- Interpret estimates to understand which levels and attributes are more desirable
- Determine each segment's ideal product

Have the slides for the Conjoint Analysis session handy, as well as the instructional videos. Not using the material learned in class will make it harder to finish the Assignment correctly.

The problem

You have recently been hired by Scentsational LLC, a new online fragrance store. Scentsational designs its own fragrances, relying mostly on the company board's intuition and understanding of the market. While some scents have been received with some success, others have failed. As such, the company's board has decided to employ a more scientific approach to developing new fragrances, and have assigned you to this task. See the memo below.

Dear Mr./Ms. X,

As you know, one of the key strategic initiatives of Scentsational is to more professionally (and quantitatively) determine how to design our new fragrances. Before your arrival, we conducted a series of focus groups, in which we determined that the following were the most relevant attributes to focus on as we design our newest women's fragrance:

- **Fragrance name:** "Moonlight" and "Little Black Dress" were the top candidate names.
- **Intensity:** Consumers seemed interested in discussing a fragrance's intensity. Therefore, we have considered to develop either a "Fresh" scent (which is not very intense) or an "Intense" scent which is the opposite.
- **Price:** Consumers seemed to conceptualize how fragrance prices work with .99 decimals, and on units of 10 - specifically, the prices most often mentioned were \$39.99, \$49.99 and \$59.99.

Please help us determine how to proceed with our design given this information.

Regards,

Olf Acton, VP of Customer Experience, Scentsational

After being assigned this task, you constructed a Conjoint Analysis survey, with 12 profiles, in order to capture the preferences of each respondent for each profile. Your survey was delivered electronically via the Qualtrics platform to 60 current Scentsational female customers. The Rating variable (0-10) is the DV of interest - note that it was captured using a [Slider scale question](#), and therefore it has decimal values.

Of note: these contacts were in a database that the company had previously overlooked; in this database, unbeknownst to the firm, there was an old Segment variable, which classified every individual as Segment 1 and 2. **You do not know** whether these segments are important or not, but you decide to experiment with the variable regardless as it might prove useful.

After deploying the survey, you prepare the data that you will use in an Excel file with the following Sheets, to be analyzed with the `conjoint` R package:

- **Profiles:** Table listing the 12 profiles each consumer rated.
- **Levels:** Text list of the levels of every fragrance attribute:
 - *Brand Name:* 1. Moonlight; 2. Little Black Dress
 - *Intensity:* 1. Intense; 2. Fresh
 - *Price:* 1. \$39.99; 2. \$49.99; 3. \$59.99
- **Ratings_All:** Consumers' ratings for each profile - **everyone** in the sample
- **Ratings_Seg1:** Consumers' ratings for each profile - **only Segment 1**
- **Ratings_Seg2:** Consumers' ratings for each profile - **only Segment 2**
- **Candidates:** A simulated consideration set among which you'll determine which product is best. These are the candidates:

Candidate Fragrance	Name	Intensity	Price
1	Moonlight	Intense	\$49.99
2	Moonlight	Fresh	\$59.99
3	Little Black Dress	Intense	\$49.99
4	Little Black Dress	Fresh	\$39.99



Assignment questions

1. Load the data into R.
2. Conduct a Conjoint Analysis regression as follows, and provide a professionally formatted regression output.

```
Rating = f(Fragrance name, intensity, price)
```

3. Comment on the estimates. What do you see? Which attribute **levels** are most preferred, and which least?

You are intrigued by the mysterious segmentation variable in the old customer database. Hence, you decide to run a separate Conjoint Analysis for **each** Segment.

In the following, you will need to conduct separate regressions by segment. You can use either RCommander or manual coding to this effect.

RCommander

In the RCommander Linear Regression window, the "Subset Expression" text box can be used to run a regression for each segment separately. There, if you want to run a regression for Segment 1, type

```
Segment == 1
```

If you want to run a regression for Segment 2, type

```
Segment == 2
```

Manual coding

If you are coding manually and using the `lm` function to run your regressions, you can subset the data by using the `subset` option in the `lm` code. That is, a fictitious regression of y on x_1 , x_2 , and x_3 in data frame D would be written as follows:

```
model_S1 <- lm(y ~ x1+x2+x3, data = D, subset = Segment == 1)
```

For Segment 2, this syntax would be

```
model_S2 <- lm(y ~ x1+x2+x3, data = D, subset = Segment == 2)
```

Reminder on model naming

Regardless of whether you are using RCommander or manual coding, **be sure to name your Regression models in a recognizable way**, for example "Regression_FullSample", "Regression_Segment1" and "Regression_Segment2". Be sure to **keep track** of these model names!

6. Conduct a Conjoint Analysis regression as follows **for each segment**, and provide a professionally formatted regression output.

```
Rating = f(Fragrance name, intensity, price)
```

Try to present the results for each Segment in only one table, as if you were comparing "Model 1" and "Model 2" as learned in the previous lectures. Better yet, you might want to have one table to encompass all the estimates in questions 2 and 6. In such a Table, you would have three models, a "pooled" model (i.e., Q2, all the data), and two "segment-level" models (Segment 1 regression, Segment 2 regression).

7. Comment on the preference structure of both segments. What is similar? What is different?
8. Using the regression results **for each** Segment, compute their attribute **importances** (name, intensity, price). Comment on your findings. Based on the similarities and differences between Segment 1 and Segment 2, create a name for each Segment.
9. Using the regression results **for each** Segment, determine which product would be ideal for each segment. You must provide a computation of the **utility** of each product for each segment.
10. Summarize your recommendations for Scentsational.

You receive another memo some time after you present your results:

Dear Mr./Ms. X,

Your recommendations were a success! The board is interested in conducting another study as the one you previously conducted, as we look forward to launching our first Mens' fragrance. The relevant attributes are:

- **Fragrance name:** "Loyalty", "Dernier Cri", and "Camp" were the top candidate names.
- **Bottle color:** Since the liquid is transparent, we can choose a range of colors for our fragrance bottles. The colors that resonated more with consumers were blue, black and silver.
- **Price:** Again, \$39.99, \$49.99 and \$59.99 were the most mentioned price points in our discussions. We hope you can begin the next round of research soon!

Regards,

Olf Action, VP of Customer Experience, Scentsational

11. Using R's `support.CEs` package, construct a fractional factorial design for Scentsational's new Conjoint study. Present this as a table with Profile numbers, and the combination of attribute levels of each profile.

Please mind the following as you answer the last question:

- Input the attributes in the order listed in the memo
- Keep all of the arguments in the function call (except for the attribute and level parts) identical to the lecture slides.

- Deliver Assignment 11 in a Word document using Canvas. There are no specific formatting guidelines, but please be professional.
- You must lay the foundations to run any models requested with visualizations.
- Produce a professional looking set of tables for your report.
- Your report must be written professionally and with no typos (which will result in penalties).
- Follow the guidelines learned in class to discuss model results professionally. Do not simply repeat the numbers in an output file.
- Name your Assignment "YourName_TeamMateName_Assignment11". Assignments not named in such a way will incur a penalty. If you do not have a teammate, just use your name.