

**Stated Preference Techniques and
Consumer Decision Making:
New Challenges to Old Assumptions**

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Contents

Abstract	1
1. Introduction	1
2. Historical Background to Stated Preference Techniques	2
Experiments Concerning Individual Choice	
Revealed Preference Theory	4
The Limitations of Revealed Preference Theory	
Stated Preference Techniques	5
Difficulties in the design of SP Experiments	6
3. Alternative Theories of Decision Making	8
Consumer Decision Making in Stated Preference Techniques	
The Use of Assumptions within Stated Preference Techniques	11
Contrasting Paradigms in Psychology	12
Cognitivist Models of Consumer Decision Making	14
Consumer Decision Making in Economics	17
Exposure to Information	19
Perception	21
Comprehension and Information Retrieval	22
Choice Strategies	24
4. Deriving a Theoretical Model of Decision Making in SP	25
5. Conclusion	27
References	28

Decision Making and Stated Preference Techniques: New Challenges to Old Assumptions

Abstract

Stated preference techniques originate from the field of experimental economics and rely heavily upon the assumptions of economic rationality and utility maximisation. Several high profile failures of the technique, and limited research evidence pointing at differences in the way in which individuals respond to different ways of representing attributes in stated preference experiments, suggest that these assumptions should be re-evaluated. This paper challenges the traditional assumptions held about decision making by stated preference practitioners, drawing on contrasting decision making literature from the psychology field. A possible explanation for the varying responses to different attribute representations is provided in a model of decision making derived from this literature.

1. Introduction

Stated preference (SP) techniques are a family of market research tools that allow researchers to uncover how consumers value different product/service attributes. SP asks respondents to rank, rate or choose between different hypothetical product/service scenarios, that are made up of different attribute mixes. The choices made by the respondents can be used to infer how they value different attributes.

This paper questions the assumptions made about the decision making process of respondents in stated preference techniques, drawing from limited evidence from SP research as well as literature from the psychology field, in order to develop a new alternative model of decision making in stated preference experiments.

This paper is separated into three distinct parts. Firstly, the origins and development of SP will be discussed. A presentation of the historical background to the technique is important in explaining the assumptions widely held by stated

preference practitioners today. Furthermore this section highlights some recent SP literature that questions our understanding of the decision making process. Secondly, the paper discusses different theories of decision making, in particular the contrasting assumptions made by users of SP and those in literature from the Psychology field. Thirdly, this paper presents a theoretical model of decision making in stated preference techniques, and suggests two areas where research needs to be carried out in order to test this model.

2. Historical Development of Stated Preference Techniques

This section describes the origins of stated preference techniques in order to explain the reasons for the assumptions about decision making that are held by stated preference practitioners.

Whilst SP is now often labelled a market research tool, it is within the field of utility theory and demand forecasting that the technique has evolved. This section provides a brief historical outline of the key developments in this area. It begins with the early research into utility theory carried out within the fields of mathematical psychology and microeconomics, that has led to the development of the forecasting techniques of revealed and stated preference techniques. Applications within the transport field are included within the discussion.

Experiments Concerning Individual Choice

The origins of utility theory can be traced to the philosophy of utilitarianism dating back to Jeremy Bentham in 1789 (Hargreaves Heap, 1992). Bentham's concept of utility was defined in hedonic terms, by the pleasure that it produces (Kahneman, 1994). Others have interpreted utility as 'wantability' (Fisher, 1918). Kahneman (1994) suggests that:

'Economic analysis is more congenial to wants and preferences than to hedonic experiences, and the current meaning of utility in economics and decision research is a positivistic version of wantability: utility is a theoretical construct inferred from observed choices.'

Researchers working within the field of utility theory were by the first half of this century trying to find ways of measuring an individual's utility measure for goods and services, and so determine consumer preferences.

In 1931 Thurstone carried out research into how to determine individuals' indifference curves. Indifference curves show combinations of goods that provide a consumer with equal utility. He reported an experiment where individuals were asked to make hypothetical choices about different commodity bundles that consisted of hats and coats, hats and shoes, or shoes and coats. Thurstone reported in detail the responses of one individual, and concluded that the trade-offs made could be adequately represented by indifference curves.

Thurstone's experiment was strongly criticised by Wallis and Friedman (1942). They stated:

'It is questionable whether a subject in so artificial an experimental situation could know what choices he would make in an economic situation; not knowing, it is almost inevitable that he would, in entire good faith, systemise his answers in such a way as to produce plausible but spurious results... .. for a satisfactory experiment it is essential that the subject give actual reactions to actual stimuli... Questionnaires or other devices based on conjectural responses to hypothetical stimuli do not satisfy this requirement. The responses are valueless because the subject cannot know how he would react'.

Rousseas and Hart (1951) described an experiment that they carried out as a response to the work reported by Thurstone, and the subsequent criticism made by Wallis and Friedman. They aimed to carry out a choice experiment that provided a more realistic choice situation by asking individuals to choose between different breakfast menus. Whilst the experiment was carried out in a different way to that of Thurstone's, Rousseas and Hart concluded that individual's preferences could be successfully measured using hypothetical choice experiments.

This conclusion was supported by research carried out by Mosteller and Noguee (1951) that looked at expected utility theory. They suggested that laboratory

experimentation can provide a valuable opportunity to examine behaviour that is *'unconfounded by other considerations'*.

Despite the descriptions above of early experiments using hypothetical choice, criticisms by economists about the validity of hypothetical choice (such as those made by Wallis and Friedman), meant that most research has relied upon observed choices or *revealed preference data*.

Revealed Preference Theory

The term revealed preference is first attributed to Samuelson (1938). He suggested that an individual's behaviour could be seen as a series of choices. By comparing observed behaviour with available alternatives, Samuelson suggests that an individual's preferences (or utility function) are inferred. This theory has been subsequently developed in order to allow choice models to be estimated. Revealed preference data is gathered either through direct observation, or in surveys asking about actual behaviour. McFadden (1973) provides a more detailed discussion of the technique.

Research into transport demand modelling has been at the forefront of the development of revealed preference choice models. Published examples within this context can be found by Warner (1962), Lisco (1967), and Quarmby (1967).

The Limitations of Revealed Preference Techniques (RP)

Whilst RP data has been used frequently to forecast travel demand, the technique exhibits a number of severe limitations:

- It can be difficult to observe the effect of sufficiently large variations in the variables of interest using revealed preference data. For example, transport operators would be unlikely to experiment widely with their fare levels in order to assess consumers' reactions. Similarly, an operator would not want to commit large sums investing in upgrading services in order to gain a greater understanding of consumer preferences. Hence revealed preference data is typically restricted in the width of variation of current or past service attribute levels. As a result, researchers can only calculate accurately a small section of a consumer utility function.
- There are often strong correlations between the variables (multicollinearity) in revealed preference data (in particular travel time and cost). Separating out the effect of different variables can be difficult, making estimation of the model parameters impossible.

- It can be difficult to estimate utility levels attributed to secondary variables (for example, seat design), as opposed to primary variables (for example travel time and cost), using revealed preference data. This is because the relative utility weighting for secondary variables is low.
- Given that revealed preference data is based on actual behaviour, the use of these techniques proves difficult when forecasting demand for new services.

Clearly, the use of revealed preference techniques for forecasting demand can, in many scenarios prove difficult. It is largely as a result of the problems encountered using RP techniques that researchers looked for new methods of estimating consumer utility functions, and so forecast demand.

Stated Preference Techniques (SP)

Experiments using hypothetical choice were used in the first half of this century, as discussed earlier, in order to develop a greater understanding of utility theory. However, this alternative method for observing consumer preferences was not developed in the field of market research, for commercial application, until the early 1970s. Early examples of experiments that used these hypothetical scenarios, then commonly referred to as 'conjoint analysis', can be found by Davidson (1973) and Louviere (1973).

In 1978, Green and Srinivasen formally defined these kinds of evaluation techniques as:

'Any decompositional method that estimates the structure of a consumer's preference..... given his/her overall evaluation of a set of alternatives that are pre-specified in terms of levels of different attributes'

From the early 1980s researchers in the transport field were using the method, and within Europe at least were referring to the method as 'stated preference techniques'. This has become a popular term, largely because of the clear contrast it portrays to 'revealed preference techniques'. Steer and Willumsen (1981) and

Sheldon and Steer (1982) provide some of the earliest publications outlining the use of the technique within the transport sector.

Prior to 1983, the emphasis of stated preference techniques had been on judgmental tasks, in which respondents were asked to rank or rate a number of attribute mixes associated with a particular choice context. However, it was not until the publication of a paper by Louviere and Hensher (1983) that stated preference techniques became better known. Louviere and Hensher's paper emphasised the use of stated preference experiments, which incorporated choice experiments. The data produced from this kind of survey proved far easier to analyse, and allowed greater prediction of market shares. Figure 1 shows an example of a simple choice card that might be presented to a respondent.

Figure 1: An example of a choice card

OPTION A	OPTION B
Travel by bus	Travel by car
Journey time is 25 mins	Journey time is 15 mins
Bus Fare is 90p	Petrol and parking costs are £1.50

- Definitely choose A
- Probably choose A
- No preference between A or B
- Definitely choose B
- Probably choose B

Choice-based stated preference techniques are now considered the most commonly used technique (Pearmain et al, 1991).

Whilst the techniques grew in their usage, economists remained sceptical about the reliance upon respondents' 'stated intentions', rather than actual behaviour (Hensher, 1992). However, stated preference techniques performed impressively when compared to revealed preference data as part of the UK Department of Transport Value of Time Project (MVA, ITS, TSO, 1987). This study resulted in the

acceptance of the method by the Department of Transport. This influential acceptance has resulted in a significant increase in the frequency of the method's usage in the UK.

Difficulties in the Design of SP Experiments

Whilst the estimates produced from SP data in the Department of Transport's value of time study (discussed above) were considered to perform well when compared with revealed preference data, the technique has experienced some problems. For example, it has been reported that the traffic forecasts for the high speed rail link between London and the channel tunnel were inaccurate (Financial Times, 18.4.98). The underlying problem with the design and/or analysis of the SP surveys on which the forecasts were based remains unresolved.

Whilst the use of stated preference techniques have become widespread, there remains a lack of understanding about how individuals make their choices during the experiment. The design and analysis of SP experiments are based upon a number of assumptions about the way people make these decisions. These assumptions originate from the economic theory in which the technique developed. In 1995 Ampt et al. compared the current economics-based beliefs and assumptions made about stated preference techniques, with findings about choice behaviour found in the field of psychology. They suggest that the assumptions currently made by SP researchers may be invalid as a result of information screening and alternative choice strategies employed by the respondent (to be discussed further later in this paper). More recently, Swanson (1998) has again called for more SP researchers to pay more attention to the findings in the psychology literature.

One aspect of SP design that is not understood is the apparent difference in responses produced when attributes are represented in alternative forms. This is an area that is becoming increasingly important as technological advances allow greater freedom in the surveying process. The use of lap top computers allow text, picture and potentially video and sound to represent attributes. Nelson and Towriss (1995) describe a study that looks at the difference between verbal (text) and visual representations of attributes in research that focused upon the demand for light rail

transit (LRT) in Manchester. This study found that responses differed depending upon the type of representations used. Follow up interviews with the respondents led the authors to tentatively suggest that *'some individuals find it difficult to make choices based on the abstract nature of attributes represented in a textual form and seek to add realism by embellishing the information given to them in the experimental setting'*.

The research by Nelson and Towriss (1995) has been important in highlighting the difference that alternative methods of representation can make in SP data. It does not however provide a detailed discussion of the possible underlying reasons for the differences in responses. This paper draws on findings within the field of psychology, and presents a theoretical model of decision making that explains the differences in responses made to different attribute representations. The remainder of this paper discusses the assumptions made about the decision making process by stated preference researchers, and discusses the economic origins of these assumptions, before contrasting them with evidence from the psychology literature. Finally a theoretical model of decision making within stated preference experiments is presented.

3. Alternative Theories of Decision Making

Consumer choice behaviour has attracted a wealth of research attention – in particular within the fields of psychology and economics and within the applied fields of marketing, and advertising research. This section aims to draw on this literature in order to explain the theoretical background to the model of decision making suggested at the end of this paper.

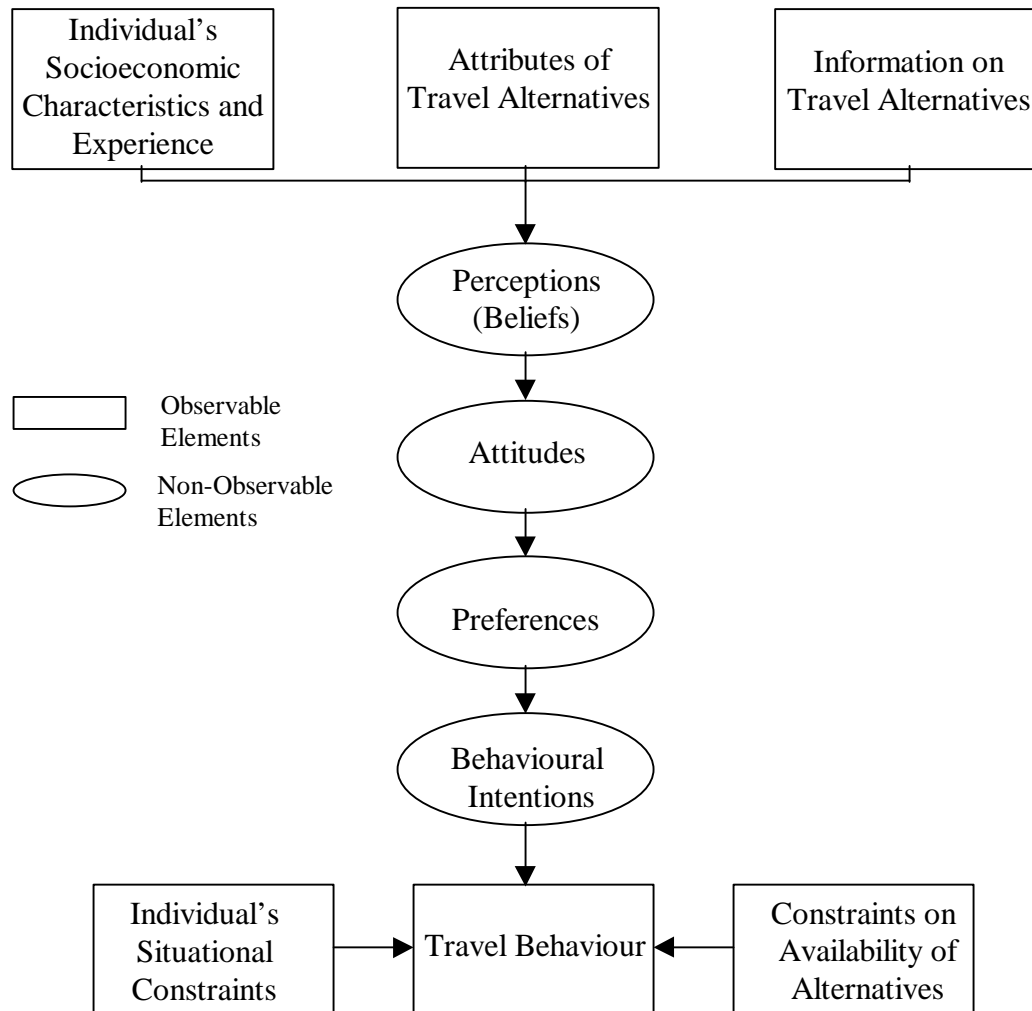
Consumer Decision Making in Stated Preference Techniques

In this section it is useful to provide an overview of the theory and assumptions adopted by stated preference practitioners. Firstly the underlying components of consumer behaviour will be described. The model discussed is taken from 'Stated Preference Techniques – A Guide to Practice' by Pearmain et al. (1991), the leading text in the field of stated preference techniques within the transport field. Secondly the assumptions made by stated preference practitioners

about the way in which information is used in the choice process will be discussed. Lastly, criticisms of the assumptions made in stated preference surveying will be outlined and compared with similar criticisms made about economic modelling in general. Some of the concepts introduced in this section relate to theories discussed later in the paper. The author feels that it is important to describe the assumed decision making within the context of stated preference techniques first however, before discussing the underlying concepts and theories in more detail in the paper.

Pearmain et al. (1991) in their widely referenced text ‘Stated Preference Techniques – A Guide to Practice’ provide a model of decision making that depicts the ‘*the main processes underlying travel behaviour*’. This model is depicted in figure 2 on the following page.

Figure 2: Components of Consumer Behaviour (Pearmain et al., 1991)



The diagram distinguishes between elements that are external to the consumer (and therefore observable) and those that are internal to the consumer (and therefore unobservable). External, observable elements are those such as the attributes of travel alternatives. Internal, unobservable elements are those such as the perceptions and preferences of the consumer. *‘The former serve to promote and constrain market behaviour, the latter reflect consumer’s understanding of their options and influence their decisions to pursue particular strategies’* (Pearmain et al., 1991). Pearmain et al. suggest that by using quantitative methods such as stated preference techniques, researchers can infer *‘data on preferences (liking or disliking for each option) and behavioural intentions (what the person would intend to do)’*.

The ‘Pearmain’ model described above clearly contains a chain of internal mental elements (perception → attitudes → preferences → behavioural intentions) that are linked to the multiple

attributes of alternative travel options. This description of the decision making process relates closely to Fishbein's theory of decision making (that is discussed later in the paper).

Stated preference practitioners make a number of assumptions about the way in which respondents choose in SP surveys:

- Stated preference techniques rely upon the concept of utility. *'Stated preference techniques use individual respondents' statements about their preferences in a set of options to estimate utility functions'* (Pearmain et al., 1991). The concept of utility will be discussed in detail in section 2.3.
- Respondents are assumed to act rationally – that is using a utility maximising choice strategy. This means that the respondents are believed to attach utility weightings to each of the attributes in a choice situation. It is assumed that the option with the highest total utility will therefore be chosen. Responses by individual's within a stated preference survey that appear to the researcher to be 'irrational' (non-utility maximising) are traditionally removed from the sample
- The attributes included within the survey are assumed to exhaust the respondent's *salient beliefs* about the object in the survey. It is assumed therefore that the information set on which decisions are made are those represented by the researcher in the survey only. The exception exists where a researcher includes attributes that are not believed to be salient, because these are variables that the researcher want to value.

Kroes and Sheldon (1988) suggest that *'An interesting feature of stated preference techniques is that they are particularly well suited by their experimental nature for testing alternative hypotheses about the functional form of the utility function'*. This is supported by Louviere (1978). However, stated preference practitioners almost without exceptions assume a utility function that is linear and additive. A typical linear additive utility function is as follows:

$$U_I = a_0 + a_1X_1 + a_2X_2... + a_nX_n$$

Where, U	=	utility of option I
X ₁ ... X _n	=	product attributes
a ₁ ... a _n	=	model coefficients
a ₀	=	model constant

The model coefficients represent the relative importance to each product attribute. The functional form of this typically assumed utility function is compensatory. It assumes that individuals trade-off an improvement in one attribute against a worsening in another.

The Use of Assumptions within Stated Preference Research

Ampt et al. (1995) questions the realism of the assumptions used in stated preference techniques. This kind of criticism has previously been discussed at length about economic theory in general. Blaug (1980) suggests that 'realistic' assumptions in the social sciences can be considered as '*motives to economic actors that we, fellow human beings, find comprehensible*'. Blaug states that the *Verstehen* doctrine tells us that this is a '*desideratum of adequate theorizing in the social sciences*'. Friedman (1953) in his 'Essay on the Methodology of Positive Economics', when discussing the 'maximization of returns hypothesis' suggests that '*individuals behave as-if they were seeking rationally to maximise their expected returns... and have full knowledge of the data needed to succeed in this attempt*'. Blaug (1980) compares this with the hypothesis that '*billiards players calculate the angle of the momentum of billiards balls every time they drive the ball into a pocket*'. The billiards player may act in a way that suggests that this calculation occurs - this does not mean that this process does actually occur. Theories are only instruments for making predictions or, better still, inference tickets that warrant the predictions that we make (Coddington, 1972: Blaug, 1980). This author accepts the suggestion by Friedman that the assumptions that are made about behaviour do not need to be realistic, so long as they allow accurate predictions. However, as discussed in the introduction to the research area, stated preference techniques have not always been accurate in their predictions (an accurate model is here considered to be one that outperforms a null or random

model – see Swanson, 1998). This suggests that the assumptions underlying stated preference techniques should, as Ampt et al. (1995) suggests, be questioned. The assumptions about the use of information will be considered in the following section.

Stated Preference Techniques and the Underlying Theory

Consumer decision making has attracted a lot of research attention in the fields of psychology and economics. Stated preference techniques have originated from the field of economics, and it is easy to see the influence of this discipline upon the assumptions made about the use of stated preference techniques. However, as already stated, the model presented by Pearmain et al. (1991) also suggests the influence of Fishbein's theory of decision making - that originates from the field of psychology. The following sections describe consumer research within the two fields, and discuss the implications for the assumptions made about stated preference techniques. The contrast between the predominant paradigms, and assumptions within the fields of psychology and economics are depicted overleaf in figure 3.

Contrasting Paradigms in Psychology

Within the field of psychology, there are two contrasting paradigms that have dominated research within the area of consumer decision making during this century. This section describes these two paradigms and criticisms made about them both.

The early years of this century saw the emergence of behaviourism as a reaction against earlier cognitive models of behaviour. Behaviourists' consider action to result from reflexes to external stimuli (Pavlov, 1927; Watson, 1930; Skinner, 1938). They consider the role of the mind as secondary, or even irrelevant to explaining behaviour. Foxall (1987) suggests that the behaviourist paradigm is comprised of three separate elements:

- Operant conditioning, in which environmental factors influence the rate at which behaviour occurs;
- A single-subject research strategy, which proceeds inductively through the intensive study of individuals rather than through the testing of deductive hypotheses by means of inter-group statistical comparisons;
- A philosophical stance that explains behaviour by reference to contingent environmental stimuli, eschewing causal reference to intrapersonal factors.

Skinner (1950) suggests that to explain behaviour, the environmental factors that affect the rate at which behavioural responses occur must be identified. These environmental factors are considered to condition human behaviour.

In stark contrast to the assumptions held within the behaviourist paradigm, the second half of the century experienced the re-establishment of cognitive psychology. Cognitive psychologists believe that elements inside the mind are causal in directing human behaviour – mediating between the stimuli of the environment and the behaviour of the individual (Sheerer, 1954). Modern cognitive psychology developed from:

- Chomsky (1959) working in the area of language and memory
- Traditions of ‘verbal learning’ stemming from Ebbinghaus’ study of human memory (Howes, 1990)
- The model of information processing that emerged during the 1960s alongside that of the computer programming (Howes, 1990).

Cognitivist models of consumer decision making will be discussed in more detail in the following section.

The cognitivist paradigm has not existed without criticism. Foxall (1987) highlights the following criticisms:

- The comprehensive models of consumer decision making have been extensively criticised, notably in view of the untestable nature of their propositions (Bagozzi, 1984; Jacoby, 1978; Tuck, 1976).
- Empirical research has revealed low correlational consistency between measures of the central pre-behavioural components of the models derived within this paradigm and that of the pre-purchase choice behaviour itself (Ajzen and Fishbein, 1977; Fishbein, 1981; Foxall, 1983; Wicker, 1969).
- Consumers have been shown to make smaller and less rational use of information than the cognitivist information-processing paradigm.

The re-emergence of the cognitive paradigm in psychology, and its displacement of behaviourism as the prevailing philosophy is now widely recognised by psychologists (Foxall, 1983, 1987). Criticisms such as those described above have not significantly weakened the adoption of the paradigm within the field. Foxall (1987) suggests that this unrivalled acceptance of a paradigm that is dependent upon untestable, unobservable mental elements is unhealthy for the future scientific advances in the field of consumer behaviour. He calls for a greater evaluation of the cognitivist paradigm's underlying assumptions. Foxall is one of the most prominent proponents for the re-examination of the behaviourist paradigm within the field of consumer behaviour. However his focus on the behaviourist perspective is argued more to encourage greater evaluation of the cognitivist assumptions in order to strengthen rather than undermine this dominant paradigm.

It is true that there exist many criticisms of the cognitivist paradigm (in particular those relating to the untestability of the internal mental elements on which the paradigm rests). However, there exists no criticism to date that has achieved to undermine the paradigm significantly, and it therefore remains the dominant framework within the field. This author therefore adopts this cognitivist paradigm.

Cognitivist Models of Consumer Decision Making

Prescriptive accounts of consumer research and marketing management emphasise strongly the need to identify and measure consumers' pre-purchase cognitive processes (for example, Kotler, 1980; Engel et al., 1978). It is argued that by understanding these processes, *'effective persuasion of the buyer's pre-purchase processing of information, gained significantly though not exclusively through advertising, strengthens or modifies changes in his buying behaviour, particularly brand choice'* (Foxall, 1983).

Information processing models of consumer behaviour have prevailed in the study of these pre-purchase mental events since they first appeared in the 1960s. These models can be likened to computer flow charts, and follow a process of pre-purchase mental events and processes. Table 1 below provides a summary of some of the most well known of these models.

**Table 1:
Information Processing Models of Consumer Choice (Adapted from Foxall, 1983; Tuck, 1976)**

Author (s)	Year	Sequence
Lionberger Rogers	1960 1962	Seeing ⇒ Reading ⇒ Believing ⇒ Remembering ⇒ Acting
Colley	1961	Unawareness ⇒ Awareness ⇒ Comprehension ⇒ Conviction ⇒ Action
Lavidge and Steiner	1961	Awareness ⇒ Knowledge ⇒ Liking ⇒ Preference ⇒ Conviction ⇒ Action
Nicosia	1968	See appendix A for flow chart
McGuire	1969	Exposure ⇒ Attention ⇒ Comprehension ⇒ Conviction ⇒ Action
Howard and Sheth	1969	Attention ⇒ Brand Comprehension ⇒ Attitude ⇒ Intention ⇒ Purchase
Engel, Kollat and Blackwell	1970	See appendix B for flow chart
Rogers and Shoemaker	1971	Knowledge ⇒ Persuasion ⇒ Decision ⇒ Confirmation
McGuire	1976	Exposure ⇒ Perception ⇒ Comprehension ⇒ Agreement ⇒ Retention ⇒ Retrieval ⇒ Decision Making ⇒ Action
Engel, Blackwell and Kollat	1978	Perceived Information ⇒ Problem Recognition ⇒ Search ⇒ Evaluation of Alternatives ⇒ Beliefs ⇒ Attitudes ⇒ Intentions ⇒ Choice
Britt	1978	Exposing ⇒ Attending ⇒ Perceiving ⇒ Learning and Remembering ⇒ Motivating ⇒ Persuading ⇒ Desired Action

Whilst these flow charts dominated the output of the academic consumer behaviour theorists in the 1960s and 1970s, they were not without criticism. Tuck (1976) states that the models of Nicosia, Engel, Kollat, and Blackwell, and Howard and Sheth ‘suffer from untestability and lack of specificity of variables. They offer models of what consumer choice might be like, but offer no evidence that it is in fact like their theories’. The criticisms that Tuck makes about these three models are essentially true for all the models included with table 2.1.2. The relationships between the variables were not clearly defined and could not easily be tested empirically. As discussed earlier in

the previous section, these criticisms relate largely to the cognitive philosophical stance that these models adopt. By accepting the existence of internal mental processes in the act of making a decision, these models immediately introduce the difficulties of variable measurement. However whilst these criticisms are strong, there remains an almost universal acceptance amongst consumer research that pre-purchase mental events do exist. As a result, different forms of these information processing models still prevail in current consumer behaviour texts (for example, see Solomon, 1996).

A consumer's overall evaluation of a product or service accounts for the bulk of his/her attitude towards it. Therefore when a market researcher wants to assess attitudes, it can be sometimes sufficient to ask a simple question such as: '*how do you feel about travelling by train?*'. However, one problem is that a product or service is commonly made up of a number attributes, some of which may be more important than others to different people. For this reason multi-attribute models have become extremely popular amongst market researchers.

Recently, models of consumer decision making (in particular multi-attribute models) have relied more and more heavily on the 'functional theory of attitudes' to explain how attitudes facilitate behaviour (Katz, 1960). Roberts (1987) defines an attitude as a general evaluation of people, object or issues.

Martin Fishbein (1983) developed the most influential attitude model. The model measures the following three components of attitude:

- *Salient beliefs* people have about an A_o (i.e. those beliefs about the object that are considered during evaluation).
- *Object-Attribute linkages*, or the probability that salient beliefs are held about a particular object.
- *Evaluation* of each of the salient beliefs.

Problems with the predictive ability of attitude models to predict behaviour led to an extended Fishbein model, the 'theory of reasoned action' (Ajzen and Fishbein, 1977).

The theory recognises the power of other people in influencing behaviour by including the following variables:

- *Normative Belief* - that others believe an action should be taken or not taken.
- *The motivation to comply* with the belief – the degree to which the consumer takes others' anticipated reactions into account when evaluating a course of action or a purchase.

Models of decision making have been extended within the decision-making literature to include other factors affecting individual's beliefs, attitudes and intentions. For example:

- *Social influence*: The extended Fishbein model can be seen to include a variable that accounts for the effects of social influence on an individual's decision. Research within the field of psychology has deepened the understanding of this influence through the investigation of the following factors: conformity; obedience; leadership; and collective behaviour (see McIlveen and Gross, 1988).
- *Cognitive dissonance*: This has been an area researched primarily within the marketing context. It relates to a consumer's post-rationalisation of their behaviour. A consumer believes that a product has additional utility after its purchase in a way of justifying previous behaviour (see Foxall, 1990).

The above points are examples of factors (other than a product's attributes) that affect the attitudes, beliefs and intentions of a consumer about a product or service. Research into these areas has been important in understanding the variables that affect attitudes. Stated preference research however, does not attempt to measure these factors separately. SP research aims to measure the intentions of individuals about products and services. Their attitudes (which include measures of the variables discussed above) are implicit within this measure.

Models of consumer decision making in the field of economics are based upon the principles of instrumental or substantive rationality, and utility maximisation. It is also upon these principles that stated preference techniques rest. This section will describe these concepts.

Instrumental rationality is defined as the choice of actions that best satisfy a person's objectives (Hargreaves Heap et al., 1992). This presumes that an individual with a variety of objectives is capable of comparing the satisfaction of these various objectives so as to come to an overall assessment. It has traditionally been assumed that these objectives can be ordered on a single scale by comparing the pleasures of satisfying them. The name given to this measure is 'utility'.

The concept of utility is rooted in the philosophy of utilitarianism (Bentham, 1789; Mill, 1863; Pigou, 1920; Hargreaves Heap, 1992), although the concept of instrumental rationality is now expressed in a slightly different way. It is assumed that individuals have preferences, and that the integration of these preferences is revealed in a preference ordering which determines action. Instrumentally rational action is defined through placing certain restrictions on these orderings (axioms of rationality). When these restrictions are met, the preference ordering can be represented by a utility function (Hargreaves Heap et al., 1992).

It is upon the above assumptions that microeconomists base the theory of consumer choice. Katz and Rosen (1991) suggest that there are three main steps involved in understanding consumer behaviour:

1. We must know what the consumer *wants* to do: that is we need to know his/her preferences for various commodities. Without knowing her preferences, we cannot know what a 'good' solution to the problem of scarcity is from his/her own point of view. Thus the first step in modelling consumer behaviour is representing consumer tastes.
2. We also need to know what the individual *can* do, given his/her income and the prices he/she faces. Hence the second step is modelling the constraints facing the decision-maker due to her limited budget.

3. The third step is simply putting the consumer's preferences together with his/her constraints. This allows us to determine which feasible choice maximises his/her well being.

Rational decisions are therefore, decisions that maximise utility, given particular consumer tastes and preferences. The key to predicting future consumer behaviour, is understanding/evaluating those tastes/preferences within their constraints.

The overall approach taken in understanding consumer behaviour has varied greatly in terms of the models produced between the field of economics and psychology. However the economic and psychological models described are not necessarily incompatible with each other. For example, the Fishbein model does not prohibit the concept of utility maximising behaviour (as can be seen in the Pearmain model presented earlier in this paper). The main contrast between the two disciplines can be seen in their understanding of the term 'rational behaviour'. This will be discussed in the next section.

The Contrast between Psychology and Economics – The Use of Information

There is an important difference in the conceptualisation of the term 'rationality' between economists and psychologists. *'In economics, rationality is viewed in terms of the choices it produces; in the other social sciences it is viewed in terms of the processes it employs'* (Simon, 1976, 1982). *'The rationality of economics is substantive rationality, while the rationality of psychology is procedural rationality'* (Simon, 1986).

The way in which these different concepts of rationality are described within the economics and psychology literature can be viewed in terms of the different assumptions that are made about the information set used in the decision making process. Instrumental or substantive rationality (or economic rationality) assumes a full information set. Procedural rationality assumes that choices may be based upon a distorted information set, as a result of different mental elements that process the information. The following sections examine the effects of these mental processes and how they might affect the information set.

Exposure to Information

The theoretical difficulty with instrumental rationality arises firstly over the informational structure of decisions made (Hargreaves Heap (1992)) - that is the availability or cost of information on which decisions are made. The problem may not be obvious at first, because it is tempting to think that the investment in acquiring information can be subjected to an instrumental calculation. For example, economists suggest that individuals invest in information up to the point at which marginal benefit in terms of additional utility, matches the marginal cost in terms of utility that might have been gained from other activities undertaken instead. However, Hargreaves Heap et al (1992) ask 'How is an individual to know the marginal benefits of further information acquisition, without knowledge of the full information set?'. They state that whilst it is possible to suggest that an individual has subjective beliefs about the benefits from additional information, this introduces an arbitrary element into the description of action.

The way in which people's choices are limited by the information that they gather has serious implications for the use of stated preference surveys. In stated preference surveys respondents are provided with all the information that is required to make a utility maximising decision. In reality the cost or availability of information may limit their instrumental rationality.

It is also possible that respondents may not utilise information that is available to them at no, or limited cost. The use of available information can be affected greatly depending upon the type of decision being made. Two different variables will now be considered, the frequency of the decision made, and the level of consumer involvement.

The frequency of the decision being made can affect the level of information search that is carried out by a consumer. For example, recent research by Verplanken et al (1998) suggests that habitual behaviour causes the information search carried out by the consumer to be limited, therefore distorting the information set on which decisions are made. Instrumentally rational action (and hence stated preference

techniques) assumes that behaviour is dependent upon a discrete decision, which is considered upon all available information. Verplanken et al (1988) suggest that when behaviour is *'repeatedly and satisfactorily executed and becomes habitual, it may lose its reasoned action'*.

Recently, substantial research attention within the field of marketing has been given to another aspect of the decision making process: the level of involvement that the consumer feels with the product as he/she makes a decision. Foxall (1993) suggests that the level of consumer involvement can affect the level of motivation to participate in the full information processing sequence (an instrumentally rational process). He states that the level of consumer involvement relies on a product's complexity, risk, and cost. An example of a product that typically exhibits high consumer involvement is that of the purchase of a car. In contrast the purchase of baked beans for example, is usually considered a low involvement decision. Therefore the level of consumer involvement can be seen to directly affect the information set on which a decision is made.

The information set used by an individual in a decision can clearly affect the assumption of instrumental rationality. Further factors affecting the information set used by respondents in stated preference surveys will be discussed later in the subsequent sections (perception, comprehension and information retrieval, the choice strategy employed)

Perception

McGuire (1978) describes perception in terms of *attention levels*, *sensory modality*, and *selective perception*.

Attention levels have received a great deal of attention within the advertising literature (for example Moray, 1969; Mackworth, 1970; Kahneman, 1973; Bogart, 1983; Krugman, 1988). However these papers relate to how long an advertisement can keep an individual's attention, and for how long this information will be retained. In a stated preference experiment, the researcher is not interested in how long the information will be retained. Furthermore, most stated preference research is carried out as an interview, and so the attention of the individual to the choices presented can be ensured. Within the context of stated preference surveying therefore we can assume that the respondent's attention to the information provided is maintained.

Literature relating to sensory modality examines how different modes of information are perceived - for example information conveyed by the eye or the ear (McGuire, 1978; Cornsweet, 1970). This research however focuses on how different modalities affect attention levels, and not comprehension of the information.

McGuire (1978) suggests that individuals implement selective perception in order to deal with the problem of sensory overload. McGuire suggests seven different strategies employed by individuals that result in our perceiving a subset of all the information that reaches our receptors:

- *Lumping or chunking* - for example, instead of seeing a group of trees, we see a forest.
- *Shifts in perception* – where an individual shifts their perception between one and another part of a scene.
- *Temporary storage* – temporary storage of information in the short term memory allows an individual to part the present information into some kind of 'pushdown' list so that the information can be dealt with at a less hectic moment.
- *Distribution of attention* – less sharply but more broadly, or alternate between sharp and broad attention.

- *Parallel processing* – allowing an individual to attend to materials in two different modalities simultaneously.
- *Not a zero-sum game* – cognitive capacity can be drawn from other activities at moments of need and concentrate it more completely on perception of the current sensory information.
- *Selectivity* – perceiving some aspects of the current sensory information while ignoring others.

The area of selective perception is approached by Timmermans (1993). Increasing the task complexity (determined by the number of alternatives and the number of attributes) in a multi-attribute decision experiment caused respondents to implement screening processes to the information presented to them. Payne et al. (1992) who suggests that the number of alternatives in a choice produces the greatest affect to information screening supports this study.

The way in which different ways of representing information affects perceptive selectivity has attracted little research attention. However within the advertising literature, Edell and Staelin (1983) suggest that *'pictures interact with words to produce effects that are significantly greater than words alone'*.

The way in which information is perceived can clearly affect the information set on which decisions are made. The above example by Timmermans (1993) shows how selective perception can reduce the information set significantly. Research to date has failed to provide evidence of whether different forms of representing attributes affects the ability of individuals to perceive information fully (that is without limiting the information set on which decisions are made). As already discussed this has far reaching implications for the assumption of instrumental rationality.

Comprehension and Information Retrieval

Comprehension of information is closely linked with information search and retrieval. Assuming that an individual has perceived the information presented to them fully, this information is *encoded* or *abstracted*. Encoding refers to the process of information storing which is believed to be undertaken (Howes, 1990). In the

encoding process information received is related to previous information stored. Comprehension of new information is therefore related to previous knowledge/beliefs and attitudes towards subjects. This is supported by Nelson and Towriss (1995) who, as described earlier in this paper, found in follow up interviews to their original research, that individuals tended to embellish information provided in stated preference surveys using previous experiences. They found that this occurred in particular with verbal stimuli.

Evidence of respondents retrieving information can be found in the advertising literature. Figure 3 shows a Benetton advertisement published in 1989 in the United States. This advertising campaign produced an outcry from the general public because the photograph was perceived as portraying a black prisoner handcuffed to a white police officer (New York Times, November 20th, 1989). Even though both men are dressed the same, people's prior assumptions distorted the advertisement's meaning.

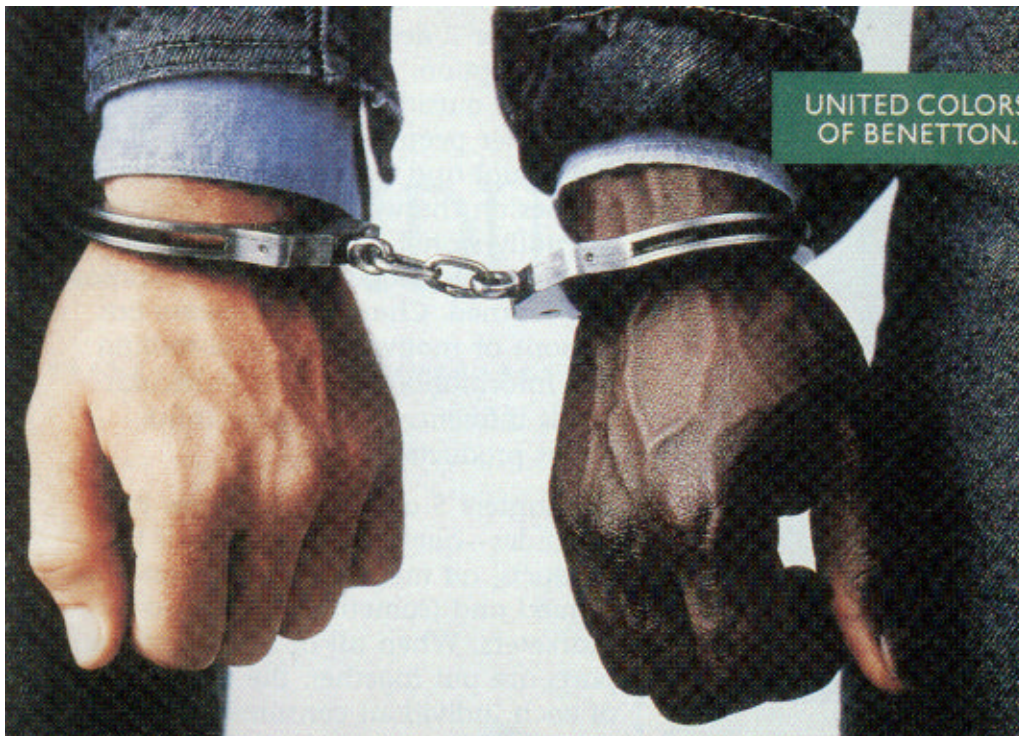


Figure 3: Benetton Advertisement from the US
Source: New York Times, November 20th 1989

Use of stored information, or embellishment of information provided within a stated preference survey, results in the distortion of the information set on which decisions are made. If respondents base their decisions not only on the information provided in the stated preference survey, but also on previously stored information, this suggests that the attributes included within the survey do not exhaust a respondent's salient beliefs. This can lead to inaccuracies in the weightings that consumers are estimated to make about the different attributes being investigated.

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Choice Strategies

The key to the alternative theory of rationality, the procedural theory, is that individuals use 'rules of thumb' - simple procedures - to guide their actions. Simon (1978) treats the use of such procedures as short-cut devices for an individual's decision-making. In 1990 Simon summarised that *'because of the limits of their computing speeds and power, intelligent systems must use approximate methods to handle most tasks. Their rationality is 'bounded'*. For example, Hargreaves Heap et al (1992) suggest an individual may use adaptive expectations, a simple examination of the past to determine the future, rather than collect all the information which might allow the formation of a rational expectation. Similarly, an individual who is deciding on which investment projects to undertake may use a simple rule of thumb. For example an individual may *'undertake any project with a payback period of less than three years', rather than carry out a strict ranking of projects according to the present discounted value of their expected profits'*. Simon suggests that procedural rationality is really an artificial form of instrumental rationality. Individuals still wish to maximise their utility. However their rationality has become bounded because they are not fully informed – in these circumstances, people settle for satisficing rather than optimising.

The existence of bounded rationality has resulted in decision processes which do not conform to the utility maximising compensatory processes which are assumed within most stated preferences exercises. A number of alternative decision making strategies, based on the heuristic search paradigm, are provided by Ampt et al. (1995):

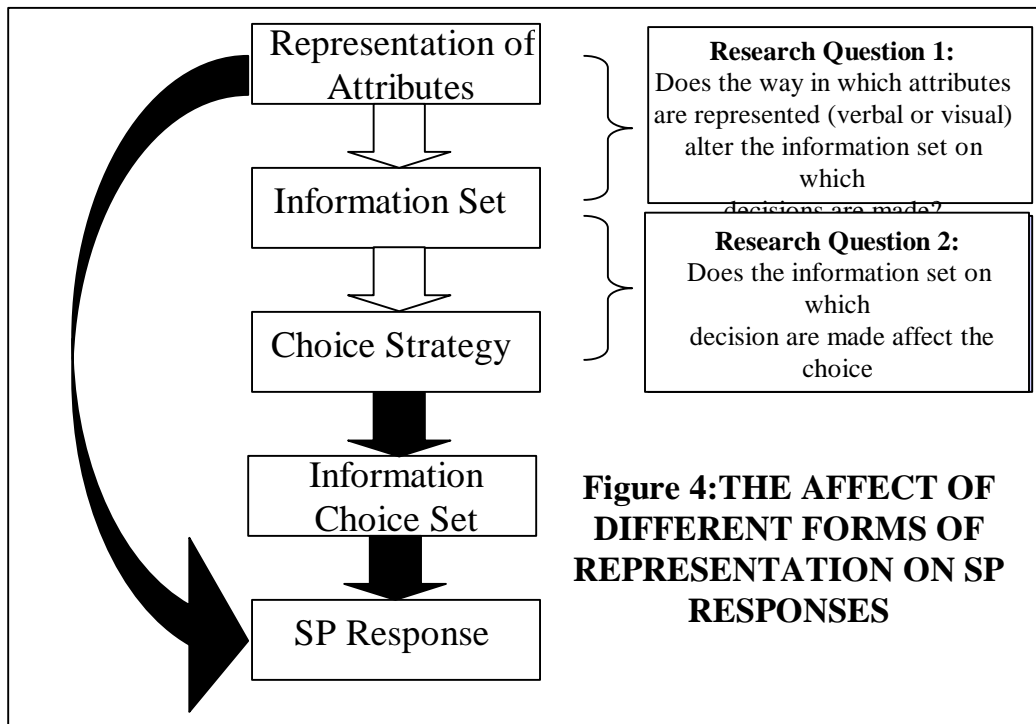
- *Dominance-based choice processes* are those where people select an option which is valued higher than all other alternatives on each attribute. For example, alternative a is valued higher in terms of each of its attributes (cost, time, comfort) than competing alternative b. This will not in general produce a single solution of course.
- Von Neuman and Morgentern (1947) postulated the *maximax* and *maximin choice strategies* in game theory. People who use a maximin choice strategy identify the least satisfactory attribute of each alternative and then choose the alternative that has the highest minimum level of satisfaction. People using a maximax strategy choose the highest maximum level of satisfaction from the most satisfactory attributes of each alternative.
- *Lexicographic choice strategies* are those used when a person hierarchically orders all attributes of the choices they are about to make and then chooses the alternative with the highest value on the most important attribute. Here again, travel behaviour choices of this type are easy to find, e.g. the person for whom travel time is critical and who will choose the quickest journey of all other attributes.
- *Conjunctive choice strategies* are those made when a person rejects any alternative that fails to meet anyone of the minimum criterion of acceptability. This means that the individual sets an acceptable level for each attribute and rejects any alternative where the level/levels are not met. Conversely, *disjunctive choice strategies* result in the acceptance of any alternative exceeding a certain criterion. Again this will not always give a single solution.

The choice strategy employed by a respondent in a stated preference survey affects the information set on which decisions are based (in a similar way to which selective perception affects the information set). As already discussed this can damage the assumption of instrumental rationality.

4. Deriving A Theoretical Model of Decision Making in SP

There has been a growing use of pictures to represent attributes in stated preference experiments. Nelson and Towriss (1995) have reported that the form used to

represent attributes in an SP experiment (verbal or visual) affects the responses made by individuals. Figure 4 on the following page depicts an alternative model of decision-making in stated preference techniques to explain this phenomenon. It adopts the information processing, cognitive approach that has dominated the psychology literature for most of this century, and continues today.



As discussed earlier in this paper, Nelson and Towriss (1995) suggested tentatively that greater embellishment (use of stored information) might occur when attributes in SP are presented to the respondent verbally. This may explain the difference in responses. This author therefore suggests that the representation of attributes can affect the information set on which decisions are made (this relationship is shown in figure 4 as a white arrow connecting the two elements).

Literature within the psychology field, stemming from Simon’s 1955 concept of bounded rationality suggests that increasing the size of the information set on which decisions are made results in simplifying ‘rules of thumb’ (or non-utility maximising choice strategies). More recently, research carried out by Timmermans (1993) supports this, by showing that increasing task complexity alters the choice strategy of respondents. Hence figure 4 shows another purple arrow linking the information set and choice strategy used by a respondent.

The use of alternative choice strategies to that of the utility maximising assumption by SP practitioners has significant affects on the information choice set – that is the information on which the final evaluation/decision is actually based. These alternative choice strategies produce a kind of screening affect on the original

information set, reducing the information on which the final decision is made. The relationship between the choice strategy and the information choice set is depicted as a black arrow linking the two elements.

The information contained within the information choice set is that upon which an individual choice is finally made. It is these factors that ought to be included as explanatory variables within any model based upon these choices. Given the possible inclusion of stored information (as discussed above) within the information choice set, it is possible that these factors could be those not included within the survey itself. The relationship between the information choice set and the response made by the individual in the SP experiment is again depicted as a black arrow in figure 4.

The arrows shown in figure 4 as black are considered by this author to have been tested previously in a stated preference context (that is in the context of hypothetical choice making). The arrows shown in purple represent relationships that have been inferred by existing evidence in the decision making field, but are as yet untested in the context of stated preference exercises. These relationships are therefore marked in figure 4 with possible research questions, which could be used in order to test this model. This author believes that the testing of this model is important for the further improvement and development of the use of stated preference techniques.

Conclusion

This paper has provided an historical background to stated preference techniques, from its origins in the field of experimental economics. Their origins were shown to influence significantly the assumptions that are made by stated preference practitioners today. The contrasting evidence to those assumptions, in existence in the field of psychology has been described in detail. This evidence has formed the theoretical basis for the alternative model of decision making in stated preference experiments made in the previous section. This model is presented as an information processing chain of internal mental events (the affect of attribute representation on the information set, and so on the choice strategy employed, the information choice set, and thus the final stated response. If this model proves to be reliable (through future testing) this has serious implications for the design and analysis of stated preference surveying (which are currently based upon the

assumptions of economic rationality and utility maximisation). This author therefore strongly supports further research in this area.

REFERENCES

- Ampt, E., Swanson, J., Pearmain, D. (1995) Stated Preference Techniques: Too Much Deference?, *Presented to the 1995 PTRC Summer Conference*.
- Bates, J. and Roberts, M. (1986) Values of Time Research: Summary of Methodology and Findings, *Presented to the 1986 PTRC Summer Conference*.
- Britt, S. (1978) *Psychological Principles of Marketing and Consumer Behaviour*: cited in Foxall, G. (1983) *Consumer Choice*, Macmillan Press Ltd.
- Colley, R. (1961) *Defining Advertising Goals for Measured Results*: cited in Foxall, G. (1983) *Consumer Choice*, Macmillan Press Ltd.
- Cornsweet, T. (1970) *Visual Perception*, New York Academic Press.
- Engel, J., Blackwell, R. and Kollat, D. (1978), *Consumer Behaviour*, 3rd edition, Hinsdale, Illinois, Dryden.
- Financial Times (18th April 1998) *High Speed Rail, the Future*.
- Fishbein, M. and Azjen, I. (1975) *Beliefs, Attitudes, Intentions and Behaviour: An Introduction to Theory and Research*, Addison-Wesley Publishing.
- Foxall, G. (1983) *Consumer Choice*, Macmillan Press Ltd.
- Green, P., and Srinivasan, V. (1990) Conjoint analysis in marketing research: new developments and directions, *Journal of Marketing* 54.
- Gross, R. and McIlveen (1998), *Cognitive Psychology*, Hodder and Stoughton.
- Gunn, H., Bradley, M., and Hensher, D. (1990) High Speed rail Market Projection: Survey Design and Analysis, *Presented at the Third International Conference on Survey Methods in Transportation, Washington DC*.
- Harre, R., and Secord, P. (1976) *The Explanation of Social Behaviour*, Basil Blackwell.
- Hargreaves Heap, S., Hollis, M., Lyons, B., Sogden, R., Weale, A. (1992) *The Theory of Choice: A Critical Guide*, Blackwell Publishers.
- Hensher, D., Barnard, P., and Truong, P. (1988) The Role of SP Methods in Studies of Travel Choice, *Journal of Transport Economics and Policy*.
- Howard, J., and Sheth, J. (1969) *The Theory of Buyer Behaviour*, New York: Wiley.

Howes, M. (1990) *The Psychology of Human Cognition: Mainstream and Genevan Traditions*, New York: Pergamon General Psychology Series.

Kahneman, D. (1973) *Attention and Effort*, Englewood Cliffs, N. J.: Prentice-Hall.

Katz, M. and Rosen, H. (1991) *Microeconomics*, Richard D. Irwin Inc.

Kolb, D. A., Rubin, I. M. and McIntyre, J. M. (1979) *Organizational Psychology: An Experimental Approach*, Prentice-Hall, London.

Kotler, P. (1980), *Marketing Management*, 4th edition, Englewood Cliffs, Prentice Hall.

Lavidge, R., and Steiner, G. (1961): cited in Foxall, G. (1983) *Consumer Choice*, Macmillan Press Ltd.

Lerman, S and Louviere, J. (1978) On the use of functional measurement to identify the functional form of the utility expressions in travel demand models, *Transportation Research Record No 673*.

Lionberger, H.(1960) *Adoption of New Ideas and Practices*: cited in Foxall, G. (1983) *Consumer Choice*, Macmillan Press Ltd.

Louviere, J. (1988), *Analysing Decision Making: Metric Conjoint Analysis*, Sage University Paper No 67.

Louviere, J. and Hensher, D. (1983) Using discrete choice models with experimental design data to forecast consumer demand for a unique cultural event, *Journal of Consumer Research*, 10.

Louviere, J., Meyer, R., Stetzer, F., and Beavers, L. (1973) Theory, methodology and findings in mode choice behaviour, *Working Paper No 11*, *The Institute of Urban and Regional Research*, University of Iowa.

Louviere, J., Schroeder, H., Louviere, C., and Woodworth, G. (1987) Do the Parameters of Choice Models Depend on Differences in Stimulus Presentation: Visual Versus Verbal Presentation, *Advances in Consumer Research*, 14.

McFadden, D. (1978) The Theory and Practice of Disaggregate Demand Forecasting for Various Modes of Urban Transport, *Transportation Planning Methods*, US Department of Transportation, Washington DC.

McGuire, W. (1969) An Information Processing Model for Advertising Effectiveness: cited in Foxall, G. (1983) *Consumer Choice*, Macmillan Press Ltd.

- McGuire, W. (1976) Some internal psychological factors influencing consumer choice, *Journal of Consumer Research*, Vol 2, No.4.
- Moray, N. (1969) *Attention: Selective Processes in Vision and Hearing*, London: Hutchinson Educational Ltd.
- MVA Consultancy, ITS (University of Leeds), Transport Studies Unit (Oxford University), (1987) The value of Travel Time Savings, *Department of Transport Policy Journal*.
- Nelson, P. (1992) An Examination of the Use of Stated Preference Techniques to Estimate the Demand for Light Rail Transit. *MSc Thesis, Centre for Logistics and Transportation, Cranfield University*.
- Nelson, P., and Towriss, J. (1995) Stated Preference Techniques and the Representation of Attributes, *Presented to the PTRC Summer Conference*.
- New York Times (November 20th, 1989) *Benetton, Another Outcry*.
- Nisbett, R. and Bellows, N. (1977), Verbal reports about causal influences on social judgement: Private access versus public theories, *Journal of Personality and Social Psychology*, 35.
- Nicosia, F. (1966) *Consumer Decision Processes*, Englewood, Cliffs, New Jersey: Prentice Hall.
- Oppenheim, A., (1982), *Questionnaire Design and Attitude Measurement*, Heinemann, London.
- Pavlov, I. (1927), *Conditioned Reflexes*, London, Oxford University Press.
- Pearmain, D., Swanson, J., Kroes, E. and Bradley, M. (1991) *Stated Preference Techniques: A Guide to Practice*, Second Edition, Steer Davies Gleave and Hague Consulting Group.
- Rogers, E. (1962) *Diffusion of Innovation*: cited in Foxall, G. (1983) *Consumer Choice*, Macmillan Press Ltd.
- Rogers, E., and Shoemaker, F. (1971) *Communication of Innovations*: cited in Foxall, G. (1983) *Consumer Choice*, Macmillan Press Ltd.
- Rousseas, S. W. and Hart, A. G. (1951), Experimental Verification of a Composite Indifference Map, *Journal of Marketing Research* (Vol.30).
- Sheerer, M. (1954) Cognitive Theory in G. Lindzey, (Ed). *Handbook of Social Psychology: Volume 1, Theory and Method*. Reading, M.A.: Addison-Wesley, pp. 91-142.

Simon, H. (1996) Rationality in Psychology and Economics, in *Rational Choice, the Contrast Between Economics and Psychology*, edited by Hogarth, R., and Reder, M., University of Chicago.

Simon, H., (1976) From Substantive to Procedural Rationality, in *Method and Appraisal in Economics*, edited by Latsis, S., Cambridge, Mass: MIT Press.

Simon, H. (1982) *Models of Bounded Rationality*. 2 vols, Cambridge, Mass.: MIT Press.

Skinner, B. (1938) *The Behaviour of Organisms*, New York, Appleton-Century-Crofts.

Samuelson, P. A. (1938), A Note on the Pure Theory of Consumer Behaviour, *Economica*, Vol 5.

Solomon, M. (1996) *Consumer Behaviour: Buying, Having, and Being*. Blackwell Publishers.

Swanson, J. (1998), *Factors Affecting the validity of Stated Preference Research*, Steer Davies Gleave, London.

Thurstone, L. L. (1931) The Indifference Function, *Journal of Social Psychology* (Vol 2).

Timmermans, D. (1993) The Impact of Task Complexity on Information Use in Multi-Attribute Decision Making, *Journal of Behavioural Decision Making*, 6, 95-111.

Tuck, M. (1976) *How do we Choose? A Study in Consumer Behaviour*, Methuen.

Verplanken, B., Aarts, H., Knippenberg, A. and Moonen, A. (1998) Habit Versus Planned Behaviour: A Field Experiment, *British Journal of Social Psychology*, 37, 111-128.

Von Neuman, J. and Morgenstern, O. (1947) *Theory of Games and Economic Behaviour*, 2nd edition, Princetown University Press, Princetown, N. J.

Wallis, W. A. and Friedman, M. (1942), The Empirical Derivation of Indifference Functions, *Studies in Mathematical Economics and Econometrics in Memory of Henry Schultz*, (Ed. O. Lange, F. McIntyre, and T. O. Yntema), University of Chicago Press, Chicago.

Worcester, R. M. (Ed) (1972) *Consumer Market Research Handbook*, McGraw-Hill Book Company

(UK) Ltd.