

**INDIAN INSTITUTE OF TECHNOLOGY ROORKEE**

**NPTEL**

**NPTEL ONLINE CERTIFICATION COURSE**

**Marketing Research**

**Lec – 40**

**Conjoint Analysis**

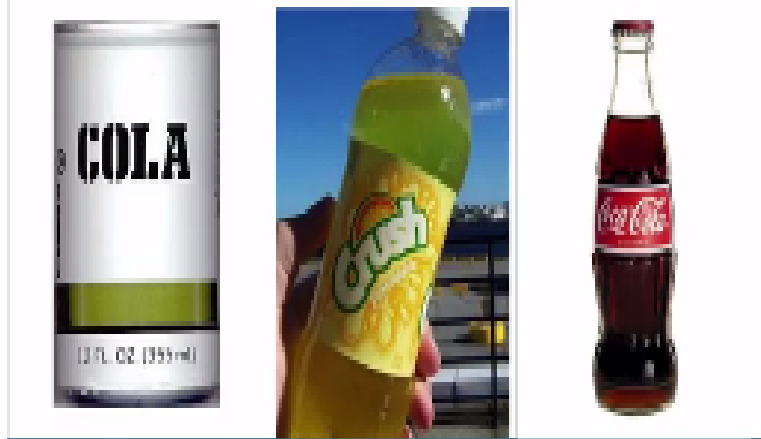
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Welcome everyone to the session of the marketing message and analysis, today we are going to discuss on something, in the last session we discussed about multidimensional scaling and its importance, today we are discussing something similar, a tool, a technique which is highly utilized by marketers. In fact you do not see too much of theoretical research in this but its practical utility is extremely high, extremely high.

So this technique that we are going to talk about is known as conjoint analysis. So, conjoint analysis is a technique where a marketer identifies the possible combinations of several attributes and then which attribute is going to be, or which combination is going to be the most, having the highest value and most sought after combination in terms of the customers point of view. So to do this conjoint analysis is highly used. Now there is a choice, for example let us see there are three colas available in three different packs.

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## Choice



One is you can see, there are three different price levels, maybe the quantity is different so when a person decides to buy or a customer decides to buy how does he make a choice? So today you must be seeing companies coming up with something called deco effect where they do nothing else but they make several combinations of attributes and then try to place in front of the customers.

So that the customer then identifies that which one he likes most and most of the, and the one which is mostly in demand that becomes a product more in demand for the marketer and so that he can maybe streamline his production and his supply chain according to the demand of the market. So, what is this conjoint analysis?

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## What is Conjoint Analysis?

- Research technique developed in early 70s
- Measures how buyers value **components** of a product/service bundle
- Dictionary definition-- "Conjoint: Joined together, combined."
- Marketer's catch-phrase-- "Features **CONsidered JOINTly**"

It is a technique developed in the early 70's, it measures how buyers value components of a product or service as a service bundle, product bundle or service bundle. That means you are not talking about, when you are talking about a product you are not talking about individual compartments, like the product, the value of the cost of the product or the amount of its size or its volume or something or nothing like that.

Rather when a person or a customer selects a product he finally selects it on the basis of a combination or a bundle of benefits and he makes his own comparison like a tradeoff, he maybe, he likes A but in a combination of a and let's say x he does not like it and suddenly he prefers something which is less preferable than a which was b but with the combination of let's say x or y.

So the person's ability to finally select a product changes with his total holistic thinking, that means what individually he may have liked, maybe it does not happen when you take in totality the entire, all attributes. So what is the definition? It says conjoint is joined together or combined so it's a combination so and no product has individual features, all products have individual features but they are available in the combination.

So in the combination finally how does a person select a combined attribute or benefit of attribute or combined bundle of attributes, so features considered jointly, marketers say it is as features considered jointly.

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## How Does Conjoint Analysis Work?

- We vary the product/service features (independent variables) to build many (usually 12 or more) product concepts
- We ask respondents to **rate/rank** or **choose among a subset** of those product concepts (dependent variable)
- Based on the respondents' evaluations of the product concepts, we figure out how much unique value (utility) each of the features (attributes) added
- (Regress dependent variable on independent variables; estimated betas equal to part worth utilities.)

So, how does conjoint analysis work? We value the product or service features which has the independent variables to build many product concepts, so what does the marketer do, the marketer combines in different combinations all the attributes which are the independent variables.

Basically for example in case of a let us say a cool drink, a soft drink the price, the packaging, the color, the volume or the amount of soft drinks, this could be the four features, four attributes. Each attribute has got several levels, you can understand like factors, each factor has several variables.

Similarly here each attributes has got several levels, so it could be 500ml, it could be 250ml, 1000ml, similarly, and in color it could be green, it could be red, different colors. So we ask the respondents to rate or rank or choose among the subset of the product concepts which are the dependent variable, so the dependent variable is your choice, your final choice, so what is your ranking or what is your choice among those various combinations which combination do you like most?

Let us say, he says a particular combination of materials, he says is no.1, and similarly some other he would say is 2. Let me explain it with an example. Let us say the attributes could be on the basis of price, volume, let us say a color, I am taking only three, so price is let us say Rs 100,

Rs 50, let us say Rs 75, volume is let us say 1000ml, this is let us say 400ml, this is let us say 750ml.

This is let us say color is green, red, and blue. Now there could be several combinations and now at least there are 3, 3, 3, so 3, 3, 3 let us say 27, so 27 combination is possible but then the question is how many, which one is most preferable for the consumers? So, so the choice, he makes a choice, let us say the price, let us say he make a particular combination as his choice and he says as rank 1, this is rank 2, this is rank 3.

So whatever the ranks, so these are the ranks which he is giving finally, so based on the respondents figure, evaluation of the product concepts we figure out how much unique value. Or utility or which is the part worth functions which we say as unique value or utility or part worth function each of the features added, that means the particular feature added with not there, what would have happened?

When it is present what would have happening, so its presence or absence will impact the utility value of the entire function. So regress dependent variables on the independent variables and estimated betas equal to the part worth utility, so the part worth utility is the ultimate utility and the ultimate utility is the summation of the part worth utility.

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## What's So Good about Conjoint?

- + More realistic questions:

Which product would you prefer . . .

- 210 horsepower	or	- 140 horsepower
- 17 MPG		- 28 MPG


- + If choose left, you prefer Power. If you choose right, you prefer Fuel Economy
- + Rather than ask directly whether you prefer Power over Fuel Economy, we present realistic tradeoff scenarios and infer preferences from your product choices

So, let us see this case, what is so good about conjoint, more realistically which product will you prefer, you want a 210 horse power and 70 mpg or 140 horse power with 28 mpg? Now suppose somebody says he will choose the left one 210 that means he is preferring power, but if he chooses the right one then he is preferring the fuel economy.

So the point is on the basis of this marketers can identify what customers want and accordingly they can place their products. Rather than ask directly whether you would prefer power or fuel economy will present realistic trade off scenarios and infer preferences about the product choices of the respondents.

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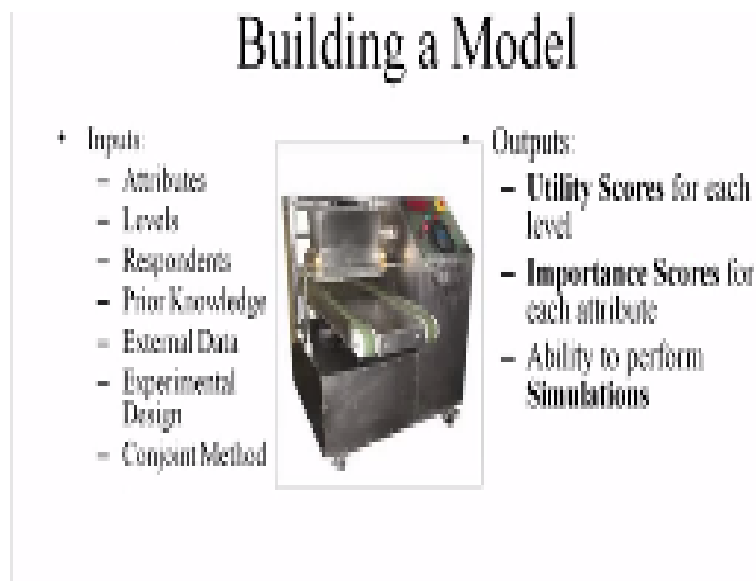
## What's So Good about Conjoint? (cont.)

- When respondents are forced to make difficult tradeoffs, we learn what they truly value 
- These values (utility scores) are associated with specific and actionable attribute levels relevant to the problem at hand

When respondents are forced to make difficult trade off, when you are not given an option and you are asked to make a choice, there you have to make a real difficulties in life, you want to watch a movie or you want to play a game of cricket so you cannot do both because you will only be given to choose one, because rest of the time the student has to study.

For example the parent says you need to study so either you choose cricket or you choose a movie, which one would you like to see? So there it is a difficult tradeoff for the student. So we learn here what is true value, suppose the students says I would like to play a game of cricket then it means that he values cricket over movies. These values are associated with the specific and actionable attribute labels relevant to the problem.

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Now let us see this case, this is a building a model, this is where conjoint analysis comes into play, so the inputs are attributes, that various attributes, size, price, all these levels, each attributes have several levels, respondents, their prior knowledge, external data, experimental design, and finally conjoint method. Outputs are the utility scores for each level so what does the score, the particular level, different levels the scores are available to the marketer.

Importance course for each attribute, so how important is a particular attribute and finally the ability to perform simulations, that means if I bring in a new respondent can I found out on basis of its, the part functions can I say this whether the new customer or the new respondent would prefer the product or not.

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## Defining Attributes

- Attributes are independent aspects of a product or a service (Brand, Price, Size, Color etc.)
- How many attributes?
- -Depends on research objectives
  - One rule of thumb was that no more than 6 (or 7) attributes is too much
    - May cause respondents to simplify, listing only a 2-3 most important
- Attributes should be independent, mutually exclusive
  - Brand, quality and product life expectancy may all measure the same thing
- Each attribute has varying degrees, or "levels"
  - Cost: \$1, \$2, \$3
- Each level is assumed to be mutually exclusive of the others (a program has one and only one level of that attribute)

So defining attributes, attributes are nothing but the independent aspects of a product or service, so brand, price, color, size etcetera. How many attributes should you take, this is the important question, so the rule of thumb is the number of attributes should be maximum up to 7, so you do not go more than 7, more than 6 or 7 as it says because if you take too many attributes with this number of levels it becomes more complicated.

So 2 to 3 is I think ideal, attributes should be independent and mutually exclusive, there is no doubt, this should be clear from each other. Each attribute has varying degrees or levels, so let us say in terms of price if you can see 1\$, 2\$, 3\$, color, green, black, blue for example are the three different levels, Each level is assumed to be mutually exclusive again, so that a program has only one level for that attribute.



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## Rules for Formulating Attribute Levels

- Attributes are assumed to be mutually exclusive
  - Attribute: Add-on features
  - Level 1= Sun roof
  - Level 2= GPS system
  - Level 3=DVD player
  - If you define levels in this way, you cannot determine the value of providing 2 or 3 of these features at the same time (or none of them)

So attributes are assumed to be mutually exclusive, attribute add on features, level one, sun roof for example, level 2 gps system, level 3 a dvd player, so if you define levels in this way you cannot determine the value of providing 2 or 3 features at the same time or none of them, so the question is how do you formulate the attributes or the levels? Let us see.

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# Solutions

- 8 level Attribute:
- Features
  - None
  - Sunroof
  - GPS system
  - DVD Player
  - Sunroof, GPS
  - Sunroof, DVD
  - GPS, DVD
  - Sunroof, GPS, DVD
- 3 Binary Attributes:
  - Sunroof:
    - None
    - Sunroof
  - GPS System
    - None
    - GPS
  - DVD Player
    - None
    - DVD Player

For the solution for a 8 level attribute for example if you can see, now this is the 8 level attribute so the features are, there are no features, sunroof, gps system, dvd player, sunroof and gps, sunroof and dvd, gps and dvd, sunroof, gps and dvd all together. So all the 8 are different levels, so the binary features whereas you can see binary attributes, sunroof none are there, gps system none there, dvd player none there, so this is the presence or absence of a binary attribute.

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## Rules for Formulating Attribute Levels

- Don't include too many levels for any one attribute
  - The usual number is about 3-5 levels per attribute
  - Make sure levels from your attributes can combine freely with one another without resulting in utterly impossible combinations (very unlikely combinations OK)

So this is how you formulate the attribute levels, don't include too many levels for any one attribute, if you include it becomes complicated. So the number of attributes is 3 to 5 per level of attributes, here 6 to 7 attributes maximum and 3 to 5 levels maximum, so in a maximum if I can understand  $7*5=35$  there should be a combination for only one case. Make sure levels from the attributes can combine freely with one another resulting in utterly impossible combinations, without resulting utterly impossible combinations.

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## Attribute Examples

<u>Cost</u>	<u>Brand</u>	<u>Color</u>
\$1	A	Red
\$2	B	Black
\$3	C	Blue

*...or graphics as well can be levels.*

Now let us see this case, on the basis of cost there are three levels, brand there are three levels, color there are three levels.

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## Suggestions for Determining Which Attributes & Levels to Include

- Talk to all stakeholders
- Focus Groups
- Search of competitors websites, sales materials

Suggestions for determining which attributes and levels to include, how do you identify which attributes should I and which levels should I include. Simple, talk to the stakeholders, the people who are involved, the customers, the managers in the company, the different people through a focus group interview, we have done focus group in qualitative research such as competitors websites and what they are doing now, so this will help you to determine which attributes to include and which one not to include.

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## Conjoint Utilities (Part Worths)

- Numeric values that reflect how desirable different features are:

Feature	Utility
Vanilla	2.5
Chocolate	1.8
25¢	5.3
35¢	3.2
50¢	1.4

- The higher the utility, the better

Now conjoint utilities that are called part worth which I said, so numerical values that reflect how desirable different features are. For example look at this case, now vanilla, chocolate, and price levels are 25 cents, 35 cents, 50 cents, the utilities are 2.5, 1.8, 5.3, and 3.2, so the higher the utility the better, why, because it simply works as the regression function so like the beta weights.

So if you have the higher beta weights automatically the total utility, because the total utility is something like  $u = \text{summation of } \alpha$ ,  $\alpha$  is the part function, is the part worth function, so if you have the utility if your  $\alpha$  values are high the coefficients are high automatically the total utility will be high.

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## Market Simulation Example

- Predict market shares for 35¢ Vanilla cone vs. 25¢ Chocolate cone for Respondent #1:

$$\begin{array}{l} \text{Vanilla (2.5) + 35¢ (3.2)} \quad = 5.7 \\ \text{Chocolate (1.8) + 25¢ (5.3)} \quad = 7.1 \end{array}$$

- + Respondent #1 "chooses" 25¢ Chocolate cone!
- + Repeat for rest of respondents...

So predict as market share for 30 cents vanilla account versus 25 cents chocolate cone, this is how the conjoint analysis work, so the vanilla, let us go back, you have 2.5, chocolate is 1.8 right so 2.5 plus 35 cents was 3.2 so 3.2, that is equal to 5.7. For the chocolate it is 1.8 from the chocolate part and from the 25 cents that is the price function it is 5.3.

Now look at it, although people do not, might be preferring chocolate but with the combination of the price that 25 cents suddenly the whole utility value has drastically changed and vanilla which was the preferred taste has gone down and the chocolate which was the less prefer taste has gone up and the total utility has become 7.1.

So the respondent sources 25 cent chocolate cone over the vanilla. So this can be repeated for the rest of the respondents and understanding can be developed, how does the marketer, how does the respondent makes his choice, makes his combinations.

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## Conjoint Analysis - Example

*In a popular example of conjoint analysis (Green and Wind, 1973), a company interested in marketing a new carpet cleaner wants to examine the influence of five factors on consumer preference - package design, brand name, price, a Good Housekeeping seal, and a money-back guarantee.*

So this is a popular example we have brought from, this is from Green and Wind is a marketing research book which is very, very popular book, you can reserve, so this book is, I have used also myself when I was a student from that day, a company interested in make marketing a new carpet cleaner wants to examine the influence of five factors, what are the five factors, package, design, brand, name, price, a good housekeeping seal and a money back guarantee. Now this 5 features he has taken right.

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## Conjoint Analysis - Example

There are three factor levels for package design, each one differing in the location of the applicator brush; three brand names (K2R, Glory, and Bissell); three price levels; and two levels (either no or yes) for each of the last two factors. The following table displays the variables used in the carpet-cleaner study, with their variable labels and values.

Variable Name	Variable Label	Variable Value
Package	package design	A, B, C
Brand	brand name	K2R, Glory, Bissell
Price	price	\$19.99, \$29.99, \$39.99
Seal	anti-moisture/seal	yes, no
Money	money back guarantee	yes, no

The three factor levels for package design, in each one deferring the location of the applicator brush, three brand names, three price levels, you can see here, so the package, the levels are A B C brand K2R, Glory, Bissell. Price, three again levels, seal, yes or no if it is there, yes, no, zero, so it is a kind of binary, money yes or no, either money back guarantee is there or it is not there.

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# Conjoint Analysis

There could be other factors and factor levels that characterize carpet cleaners, but these are the only ones of interest to management. This is an important point in conjoint analysis. You want to choose only those factors (independent variables) that you think most influence the subject's preference (the dependent variable). Using conjoint analysis, you will develop a model for customer preference based on these five factors.

Now there could be other factors and factor level that characterized the corporate cleaners but these are the only once of the interest to the management see the question is there could be several attributes but the question is we can take into play all the attributes it becomes extremely complex so what are the most important once we have selected them right.

So these are important point conjoint analysis you need to indentify the most important ones right you want to choose only those factors that you think mostly influence the subject preference using conjoint analyzes you will develop a model for customer preference based on these five factors so these five factors that we have chosen now on the basis of this five factors we will see how are the consumers they making a choice.

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# Conjoint Analysis

The first step in a conjoint analysis is to create the combinations of factor levels that are presented as product profiles to the subjects. Since even a small number of factors and a few levels for each factor will lead to an unmanageable number of potential product profiles, you need to generate a representative subset known as an orthogonal array.

So, the first step in the conjoint analyze is to create a combination of a the factor levels that are presented as a product profile to the subjects right since even a small number factors and a few levels for each factors will lead to unmanageable number of potential profiles you need to generate the representative subset known as an orthogonal array now what is that mean so if you have so many combinations.

Then it could be a huge built up right and you cannot do it so it is better to have something which is orthogonal means completely opposite not opposite they do not meet that means parallel to each other right so the 90 degree to each other so those representative only we will take those subsets which are exclusive extremely exclusive mutually exclusive right.

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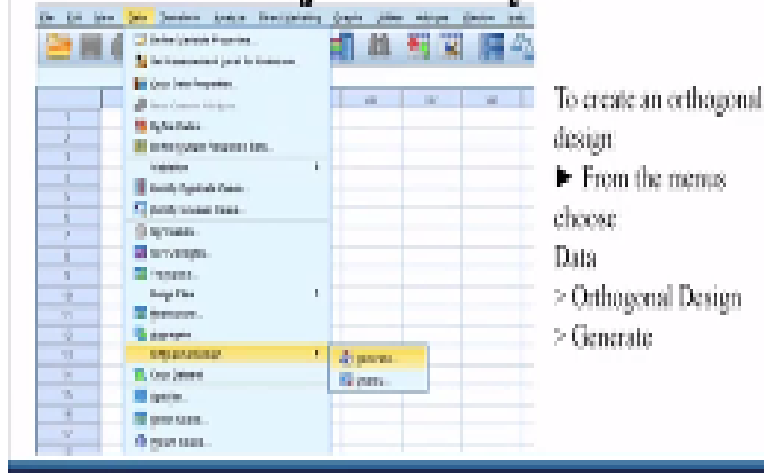
## Conjoint Analysis

The "Generate Orthogonal Design" procedure creates an orthogonal array - also referred to as an orthogonal design - and stores the information in a data file. Unlike most procedures, an active dataset is not required before running the Generate Orthogonal Design procedure. If you do not have an active dataset, you have the option of creating one, generating variable names, variable labels, and value labels from the options that you select in the dialog boxes. If you already have an active dataset, you can either replace it or save the orthogonal design as a separate data file.

So, was to generate the orthogonal design procedure which is orthogonal design what is done is we can create one right if you already have a active data's you can either replace it or save the orthogonal design or create a orthogonal date file right so I will show through a file how do you do it right theoretically you have understood key that you have make several combinations right and then you can say which combination is the most preferred combination right so one two three so several combination 27 combination can come right.

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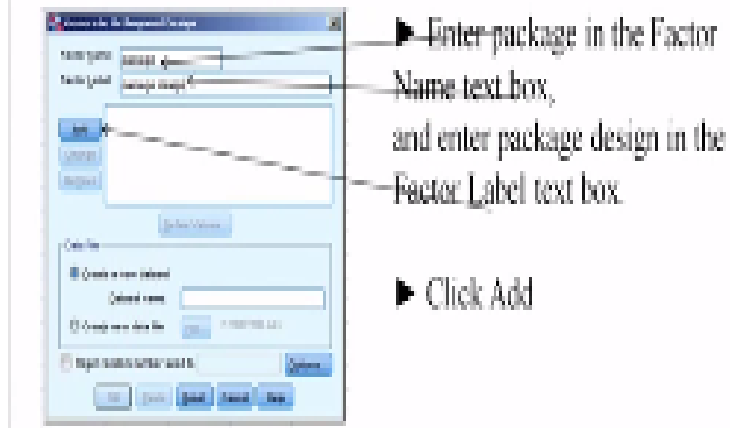
# Conjoint Analysis



Let see this conjoint analyze so to do that go to data orthogonal design and then generate right so I have in steps so that if ever you want to do conjoint analyses you do not want you do not have to search for the steps right it becomes easier for you to do it so this is on SPSS.

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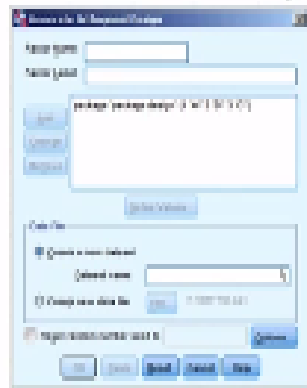
# Conjoint Analysis



So, once you have suppose for the package for example package so the label of the package is package design you name it and start adding right so how does it look a package design this creates the item level package design select this item ok and define the values here so one let's say one is A two is B three is C.

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# Conjoint Analysis



You'll now want to repeat this process for the remaining factors,  
brand, price, seal, and money.

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Similarly you can do it for the other factors also remaining factors like brand price seal and money.

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# Conjoint Analysis

Use the values and labels from the following table, which includes the values you've already entered for package.

Attribute	Attribute Label	Level 1	Level 2
Brand	Unleashed	1 1 1	1 1 1 1
Brand	Unleashed	1 1 1	1 1 1 1 1 1 1 1
Price	Price	1 1 1 1 1 1 1 1	1 1 1 1 1 1 1 1
Seal	Seal (Money Back)	1 1	1 1 1 1
Warranty	Warranty (Money Back)	1 1	1 1 1 1

So, this is how it will look like finally you can see this phase right this is how it will look like so package design three brand name 1 K2R to 2 glory 3 Bissell price similarly 1 2 3 we have again three levels ok seal 1 is no 2 is yes money back 1 is no 2 is yes so you can do this right.

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# Conjoint Analysis

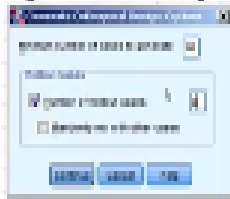
Generating an orthogonal design requires a set of random numbers. If you want to duplicate a design - in this case, the design used for the present case study - you need to set the seed value before you generate the design and reset it to the same value each subsequent time you generate the design. The design used for this case study was generated with a seed value of 2000000. This value is essential to ensure repeat analysis will reproduce identical results.

And once you have created this data set right so what you do is we do a random number you know for iteration we use it but you may not you can kept it a default which is 2 lakhs right what is done is new data file is created out here now this new data file of interest to us right yes but one thing is important when you are creating new data.

And once you created a new data file please understand that too for the validity of the test that what you have tested is valid and highly is valid thing you have to split the data file into two parts the one part is where you are doing the normal analyses and other part is called the hold out part as we are done in other MDS also we have done MDS and other things so sorry so this is called the holed out case.

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# Conjoint Analysis

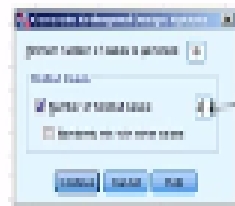


By default, the minimum number of cases necessary for an orthogonal array is generated. The procedure determines the number of cases that need to be administered to allow estimation of the utilities. You can also specify a minimum number of cases to generate, as you've done here. You might want to do this because the default number of minimum cases is too small to be useful or because you have experimental design considerations that require a certain minimum number of cases.

So, the data file will have now two data files one is holder and other one is the one which are using right so once you have done it right then you can run the analyses.

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# Conjoint Analysis



► Select Number of holdout cases and type 4.

Holdout cases are judged by the subjects but are not used by the conjoint analysis to estimate utilities. They are used as a check on the validity of the estimated utilities. The holdout cases are generated from another random plan, not the experimental orthogonal plan.

So, let me go to the file so this is how the final file look like right the final file will look something like this.

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# Conjoint Analysis

	price	brand	size	wt	color	MPG_C	MPG_H
1	1.00	1.00	1.00	1.00	1.00	1.00	1.00
2	1.00	2.00	1.00	1.00	1.00	1.00	1.00
3	1.00	3.00	1.00	1.00	1.00	1.00	1.00
4	1.00	4.00	1.00	1.00	1.00	1.00	1.00
5	1.00	5.00	1.00	1.00	1.00	1.00	1.00
6	1.00	1.00	2.00	1.00	1.00	1.00	1.00
7	1.00	1.00	3.00	1.00	1.00	1.00	1.00
8	1.00	1.00	4.00	1.00	1.00	1.00	1.00
9	1.00	1.00	5.00	1.00	1.00	1.00	1.00
10	1.00	2.00	2.00	1.00	1.00	1.00	1.00
11	1.00	2.00	3.00	1.00	1.00	1.00	1.00
12	1.00	2.00	4.00	1.00	1.00	1.00	1.00
13	1.00	2.00	5.00	1.00	1.00	1.00	1.00
14	1.00	3.00	2.00	1.00	1.00	1.00	1.00
15	1.00	3.00	3.00	1.00	1.00	1.00	1.00
16	1.00	3.00	4.00	1.00	1.00	1.00	1.00
17	1.00	3.00	5.00	1.00	1.00	1.00	1.00
18	1.00	4.00	2.00	1.00	1.00	1.00	1.00
19	1.00	4.00	3.00	1.00	1.00	1.00	1.00
20	1.00	4.00	4.00	1.00	1.00	1.00	1.00
21	1.00	4.00	5.00	1.00	1.00	1.00	1.00
22	1.00	5.00	2.00	1.00	1.00	1.00	1.00
23	1.00	5.00	3.00	1.00	1.00	1.00	1.00
24	1.00	5.00	4.00	1.00	1.00	1.00	1.00
25	1.00	5.00	5.00	1.00	1.00	1.00	1.00

So, 1 2 3 4 5 ok so data we have already done it am I going back so this is the how you have done it so listing of experiments so you have taken the five factors lets go back once so now so you have your display or from the menu choose the data orthogonal design display go to display and then this factors you take it here right select package brand for factors right format is listing off for experiment.

Because it is an experimental design correct you are experimenting this is purely the experimental design like 23:01 analyzes of variants you are trying to experiment which combination is going to be the most give you the highest worth utility or highest utility or part worth function ok so orthogonal is end click ok so the output resembles the look of the orthogonal design as shown in the data editor one row for each profile with the factors as the columns so the factors or these are the factors 1 2 3 4 5.

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# Conjoint Analysis

	Car	Price	Color	MPG	Weight	Year	Brand	Response
1	1.0	10000	Red	15	1500	1990	Ford	10
2	2.0	12000	Blue	18	1800	1991	Toyota	15
3	3.0	14000	Green	20	2000	1992	Honda	20
4	4.0	16000	Yellow	22	2200	1993	Nissan	25
5	5.0	18000	Purple	25	2500	1994	Subaru	30
6	6.0	20000	Orange	28	2800	1995	Volkswagen	35
7	7.0	22000	Pink	30	3000	1996	BMW	40
8	8.0	24000	Grey	32	3200	1997	Audi	45
9	9.0	26000	Black	35	3500	1998	Mercedes	50
10	10.0	28000	White	38	3800	1999	Porsche	55
11	11.0	30000	Silver	40	4000	2000	Volvo	60
12	12.0	32000	Gold	42	4200	2001	Jeep	65
13	13.0	34000	Bronze	45	4500	2002	Dodge	70
14	14.0	36000	Copper	48	4800	2003	Chrysler	75
15	15.0	38000	Platinum	50	5000	2004	Ford	80
16	16.0	40000	Palladium	52	5200	2005	Toyota	85
17	17.0	42000	Rhodium	55	5500	2006	Honda	90
18	18.0	44000	Palladium	58	5800	2007	Nissan	95
19	19.0	46000	Rhodium	60	6000	2008	Subaru	100
20	20.0	48000	Palladium	62	6200	2009	Volkswagen	105
21	21.0	50000	Rhodium	65	6500	2010	BMW	110
22	22.0	52000	Palladium	68	6800	2011	Audi	115
23	23.0	54000	Rhodium	70	7000	2012	Mercedes	120
24	24.0	56000	Palladium	72	7200	2013	Porsche	125
25	25.0	58000	Rhodium	75	7500	2014	Volvo	130
26	26.0	60000	Palladium	78	7800	2015	Jeep	135
27	27.0	62000	Rhodium	80	8000	2016	Dodge	140
28	28.0	64000	Palladium	82	8200	2017	Chrysler	145
29	29.0	66000	Rhodium	85	8500	2018	Ford	150
30	30.0	68000	Palladium	88	8800	2019	Toyota	155

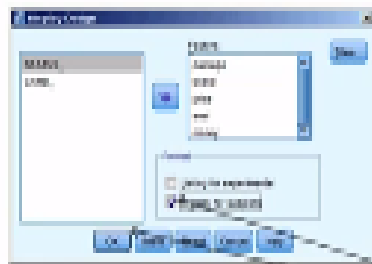
The output resembles the look of the orthogonal design as shown in the Data Editor—one row for each profile, with the factors as columns.

Notice, however, that the column headers are the variable labels rather than the variable names that you see in the Data Editor.

However the column editors are the variable levels rather than the variable names that you see in the data ok fine so this is the hold out case now when there is a hold out case that will be a foot not and it return and check it right so this is hold out case so the phases gives you two files ok now to display each profiles in a separate table what you can do is you can also see for each profile individually for the each respondent you can see key whether how it is what is there response right you can go for profile for subjects here can you see you can profile for subjects.

(Refer Slide Time: 24:09)

# Conjoint Analysis



To display each profile in a separate table:

▶ Click the Dialog Recall button and select Display Design.

▶ Deselect Listing for experimenter and select Profiles for subjects.

▶ Click OK.

So, deselect listing for experiment and select profile for subjects and click.

(Refer Slide Time: 24:17)

# Conjoint Analysis

The information for each product profile is displayed in a separate table. In addition, holdout cases are indistinguishable from the rest of the cases, so there is no issue of removing identifiers for holdouts as with the single table layout.

Profile Number 1

Case ID	Package Design	Brand Name	Price	Good Housekeeping Seal	Money Back Guarantee
1	1A	Glory	1.39	Yes	Yes

Profile Number 2

Case ID	Package Design	Brand Name	Price	Good Housekeeping Seal	Money Back Guarantee
2	2A	Bissell	1.99	No	No

So, this is what you will get so if you can look at these file the information for each product profile is displayed in a separate table in a profile number 1 say 1 this is 1 package design is 1A, glory brand name prices 1.39 housekeeping seal he wants it money back guarantee is not important similarly two package is an profile brand name is Bissell price is this one housekeeping seal not required money back guarantee not required.

So that process also you can do it for each case right so by doing that and then you can finally may be through a subjective analyzes interpretation you can see and tell key which is the one which is the which is mostly in demand and you can make a interpretation out of it or right so otherwise what you can do is you go the complete file right the complete file and find the utilities.

(Refer Slide Time: 25:09)

# Conjoint Analysis

Overall Statistics

		Utility	SE
Factor	Level	Utility	SE
product	A	1.123	0.050
	B	1.475	0.050
	C	1.275	0.050
brand	IBM	0.77	0.050
	Sony	1.05	0.050
	HP	0.87	0.050
	Other	0.00	0.050
price	11.99	-0.793	0.050
	13.99	-0.933	0.050
	15.99	-1.111	0.050
deal	no	0.000	0.050
	yes	0.000	0.050
warranty	no	1.150	0.050
	yes	1.350	0.050
Constant		1.110	0.050

This table shows the utility (part-worth) scores and their standard errors for each factor level. Higher utility values indicate greater preference.

So, this table the table which gives you the whole statistic table and utilities this table shows the utility or the part worth scores and their standard error for each factor level higher utility once you get the utility function which are the beta, for example I have said to you once you get the utility functions then you can from here you can calculate you know that the final the dependant value or the dependant score right so high utility values indicate greater preference so suppose for somebody says now for example here let's say package A.

I think there must be example let's see okay let's say package A then glory price 1.39 and seal yes and A yes so let say automatically by you putting in those values of utility function you can finally find the total value or total score and this score you can compare and say whether it is high or low higher utility value indicate greater preference because obviously the more the utility that means the people are finding more value in it right so obviously the preference would be higher for example look a this price now it's says there is inverse relationship routine price and utility higher prices corresponding to lower utility.

So once the going up the utility value is going down so that is not the desirable thing so similarly if you can look at seal right so if there is a seal then the utility function goes high the preference goes high for the respondent and similarly money back guarantee if it is there still I but you can see right there are some let us say for example the package B has got a very high positive value right similarly you can use this values ok this is already I have explained.

(Refer Slide Time: 27:11)



# Conjoint Analysis

Overall Statistics

		Utility Coefficient	Std. Error
package	A*	-1.111	.093
	B*	1.867	.097
	C*	.693	.093
brand	K2R	.367	.097
	Bissell	-1.188	.097
	Bissell	-1.173	.093
price	\$1.19	-4.585	.888
	\$1.19	-4.585	1.154
	\$1.19	-4.511	1.108
seal	no	2.088	.367
	yes	-1.598	.373
	yes	1.178	.367
Constant		12.158	1.852

Since the utilities are all expressed in a common unit, they can be added together to give the total utility of any combination.

For example, the total utility of a cleaner with package design B\*, brand K2R, price \$1.19, and no seal of approval or money-back guarantee is:

$$\text{utility}(\text{package B}^*) + \text{utility}(\text{K2R}) + \text{utility}(\$1.19) + \text{utility}(\text{no seal}) + \text{utility}(\text{no money-back}) + \text{constant}$$

$$1.867 + 0.367 + (-6.585) + 2.088 + 1.250 + 12.870 = 11.759$$

Now let us look at this since the utilities are all expressed in a common unit they can be added together that the beauty so I said utility is equal to, of alpha right so now the alpha is the part worth ok for example the total utility of a cleaner now look at this part the total utility of cleaner with package design B brand K2R price this much and no seal of a approval or money back guarantee is how much this not much let's see 1.867 now this is 1.867 B ok plus 0.367, 0.367 K2R.

This one, it adds on it comes to 11.759 suppose it says if the cleaner have the package design seal brand Bissell and come changes have been made now how much is the total utility function is coming is 10.909 so now this was 11.759 and that was that is 10.909 so obviously you can see from here that the utility function is growing with the change in it so in con joint analyze the most important is to calculate the utility functions right this utility sometimes you can use dummy variable coding also to use it. But let me not getting into it right now so but you need to calculate this coefficient and then do it right so now it is saying it has the range of the utility values for each factor provide the measure of how important the factor was to overall preference factor with greater utility play a more significant role then those with smaller ranges right so you can see this suppose factor this factor has minus 2.23.

1.867, 0.367 brand is this is one ok this much price yes you can look at the impact if you forget the negative and the positive sign take the absolute value price plays a very, very, very significant

role in impacting the preference right similarly seal also has an impact but if you look at the brand hardly it has got a very important role to play with ok so here the marketer can play with the consumer and its wants and then accordingly you can decide so this is the final beta portion.

(Refer Slide Time: 29:51)

## Conjoint Analysis

This table shows the linear regression coefficients for those factors specified as LINEAR (for IDEAL and ANTIIDEAL models, there would also be a quadratic term). The utility for a particular factor level is determined by multiplying the level by the coefficient. For example, the predicted utility for a price of \$1.19 was listed as -6.595 in the utilities table. This is simply the value of the price level, 1.19, multiplied by the price coefficient, -5.542.

Coefficients	
	In Utilities
	Estimate
price	-5.542
seal	1.25
money	1.19

So price point -5.542 seal is 2 money is 1.25 so these are the things that are very important in conjoint analysis so once you can do that conjoint analyze helps you to identify which is the best combination and which combination has got the highest utility function and then accordingly that can be placed to the market or before the market so that the consumers can you know so a greater demand and ultimately that also has an impact in doing a better forecasting as a marketer and streamlining your supply chain accordingly, right, okay that is all for the day. We have thank you so much. Well thank you very much.

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