UNIT 27 CONJOINT ANALYSIS

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27.1 INTRODUCTION

Conjoint Analysis is a popular marketing research technique that helps the marketers in understanding how people make choices between products or services or a combination of product and service. This helps in designing new products or services that better meet customers' underlying needs. Conjoint analysis has been found to be an extremely powerful of way of capturing what really drives customers to buy one product over another and what customers really value. We shall start our unit by discussing the developments in conjoint analysis in Section 27.2.

Conjoint analysis is a statistical technique used in market research to determine how people value different features that make up an individual product or service. The objective of conjoint analysis is to determine what combination of a limited number of attributes is most influential on respondent choice or decision making. A controlled set of potential products or services is shown to respondents and by analyzing how they make preferences between these products or services, the implicit valuation of the individual elements making up the product or service can be determined. These implicit valuations (utilities or part-worths) can be used to create market models that estimate market share, revenue and even profitability of new designs, which is discussed in Section 27.3. In Section 27.4, we shall focus on procedures of conjoint analysis and in Section 27.5, we shall describe the conjoint analysis models. In Section 27.6, use of fractional factorial plans in conjoint analysis is discussed with an example. At the end of this unit, we shall explain the application and disadvantages of conjoint analysis in Section 27.7.

Objectives

After studying this unit, one should be able to

- understand the concept and need of conjoint analysis
- explain the steps involved in conjoint analysis'
- apply conjoint analysis in different marketing needs

27.2 DEVELOPMENTS IN CONJOINT ANALYSIS

Conjoint originated in mathematical psychology and was developed by marketing professor Paul Green at the Wharton School of the University of Pennsylvania and Data Chan. Other prominent conjoint analysis pioneers include Richard Johnson (founder of Sawtooth Software) who developed the Adaptive Conjoint Analysis technique in the 1980s and Jordan Louviere who invented and developed Choice-based approaches to conjoint analysis and related techniques such as MaxDiff.

Early Years - Full Profile and Part-Worths

Conjoint analysis has its earliest roots in psychology and the testing of the theory that when people take decisions the result is the 'sum' of all the bits of value for each part in that decision. So when we buy a computer, there is a difference in value between computers with a small screen compared to a large screen, for instance. The difference in value to the customer can be linked just to this one feature and by adding up different values in a kind of 'configurator' style you can come to a conclusion about the overall value of the product or service.

This seemed sensible in theory, but to test it required a method for breaking a product down into constituent parts, building profiles from these parts, then gathering preference data, then finally testing untried combinations to see if the customer preference was as per expectation. This is then the root of conjoint design. A demonstration can be seen here.

The first such tests were called full-profile designs (since the respondent saw profiles with one of each type of part) and were designed on cards using some form of ranking exercise typically. A major hurdle was in reducing the number of profiles down to a manageable number. This drew on work from statistics looking at experimental design - how do you minimize the number of experiments required to test a number of combinations of properties, for instance in drug development? The result was the use of 'orthogonal fractional factorial plans' in building the profiles for testing. Since the objective was to validate the decision making process, tests were carried out and analyzed and then compared to 'hold-out' profiles. These were profiles that were not counted for statistical accuracy but were required to validate the model.

The method of analysis initially was analysis of variance (ANOVA) to produce a statistical model to predict the preference drivers. Early studies evaluated attributes as continuous (eg. price) or discrete (eg. colour), but it soon became apparent that it was more effective to treat all variables as if they were discrete variables as even 'linear' attributes such as price were often non-linear in nature. The result of the analysis was the calculation of 'part-worths'. That is the model betas which describe how much each variable contributes to the final model. A higher beta is being more important. Since these part-worths have no units and because they are predicting an abstract entity such as preference, it is possible to scale and adjust the parameters without affecting the underlying model outcomes. This meant many of the consultancies that started to use conjoint turned these part-worths into the more user-friendly 'utilities'.

Developments of computer learning techniques

Research into conjoint type techniques continues to develop. The advent of online research means that computer-based techniques such as adaptive are much lower cost than when computer interviewing was carried out face-to-face. Consequently there is an ongoing development of computer learning techniques using elements such as genetic algorithms and evolutionary learning to 'search' the decision making space with the consumer and so make judgments about people would make decisions. In addition the development of product configurations, such as those used by Dell selling computers, means that there are other ways of getting at choice data.

There is still also controversy at the academic level since there are still some very fundamental assumptions being made about the types of models that people use - we blithely treat everything as linear functions and often disregard non-linear factors such as diminishing returns.

27.3 CONJOINT ANALYSIS DESIGN

Conjoint analysis and trade-off studies are amongst the most sophisticated forms of market research because they provide estimates of demand based on product or service design. But like any form of research, the quality of the output depends heavily on the quality of the design. For conjoint analysis, in particular this means choosing the right flavour or type of conjoint to use and ensuring that the design of the attributes and levels meets the research, analysis and business requirements.

The basis of conjoint design splits into three interrelated parts viz.

1. Choice of the flavour or type of conjoint analysis that is to be used. Different types of conjoint analysis have different strengths and weaknesses. Some forms can be carried out on paper, some require the use of computer or internet-based interviews, some allow large complex designs, others are more robust in the face of issues like pricing;
2. The attributes and levels that make up the product.
3. The sample itself and the contact methods available where the conjoint interview can be carried out face-to-face, or over the internet, or by post and phone, and how long will the questionnaire be.

Attributes and Levels in Conjoint Analysis

Attributes and levels form the fundamental basis of conjoint analysis. The idea is that a product or service can be broken down into its constituent parts - so for instance a mobile phone has a size, weight, battery life, size of address book, type of ring. Each of these elements making up a generic mobile phone is known as an attribute.

When we compare between mobile phones each will have a different specification on each of these attributes. We might have choices in terms of battery life between 12, 24, 36, 48 hours of battery life. Each of these options is known as a level of the battery life attribute. In another example, a car might have an attribute colour which is made up of the levels red, blue, green, white.

This breaking down of products and services into attributes and levels is an extremely powerful tool for examining what a business offers and what it should be offering. For new product development, combining this product breakdown with an understanding of what the customer values most means that the business can focus its efforts on the areas that find favour with customers.

In addition, each level can also be thought of as a performance target. If the customer, on the attribute 'delivery', wants the level "next day delivery" and we are perceived to be offering "48hr delivery" then there is a gap to make up. What is more with conjoint analysis, it is possible to calculate what the value of making up that gap is to the business. Compare this to the cost of doing it and the business can decide whether it is worth it.

In conjoint analysis, the attributes and levels have to behave in certain ways so as to make the results of the conjoint analysis valid and conjoint useful. The first and foremost point is each attribute should be independent. In other words, it should not overlap with other attributes. So, colour and fuel economy are clearly not related, so they can appear together. However, some things like "car shape" and "number of passengers" aren't independent and as such cannot be used. Certain attributes have halo-effect on others around them. For example, if one level is "gold-plated handle", many people would infer that the rest of the product is also of better quality when there is no other information to support this. The main difficulty this causes is that price and brand need to be treated extremely carefully in conjoint studies to produce valid results.

Each level also needs to be capable of being read and understood on its own. Although attributes are used to help break a product down and in analysis, when presented to respondents what respondent sees is the levels.

Independent and readable levels are important from an analysis point of view, but for the conjoint to be useful it also needs to ensure that the range of attributes cover all the areas that are important to the customer, and that the range of levels cover all possibilities. If we do want to focus on a particular element of choice, it is possible to use an "all other things being equal" scenario, but if we are looking at the type of car-radio this limitation would not tell us about the importance of the car-radio in the overall choice of car.

For many products, particularly in business markets, service can be more important than the actual product. By using both product and service attributes in the same conjoint it is possible to see how customers trade-off service against features. The care, however, has to be taken to balance the attributes to prevent biasing the outcome one way or another.

It is also vital that the levels used describe real and where possible measurable and actionable performance. We could run a conjoint with levels "very good fuel economy" "good fuel economy" "not so good fuel economy". But, as with the scales above, these do not mean anything. If we come out with "good fuel economy" and the customer wants "very good fuel economy" what do you do?

One good test is if we showed it to the shop-floor (or the call centre) would they know how to deliver it. A second test is whether it is a statement you could use on a packet or in a brochure.

Now, in the following section, we shall discuss procedures of conjoint analysis

27.4 PROCEDURES OF CONJOINT ANALYSIS

The various procedures of conjoint analysis are Adaptive conjoint analysis, Choice Based Conjoint Analysis, Discrete Choice Analysis, Full Profile Conjoint Analysis, etc. A brief description of each one of them is given in the sequel.

1) **Hybrid Designs and Adaptive Conjoint Analysis (ACA)**
   One of the most fundamental problems in conjoint is reducing the number of profiles that need to be evaluated by respondents. It was developed by Richard Johnson as a a computer based approach to conduct conjoint analysis which relied on initial self-explicated exercises where respondents pre-rank and pre-value items before undertaking the preference task.

   Adaptive Conjoint Analysis (ACA) is one of two most common methods for carrying out conjoint analysis. The benefits of ACA are that it allows for a large number of attributes (up to 30) and levels (up to 7 per attribute) to be used. However, ACA does require a computer-based interview and the large number of attributes means that it is common for an ACA interview to last 45 minutes or more. In addition, some of the methods it uses to simplify the task of working out utilities mean that some care is needed in choosing and designing the attributes in order to get reliable results.

   Technically ACA is known as a hybrid technique as it contains elements of 'self-explication' followed by the trade-off tasks themselves. ACA itself is produced by Sawtooth Software and can be conducted face-to-face or on-line. Telephone use of ACA is difficult and paper-base questionnaires are not possible.

2) **Choice Based Conjoint Analysis - CBC**
   Choice-based conjoint analysis (CBC) is the most common alternative ACA. Design, implementation and calculation in CBC are completely different from ACA.

ACA has respondents selecting from products described with two or three attributes, CBC shows full descriptions using all the attributes available. In addition, CBC can show more than just two "products" at the same time, together with a none-of-these option enabling more realistic choice decisions to be evaluated.

A respondent takes a long time in CBC. As a consequence, choice-based conjoint is limited to 5-7 attributes in contrast to 25-30 attributes for ACA.

An additional twist is that utilities and importance in CBC are calculated across a sample as a whole, whereas for ACA we get utilities and importance for each individual in the sample. Combined with the lower number of attributes, this means that choice-based studies require far shorter questionnaires (15-20 minutes) and can be designed to be purely paper-based.

The advantages choice-based conjoint gives us are greater robustness of results - particularly for pricing work (although there are ways of getting around ACA's pricing limitations), combined with shorter and therefore less costly fieldwork. It is also favoured for it's rigour academically.

The disadvantages are the lower number of attributes that are possible, and the lack of individual level utilities.

3) **Discrete Choice Analysis**
A more advanced form of choice-based conjoint is Discrete Choice Analysis. It is also known as "stated preference research". DCA studies are particularly popular for transportation studies looking at modal choice - the preference between a train, car and airline for instance. The main difference from CBC is the inclusion of continuous variables such as price and time. This allows the ability to examine the varying costs of the ticket with varying times taken to travel and so to establish the value of time for the journey. This enables transport economists to make statements like "2cm extra leg room is worth 10 minutes longer journey time or £40 extra fare" or "an extra train every 15 minutes would encourage x% of car drivers to switch to the train".

4) **Full Profile Conjoint Analysis**
An additional option that dates back a long time but that is still used is full profile conjoint analysis. Full-profile is the original form of conjoint and is still in use, though predominantly in the US it would appear. Full profile conjoint anlaysis makes use of a more limited number of attributes to describe the product or service, but sufficient treatments are shown to one respondent to enable individual level utilities to be calculated. A fractional factorial design is used to specify a fixed set of profiles that need to be shown for analysis. The difficulty is that this does limit the number of attributes quite severely. However these old school studies are still popular for simple, non-computer-based conjoint projects and are most common for students learning about conjoint for the first time.

Most conjoint analysts fit what is known as part-worth model to respondents' evaluating judgments, whether obtained by trade-off tables or full profile, self explicated, or hybrid approaches.

Now, try an exercise.

E1) List any two procedures of conjoint analysis. Also, give one example of each.

Data for conjoint analysis is most commonly gathered through a market research survey. Conjoint analysis can also be applied to a carefully designed configurator or data from an appropriately design test market experiment. Market research rules of thumb apply with regard to statistical sample size and accuracy when designing conjoint analysis interviews.

The length of the research questionnaire depends on the number of attributes to be assessed and the method of conjoint analysis in use. A typical Adaptive Conjoint questionnaire with 20-25 attributes may take more than 30 minutes to complete. Choice based conjoint, by using a smaller profile set distributed across the sample as a whole may be completed in less than 15 minutes. Choice exercises may be displayed as a store front type layout or in some other simulated shopping environment.

27.5 CONJOINT ANALYSIS MODELS

Let p = 1,2,…, t denote the set of *t* attributes that are used in the study design. Let y_{ip} denote the level of p^{th} attribute for the i^{th} stimulus. First we assume that y_{ip} is inherently continuous. The vector model assumes that the preferences s_j for the j^{th} stimulus is given by

$$s_j = \sum_{p=1}^{t} w_p y_{jp}$$

where w_p denotes a respondent's weight for each of the p^{th} attributes.

The ideal point model shows that preference s_j is negatively related to the weighted squared distance d_j^2 of the location y_{ip} of the j^{th} stimulus from the individual's ideal point x_p where d_j^2 is defined as

$$d_j^2 = \sum_{p=1}^{t} w_p (y_{jp} - x_p)^2$$

The part-worth model assumes that

$$s_j = \sum_{p=1}^{t} f_p(y_{jp})$$

where f_p is a function denoting the part-worth of difference levels of y_{ip} for the p^{th} attribute. In practice $f_p(y_{jp})$ is estimated for a selected set of discrete levels of y_{ip}.

Any number of algorithms may be used to estimate utility functions. These utility functions indicate the perceived value of the feature and how sensitive consumer perceptions and preferences are to changes in product features. The actual mode of analysis will depend on the design of the task and profiles for respondents. For full profile tasks, linear regression may be appropriate, for choice based tasks, maximum likelihood estimation, usually with logistic regression are typically used. The original methods were monotonic analysis of variance or linear programming techniques, but these are largely obsolete in contemporary marketing research practice. Conjoint analysis makes extensive use of Orthogonal Arrays (Addelman, 1962) to reduce the number of stimulus descriptions to a small fraction of the total number of descriptions.

27.6 USE OF FRACTIONAL FACTORIAL PLANS IN CONJOINT ANALYSIS: AN EXAMPLE

In Conjoint Analysis the profile of different products are presented to the consumers for their responses. These profiles are generated by varying the levels of its attribute. For example, suppose we are conducting a Conjoint Analysis based study of dish washers. Let us assume that the most important attributes considered by its customers are Brand, Price, Washing Capacity, Colour and Shape. Let us further assume that the following levels of attributes are considered relevant and interesting by the marketer for the study.

S.No.	**Attribute**	**Levels**
1.	Brand	Kitchen Master; Elegant; Torrent Evermaid
2.	Price	Rs. 15,000/-; Rs. 20,000/-; Rs. 25,000/-
3	Washing Capacity	High; Medium; Low
4.	Colour	Steel grey; White; Light Blue; Pink
5.	Shape	Cylindrical; Box Type

Since the 5 attributes can take 4, 3, 3, 4 and 2 levels, the total number of possible product concepts that can be generated by configuring these attributes is $4\times3\times3\times4\times2=288$. In order to determine the part worth utilities of each of the levels of all these attributes, we shall have to take 288 different product concepts for getting his/her responses. This number is certainly too large for any consumer. Therefore, we resort to the method of Fractional Factorial Design of Experiment to make it manageable.

The statistical technique of Fractional Factorial Design of Experiment finds out the minimum number of product designs which are necessary to use in the study and yet provide us all the information that we originally sought. These designs are also mutually independent (orthogonal) to avoid any redundancy in the data and allow the representation of each of the attributes and their respective levels in an unbiased manner.

In the example of dish washer considered here, this technique has given us only 16 designs out of the 288 possible dish washers. However, it should be noted that such reduction in number of product designs is possible only after making certain assumptions. For example, we had assumed that none of the attributes interact among themselves. Or in other words, the attributes are considered to be independent of each other. Only under this assumption we got the number of product concepts as 16. At the other end, if we would have allowed all the attributes to interact with each other the required number of product concepts would have remained as 288. With different types of assumptions the number of concepts required would be in between these extremes.

The 16 product concepts found through this method are not unique. Many other sets of 16 cards would have also been equally good. However, all of these sets would have to be independent and represent all the attributes and their respective levels in an unbiased manner. We are illustrating below one such set of 16 cards representing the product concepts of dish washers using Fractional Factorial Design of Experiment.

Table 1: Description of Product Concept Cards

Card#	**Brand**	**Price**	**Cap.**	**Colour**	**Shape**
Card 1	Kit Master	Rs. 15,000	High	St. Grey	Cylinder
Card 2	Elegant	Rs. 25,000	Medium	St. Grey	Box Type
Card 3	Torrent	Rs. 20,000	Medium	St. Grey	Box Type
Card 4	Ever Maid	Rs. 20,000	Low	St. Grey	Cylinder
Card 5	Kit Master	Rs. 20,000	Medium	White	Box Type
Card 6	Elegant	Rs. 20,000	Low	White	Cylinder
Card 7	Torrent	Rs. 25,000	High	White	Cylinder
Card 8	Ever Maid	Rs. 15,000	Medium	White	Box Type

Card 9	Kit Master	Rs. 25,000	Low	Light B1	Box Type
Card 10	Elegant	Rs. 15,000	Medium	Light B1	Cylinder
Card 11	Torrent	Rs. 20,000	Medium	Light B1	Cylinder
Card 12	Ever Maid	Rs. 20,000	High	Light B1	Box Type
Card 13	Kit Master	Rs. 20,000	Medium	Pink	Cylinder
Card 14	Elegant	Rs. 20,000	High	Pink	Box Type
Card 15	Torrent	Rs. 15,000	Low	Pink	Box Type
Card 16	Ever Maid	Rs. 25,000	Medium	Pink	Cylinder

- **Physical Design of Stimuli**

After selecting the product concepts required for Conjoint Analysis study, they need to be exposed to the consumers as stimuli. This may be done in a variety of ways mainly depending on the demands of the situation and the convenience of the researcher. Of course, it would be most desirable to present real life prototypes of the products according to the product concepts specified. These, may be given to the consumers for their usage or trials. But, such extreme ways of presenting the products may not always be possible or even necessary. In such cases, product models, diagrams or even verbal descriptions may be adopted. In our example of dish washers, it may not be possible to produce the 16 prototypes and take them to the consumers. Just their models or pictures may be sufficient.

- **Data Collection**

Ease of data collection is a key feature of Conjoint Analysis. The consumers are asked only to assign rating scores to each of the product stimuli or even rank the different concepts presented to them. This is quite a realistic task and is close to the shopping experiences where the customer merely makes choices. He does not have to respond to each of the attributes separately.

This feature of conjoint analysis is possible due to the use of Fractional Factorial Design of Experiment before collection of data and the use of Conjoint Analysis after collecting the data. In other words, the use of the technique eases the burden of the respondents.

- **Determination of part worth utilities**

The rating or ranking data obtained from the consumers are analyzed next. Two methods are more popular for this purpose. In one method, the part worth utility for each of the levels of each attributes are arbitrarily assigned. Based on these assumed values, consumers overall rating or ranking (as the case may be) are estimated. These estimated responses may understandably, be quite different from the actual data. After a few iterations convergence is achieved so that the part worth utilities found approximate the estimate responses to the actual data best.

In the alternative method, the part worth utilities are derived in one step. Here, an error function describing the difference between the estimated and actual data is defined. This function is then minimized.

After using any of the available method, the output is obtained for each of the respondent separately. This is quite significant as the disaggregate data can be combined in any of the desired way. But, if the output was only at the aggregate level then disaggregation might not have been possible.
In our example of dish washer, the part worth utilities may be found for each of the attributes and their levels as following:

Table 2: Attributes with their levels

	Attribute	**Levels**	**Part Worth Utility**
1.	Brand (25.4%)	Kitchen Master Elegant	2.2 -2.3

		Torrent Ever Maid	-0.8 0.9
2.	Price (66.2%)	Rs. 15,000 Rs.20,000 Rs. 25,000	5.0 -0.1 -5.8
3.	Washing Capacity (4.9%)	High Medium Low	0.0 0.1 -0.1
4.	Colour (2.8%)	Steel Grey White Light Blue Pink	-0.3 -0.1 0.1 0.2
5.	Shape (0.7%)	Cylindrical Box Type	-0.1 0.1

From the above table, we find that price plays most important role (66.2%) in the minds of customers. This is followed by Brand (25.4%), Washing Capacity (4.9%), Colour (2.8%) and Shape (0.7%). These relative importance values for the maximum and minimum values of the part, worth utilities of the respective attributes. Customers respond quite predictably towards different price levels. They prefer lesser price to the higher ones. Among brands, we find that Kitchen Master is the most liked brand and Elegant in the least liked one. However, they do not prefer the "High" capacity most. They prefer "Medium" size most. In terms of the colour, they prefer Pink colour most. Between the two shapes, box type dish washers are preferred more. But, the importance scores for the wash capacity, colour and shape themselves are quite low.

The part worth utilities can now be added to determine the total utility for each of the possible product concepts. This allows us to scan the consumer preference pattern for all of the 288 product concepts although he has been exposed to only 16 of them. We can now also rank all of these 288 product concepts.

27.7 APPLICATIONS OF CONJOINT ANALYSIS

Calculation of the part worth utilities becomes just the starting point for many interesting applications of conjoint analysis. The important ones among them are described next:

1) **Optimum Product Design:** Since all possible product concepts can be compared after adding their respective attribute levels part worth utilities, it is possible to determine the demand for different products out of any given set of available products in the market place. The demand levels can be converted into profit figures as cost of producing and marketing can also be calculated. These cost calculations are possible as the volume of operations and the features of the products are now known. Thus, the optimum product can be chosen from the profits point of view (or any of the other given management's objective). Customers differential rates of purchase of products are also duly considered at this stage.

   Quite often, a manager may like to know the effects of slight change in any of the attribute by his own company or the competitor's. Conjoint Analysis allows this kind of "What if" analysis very easily with the data base of part worth utilities. In fact, different kinds of scenarios can be simulated and the manager can optimize not only the product but other aspects of his marketing strategy. Similarly, whenever there is any change in competitor’s actions or in the environment a fresh scenario can be drawn for simulation. Of course, the simulation shall be limited to the attributes considered in the analysis. This feature does also help in increasing the shelf life of the conjoint analysis output.

2) **Market segmentation:** Since the Conjoint Analysis is done at the individual customer level, the individual customer's identity can be retained through out the analysis. Thus, customers can be segmented according to their sensitivities to different product attributes.

   It is also possible to identify the customers segments, which would be attracted most for the proposed product position. This helps in having a focused matching between the chosen product position and the target customer segment. It can also help in identifying that part f competitor's market which needs to be poached for snatching market share from them. Similarly, the same type of analysis can be done to identify the most vulnerable section of one's own market segment.

   Sometimes, an additional product offer appears to be quite attractive. But, this may be at the cost of cannibalisation. Conjoint Analysis can help in estimating the effects of cannibalisation as well. Thus, it helps in maximizing net profits of the organization.

3) **SWOT Analysis:** First of all, the part worth utility of the brand itself can tell about the relative brand strength. Similarly by looking at the other features of one's own and competitor's offers Conjoint Analysis enables the marketers to conduct his detailed SWOT Analysis.

4) **Estimating Customer Level Brand Equity:** Conjoint Analysis is a good bridge between the consumer level perceptions and the financial worth of the offers. This can be used for estimating the important parameter of brand equity at the consumers level. There is scope of differentiating the “Loyal”, “Acceptors” and “Switchers” for more accurate calculations of brand equity.

Now let us discuss the advantages and disadvantages of conjoint analysis.

Advantages

- It estimates psychological tradeoffs that consumers make when evaluating several attributes together.
- It measures preferences at the individual level.
- It uncovers real or hidden drivers which may not be apparent to the respondent themselves.
- It is realistic choice or shopping task.
- It is able to use physical objects.
- If it is appropriately designed, the ability to model interactions between attributes can be used to develop needs based segmentation.

Disadvantages

- Designing the conjoint studies can be complex with too many options, respondents resort to simplification strategies.
- It is difficult to use for product positioning research because there is no procedure for converting perceptions about actual features to perceptions about a reduced set of underlying features.
- The respondents are unable to articulate attitudes toward new categories, or may feel forced to think about issues they would otherwise not give much thought to poorly designed studies may over-value emotional/preference variables and undervalue concrete variables.
- It does not take into account the number items per purchase so it can give a poor reading of market share

Inspite of lot of developments in the field of conjoint anlaysis and its widespread use, one can still find market research professionals who have no experience of conjoint analysis, or who still rely on self-explication to try for the prediction of the consumer behaviour.

Now, try the following exercises.

E2) State conjoint analysis and state its potential applications.

E3) What are the steps involved in a conjoint analysis? Explain with the help of examples.

E4) Write three advantages and three disadvantages of conjoint analysis.

Now, let us summarize the unit.

27.8 SUMMARY

In this unit, we have covered the following points.

1) **Conjoint analysis** is a statistical technique used in market research to determine how people value different features that make up an individual product or service. The objective of conjoint analysis is to determine what combination of a limited number of attributes is most influential on respondent choice or decision making.

2) The main steps involved in using conjoint analysis include determinationof salient attributes for the given product from the points of view of consumer, assigning a set of discrete levels or a range of continuous values to each of the attributes, utilizing fractional factorial plan for desgning the stimuli of the experiment, physically designing the stimuli, data collection and determination of part worth utilities.

3) Some of the procedures of conjoint analysis are Adaptive conjoint analysis, Choice Based Conjoint Analysis, Discrete Choice Analysis, Full Profile Conjoint Analysis, etc.

4) Data for conjoint analysis is most commonly gathered through a market research survey. Conjoint analysis can also be applied to a carefully designed configurator or data from an appropriately design test market experiment.

5) The possible application of conjoint analysis include product design, market segmentation, SWOT analysis, etc.