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## Conjoint or DCM? Choice Models Overview

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### Overview

Conjoint and discrete choice are most often used in the following situations:

- Designing new products or modifying existing ones.
- Estimating the most appropriate price of a product.
- Estimating brand equity.

The most common uses are:

- Measure the relative importance of the attributes.
- Optimize the configuration of a product.
- Understand sensitivity to price.
- Optimize the configurations and prices of the products in a portfolio.
- Simulate the effect on *your* market share of an anticipated change in your *competitor's* products or prices.

Customer Lifecycle, LLC has done extensive work for our clients using both conjoint and discrete choice modeling. What follows is a discussion regarding the appropriate uses of each technique.

### Terminology

The independent variables whose effects are being tested, such as horsepower and guarantee, are called *attributes*.

The options or increments of an attribute are called *levels*. For example, horsepower may have three levels, 4, 5 and 8 horses. Guarantee may have two levels, present and absent.

A product described in terms of the attributes in the study is called a *profile* (product configuration).

A *choice task* consists of two or more profiles from which the respondent is asked to choose.

### Conjoint

In conjoint, respondents evaluate the product configurations *independently of each other*. Typically, the evaluation question is an attractiveness rating scale.

In the analysis, the influence of the attributes on the profile evaluations is measured. This analysis yields a measure of the relative importance of each attribute, and a measure of the

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strength of influence of each level of each attribute. This is useful information by itself, and is of further usefulness because the attribute level strength of influence values can be used to perform simulations ("what if" exercises). That is, we can calculate mean attractiveness ratings for product configurations that did not actually appear in the questionnaire.

Perhaps the most commonly-performed simulation today is to calculate an attractiveness rating for each of all possible product configurations, and then sort the configurations by their attractiveness ratings. This allows us to identify the most preferred configuration (of all possible). In addition, if price is one of the attributes, and cost information is available, the most profitable combination of features can be identified.

There are two types of conjoint methodology in wide use today: the traditional approach (using a "fractional factorial design") and adaptive conjoint. Adaptive conjoint was developed to enable us to use more attributes in the study. It does this by first identifying, for each respondent individually, attributes that are unimportant to the respondent. These attributes are not used in constructing the profiles.

## **Discrete Choice**

In discrete choice, respondents *simultaneously consider* multiple profiles. That is, respondents are exposed to a series of choice tasks, and in each task are asked which profile they are most likely to purchase (if any).

In the analysis, the influence of the attributes on choice is measured. The analysis takes into account the levels of the profile that was chosen, and those of the profiles in the respective choice task that were not chosen.

As is the case in conjoint, the discrete choice analysis yields a measure of the relative importance of each attribute, and a measure of the strength of influence of each level of each attribute. (The focus of these measures is different from conjoint, in discrete choice their focus is on profile choice). Simulations are also possible. Share of preference is what is simulated.

There are three versions of discrete choice methodology in wide use today: the traditional approach (using the multinomial logit model), complex versions of the traditional approach (the "mother logit model"), and the traditional approach enhanced by Hierarchical Bayes estimation (HB).

HB is highly technical, but its purpose and rationale can be simply stated. Markets do not make purchase decisions, individual people do. Therefore, *to some extent*, the traditional discrete choice approach enhanced by Hierarchical Bayes builds a choice model *for each respondent individually*. In conjoint and in the other discrete choice methodologies discussed here, the analysis is conducted entirely at the total sample level (or within subpopulations).

## **Which Approach Should Be Used**

Each of the methodologies discussed has advantages and disadvantages, and make different assumptions. Additional information is necessary for Customer Lifecycle, LLC to make a recommendation.

At the risk of over-generalization, we will offer some rules of thumb on the broadest question, the decision between conjoint and discrete choice.

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Conjoint is usually recommended over discrete choice when:

- For whatever reason, the competition does not need to be considered at this stage in the research process.
- The competition can not be identified with sufficient specificity for research purposes
- The number of competitor brands is so large that a discrete choice study that included brand would be too large and expensive.

Discrete Choice is usually recommended over conjoint when...

...brand market share simulations are desired, when brand is one of the attributes, or we are trying to decide how to configure a portfolio.

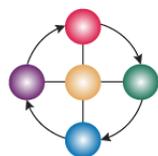
To lay the groundwork for the discussion of methodology, we would like to take this opportunity to explain an issue that will arise in several contexts, and in the decision of which methodology to use. The technical term for the issue is "statistical interaction" between the attributes. By definition, if the effect of a given level of an attribute depends on a level of another attribute, we say that the two attributes interact with each other. The classic case is brand and price. That is, the effect of price on choice differs from one brand to another. Stated in marketing terms, some brands are more sensitive to price decreases/increases than others.

Another example is multiple price-related attributes. For example, purchase price and financing options. E.G., the attractiveness of a given purchase price depends upon the financing plan's interest rate.

We bring this issue up for several reasons. One is that the different methodologies discussed here differ greatly in how well they handle interactions. Another is that accommodating interactions increases the sample size of the study. The reason is that, using brand and price to illustrate, we need "enough" respondents to evaluate each brand at each price level. This is because capturing the interaction in the analysis requires us to have multiple price variables, one for each brand.

In summary, this document delineated our expertise in various choice modeling techniques, conjoint being one of them. Customer Lifecycle has the wherewithal to make appropriate recommendations regarding the best methodology to use based on the research study objectives. We would work closely with you to determine which analytical technique would optimally serve the purposes at hand.

If you would like more information, please visit our website at [www.customerlifecycle.us](http://www.customerlifecycle.us) or contact one of our principals.



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