**Design of choice experiments**

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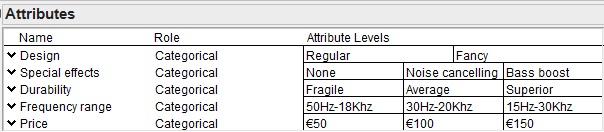
1. **Introduction.**

Product that was chosen for the experiment is **headphones**. Sometimes it can be difficult to make a decision about buying an appropriate pair of headphones due to the fact that diversity of them on the market exceeds any expectations. That’s why choice based conjoint experiment is a relevant research method for gaining marketing information in this case.

1. **Setting up attributes, levels and interactions.**

The relevant attributes for the product are the following: Design, Durability, Frequency range, Presence of special effects, Price range.

Thus we constructed a table with the ranking levels for each attribute:



So there are 2x3x3x3x3=162 different possible headphones models.

Interactions between attributes are the following:

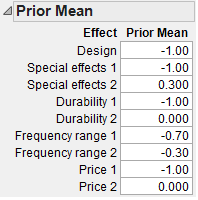
Price is a key attribute for interactions in our case. Every attribute interacts with the price, because mean of any attribute strongly reflects the price of a product. The higher mean and thus importance of an attribute – the higher price would be.

1. **Estimation of value for attribute levels (prior mean).**

We determined particular level weights as it shown in the table.

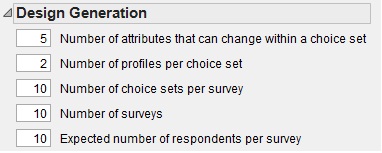
|  |  |  |  |
| --- | --- | --- | --- |
| **Regular** | | **Fancy** | |
| -1 | | 1 | |
| **None** | **Noise cancelling** | | **Bass boost** |
| -1 | 0,3 | | 0,7 |
| **Fragile** | **Average** | | **Superior** |
| -1 | 0 | | 1 |
| **50Hz-18Khz** | **30Hz-20Khz** | | **15Hz-30Khz** |
| -0,7 | -0,3 | | 1 |
| **€50** | **€100** | | **€150** |
| -1 | 0 | | 1 |

So in JMP software we have got the following prior mean table that shows importance of attribute levels in the consumer mind.



1. **Design construction**

To prevent multicollinearity, we need a lot of different questions and survey versions. To keep the amount of questions for the respondents acceptable we took 10 questions of 2 choices. We make 10 different versions and try to get 10 respondents per survey.



Thus, our design for the survey looks the following way:

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 1 | 1 |  | Fancy | Bass boost | Average | 50Hz-18Khz | € 100 |
| 1 | 1 |  | Regular | Noise cancelling | Fragile | 30Hz-20Khz | € 150 |
| 1 | 2 |  | Regular | Noise cancelling | Superior | 50Hz-18Khz | € 100 |
| 1 | 2 |  | Fancy | None | Fragile | 30Hz-20Khz | € 50 |
| 1 | 3 |  | Regular | None | Fragile | 30Hz-20Khz | € 50 |
| 1 | 3 |  | Fancy | Bass boost | Average | 15Hz-30Khz | € 150 |
| 1 | 4 |  | Fancy | None | Average | 30Hz-20Khz | € 50 |
| 1 | 4 |  | Regular | Noise cancelling | Superior | 50Hz-18Khz | € 100 |
| 1 | 5 |  | Regular | Bass boost | Average | 30Hz-20Khz | € 100 |
| 1 | 5 |  | Fancy | None | Fragile | 50Hz-18Khz | € 150 |
| 1 | 6 |  | Regular | None | Average | 50Hz-18Khz | € 100 |
| 1 | 6 |  | Fancy | Noise cancelling | Superior | 30Hz-20Khz | € 50 |
| 1 | 7 |  | Regular | Noise cancelling | Average | 50Hz-18Khz | € 50 |
| 1 | 7 |  | Fancy | None | Superior | 30Hz-20Khz | € 100 |
| 1 | 8 |  | Fancy | Noise cancelling | Fragile | 50Hz-18Khz | € 150 |
| 1 | 8 |  | Regular | Bass boost | Superior | 30Hz-20Khz | € 50 |
| 1 | 9 |  | Fancy | None | Fragile | 30Hz-20Khz | € 50 |
| 1 | 9 |  | Regular | Noise cancelling | Superior | 15Hz-30Khz | € 150 |
| 1 | 10 |  | Fancy | None | Superior | 30Hz-20Khz | € 150 |
| 1 | 10 |  | Regular | Noise cancelling | Average | 50Hz-18Khz | € 100 |
| 2 | 11 |  | Fancy | Noise cancelling | Fragile | 15Hz-30Khz | € 100 |
| 2 | 11 |  | Regular | Bass boost | Average | 30Hz-20Khz | € 50 |
| 2 | 12 |  | Regular | Bass boost | Average | 30Hz-20Khz | € 100 |
| 2 | 12 |  | Fancy | Noise cancelling | Superior | 50Hz-18Khz | € 150 |
| 2 | 13 |  | Fancy | Bass boost | Fragile | 50Hz-18Khz | € 50 |
| 2 | 13 |  | Regular | None | Superior | 30Hz-20Khz | € 100 |
| 2 | 14 |  | Regular | Bass boost | Superior | 30Hz-20Khz | € 100 |
| 2 | 14 |  | Fancy | None | Average | 50Hz-18Khz | € 50 |
| 2 | 15 |  | Fancy | Bass boost | Average | 50Hz-18Khz | € 50 |
| 2 | 15 |  | Regular | None | Superior | 30Hz-20Khz | € 150 |
| 2 | 16 |  | Regular | Bass boost | Superior | 50Hz-18Khz | € 150 |
| 2 | 16 |  | Fancy | None | Average | 15Hz-30Khz | € 100 |
| 2 | 17 |  | Regular | None | Average | 15Hz-30Khz | € 150 |
| 2 | 17 |  | Fancy | Noise cancelling | Fragile | 30Hz-20Khz | € 50 |
| 2 | 18 |  | Regular | Bass boost | Superior | 30Hz-20Khz | € 100 |
| 2 | 18 |  | Fancy | None | Fragile | 50Hz-18Khz | € 150 |
| 2 | 19 |  | Fancy | None | Fragile | 30Hz-20Khz | € 100 |
| 2 | 19 |  | Regular | Bass boost | Average | 50Hz-18Khz | € 150 |
| 2 | 20 |  | Fancy | None | Average | 30Hz-20Khz | € 100 |
| 2 | 20 |  | Regular | Noise cancelling | Superior | 15Hz-30Khz | € 150 |
| 3 | 21 |  | Regular | None | Superior | 30Hz-20Khz | € 50 |
| 3 | 21 |  | Fancy | Bass boost | Average | 15Hz-30Khz | € 150 |
| 3 | 22 |  | Fancy | Noise cancelling | Average | 50Hz-18Khz | € 100 |
| 3 | 22 |  | Regular | None | Superior | 15Hz-30Khz | € 150 |
| 3 | 23 |  | Regular | Noise cancelling | Fragile | 30Hz-20Khz | € 50 |
| 3 | 23 |  | Fancy | Bass boost | Superior | 15Hz-30Khz | € 100 |
| 3 | 24 |  | Regular | None | Average | 15Hz-30Khz | € 100 |
| 3 | 24 |  | Fancy | Bass boost | Superior | 30Hz-20Khz | € 150 |
| 3 | 25 |  | Regular | Bass boost | Average | 15Hz-30Khz | € 150 |
| 3 | 25 |  | Fancy | None | Fragile | 50Hz-18Khz | € 100 |
| 3 | 26 |  | Fancy | Noise cancelling | Fragile | 30Hz-20Khz | € 150 |
| 3 | 26 |  | Regular | None | Superior | 50Hz-18Khz | € 100 |
| 3 | 27 |  | Fancy | Bass boost | Superior | 30Hz-20Khz | € 100 |
| 3 | 27 |  | Regular | None | Fragile | 15Hz-30Khz | € 150 |
| 3 | 28 |  | Fancy | Bass boost | Average | 50Hz-18Khz | € 150 |
| 3 | 28 |  | Regular | Noise cancelling | Fragile | 15Hz-30Khz | € 50 |
| 3 | 29 |  | Regular | None | Fragile | 30Hz-20Khz | € 150 |
| 3 | 29 |  | Fancy | Bass boost | Superior | 50Hz-18Khz | € 50 |
| 3 | 30 |  | Regular | Noise cancelling | Average | 15Hz-30Khz | € 150 |
| 3 | 30 |  | Fancy | Bass boost | Fragile | 50Hz-18Khz | € 50 |
| 4 | 31 |  | Regular | Noise cancelling | Fragile | 50Hz-18Khz | € 100 |
| 4 | 31 |  | Fancy | Bass boost | Average | 30Hz-20Khz | € 50 |
| 4 | 32 |  | Fancy | None | Average | 15Hz-30Khz | € 50 |
| 4 | 32 |  | Regular | Noise cancelling | Superior | 50Hz-18Khz | € 100 |
| 4 | 33 |  | Fancy | Bass boost | Fragile | 15Hz-30Khz | € 100 |
| 4 | 33 |  | Regular | Noise cancelling | Superior | 30Hz-20Khz | € 50 |
| 4 | 34 |  | Fancy | Noise cancelling | Average | 30Hz-20Khz | € 150 |
| 4 | 34 |  | Regular | None | Superior | 15Hz-30Khz | € 100 |
| 4 | 35 |  | Fancy | None | Superior | 15Hz-30Khz | € 150 |
| 4 | 35 |  | Regular | Noise cancelling | Average | 30Hz-20Khz | € 100 |
| 4 | 36 |  | Regular | None | Superior | 50Hz-18Khz | € 50 |
| 4 | 36 |  | Fancy | Noise cancelling | Average | 15Hz-30Khz | € 150 |
| 4 | 37 |  | Regular | Bass boost | Average | 50Hz-18Khz | € 150 |
| 4 | 37 |  | Fancy | Noise cancelling | Fragile | 15Hz-30Khz | € 100 |
| 4 | 38 |  | Fancy | None | Average | 30Hz-20Khz | € 100 |
| 4 | 38 |  | Regular | Bass boost | Fragile | 15Hz-30Khz | € 150 |
| 4 | 39 |  | Fancy | Noise cancelling | Average | 15Hz-30Khz | € 50 |
| 4 | 39 |  | Regular | None | Fragile | 30Hz-20Khz | € 150 |
| 4 | 40 |  | Fancy | Noise cancelling | Superior | 50Hz-18Khz | € 50 |
| 4 | 40 |  | Regular | Bass boost | Average | 15Hz-30Khz | € 100 |
| 5 | 41 |  | Fancy | Noise cancelling | Fragile | 15Hz-30Khz | € 50 |
| 5 | 41 |  | Regular | Bass boost | Average | 30Hz-20Khz | € 150 |
| 5 | 42 |  | Regular | Noise cancelling | Average | 30Hz-20Khz | € 50 |
| 5 | 42 |  | Fancy | Bass boost | Superior | 50Hz-18Khz | € 150 |
| 5 | 43 |  | Fancy | None | Superior | 15Hz-30Khz | € 50 |
| 5 | 43 |  | Regular | Noise cancelling | Fragile | 30Hz-20Khz | € 100 |
| 5 | 44 |  | Fancy | Bass boost | Superior | 30Hz-20Khz | € 150 |
| 5 | 44 |  | Regular | None | Fragile | 50Hz-18Khz | € 100 |
| 5 | 45 |  | Fancy | Noise cancelling | Fragile | 30Hz-20Khz | € 100 |
| 5 | 45 |  | Regular | None | Superior | 50Hz-18Khz | € 50 |
| 5 | 46 |  | Regular | Bass boost | Fragile | 15Hz-30Khz | € 100 |
| 5 | 46 |  | Fancy | Noise cancelling | Superior | 30Hz-20Khz | € 50 |
| 5 | 47 |  | Regular | Noise cancelling | Superior | 15Hz-30Khz | € 50 |
| 5 | 47 |  | Fancy | None | Fragile | 30Hz-20Khz | € 150 |
| 5 | 48 |  | Regular | None | Average | 50Hz-18Khz | € 150 |
| 5 | 48 |  | Fancy | Bass boost | Fragile | 15Hz-30Khz | € 50 |
| 5 | 49 |  | Regular | Bass boost | Superior | 30Hz-20Khz | € 50 |
| 5 | 49 |  | Fancy | Noise cancelling | Average | 15Hz-30Khz | € 150 |
| 5 | 50 |  | Regular | None | Fragile | 15Hz-30Khz | € 100 |
| 5 | 50 |  | Fancy | Noise cancelling | Average | 50Hz-18Khz | € 150 |
| 6 | 51 |  | Regular | Bass boost | Fragile | 15Hz-30Khz | € 150 |
| 6 | 51 |  | Fancy | None | Average | 30Hz-20Khz | € 100 |
| 6 | 52 |  | Fancy | None | Average | 15Hz-30Khz | € 100 |
| 6 | 52 |  | Regular | Bass boost | Fragile | 30Hz-20Khz | € 150 |
| 6 | 53 |  | Fancy | Bass boost | Fragile | 50Hz-18Khz | € 100 |
| 6 | 53 |  | Regular | None | Superior | 15Hz-30Khz | € 150 |
| 6 | 54 |  | Regular | Bass boost | Fragile | 50Hz-18Khz | € 50 |
| 6 | 54 |  | Fancy | Noise cancelling | Superior | 15Hz-30Khz | € 100 |
| 6 | 55 |  | Regular | Noise cancelling | Average | 15Hz-30Khz | € 50 |
| 6 | 55 |  | Fancy | Bass boost | Fragile | 30Hz-20Khz | € 100 |
| 6 | 56 |  | Regular | None | Fragile | 50Hz-18Khz | € 50 |
| 6 | 56 |  | Fancy | Bass boost | Average | 15Hz-30Khz | € 100 |
| 6 | 57 |  | Regular | Bass boost | Superior | 50Hz-18Khz | € 100 |
| 6 | 57 |  | Fancy | None | Average | 15Hz-30Khz | € 50 |
| 6 | 58 |  | Regular | Bass boost | Fragile | 30Hz-20Khz | € 50 |
| 6 | 58 |  | Fancy | None | Superior | 15Hz-30Khz | € 150 |
| 6 | 59 |  | Regular | Bass boost | Average | 30Hz-20Khz | € 50 |
| 6 | 59 |  | Fancy | Noise cancelling | Superior | 50Hz-18Khz | € 150 |
| 6 | 60 |  | Regular | None | Average | 50Hz-18Khz | € 50 |
| 6 | 60 |  | Fancy | Bass boost | Superior | 30Hz-20Khz | € 150 |
| 7 | 61 |  | Regular | Noise cancelling | Superior | 30Hz-20Khz | € 150 |
| 7 | 61 |  | Fancy | Bass boost | Average | 15Hz-30Khz | € 50 |
| 7 | 62 |  | Regular | Noise cancelling | Fragile | 15Hz-30Khz | € 100 |
| 7 | 62 |  | Fancy | None | Superior | 50Hz-18Khz | € 50 |
| 7 | 63 |  | Regular | Noise cancelling | Fragile | 15Hz-30Khz | € 50 |
| 7 | 63 |  | Fancy | None | Superior | 50Hz-18Khz | € 150 |
| 7 | 64 |  | Regular | Noise cancelling | Superior | 15Hz-30Khz | € 150 |
| 7 | 64 |  | Fancy | Bass boost | Fragile | 30Hz-20Khz | € 50 |
| 7 | 65 |  | Fancy | None | Average | 50Hz-18Khz | € 150 |
| 7 | 65 |  | Regular | Bass boost | Superior | 15Hz-30Khz | € 50 |
| 7 | 66 |  | Regular | None | Fragile | 15Hz-30Khz | € 50 |
| 7 | 66 |  | Fancy | Bass boost | Average | 50Hz-18Khz | € 100 |
| 7 | 67 |  | Fancy | Noise cancelling | Superior | 15Hz-30Khz | € 100 |
| 7 | 67 |  | Regular | None | Average | 50Hz-18Khz | € 150 |
| 7 | 68 |  | Fancy | Bass boost | Fragile | 15Hz-30Khz | € 50 |
| 7 | 68 |  | Regular | Noise cancelling | Average | 30Hz-20Khz | € 150 |
| 7 | 69 |  | Fancy | Bass boost | Superior | 30Hz-20Khz | € 50 |
| 7 | 69 |  | Regular | None | Average | 50Hz-18Khz | € 100 |
| 7 | 70 |  | Regular | Noise cancelling | Average | 30Hz-20Khz | € 50 |
| 7 | 70 |  | Fancy | Bass boost | Superior | 50Hz-18Khz | € 100 |
| 8 | 71 |  | Fancy | Bass boost | Superior | 50Hz-18Khz | € 50 |
| 8 | 71 |  | Regular | None | Fragile | 30Hz-20Khz | € 100 |
| 8 | 72 |  | Regular | Bass boost | Fragile | 15Hz-30Khz | € 150 |
| 8 | 72 |  | Fancy | Noise cancelling | Superior | 50Hz-18Khz | € 50 |
| 8 | 73 |  | Fancy | Bass boost | Fragile | 50Hz-18Khz | € 100 |
| 8 | 73 |  | Regular | Noise cancelling | Average | 15Hz-30Khz | € 50 |
| 8 | 74 |  | Fancy | Bass boost | Average | 15Hz-30Khz | € 150 |
| 8 | 74 |  | Regular | None | Superior | 50Hz-18Khz | € 50 |
| 8 | 75 |  | Regular | Noise cancelling | Average | 30Hz-20Khz | € 50 |
| 8 | 75 |  | Fancy | Bass boost | Fragile | 50Hz-18Khz | € 150 |
| 8 | 76 |  | Regular | Noise cancelling | Fragile | 50Hz-18Khz | € 150 |
| 8 | 76 |  | Fancy | None | Average | 15Hz-30Khz | € 100 |
| 8 | 77 |  | Regular | Bass boost | Average | 50Hz-18Khz | € 150 |
| 8 | 77 |  | Fancy | Noise cancelling | Superior | 30Hz-20Khz | € 100 |
| 8 | 78 |  | Regular | Bass boost | Average | 50Hz-18Khz | € 100 |
| 8 | 78 |  | Fancy | Noise cancelling | Superior | 15Hz-30Khz | € 150 |
| 8 | 79 |  | Regular | None | Superior | 30Hz-20Khz | € 150 |
| 8 | 79 |  | Fancy | Noise cancelling | Fragile | 50Hz-18Khz | € 50 |
| 8 | 80 |  | Regular | None | Superior | 15Hz-30Khz | € 50 |
| 8 | 80 |  | Fancy | Bass boost | Fragile | 30Hz-20Khz | € 150 |
| 9 | 81 |  | Regular | None | Superior | 50Hz-18Khz | € 100 |
| 9 | 81 |  | Fancy | Bass boost | Average | 15Hz-30Khz | € 150 |
| 9 | 82 |  | Fancy | Noise cancelling | Average | 50Hz-18Khz | € 150 |
| 9 | 82 |  | Regular | Bass boost | Fragile | 15Hz-30Khz | € 50 |
| 9 | 83 |  | Fancy | None | Fragile | 30Hz-20Khz | € 150 |
| 9 | 83 |  | Regular | Noise cancelling | Superior | 50Hz-18Khz | € 50 |
| 9 | 84 |  | Fancy | Noise cancelling | Average | 30Hz-20Khz | € 100 |
| 9 | 84 |  | Regular | None | Fragile | 50Hz-18Khz | € 150 |
| 9 | 85 |  | Regular | Bass boost | Fragile | 15Hz-30Khz | € 150 |
| 9 | 85 |  | Fancy | Noise cancelling | Average | 50Hz-18Khz | € 100 |
| 9 | 86 |  | Fancy | Noise cancelling | Average | 50Hz-18Khz | € 50 |
| 9 | 86 |  | Regular | Bass boost | Superior | 15Hz-30Khz | € 100 |
| 9 | 87 |  | Regular | Bass boost | Average | 50Hz-18Khz | € 50 |
| 9 | 87 |  | Fancy | None | Superior | 30Hz-20Khz | € 100 |
| 9 | 88 |  | Regular | Noise cancelling | Fragile | 30Hz-20Khz | € 50 |
| 9 | 88 |  | Fancy | None | Superior | 15Hz-30Khz | € 100 |
| 9 | 89 |  | Fancy | None | Superior | 30Hz-20Khz | € 100 |
| 9 | 89 |  | Regular | Noise cancelling | Fragile | 15Hz-30Khz | € 150 |
| 9 | 90 |  | Regular | Bass boost | Fragile | 50Hz-18Khz | € 100 |
| 9 | 90 |  | Fancy | Noise cancelling | Average | 15Hz-30Khz | € 50 |
| 10 | 91 |  | Regular | Noise cancelling | Average | 30Hz-20Khz | € 150 |
| 10 | 91 |  | Fancy | Bass boost | Fragile | 50Hz-18Khz | € 50 |
| 10 | 92 |  | Fancy | Noise cancelling | Fragile | 15Hz-30Khz | € 100 |
| 10 | 92 |  | Regular | None | Average | 30Hz-20Khz | € 150 |
| 10 | 93 |  | Regular | Noise cancelling | Fragile | 30Hz-20Khz | € 100 |
| 10 | 93 |  | Fancy | None | Superior | 50Hz-18Khz | € 50 |
| 10 | 94 |  | Regular | Bass boost | Average | 15Hz-30Khz | € 100 |
| 10 | 94 |  | Fancy | Noise cancelling | Fragile | 50Hz-18Khz | € 150 |
| 10 | 95 |  | Regular | Noise cancelling | Superior | 50Hz-18Khz | € 100 |
| 10 | 95 |  | Fancy | None | Fragile | 15Hz-30Khz | € 150 |
| 10 | 96 |  | Regular | None | Average | 50Hz-18Khz | € 100 |
| 10 | 96 |  | Fancy | Bass boost | Superior | 30Hz-20Khz | € 50 |
| 10 | 97 |  | Regular | Bass boost | Average | 30Hz-20Khz | € 150 |
| 10 | 97 |  | Fancy | Noise cancelling | Fragile | 15Hz-30Khz | € 100 |
| 10 | 98 |  | Regular | None | Fragile | 15Hz-30Khz | € 50 |
| 10 | 98 |  | Fancy | Noise cancelling | Superior | 30Hz-20Khz | € 150 |
| 10 | 99 |  | Regular | Noise cancelling | Fragile | 50Hz-18Khz | € 100 |
| 10 | 99 |  | Fancy | None | Superior | 15Hz-30Khz | € 50 |
| 10 | 100 |  | Fancy | None | Fragile | 30Hz-20Khz | € 150 |
| 10 | 100 |  | Regular | Bass boost | Superior | 15Hz-30Khz | € 50 |