

White paper:

**Understanding how consumers make
complex choices**

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Table of contents

Abstract.....	3
Introduction.....	4
Consumer purchasing decisions.....	5
High involvement purchase decisions (complex).....	5
Low involvement purchase decisions (simple).....	5
Influences on consumer decision making.....	6
Fundamental Assumptions of Consumer Behaviour.....	6
Directly asking consumers about their behaviour.....	6
Understanding consumer behaviour.....	7
Consumer Decision Process.....	8
1- Problem Recognition:.....	9
2- Information Search.....	9
3- Alternative Evaluation.....	10
4- Channel Choice and Purchasing.....	11
5- Post purchase evaluation.....	12
Summary of the decision process.....	12
Alternative evaluation and selection.....	13
Evaluative criteria and choice heuristics.....	14
The Expectation of Satisfaction.....	15
From the theoretical to the practical:.....	17
An application to the purchase of a personal computer.....	17
Adaptive Conjoint Analysis.....	18
Defining consumer utilities.....	19
Discussion of the Adaptive Conjoint Technique.....	21
Use of consumer behavioural modeling techniques.....	22
Summary.....	22
Appendix 1 - Examples of adaptive conjoint tasks.....	23

Abstract

Paramount to the success of any marketing strategy or public policy formulation is a comprehensive and exhaustive understanding of consumer, potential consumer, or population attitudes, behaviours and preferences. This strategic information is necessary for product development and optimization, evaluating reactions to a competitive product change, or defining the optimal pricing strategy. According to classical economic theory, consumers are utility maximizers. This means that, when faced with competing bundles of products, consumers should select the product that delivers the highest overall utility (also called enjoyment or satisfaction). However, the limitations of neoclassical utility maximization theory occur through the comparison of two, often not competing, bundles of goods (for example, will you prefer a bushel of apples, or a bushel of coffee beans?). This simplistic example ignores an examination of the antecedents contributing to overall product utility among similar competing products. This paper explains the foundation of consumer behaviour by reviewing decision theory and the consumer decision process, then concentrates specifically on the alternative evaluation process (including evaluative criteria and choice heuristics). Further, this paper extends the work of Louviere and others by introducing the concept of static (namely demographic, attitudinal, psychological, cultural, social and personal characteristics) and dynamic (specifically related to usage situations) influences on consumer behaviour. Finally, the paper moves from the theoretical to the practical by examining how conjoint techniques can be used to identify product attribute utilities in relation to the choice of a personal computer.

Understanding the behavioural responses of individuals to the actions of business and government will always be of interest to a wide spectrum of society. Whether a simple application such as gauging the effect of an increase in the price of a specific good or service, or a more complex one such as evaluating the introduction of a new product with private and public impacts, understanding and predicting the nature of individual and aggregate responses is vital to the evaluation of the resulting costs and benefits¹.

Introduction

Understanding the theory of how consumers make purchasing decisions is a critical component of marketing strategy. Consumer purchasing behaviour can be complicated, yet understanding it is the essential task of effective marketing management.

Consumer behaviour is about how individuals make decisions to spend their available resources, such as time and money, on consumption-related items². In economic terms, the latent satisfaction or enjoyment received from consuming goods or services is called **utility**. The common rule for consumer decision-making assumes that the consumers' objective is to derive the greatest possible utility from their typically static incomes³. An understanding of consumer behaviour draws on knowledge from many disciplines including Economics, Marketing, Psychology, and Sociology

This paper will explore the dynamics of consumer behaviour and its relation to the consumer market. It will not focus on understanding how organizations make purchasing decisions, or the market structure, nature of the buying unit, types of decisions or the decision processes involved in the organizational market itself⁴. Although this paper addresses consumer behaviour from the perspective of optimizing a marketing strategy, the same techniques could be used to address a given population's support of various public policy options or government services. For illustrative purposes, this paper will discuss the choices involved in deciding which personal computer a consumer will select. Prior to evaluating this case, a discussion of the fundamentals of consumer purchasing behaviour is first explored.

¹ Louviere, Jordan J., David Hensher, and Joffre Swait, "Stated Choice Methods: Analysis and Application", Cambridge University Press, Cambridge UK, 2000.

² Shiffman, G.L. and L.L Kanuk, *Consumer Behaviour* (7th Edition), 2000, Upper Saddle River, NH: Prentice Hall

³ Stager, David *Economic Analysis and Canadian Policy*, (Toronto, Ontario: Butterworths), 6th Edition, 1988.

⁴ For a simple example comparing the consumer decision-making process compared to the organizational decision-making process, consider the example of purchasing tires. The consumer decides which brand and model of replacement tire will be selected. Compare this with the process of Chrysler deciding which brand and model of tire to place on its Jeep Grand Cherokees.

Consumer purchasing decisions

The decision-making processes consumers use when making purchasing decisions vary widely, often in relation to the type of purchase being considered. Different consumers engage in different types of decision-making depending on how involved they are with the product, and whether it is necessary to engage in external research. For example, consumers have a different approach to purchasing small, routine items like toothpaste or dishwashing detergent, than they do if they are purchasing a home, investing in mutual funds, taking out a mortgage, or buying a personal computer. Although consumers still weigh alternatives and utilities across competing goods, the amount of information sought, and the cost of making an error, is much lower with simple purchases than with complex ones.

High involvement purchase decisions (complex)

High involvement purchase decisions involve products or services that are important to the consumer and more often than not are infrequent, but large, purchases. These types of purchases have greater risks associated with them, and as such, often require greater involvement and research to mitigate these risks.

To reduce the risks associated with buying large ticket items (whether for services like vacations, choice of physician, or financial advisor or for products like houses, cars, and household furnishings, or personal computers), many consumers engage in a more formal, complex decision-making process. They often search extensively for information, collecting it from a variety of sources, to evaluate alternative products or brands before making the purchase.

However, some frequently purchased products, like perfume or cologne, can also be considered high involvement products. This is because these products are tied to the social needs and ego of the individual. Although the frequency of repeat purchase and lower costs minimize the risks of a poor decision, these factors also enable a customer to judge which brand is best, with little thought given to competing alternatives. This process is frequently referred to as **brand loyalty**. Although the effect that the “brand influence” has on consumer behaviour varies from product to product, it is an important antecedent of product choice.

Low involvement purchase decisions (simple)

Because low involvement purchase decisions are not as important to consumers, and are characterized by having lower risks, the search for information is likely to be minimal. As a result, decisions to purchase products such as cookies or cereals are often made within the store, either impulsively on the basis of the brand familiarity, or as a result of comparisons of the brands on the shelf. Consumers are more influenced by aesthetically pleasing packaging for low involvement decisions, and if they think of the products as having similar attributes, are more likely to be influenced by price. The use of colors and pictures on a package also impact consumer beliefs regarding important product

attributes⁵. Some marketers have introduced tactics to increase sales through health claims on the packaging.

Consumption decisions made about frequently purchased items, via simple transactions, are easier to make on a trial-and-error basis and can easily be improved on. Because these decisions are routine and relatively inexpensive, they exert a much smaller influence on the life of the consumer⁶.

This paper will focus on examining the behaviour associated with making complex decisions.

Influences on consumer decision making

Consumer purchases are strongly influenced by cultural, social, personal, demographic and psychological characteristics. Although the marketing professional cannot control these factors, they need to be taken into account through the marketing and marketing research phases because of the important influences they play on decision-making. However, many marketers attempt to control for these variables by profiling their market into segments.

For instance, in considering the purchase of a personal computer, one segment of the population may look at a desk top computer, while another (perhaps a small business owner seeking mobility), may prefer a laptop. As an alternative example, consider the heavier use of acne medication by youths in their teens. The decision to purchase acne medication is clearly correlated with demographics; although the need is to remove acne, the attitudinal and demographic characteristics of population dictate which segment(s) acne manufacturers should concentrate on.

Fundamental Assumptions of Consumer Behaviour

The marketer needs to know how the consumers process information to arrive at brand choices. Unfortunately, there is no simple and single evaluation process used by all consumers, or even by one consumer in all buying processes. The process by which consumers compare brands on sets of alternatives is complicated. Awareness of a brand is necessary before it can be included in the evaluation. Now the question is: How do consumers choose among the alternative brands?

Directly asking consumers about their behaviour

Perhaps the most direct method of understanding how consumers make purchasing decisions is to ask them directly. Despite the inherent simplicity of this approach, it often yields unsatisfactory strategic information for the following three reasons:

⁵ Bone, Paula and Karen France, "Package Graphics and Consumer Product Beliefs", *Journal of Business and Psychology*, Vol. 15(3), pp. 467., Spring 2001.

⁶ Bazerman, Max, "Consumer Research for Consumers", *Journal of Consumer Research*, Vol 27, March 2001.

First, when asked whether a list of given attributes is important to them, consumers inevitably respond by stating that all factors are extremely important to them. The overstatement of importance provides little strategic direction. Market researchers assume that product importance is correlated with behaviour. However, this is not necessarily the best method of determining behaviour, since many variables have overstated importance ratings.

Second, when asked directly why they made a particular purchase, consumers often have difficulty articulating how their utility preferences are formulated; it is difficult to communicate such reasons for action. In many instances, consumers simply do not know how they came to make a particular decision; people can often be unsure of their preferences⁷.

Third, in instances where a consumer is able to directly state the factors or variables influencing a purchasing decision (for example, selecting a computer based on price, or size of hard drive or both), consumers have difficulty indicating the relative importance of sub-standard attributes. While price may be the motivating factor for selecting a computer, followed by the size of hard drive, and amount of RAM, consumers are usually unable to state the relative importance of these variables; on a continuum of price to RAM, where exactly does size of hard drive fall? Is it closer to price or RAM?

As such, it is usually necessary to reveal the relative importance of determinant variables. This can be accomplished using conjoint analysis or discrete choice modeling, discussed in more detail later in this paper.

Understanding consumer behaviour

Louviere,⁸ a pioneer in modeling consumer behaviour, introduced the concept that consumers probably do not perceive physical variables, such as travel time and amount of parking space, in physical measurement terms. Rather, they make psychophysical or perceptual judgments about each. Other variables, such as price, or certain product features (amount of RAM or hard drive space for a personal computer), may be more accurately perceived because they can be more accurately observed. Nevertheless, consumers form impressions or opinions about the positions of various brands on each determinant attribute that matters; this process involves integrating perceptual information. Further, Louviere writes⁹:

After consumers form impressions of the positions of various alternatives on the determinant attributes, they make value judgments about how good (or bad) it is for alternatives to be positioned on each attribute. The

⁷ March, J.G., "Bounded rationality, ambiguity, and the engineering of choice", *Bell Journal of Economic Management*, 9, 1978, pp. 587-608.

⁸ Louviere, Jordan J., "Analyzing Decision Making: Metric Conjoint Analysis", Sage Publications, Newbury Park, CA, 1988

⁹ Louviere, Jordan J., "Analyzing Decision Making: Metric Conjoint Analysis", Sage Publications, Newbury Park, CA, 1988

evaluation process can be examined from an analysis of the way in which consumers combine (integrate) information about different determinant attributes to form overall impressions of brands. It is in this integration of attribute information that one studies information integration theory (IIT).

Consumers' overall impressions, evaluations or judgments of the attributes of brands are relative to the set of brands they consider. Therefore, the impressions of brands may change if:

- additional brands are added to those already considered;
- new information is acquired that changes the set of determinant attributes by adding or deleting one (consider first the widespread use of CD-ROMS with computers. Not only did this technology diminished the demand for floppy drivers – especially larger format disks – but it has evolved and added newer variables into the choice equation, namely DVD and/or CD-RW);
- consumer beliefs about the values of attributes are changed by new information prior to choice (for example, a friend says that her headaches are cured by extra strength brand X with 750mg aspirin; previously, brand X was believed to have 500mg aspirin).

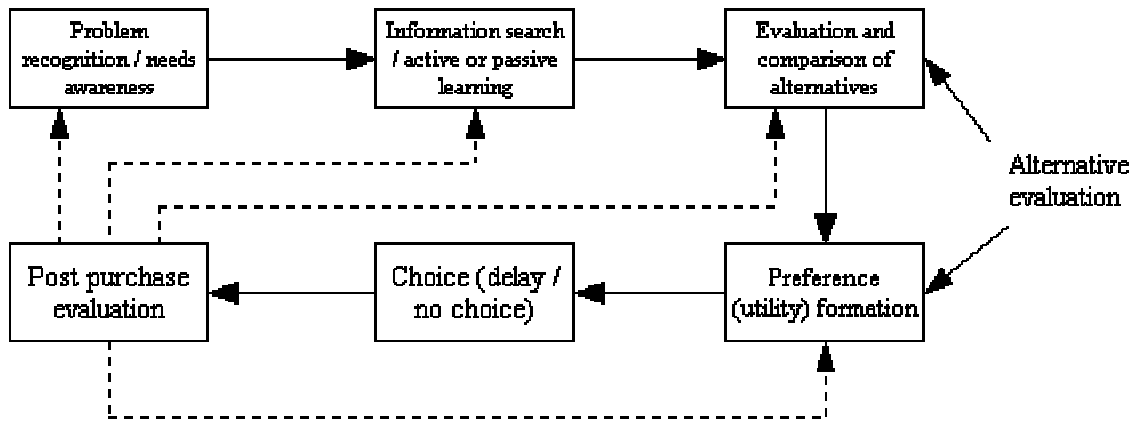
Following the comparison, evaluation and impression-formulation stage, consumers form final choice sets and decide which brand is better, taking into account all available information. Consumers then decide whether to purchase any of the brands, and if so which one. If a consumer decides not to purchase, he or she may have decided either to delay the purchase until a later time (wait for a sale), or not to purchase (for example, “I cannot afford this” or “This doesn't satisfy the need I had in mind”).

Consumer Decision Process

A general order of stages in a consumer's decision process is summarized in figure 1 below¹⁰. Depending on the type of purchase, an individual may follow all or any of the common steps in the consumer decision process. After briefly reviewing all the steps in the process, this paper will discuss one step (alternative evaluation) in greater detail.

¹⁰ Louviere, Jordan J., David Hensher, and Joffre Swait, “Stated Choice Methods: Analysis and Application”, Cambridge University Press, Cambridge UK, 2000.

Figure 1: Stages in a consumer's decision process



The dashed line emphasizes learning. The steps in the process are:

1- Problem Recognition:

The consumer decision process begins with the recognition that a problem exists. A consumer problem is simply a need; the difference between an existing state, and a desired state. A problem that the consumer solves by recalling one satisfactory solution and purchasing that specific solution without an evaluation is termed **habitual decision making**. Many consumer purchases, particularly for frequently purchased items such as detergents, soft drinks, and gasoline, are of this nature.

Problems that require thorough information searches, both internal and external, the evaluation of several alternatives along several dimensions, and considerable post-purchase evaluation, produce extended decision-making and consumers seek greater information.

2- Information Search

Once the problem is recognized, an information search is undertaken to isolate an effective solution. As described above, the information search may be extensive, very brief, or somewhere in between.

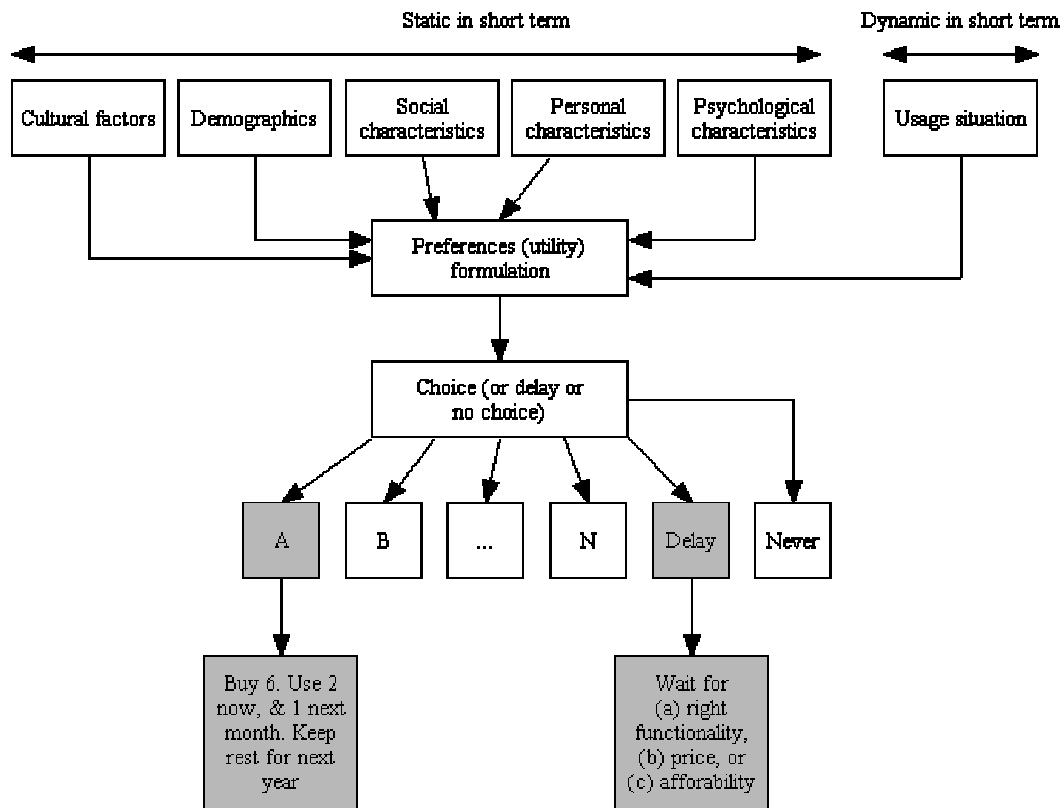
One of the main objectives facing marketers is to present consumers with information on which they can base their decisions. Presenting information is not simple, and it contains an interesting dilemma. Is the company presenting too much or too little information? Without knowing what information is relative, the amount of information that is potentially relevant can be very large. Through the introduction of the internet, marketers can provide consumers with interactive information systems that allows consumers to be appropriately selective in their own information search. However, the control over the

product information system (what information is provided, how long it is displayed, what information will follow), in and of itself has benefits and disadvantages¹¹.

3- Alternative Evaluation

After information allowing one to determine and compare the relevant and feasible alternatives has been gathered, the decision can be made. The **evaluative criteria** (product attributes) are the various features a consumer looks for in response to a particular problem. For example, before purchasing a calculator, a consumer might want to evaluate cost, size, power source, capabilities, display size, and warranty. Evaluative criteria can differ in type, number and importance. The type of evaluative criteria a consumer uses in a decision varies from the tangible or hard product attributes (cost, performance, features) to the intangible or soft-product attributes such as style, taste, prestige, and brand image¹². Equally important in many purchase decisions is the way we feel about a particular brand, and prior experience with either the brand or the product.

This process is illustrated by the diagram below¹³:



¹¹ Ariely, Dan, “Controlling the Information Flow: Effects on Consumers’ Decision-making and Preferences”, *Journal of Consumer Research*, Vol. 27. September 2000.

¹² Hallaq, J. and K. Pettit, “The Relationship of Product Type, Perceived Evaluative Criteria, and the Order of Consumption of the Evaluation of Consumer Products”, *Advances in Consumer Research*, (Chicago: Association for Consumer Research), 1983.

¹³ Adapted partially from: Louviere, Jordan J., David Hensher, and Joffre Swait, “Stated Choice Methods: Analysis and Application”, Cambridge University Press, Cambridge UK, 2000, and extended by the author.

This diagram examines how individual consumers form utilities and begin to compare products to form overall (holistic) preferences for a variable set of N alternatives.

Utility formulation is influenced by many factors that remain stable over the short term, including cultural factors, demographics, social characteristics, personal/individual characteristics, and psychological characteristics (namely, the static antecedents illustrated above). Although these items are typically stable over the short term, fierce exogenous changes can occur suddenly (for example, the widespread, and often sudden, loss of consumer confidence as an economy slips into a recession).

Further, these antecedents are often targeted, and therefore influenced, by marketing communication efforts including advertising and other marketing efforts.

Additionally, it is important to consider **usage** as a factor in examining decision-making. Think for a moment about how fast food outlets (or quick service restaurants) respond to the consumer's choice of eating location. While demographic and psychographic characteristics do not change (or at least they do not in the short run), the mood of a consumer does; over the course of a single week, a consumer might eat at McDonald's one night, take a client to dinner at an expensive restaurant the next, and then pick up curry take-away for a weekend dinner at home¹⁴. Clearly, consumer behaviour is influenced heavily by the usage situation, and this situation evolves continuously.

4- Channel Choice and Purchasing

For consumer products, most products are acquired through some form of retail outlet. Thus, consumers must select among competitive distribution channels as well as the purchase of the good or service¹⁵. There are three general ways these decisions can be made:

- simultaneously;
- item first, outlet second;
- outlet first, item second

Both the manufacturer and the retailer must be aware of the decision sequence used by their target market. It will have a major impact on marketing strategy.

¹⁴ Rozanski, Horacio, Gerry Bollman, and Martin Lipman, "Seize the Occasion: The Seven Segment System for Online Marketing", *Strategy+Business*, Booz-Allen & Hamilton, Issue 24, Third Quarter 2001.

¹⁵ The same can also hold true for the purchase of services. Considering the purchase on an airline ticket. The consumer can decide to purchase the ticket directly from the airline in person, directly from the airline over the phone, directly from the airline over the internet, through a travel agent, or online through a third party (like Travelocity).

5- Post purchase evaluation

Following some purchases, consumers may experience doubts or anxiety about the wisdom of the purchase. This is also known as post-purchase dissonance. It is most likely to occur¹⁶:

- among individuals with a tendency to experience anxiety,
- after an irrevocable purchase,
- when the purchase was important to the consumer; and
- when it involved a difficult choice between two or more alternatives.

Whether or not the consumer experiences dissonance, most purchases are followed by product usage. Marketing managers are interested in this usage because consumers use a product to fulfill certain needs, and if the product does not fulfill these needs, a negative evaluation may result. Monitoring usage can identify new uses for existing products, needed product modifications, appropriate advertising themes, and opportunities for new products.

Post-purchase dissonance, product usage, and disposition are potential influences on the post-purchase evaluation process. Consumers develop certain expectations about the ability of a product to fulfill instrumental and symbolic needs. To the extent that the product meets these needs, satisfaction is likely to result. When expectations are not met, dissatisfaction is the likely result.

Summary of the decision process

Earlier, Louviere stated that newer product information can affect a consumer's overall impression and evaluation of a product, but he failed to recognize the importance of both the static and dynamic antecedents affecting consumer choices. As an extension of his work, this paper proposes adding a fourth and fifth component, namely the influence of static variables (such as demographics, attitudes, and respondent personality), and dynamic influences such as a consideration of specific usage situations.

The next section of the paper discusses alternative evaluation and selection in greater detail.

¹⁶ Hawkins, Del and Roger Best, Kenneth Coney, *Consumer Behaviour: Implications for Marketing Strategy*, Fourth Edition, BPI-Irwin, Homewood, IL, 1989.

Alternative evaluation and selection

Evaluative criteria are the various features a consumer looks for in response to a particular type of problem¹⁷. This process is unique to each individual. However, certain basic concepts are fundamental to the consumer evaluation process.

1. We assume that each consumer sees a product as a bundle of product attributes. For computers, these attributes include size of hard drive, type and speed of processor, processing speed, price, amount of RAM, size of monitor, and others. Based on the factors identified throughout this paper, customers will vary as to which of these attributes they consider most relevant, and will pay more attention to those attributes connected to their needs.
2. The consumer will attach different degrees of importance to the attributes. That is, each consumer attaches importance to each of the attributes according to his or her unique needs and wants.
3. The consumer is likely to develop a set of brand beliefs about where each brand stands on each attribute. The set of beliefs may vary from the true attributes because of his or her experience and the effect of selective perception, selective distortion, and selective retention.

In economic terms, the latent satisfaction or enjoyment received from consuming goods or services is called **utility**. The common rule for consumer decision-making assumes that the consumers' objective is to derive the greatest possible utility from their typically static incomes¹⁸. In other words the neoclassical theory of consumer behaviour states that consumers are utility maximizers¹⁹. Neoclassical theory of demand satisfies certain consistency requirements. These requirements are often called the axioms of revealed preference. We say that a bundle of goods x is directly 'revealed preferred' to some other bundle y if x is not more expensive than y at the prevailing prices. If the consumer always chooses the best bundle they can get, as a utility maximizer, he must never choose y when x is available²⁰.

Also important in the decision-making process is the probability or likelihood of obtaining a satisfactory solution to a given need or problem. Thus, the expected utility

¹⁷ Hawkins, Del, Roger Best, and Kenneth Coney, "Consumer Behavior: Implications for Marketing Strategy", BPI Irwin, Homewood, IL, 1989.

¹⁸ Stager, David *Economic Analysis and Canadian Policy*, (Toronto, Ontario: Butterworths), 6th Edition, 1988.

¹⁹ Samuleson, P. A., "A Note on the pure theory of consumer's behaviour", *Econometrica*, Vol. 5. pp. 61-71, 1938.

²⁰ Houthakker, H. S., "Revealed Preference and the Utility Function", *Economica*, Vol. 17., pp. 159 – 174., 1950.

model can be adapted to accommodate the likelihood of certain payoffs occurring. This model can be described as²¹:

$$E(U) = p u(x) + q u(y) \quad [1]$$

where the expected utility $E(U)$ of a gamble where the payoffs are x and y with probabilities p and q (where $p+q = 1$).

In this sense, we can assume that different product attributes contribute different levels of utility, and that the consumer, when faced with a purchase decision among competing products, will choose the brand delivering the highest overall utility. As discussed earlier, specific product attributes deliver different levels of utility for each individual, and the positive product features need to be offset against the negative product features, including the negative utility associated with having to pay for the particular product. It is also important to realize that while the various brands each contribute different levels of utility, brand equity is certainly included in the decision-making process.

While we assume that consumers are rational utility maximizers, it is important to realize that under certain circumstances, or in particular situations, consumers may not behave rationally²². For lower involvement purchases, or when consumers may be in an altered state of mind, they may be demonstrating purchasing behaviour inconsistent with utility maximization, and in actuality, their specific purchases could be considered random²³.

Evaluative criteria and choice heuristics

Consumers are subject to limitations in processing capacity. This means that detailed and complex calculations or comparisons among alternatives may be the exception rather than the rule. Consumers may often use simple heuristics to make comparisons. These rules of thumb may be used to make comparisons among alternatives in many cases.

Choice heuristics can be summarized by the following aspects²⁴:

- How an evaluation for each alternative is developed, either directly as a result of the heuristic; or derived arbitrarily
- The choice criterion used to choose among the alternatives
- The form of processing (for example, by brand or attribute) implied. The form of processing interacts with the other aspects, particularly the evaluation aspect.

²¹ Einhorn, Hillel J., and Robin Hogarth, "Behavioral Decision Theory: Processes of Judgment and Choice", *Annual Review of Psychology*, 32, 1981, pp. 53-88.

²² see also, Sippel, Richard, "An Experiment on the Pure Theory of Consumer's Behaviour", *The Economic Journal*, 107, September 1997, pp. 1431-1444.

²³ Mattei, Aurelio "Full scale real tests of consumer behaviour using experimental data", *Journal of Economic Behaviour and Organization*, 43 (4), December 2000.

²⁴ Bettman, James, "An information processing theory of consumer choice", Addison-Wesley, Reading, MA, 1979.

There are five common decision rules used by consumers²⁵:

Conjunctive: Select all (or any or first) brands that surpass a minimum level on each relevant evaluative criterion;

Disjunctive: Select all (or any or first) brands that surpass a satisfactory level on any relevant evaluation criterion;

Elimination-by-aspects: Rank the evaluative criteria in terms of importance and establish satisfactory levels for each. Start with the most important and eliminate all brands that do not meet the satisfactory level. Continue through the attributes in order of importance until only one brand is left;

Lexicographic: Rank the evaluative criteria in terms of importance. Start with the most important criterion and select the brand that scores highest on that dimension. If two or more brands tie, continue through the attributes in order of importance until one of the remaining brands outperforms the others;

Compensatory: Select the brand that provides the highest total score when the performance ratings for all the relevant attributes are added (with or without the importance weights) together for each brand.

The specific identification of consumer variable utilities can be accomplished using techniques like conjoint analysis or discrete choice modeling, and will be addressed in more detail in the next section.

The Expectation of Satisfaction

Some research has indicated that the anticipation of future satisfaction received from purchasing a good is likely to contribute to purchasing behaviour²⁶. When anticipating satisfaction, the consumer forms a mental image related to one or more of the options, and the final decision is likely to be influenced by the focus of these imagery-related processes. The effects of the process are:

- alternatives with vivid attributes are more likely to attract attention,
- their vivid attributes are likely to be weighted more heavily, and
- thereby generate greater preferences for alternatives with vivid attributes than when the goal is strictly choice oriented.

In this sense, consumers could be creating internal advertisements within their own minds, thereby creating an internal bias towards certain product attributes. Essentially,

²⁵ Hawkins, Del and Roger Best, Kenneth Coney, *Consumer Behaviour: Implications for Marketing Strategy*, Fourth Edition, BPI-Irwin, Homewood, IL, 1989.

²⁶ Shiv, Baba and Joel Huber, "The Impact of Anticipating Satisfaction on Consumer Choice", *Journal of Consumer Research*, Vol. 27., September 2000.

consumers may create a visual image of certain product related *behaviours* and their expected consequences. This enables the consumer to experience vicariously, at a subconscious level, the important or self-relevant consequences of product use, prior to purchase²⁷.

For example, when a consumer approaches a decision with an anticipated satisfaction goal, consumers are likely to engage in imagery-related processes. Assuming that leather trim and a sunroof are more vivid than price, more cognitive resources are likely to be attributed to the vivid attributes during such processes when preferences are constructed with an anticipated-satisfaction goal rather than with a choice goal. As a result, in the presence of an anticipated satisfaction goal, the attributes “leather trim” and “sunroof” are likely to have more influence on the construction of preferences than price, and the customer is more likely to choose the car with these vivid attributes.

²⁷ Walker, Beth and Jerry Olsen, “The Activated Self in Consumer Behaviour: A Cognitive Structure Perspective”, *Research in Consumer Behavior*, 8, pp. 135-171, 1997.

From the theoretical to the practical:

An application to the purchase of a personal computer

Assuming that a consumer is considering the purchase of a personal computer, one might evaluate potential alternatives based on the following attributes and levels²⁸:

Attribute	Attribute Levels
Brand	<ul style="list-style-type: none"> ▪ Dell ▪ Hewlett Packard ▪ IBM ▪ Gateway
Processor speed	<ul style="list-style-type: none"> ▪ 900 Mhz Intel Celeron Processor ▪ 1.1Ghz Intel Celeron Processor ▪ 1.5 Ghz Intel Pentium Processor ▪ 1.7 Ghz Intel Pentium Processor ▪ 2.0 Ghz Intel Pentium Processor
Memory (RAM)	<ul style="list-style-type: none"> ▪ 128 MB RAM ▪ 256 MB RAM ▪ 512 MB RAM
Hard Drive	<ul style="list-style-type: none"> ▪ 20 GB Hard Drive ▪ 40 GB Hard Drive ▪ 60 GB Hard Drive ▪ 80 GB Hard Drive
Monitor	<ul style="list-style-type: none"> ▪ 15" Monitor ▪ 17" Monitor ▪ 21" Monitor
Keyboard	<ul style="list-style-type: none"> ▪ Standard ▪ Ergonomic
Optical Drive	<ul style="list-style-type: none"> ▪ CD Rom drive ▪ CD Rewritable (CD-RW) drive ▪ DVD Drive ▪ CD-RW/DVD Combination drive

This list of attributes and attribute levels indicates the range of possible alternatives available to a given consumer. Although there may be other variables (type of video card, or monitor resolution for instance), for the sake of brevity, this paper assumes that this list is either exhaustive, or only addresses the most important variables from the consumers' perspective (that is to say they are indifferent towards all other variables); hence the importance of identifying determinant attributes.

²⁸ It should be noted that as of the time of writing (October 2001), these computer components are considered state of the art. Future readers of this paper will no doubt find these variables lacking.

Adaptive Conjoint Analysis

One simplistic method of revealing product utilities is Adaptive Conjoint Analysis.

Conjoint (tradeoff) analysis is a technique frequently used for market research applications. Such applications are usually concerned with consumer preference and they attempt to assess the impact of specific product features on overall preference. Products or services are thought of as possessing specific levels of defined attributes, and a respondent's "liking" for a product is modeled as the sum of the respondent's "utilities" for each of its attribute levels.

The strength of conjoint analysis is its ability to ask realistic questions that mimic the tradeoffs that respondents make in the real world. Respondents evaluate product alternatives (concepts) described by various attributes and indicate which products they prefer. By analyzing the answers, conjoint analysis can estimate the weights and preferences respondents must have placed on the various features in order to result in the observed product preferences. In contrast to direct questioning methods that simply ask how important each attribute is, or the desirability of each level, conjoint analysis forces respondents to make difficult tradeoffs like the ones they encounter in the real world. As in real purchase decisions, buyers cannot get all the best features at the lowest price.

It would be time consuming and difficult for respondents to evaluate all possible product combinations in order to provide information on their values for the various product features. Conjoint analysis offers the researcher a more efficient way to obtain such information: only a carefully chosen subset of hypothetical product concepts is presented to respondents for evaluation. Examples of two conjoint concepts are included in appendix 1.

The answers to such questions are used to determine the respondent's utility for each of the attribute levels. Once utilities have been determined, the respondent's overall utility (preference) for a given product can be estimated by summing the utilities for each attribute level that describes that product.

Defining consumer utilities

For illustrative purposes, the author completed an online adaptive conjoint exercise using the computer attributes outlined above²⁹. The utilities uncovered, unique to the individual, are summarized in the table below, and relate to the purchase of a home-based desktop PC for general home usage (internet access, letter writing etc.):

Attribute	Attribute Levels	Utility
Brand	▪ Dell	73
	▪ Hewlett Packard	-106
	▪ IBM	97
	▪ Gateway	-64
Processor speed	▪ 900 Mhz Intel Celeron Processor	-10
	▪ 1.1Ghz Intel Celeron Processor	-34
	▪ 1.5 Ghz Intel Pentium Processor	8
	▪ 1.7 Ghz Intel Pentium Processor	14
	▪ 2.0 Ghz Intel Pentium Processor	23
Memory (RAM)	▪ 128 MB RAM	-67
	▪ 256 MB RAM	30
	▪ 512 MB RAM	37
Hard Drive	▪ 20 GB Hard Drive	-44
	▪ 40 GB Hard Drive	-35
	▪ 60 GB Hard Drive	31
	▪ 80 GB Hard Drive	47
Monitor	▪ 15" Monitor	-9
	▪ 17" Monitor	-68
	▪ 21" Monitor	77
Keyboard	▪ Standard	-9
	▪ Ergonomic	9
Optical Drive	▪ CD Rom drive	-51
	▪ CD Rewritable (CD-RW) drive	-11
	▪ DVD Drive	31
	▪ CD-RW/DVD Combination drive	30

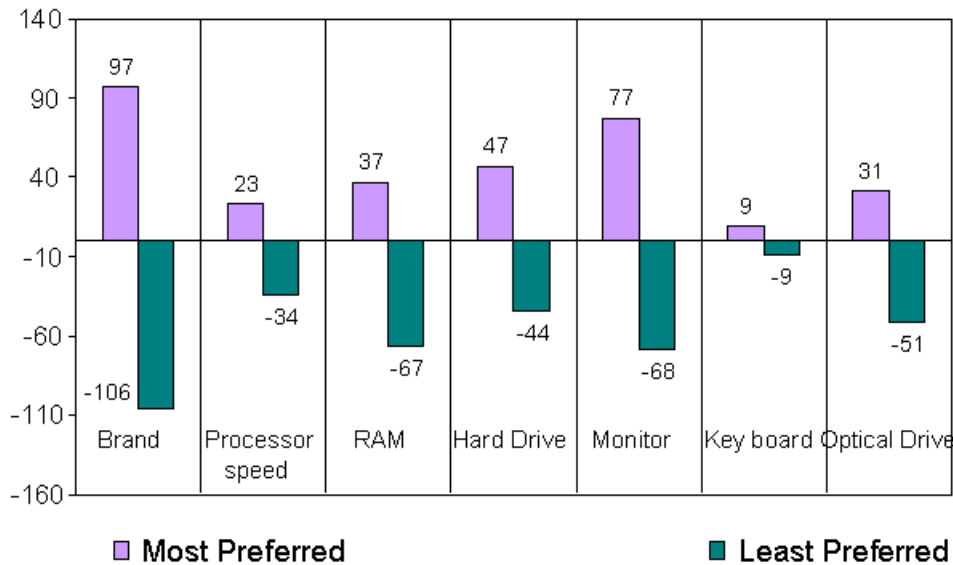
²⁹ To take the same short survey, please visit: <http://www.sawtoothsoftware.com/acanet/login.htm>

If computer makers had this information available to them, they would quickly realize that the most and least desired computers, from the author’s perspective³⁰, are:

Most desired personal computer	Least desired personal computer
IBM 3.0 Ghz Intel Pentium 4 processor 512 MB RAM 80 GB Hard Drive 21” Monitor Ergonomic Keyboard DVD Drive	Hewlett Packard 1.1 Ghz Intel Celeron Processor 128 MB Ram 20GB Hard Drive 17” Monitor Standard Keyboard CD-ROM

Looking at these alternatives, it should come as no surprise that a customer naturally wants the best items in a product. With the exception of the IBM brand, all the variables included in the most desired computer are at the highest ordinal level. What becomes interesting is to compare the relative importance of these variables, as is illustrated in the graph below:

Relative Utilities



³⁰ It should be noted that if such a tool were used by a firm to understand how consumers make product tradeoffs, it would be very inefficient to analyze the results one respondent at a time. In an actual model, groups or segments of respondents would be analyzed collectively, therefore producing more robust models.

Graphically, it becomes apparent that for this consumer, the two most important relative antecedents of computer choice are brand and monitor; other variables such as type of keyboard and processor speed have significantly less importance. Relatively speaking, the IBM brand is roughly equal to the sum of the utilities for processor speed, RAM, keyboard, and optical drive.

Discussion of the Adaptive Conjoint Technique

Although the technique does reveal the relative importance of various attributes across a broad scope of competing alternatives, there are some significant limitations with this technique as presented in this paper³¹.

1. Respondents indicate a preference: As illustrated by two examples (out of a possible ten) included in appendix 1, respondents are not asked to select among competing alternatives, but to indicate a preference for one product or another. Converting such preferences into stated purchases introduce assumptions that limit the overall value of the model. There are fundamental differences between preferences and actual behaviour; many consumers may prefer BMW's, but actually drive Fords and Chevys.
2. Limited variables displayed: Respondents are asked to make a choice given a subset of the overall available attributes. This presents an unrealistic choice environment since rarely will a respondent choose between only two variables, and have "everything else held the same".
3. No choice option: As in real life, a respondent does not have the opportunity to say that he or she does not like any of these alternatives.
4. Inclusion of representative variables: As indicated earlier in the paper, the description of a product in terms of variables and levels will naturally not include the complete universe of potential variables. Since there is ultimately a limit as to how much information a respondent can process, marketers often include only the determinant or critical variables. However, in this example, one significant variable was overlooked, namely price. While this is more a criticism of this specific example than the technique itself, it nevertheless illustrates a shortcoming of the technique; the omission (intentional or otherwise) of variables affecting consumer behaviour.

Alternatively, the technique does have significant advantages over time series analysis or multiple regressions which model past consumer behaviour by accommodating the inclusion of revolutionary determinant attributes, or newer attribute levels.

³¹ For a more detailed discussion of the shortcomings of conjoint, please see Glowa, Tim and Sean Lawson, "Discrete choice experiments and traditional conjoint analysis", *Quirks Marketing Research Review*, May 2000.

Use of consumer behavioural modeling techniques

Given the complexity and challenges involved in accurately measuring consumer behaviour, a manager may wonder why he or she bothers even trying to understand consumer behaviour. The reason is very simple; by understanding how consumers make purchasing decisions, and inherent within this is how they make tradeoffs between competing product offerings, the manager receives strategic information that is valuable in developing a marketing strategy, and optimizing a product's positioning in the marketplace.

Specifically, these models can be used to:

- identify price elasticity, and therefore lead to an understanding of the optimal pricing strategy;
- optimize a product offering;
- determine your best product reaction to a competitive product change;
- recognize (through a cost / benefit analysis) whether a given product change will pay for itself with increased demand.

Ultimately, behaviour models provide firms with an opportunity to peek inside the head of the consumer. This understanding about consumer preferences will allow them to position their product or service to capture the greatest relative position in the mindset of the consumer. This will lead to increased revenues, improved satisfaction, or increased acceptance of a product or policy.

Summary

In making a purchase, a consumer goes through a decision process consisting of problem recognition, information search, evaluation of alternatives, purchase decision, and post-purchase behaviour. The marketer must understand consumer behaviour at each stage of the process, and what influences are operating. This helps the marketer to develop effective marketing programs for the target market.

Appendix 1 - Examples of adaptive conjoint tasks

