CONSUMER DECISION MAKING*

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This chapter reviews theories and research on consumer decision making. We characterize the properties of the consumer decision-making task and the consumer information environment. The limited information processing capabilities of consumers are addressed, and the choice heuristics used by consumers to cope with difficult decisions are described. Conceptual frameworks for understanding contingent consumer decision making and a review of relevant research on contingent processing are presented. Finally, methods for studying consumer decision making are discussed, and future research opportunities are outlined.

INTRODUCTION

Consumers constantly make decisions regarding the choice, purchase, and use of products and services. These decisions are of great import not only for the consumers themselves, but also for marketers and policymakers. These decisions are often difficult. Consumers are often faced with a large number of alternatives, which are constantly changing due to new technologies and competitive pressures. There is often a great deal of information available from many sources (e.g., advertisements, packages, brochures, salespeople, and friends). Moreover, the consumer is often not completely certain about how a product might perform. Finally, the consumer is often faced with difficult value trade-offs, such as price versus safety in the purchase of an automobile.

This multifaceted nature of the consumer decision-making task has generated a number of important research questions. Such ques-

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tions as how consumers develop and use strategies for making decisions, how different amounts of prior knowledge influence consumer choice processes, how consumers adapt to different decision settings, and how consumers categorize products have spawned major streams of research.

Our goal in this chapter is to provide an introduction to these and other research areas that are related to consumer decisions. We hope not only to arouse interest in consumer decision making as a research focus, but also to suggest approaches and directions for new research. To keep the scope of the chapter manageable, we focus mostly on consumer choice; consumer judgments and inferences receive more limited attention.

We begin by outlining the properties of the consumer's decision task and ask what makes these decisions difficult? We categorize different types of consumer decisions and examine the implications of such distinctions for consumers. Next we consider the resources that consumers can bring to bear on such tasks. In particular, we discuss the properties of consumer memory, knowledge, and the heuristics — simplified strategies or rules of thumb — used to make choices. Given the potential mismatch between a difficult decision task and limited processing capabilities, we next look at how consumers cope. We argue that consumers adapt and change the strategies they use depending upon the demands made by the specific decision they face. After explaining this concept of contingent decision making and outlining two conceptual frameworks that could explain such contingent processing, several areas of research on consumer decision making are briefly reviewed. Finally, we describe research methods useful for studying consumer decisions and present some areas for future research on consumer decision making.

THE CONSUMER DECISION MAKING TASK

What defines a consumer’s task? How can we characterize a consumer’s choice as easy or difficult? To answer this question, we will provide an initial task analysis (Newell and Simon 1972) for consumer choice. First, we must examine the elements that compose a choice: alternatives, attributes of value, and uncertainties. We then look at how that information is available in the environment, both in terms of content (what is available) and structure (how it is organized). Finally, we look at other factors that may influence how a consumer responds to a choice task. In this section, we present a simplified overview of the factors that define a consumer's choice task and that affect a consumer's response to that task. In the subsequent section on contingent consumer decision making, we discuss such factors in more detail.

A typical consumer choice consists of a set of alternatives, each described by several attributes. Consider, for example, selecting an automobile. Each car has different mileage, attractiveness, passenger capacity, and so forth. The values of some of these attributes may be known with reasonable certainty (e.g., an alternative automobile's engine size). However, the value of other attributes is uncertain, such as the reliability or durability of a newly introduced car. For many choices, the types of attributes considered are similar across the available alternatives (e.g., choosing among different brands of automobiles). However, recent research (e.g., Johnson 1984) has emphasized that in some cases different attributes may apply to different alternatives. Given an amount of money to spend, one might choose, for example, between a vacation, described by attributes such as the number of days of sunshine and the quality of food, and a new dishwasher, described by its effectiveness in cleaning pans. Such choices have been called “noncomparable.”

The difficulty of a consumer's choice depends directly upon such elements. For example, choice difficulty generally will increase (1) as the number of alternatives and attributes increases, (2) if some specific attribute values are difficult to process, (3) if there is a great deal of uncertainty about the values of many attributes, and (4) as the number of shared attributes becomes smaller.
The Consumer Information Environment

The difficulty of the consumer's decision is influenced not only by the elements of the task, but also by how information is provided in the environment. First, information is available in advertisements, on packages, via in-store displays, or in brochures. Information is also indirectly conveyed by the price and by the type of store in which the product is sold. The consumer may also draw upon his or her own prior experience; the consumer may obtain information from friends, family, or salespeople, or read about products in product-rating publications or specialty magazines (e.g., high fidelity or photography magazines). And a consumer may observe products being used by others. Finally, policymakers may mandate the provision of certain types of information, such as mileage ratings for automobiles or annual percentage rates for consumer credit. Note that, at any given moment, such information can be placed into two categories: that available in the consumer's memory and that found in the external environment. As we will discuss, this distinction can have an impact on how consumers make decisions.

The organization of information also affects the difficulty of a consumer's task. For example, advertisements usually discuss one brand at a time and only present a favorable subset of the available information about that brand. Additional information about that brand or information about competing brands is typically acquired at different times, when other advertisements or sources of information are encountered. In such an environment, where information is received sequentially rather than simultaneously, some methods for making a decision become very difficult (Bettman 1982). If we were to ask a consumer to recall the values of all brands in a product category on a particular attribute and to pick the best, the consumer would probably be unable to do so. That process would be trivial, however, if a table summarizing the values of the brands' attributes were available, such as the tables presented in Consumer Reports. The match between properties of the consumer's information environment and the specific methods or strategies the consumer might use to make a choice in that environment is a major focus of this chapter.

A related distinction has been suggested by Lynch and Srull (1982), who categorized decisions as either stimulus-based, memory-based, or mixed. A decision where all the relevant information is externally available (e.g., in a summary table, in a catalog, or on several packages) is called a stimulus-based decision. In contrast, if a decision must be made using only information available in memory, it is a memory-based decision. Mixed decisions, where information in memory and information externally available are used, are probably most prevalent. Whether a choice is stimulus-based, memory-based, or mixed will influence the way consumers make choices. If choices are made based only upon information in memory, for example, they will be influenced by the characteristics of memory: information may be incomplete, inferences may be made about missing information, and the information that can be recalled may be a function of the many factors which influence retrieval from memory. As a result, consumers might not be able to employ some strategies that require complete and comparable information for all the alternatives. However, if faced with a stimulus-based display listing all the alternatives, such complete strategies could then be used. Whereas much early research on consumer decision making focused on stimulus-based choices, new work on memory-based and mixed choice (e.g., Biehal and Chakvavarti 1983) has opened up this exciting research area.

Given that information is present in memory and/or in the external environment, consumers must somehow integrate this information to make a decision. Specific strategies for combining information are discussed below. It is important, however, to realize that consumers can use two general approaches: (1) utilize an existing strategy, perhaps one that has been used previously for the same or a similar decision, and (2) construct a new strategy on the spot, exploiting whatever structure characterizes the existing information (e.g., eliminating an at-
tribute from further consideration if all the available alternatives have the same or very similar values on that attribute). Such dynamic decision processes, where a strategy is developed on-line, represent an exciting area for recent research (e.g., Payne, Bettman, and Johnson, in press).

**Other Factors Characterizing Consumer Decision Tasks**

A variety of other factors characterize consumer decision tasks and affect how consumers respond to those tasks. One major factor is the importance of the task. For most consumers, there is an enormous difference between choosing a brand of mayonnaise and buying an automobile. In the former case, the decision is often routine, has relatively few consequences, and is made almost automatically, with little effort. In the latter case, the consequences are much greater, and the consumer will often devote a great deal of effort, searching large amounts of information, soliciting advice, and agonizing over difficult trade-offs. Many theories of consumer choice postulate three different types of decision process: a simple, habitual process, a process with moderate processing, and a process with extensive processing (e.g., Howard and Sheth 1969; Hansen 1972; Howard 1977; Engel, Blackwell, and Kollat 1978; and Bettman 1979).

Aspects of the choice task, such as time pressures (Wright 1974; Wright and Weitz 1977); characteristics of the alternatives themselves, such as the variation in importance weights for the attributes (Payne, Bettman, and Johnson 1988); individual differences in ability or knowledge; and social factors can also influence how consumers respond to a decision task. More details on these factors and others are provided later in the section on contingent decision making.

**How Consumers Cope with Difficult Decision Tasks**

We have described above the types of decision tasks faced by consumers and have argued that these tasks can often become quite difficult. How do consumers cope with such difficulty? One approach to consumer decision making, favored by economists, argues that consumers are exquisitely rational beings. This perfect rationality model assumes that a consumer obtains complete information on the alternatives, makes trade-offs that allow him or her to compute utilities for every alternative, and selects the alternative that maximizes utility. Any limitations in processing capacities are ignored or assumed to be easily circumvented. The key research question from the economic perspective is understanding the values that different consumers use to make choices.

An alternative, and more realistic, perspective is that of bounded rationality (Simon 1955). Simon argues that decision makers have limitations on their abilities for processing information. Hence, decision makers cannot be perfectly rational in the sense outlined above. Rather, decision makers attempt to do as well as they can given the limitations to which they are subject. Simon's major conceptual contribution is the notion that information processing considerations play a major role in understanding decision making. From this perspective, the key research question is understanding the processing strategies consumers use to solve difficult choice problems with their limited processing capacity. In the next section, we discuss the consumer's processing abilities and limitations in more detail. (See also the chapters in this volume by Shimp and by Alba, Hutchinson, and Lynch).

**THE CONSUMER AS A LIMITED INFORMATION PROCESSOR**

Over the past thirty years, psychologists have greatly expanded our knowledge of the human information processing system.

One of the most important theoretical postulates in current psychology is to describe behavior (e.g., a consumer choosing a product) in terms of a small number of memories and processes (strategies) involving the acquisition, storage, retrieval, and utilization of informa-
tion (for reviews, see Haugeland 1981; Newell and Simon 1972; Bettman 1979; Cowan 1988).

The set of memories and processes that interact with the environment to produce behavior can be divided into three major subsystems: (1) the perceptual system; (2) the motor system; and (3) the cognitive system (Card, Moran, and Newell 1983). The perceptual system consists of sensors (receptors), such as the eyes and ears and the associated buffer memories. It translates sensations from the physical world (i.e., visual or aural input) into a symbolic code that can be processed more fully by the cognitive system. The motor system, on the other hand, translates thought into action by activating patterns of voluntary muscles. Much research has been done to understand the components of these two subsystems. Some of that work is relevant to consumer decision making. For example, the amount of information a reader can take in with a single eye fixation has been shown to be a joint function of the perceptual difficulty of the material (e.g., the spacing of letters) and the skill of the reader. However, we will focus on the work concerning the properties of the cognitive system that is most relevant to consumer decision making.

**Human Memory**

In discussing the cognitive system, most researchers have found it useful to distinguish between two types of memories: (1) Working Memory, and (2) Long-Term Memory. Working Memory contains the information under current consideration. Long-Term Memory (LTM) holds (i.e., stores) the individual’s mass of available knowledge, including both facts and procedures for doing things. We will briefly review what is known about both memories. It should be noted that this distinction does not necessarily imply that there are two physically distinct memories. Working Memory may simply be the currently activated portion of Long-Term Memory. It is the different functioning of these two types of memories that is the crucial distinction.

**Working Memory.** Working Memory can combine information from both the environment, as produced by the perceptual system, and information drawn (i.e., retrieved) from Long-Term Memory. For example, in solving an arithmetic problem, one uses both the given information (e.g., the numbers) and the procedural information (e.g., the rules of addition) retrieved from Long-Term Memory. Working Memory, which is often termed Short-Term Memory, also contains the intermediate products of thinking. That term captures the important fact that items of information in Working Memory are quickly lost if not actively rehearsed.

The central constraint on Working Memory is its limited capacity. That is, only a few items of information can be considered at any one time. How few? The standard answer to this question is seven items of information, plus or minus two (Miller 1956), although some researchers have suggested that roughly four to five items is a more accurate estimate (Simon 1974). This capacity limitation is easily shown using a memory span task. The task requires that a person recall a sequence of items in their correct order. For example, imagine that the following letters were read to you, one per second, and you were then asked to recall them in the correct order:


Most of us would find that a very difficult task. A shorter list, such as M-C-A-S, would be easier. Seven to nine letters is the limit for most of us. The number of items of information recalled, however, can be increased by recoding the information to form “chunks.” What constitutes a chunk of information is somewhat ill-defined, but it might be best characterized as any piece of information that is represented as a single, meaningful item or that has some unitary representation in long-term memory. To illustrate, consider reordering the previous 12 letter sequence like this:

For most people in this culture, the twelve letters now can be formed into four chunks—TWA, IBM, CIA, CBS—that are easy to recall. This increase in recall due to chunking can be dramatic. In one instance, a student was trained to recall eighty-one digits (Chase and Ericsson 1981). The student, an avid runner, was able to chunk the numbers into a much smaller set of items by relating the sequence of numbers to running times.

Another example of the limitations of Working Memory is provided by mental multiplication: Try multiplying two 4-digit numbers. Even if the numbers themselves are easily remembered (e.g., 1776 and 1492), the need to remember intermediate products will overwhelm most people’s Working Memory.

Such limitations of Working Memory are likely to affect consumer decision making. For example, a consumer probably cannot remember a long shopping list; however, if such a list could be chunked into ingredients for two or three dishes, it would be easier to recall. Likewise, remembering prices for several brands in a category and doing mental arithmetic using those prices is likely to be difficult and prone to errors (Friedman 1966).

More generally, Working Memory capacity limitations impose limits on how much information it is reasonable to expect a consumer will be able to process in any given amount of time. While current research (Biehal and Chakravarti 1982, 1983, 1986) has shown that both memory organization and information format can affect choice processes, limitations in Working Memory suggest that transforming information from one form to another may be difficult. Given the cognitive effort involved, Bettman and Kakkar (1977) have shown that people often do not transform information, but instead process it in the form given. This has been termed the concreteness principle (Slovic 1972), and it is one of the reasons why the same information presented in different formats can have a different impact on a person’s decision. Consumer behavior examples of information format effects will be discussed at several points later in this chapter.

A second consequence of a limited Working Memory is the use of heuristics to process information (Haugeland 1981; Card, Moran, and Newell 1983). Heuristics are procedures for systematically simplifying the search through the available information about a problem. That is, heuristics function by disregarding some of the available information. Heuristics improve a person’s chances of making a reasonably good decision given the limitations in processing capacity, while leaving some possibility of a “mistake.” The use of heuristic strategies to solve problems and make decisions is one of the general principles of human information processing. Newell and Simon (1981) have argued that the use of heuristic search is at the heart of intelligence. As noted above, the use of particular heuristics can be premeditated, or strategies may be simply constructed or realized on the spot, given a set of resources and task contingencies. Specific heuristics for decision making are described in more detail later.

**Long-Term Memory.** Unlike Working Memory, Long-Term Memory’s capacity is generally thought of as infinite. That is, for all practical purposes there are not limits to the amount of information that can be stored in Long-Term Memory. It has also been suggested that once information has been transferred from Working Memory into Long-Term Memory it is never lost. Obviously, however, we do “forget” information. What is suggested is that forgetting really is just the person’s inability to retrieve the information from Long-Term Memory at a particular point in time. At a different time, new retrieval cues or strategies may allow the person to remember information that was previously viewed as forgotten.

Because of its capacity, Long-Term Memory is sometimes viewed as an external memory, just like a library, encyclopedia, or management information system (see Simon, 1981, for an elaboration of this view). Problem solving and decision making would then involve a search for information in both the external perceptual environment and in the memory environment, with information from one environ-
ment often guiding the search in the other (see, for example, Simonson, Huber, and Payne 1988).

In spite of its unlimited capacity, not all information that is perceived, that is, placed in Working Memory, is transferred to or stored in Long-Term Memory. In part, this is due to the amount of time it takes to transfer an item of information to Long-Term Memory. Writing (the storage of) an item of information into Long-Term Memory takes about seven seconds of processing effort. In contrast, it has been estimated that retrieval from Long-Term Memory is orders of magnitude faster than writing to Long-Term Memory (Card, Moran, and Newell 1983). As noted by Card, Moran, and Newell (1983, p. 4), “this asymmetry puts great importance on the limited capacity of Working Memory, since it is not possible in tasks of short duration to transfer very much knowledge to Long-Term Memory as a working convenience.”

Capacity and read (retrieval) and write times are just some of the features of Long-Term Memory. We do not have the space to adequately summarize this vast literature. However, we should note two important issues addressed in the literature: (1) how information is encoded in memory, and (2) how it is retrieved. Most current models of long-term storage posit that information is represented in terms of a network of semantic associations. That is, information is processed and encoded in the form of separate concepts and the associations among those concepts. It is also thought that information is often represented hierarchically. An example of this form of representation for bleach with some encoded information about its hazards is provided in Figure 2.1. Note that in this example the concept of

**FIGURE 2.1** Semantic Network for the Concept Bleach

![Diagram of Semantic Network for Bleach](image-url)
hazard is encoded with the generic concept “bleach” instead of being associated with the two specific brands, Bright Bleach and Clorox. If this were the case, then the consumer would not perceive different hazard levels for the two brands. Consequently, the hazardous nature of the product category should not influence the consumer’s decision between the two brands, for this specific example. If a policymaker wanted this consumer to choose among brands on the basis of hazard, the coding of the information must be changed so that specific hazard levels are associated with each brand.

Given the importance of the encoding of information by consumers on how they ultimately use this stored information in making a decision, it is necessary to understand better the factors that affect the encoding process. One important feature is that the acquisition of new knowledge appears to be greatly facilitated by the existence of previously acquired relevant knowledge that can be used to form associations. This suggests, for example, that use of both a common format and a common set of concepts in labeling hazardous chemicals across products would facilitate a consumer’s ability to successfully encode hazard information about a new brand once the format had been learned through prior experience with other labels. Put differently, the learned structure will enhance future encoding of new information that fits into that existing memory structure.

Retrieval within a memory network is often modeled by a process of spreading activation (Anderson 1983). Once a concept is activated, say by seeing a product on a billboard, activation flows from that concept to others which are linked to it in memory. Concepts that are more closely tied to the activated concept receive more activation and are more likely to be recalled. In Figure 2.1, activation of the concept of bleach is likely to cause recall of the concept of possible hazards, potential benefits of bleach, and the two brands, Bright Bleach and Clorox. Other concepts related to this category only because they are also hazards, such as air disasters, are less likely to be recalled. For decision making, the consequences of these models are largely unexplored, but this suggests that memory-based decisions may depend largely upon what is activated in memory, which, in turn, can depend greatly upon recent experience, the relations between concepts in memory, and external cues. For instance, Keller (1987) shows how cues available on the package (e.g., a picture of the boy Mikey on Life cereal packages) can activate information stored in memory from previous advertising exposures.

**Implications of Consumer Processing Limitations**

The brief summary just presented has indicated that consumers have limited capacities to process information. These conclusions are contrary to the typical perfect rationality assumptions that consumers are extensive information processors and that providing more information is always helpful. Rather, consumers may use simplifying heuristics to limit processing. Thus, merely making information available may not be sufficient. Instead one must distinguish between the availability and the processability of information (Russo, Krieser, and Miyashita 1975). Processability refers to the ease with which information can be comprehended and used. In general, information must be both available and easily processable to be utilized.

Processability of information is in part a function of the way the information is presented. That is, presenting information that is well organized and in formats that facilitate processing can increase usage of that information. Processability is not only a function of how information is provided, however; the kind of processing to be done is also important (Bettman 1979). Consumers may use different processing strategies depending upon the task. Some of the more common decision strategies are described below. Thus, a major goal in the design of information systems for consumers is to take advantage of the power of heuristics while minimizing their potential for errors. This means that effective consumer information should be designed with awareness that most people will adopt simplifying strategies for processing that information. The use of more accurate heuristics can be encouraged by de-
signing information displays so that strategies which tend to be more accurate are simpler to implement. The basic concept is that mental processing capacity should be viewed as a scarce resource (Simon 1978). To the extent that the mental effort associated with that processing can be reduced, people will tend to process more of the available information.

**CHOICE HEURISTICS**

The decision-making strategies described in this section are defined in terms of a typical choice problem, consisting of a set of alternatives, each described by values on several attributes. For each attribute, there may also be an importance weight and a cutoff value specifying a minimal acceptable level for that attribute (see Klein and Bither, 1987, for a model of cutoff selection).

Before considering the specific heuristics, some general aspects of consumer decision processes should be addressed briefly. First, these heuristics can either be used alone or in combination with other heuristics. Some typical combinations are discussed subsequently after the individual heuristics have been presented. Second, as noted previously, heuristics can be either constructed on the spot or their use could be planned a priori. Third, heuristics differ in both how much effort they require to use and how accurate they are likely to be. For example, a heuristic that only considered information on one attribute (e.g., the lexicographic heuristic) might require less effort and be less accurate for some types of decisions than a heuristic which examined a larger proportion of the available information. Following the descriptions of the heuristics and their properties, we will provide a framework for determining which heuristics will be used in a particular choice situation.

**The Weighted Additive (WADD) Rule.** Normative procedures for dealing with decision problems generally prescribe processes involving the consideration of all the relevant problem information. For example, the weighted additive (WADD) rule considers the values of each alternative on all the relevant attributes and considers all the relative importances of the attributes to the decision maker. Furthermore, a rule like WADD involves substantial computational processing of the information. For instance, the WADD rule develops a weighted value for each attribute by multiplying the weight times the attribute value and summing over all attributes to arrive at an overall evaluation of an alternative. It is assumed that the alternative with the highest overall evaluation is chosen. While people sometimes make decisions in ways consistent with such a normative procedure, more often people appear to make decisions using simpler decision processes (heuristics).

A number of heuristics used to solve decision problems have been identified (Svenson 1979). Some of the more common heuristics are described subsequently. Each heuristic represents a different method for simplifying decision making by limiting the amount of information that is processed and/or by making how that information is processed easier.

**The Satisficing (SAT) Heuristic.** Satisficing is one of the oldest heuristics identified in the literature (Simon 1955). With this strategy, alternatives are considered one at a time, in the order they occur in the set. The value of each attribute of an alternative is considered to see whether it meets a predetermined cutoff level. If any attribute value is below the cutoff, then that alternative is rejected. The first alternative that has values which meet the cutoff requirements for all attributes is chosen. If no alternatives pass all the cutoffs, the cutoff level can be relaxed and the process repeated, or an alternative can be randomly selected. An implication of the satisficing heuristic is that choice will be a function of the order in which consumers evaluate products. That is, if Brand A and Brand B both pass the cutoff levels, then whether A or B is chosen will depend on whether A or B is evaluated first. There will be no comparison of the relative merit of Brand A as compared with Brand B.
**The Lexicographic (LEX) Heuristic.** The lexicographic procedure determines the most important attribute, and then examines the values of all alternatives on that attribute. The alternative with the best value on the most important attribute is selected. If two alternatives are tied, that is, are equivalent on the key attribute, the second most important attribute is then considered, and so on, until the tie is broken. An example from consumer choice of the LEX procedure might be choosing the cheapest brand. Sometimes the LEX strategy includes the notion of a just-noticeable difference (JND). If several alternatives are within a JND of the best alternative on the most important attribute, they are considered to be tied (Tversky 1969). This version of the LEX rule is sometimes called lexicographic-semiorder (LEXSEMI).

**The Elimination-by-Aspects (EBA) Heuristic.** First described by Tversky (1972), an EBA strategy begins by determining the most important attribute. Then, the cutoff level for that attribute is retrieved, and all alternatives with values for that attribute below the cutoff level are eliminated. The process continues with the second most important attribute, then the third, and so on, until one alternative remains. Interestingly, the example Tversky used to motivate this heuristic involved an advertisement for computer training schools in San Francisco. The advertisement presented a series of arguments about why all other schools should be eliminated on the basis of various aspects until only the advertised school remained.

**The Majority of Confirming Dimensions (MCD) Heuristic.** This heuristic, described by Russo and Dosher (1983), involves processing pairs of alternatives. The values for each of the two alternatives are compared on each attribute, and the alternative with a majority of winning (better) attribute values is retained. The retained alternative is then compared with the next alternative among the set of alternatives. The process of pairwise comparison repeats until all alternatives have been evaluated and the final winning alternative identified.

**The Frequency of Good and Bad Features (FRQ) Heuristic.** Albó and Marmorstein (1987) suggest that consumers may evaluate or choose alternatives based simply upon counts of the good or bad features the alternatives possess. To implement this heuristic, consumers would need to develop cutoff levels for specifying good and bad features. Then the consumer would count the number of such features. Depending upon whether the consumer focussed on good features, bad features, or both, different variants of the heuristic would arise.

**The Equal Weight (EQW) Heuristic.** This processing strategy examines all the alternatives and all the attribute values for each alternative. However, the equal weight strategy simplifies decision making by ignoring information about the relative importance or probability of each attribute. A value is obtained for each alternative by simply summing the values of the attributes for each alternative. Hence this heuristic is a special case of the weighted additive rule. The equal weight rule has been advocated as a highly accurate simplification of the decision-making process for both risky (Thorn gate, 1980) and nonrisky choice (Dawes 1979; Einhorn and Hogarth 1975).

**Combined Heuristics.** In some instances, consumers may use combined or phased strategies. Typically, such combined strategies have an initial phase where poor alternatives are eliminated, and then a second phase examining the remaining alternatives in more detail (Payne 1976). One such combined heuristic is an elimination-by-aspects plus weighted additive strategy. EBA would be used to reduce the number of alternatives to some small number (e.g., two or three), and then a weighted additive rule would be used to select among those remaining alternatives.

**Other Heuristics.** In the area of consumer choice, several even simpler heuristics have been proposed. A frequent strategy for choice of this type is the habitual heuristic: choose what one chose last time. A related heuristic, suggested by Wright (1975), is affect referral. The consumer simply elicits a previously formed
evaluation for each alternative from memory and selects the most highly evaluated alternative. No detailed attribute information is considered.

**General Properties of Choice Heuristics**

The strategies we have just discussed are only some of those proposed to describe choice behavior. These strategies have come from a number of disciplines and have been described using very different kinds of formalisms. As a result, in order to compare and contrast strategies for choice, researchers have often described them using fairly broad and global characteristics (Bettman 1979).

**Compensatory versus Noncompensatory.** One of the most important distinctions among rules is the extent of compensatory as compared to noncompensatory processing. Some rules (e.g., the lexicographic rule) are noncompensatory, since excellent values on less important attributes cannot compensate for a poor value on the most important attribute. Rules such as weighted additive or equal weight are compensatory, on the other hand, since high values on some attributes can compensate for low values on others. Hogarth (1987) has suggested that people find making explicit trade-offs emotionally uncomfortable. Thus, consumers may avoid strategies that are compensatory not only because they are difficult to execute (require great cognitive effort), but also because they require the explicit resolving of difficult value trade-offs.

**Consistent versus Selective Processing.** A related aspect of choice heuristics is the degree to which the amount of processing is consistent or selective across alternatives or attributes. That is, is the same amount of information examined for each alternative or attribute, or does the amount vary? In general, it has been assumed that more consistent processing across alternatives is indicative of a more compensatory decision strategy (Payne 1976). Consistent processing sometimes involves examination of all information for every alternative and attribute. A more variable (selective) processing pattern, on the other hand, is seen as indicating a strategy of eliminating alternatives or attributes on the basis of only a partial processing of information, without considering whether additional information might compensate for a poor value.

**Amount of Processing.** A third general processing characteristic is the total amount of processing carried out. Whether processing is consistent or not, the total amount of information examined can vary, leading to an examination that can be quite cursory to very exhaustive. For some strategies, such as EBA, lexicographic, and satisficing, the total amount of information processed is contingent upon the particular values of the alternatives and the cutoff levels.

**Alternative-based versus Attribute-based Processing.** A fourth aspect of processing concerns whether the search and processing of alternatives proceeds across or within attributes. The former (across attribute processing) is often called holistic, alternative-based, or brand-based processing. The latter (within attribute processing) is called dimensional or attribute-based processing. In alternative-based processing, multiple attributes of a single alternative are considered before information about a second alternative is processed. In contrast, in attribute-based processing, the values of several alternatives on a single attribute are processed before information about a second attribute is processed. Russo and Dosher (1983) suggest that attribute-based processing is cognitively easier.

**Quantitative versus Qualitative Reasoning.** Note that heuristics also differ in terms of the degree of quantitative versus qualitative reasoning used. Some heuristics include quantitative reasoning operations. For example, the equal weight method involves a summing of values, and the frequency heuristic requires counts. The weighted adding rule, a normative strategy, includes the even more quantitative operation of multiplying two values. In contrast, most of the reasoning contained in the
other heuristics described above is more qualitative in nature. That is, most of the operations for a heuristic such as EBA involve simple comparisons of values. Hegarty, Just, and Morrison (1988) have recently explored strategy differences in making inferences about mechanical systems that involve a similar distinction between qualitative and quantitative reasoning.

**Formation of Evaluations.** Finally, the heuristics differ in terms of whether or not an evaluation for each alternative is formed. In the equal weight or weighted additive rules, for example, each alternative is given a score that represents its overall evaluation. On the other hand, rules such as lexicographic or EBA eliminate some alternatives and select others without directly forming an overall evaluation.

The various heuristics described previously represent different combinations of these general properties. Table 2.1 characterizes each heuristic in terms of five of these properties. Amount of information processed is not included in the table because it is variable for many of the strategies.

**Implementation of Heuristics**

By now the reader might ask if any of these rules describes how consumers make decisions. While we can categorize specific heuristics using distinctions like those previously described, an obvious question is exactly how these heuristics might be implemented. Do people actually use any one heuristic to make a given decision? As noted earlier, an important distinction can be made between two ways in which choice processes might be implemented. On one hand, consumers may have a set of strategies or rules stored in memory and then invoke these rules in their entirety when needed. This might be called a stored rule method for implementing choice. A second conception, a constructive method, states that rules of thumb are developed at the time of choice using fragments or elements of rules stored in memory (Bettman 1979; Bettman and Park 1980 a,b). These fragments or elements may be beliefs about alternatives; evaluations; simple rules of thumb involving subsets of beliefs (e.g., “Compare these products on Attribute A to see if they differ very much”); rules for integrating beliefs (e.g., “Count how many attributes Alternative X is best on” or “Average those ratings”); rules for assigning weights (e.g., “If performance is comparable across brands, weight price heavily”); or, perhaps, even computational rules. Presumably the elements used will be a function of what is available in the particular choice situation and how easy various pieces of information are to process (e.g., a “Compare prices” element may not be used if unit prices are not given and different brands have different-size packages). The basic idea behind the distinction between the stored rule methods and constructive methods for implementing heuristics is that in some cases completed heuristics or rules do not exist in memory, but must be built up from subparts. Biehal and Chakravarti (1986) argue that simple processing operations

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<th>TABLE 2.1 Properties of Choice Heuristics</th>
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<td><strong>Heuristics</strong></td>
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Note: WADD = weighted additive; EQW = equal weight; EBA = elimination-by-aspects; SAT = satisficing; LEX = lexicographic; MCD = majority of confirming dimensions; FRQ = frequency of good and bad features.
such as those described earlier may be the level at which consumers store their information processing repertoire in memory.

The consumer may have only a general plan to guide the construction of a heuristic in a particular situation. Thus choice heuristics might vary from one situation to the next if a constructive method is used, depending on how the elements available were put together. A heuristic may then be the strategy realized as individual elements are brought to bear, depending upon the properties of the task. Stored rules will tend to be used in situations in which there is a good deal of prior experience, and constructive processes in situations in which there is little prior knowledge or experience.

A concept related to the idea of constructive decision processing is that of "editing" (Kahneman and Tversky 1979). Editing involves the use of combinations of simple operations, like the cancellation of outcomes which are identical across alternatives or the elimination of dominated alternatives to simplify decision problems. For example, a consumer may notice that all the refrigerators available in a particular store have frost-free operation and an ice maker. When considering those alternatives, the consumer will probably pay little attention to those features.

As initially formulated (Kahneman and Tversky 1979; Goldstein and Einhorn 1987), editing processes were assumed to come first, with alternatives edited and the simplified options evaluated. Alternatively, we have argued that editing is more opportunistic (Payne, Bettman and Johnson 1990). Editing may occur throughout a choice whenever individuals notice some structure in the choice environment that can be exploited. Hence, editing may be seen as part of a constructive method of decision processing. An implication of this viewpoint is that the regularities in the task environment (if any) which are noted and exploited can profoundly affect the course of the decision process. A related implication is that the resultant decision process and choice may be highly sensitive to the structure of the decision task. These concepts of constructive decision making and editing represent exciting topics for new research on consumer decision making.

CONTINGENT CONSUMER DECISION MAKING

The Concept of Contingent Decision Making

While we have discussed many different decision-making strategies, we have not specified the conditions where one rule or another would be used. As noted above, many factors can influence which strategy is used. Three major classes of such factors are shown in Figure 2.2: characteristics of the decision problems, characteristics of the person, and characteristics of the social context.

Characteristics of the Decision Problem. Increasingly, it seems that the use of a rule is contingent on the variables that describe the decision problem (Payne 1982). For example, when faced with a decision problem involving only two or three alternatives, people generally use compensatory types of decision strategies.

![Figure 2.2 Contingent Strategy Selection](image-url)
When faced with more complex (multiple alternative) decision tasks, people tend to use non-compensatory strategies such as elimination-by-aspects (Payne 1976; Lussier and Olshavsky 1979).

The response of decision makers to time pressure is another example of contingent decision making. Several studies indicate that reducing the time available to make decisions causes people to shift attention (Ben Zur and Breznitz 1981; Svenson, Edland, and Karlson, 1985; Wright 1974; Wright and Weitz 1977). A general hypothesis underlying much of the work on time pressure is that increased time constraints lead to efforts by the decision maker to simplify the task (Wright 1974). One approach, acceleration (Ben Zur and Breznitz 1981), would simply be to process the same information more rapidly. Selectively focussing on the use of only the more important information under time pressure (the idea of “filtration,” see Miller 1960) is another way the task might be simplified. Finally, one might shift strategies in order to cope with time pressure. Payne, Bettman, and Johnson (1988) report results indicating that people do accelerate their processing, focus on a subset of information, and finally, under severe time pressure, change their decision strategies.

Number of alternatives and time pressure represent task variables, which are associated with general characteristics of the decision problem and are not dependent on the particular values of the alternatives (Payne 1982). Context variables, on the other hand, are associated with the particular values of the alternatives. Context variables have also been shown to impact decision behavior. Several studies, for example, have shown that choice probabilities can be strongly influenced by the similarity of alternatives in a decision set (Restle 1961; Tversky 1972). Issues of similarity and choice have played a major role in consideration of new product introduction strategies and the problem of “cannibalization” in product lines (e.g., Batsell and Polking 1985). Another context variable that has been shown to affect choice is the presence of certain types of dominated alternatives (Huber, Payne, Puto 1982).

**Characteristics of the Person.** Individual differences can also influence contingent decision behavior. Both ability and knowledge differences can have major effects. For example, decision makers who find arithmetic operations relatively difficult may use heuristics requiring qualitative reasoning more frequently than individuals for whom arithmetic operations are comparatively easy (Bettman, Johnson, and Payne 1990). There is also a good deal of evidence that prior knowledge and expertise can affect how information is processed (e.g., Brucks 1985), inferences (e.g., Ford and Smith 1987), and memory (e.g., Hutchinson 1983).

**Characteristics of the Social Context.** Decisions are not made in a social vacuum; rather, many social factors can influence decision making. For example, even if an individual is making a decision, he or she may feel accountable to others, such as family members. Such feelings of accountability can lead to choice heuristics that focus on how easy a decision is to justify to others. For example, Simonson (1989) shows that the need to justify leads consumers to choose options that provide easy rationales or justifications. In addition to the implicit influence of accountability, many consumer decisions explicitly involve multiple individuals, such as different family members or different members of an individual purchasing unit. Clearly, there is an important difference between deciding for yourself (satisfying your own goals) and deciding jointly with a spouse, a child, or a boss, where your goals and theirs may conflict (Park 1982). There are important issues of coordination, organization, and information flow involved in multiperson decision making.

Problem, person, and social context factors provide an outline of the major aspects affecting contingent consumer decision making. We have provided only a brief overview of each of these three aspects thus far. Next we will consider alternative conceptual frameworks for understanding contingent consumer decision making. Then we will consider empirical research on decision problem and person-related factors in more detail. We do not provide a
more detailed discussion of social context influences because of the paucity of available research.

Conceptual Frameworks for Contingent Decision Making

Given the substantial evidence for contingent decision behavior, a natural question is why decision makers, given a particular task, select one particular decision strategy instead of another. There are two major conceptual frameworks that have been proposed to account for contingent decision making: the cost/benefit and perceptual.

The Cost/Benefit Framework. One possible reason that a decision maker decides to use a particular decision strategy in a specific task environment is that rule usage is the result of a cost/benefit analysis. The idea is that any decision strategy has certain benefits associated with its use and also has certain costs. The benefits would include the probability that the strategy will lead to a “correct” decision, the speed of making the decision, and its justifiability. Costs might include the information acquisition and the computational effort involved in using the strategy. Decision rule (heuristic) selection would then involve consideration of both the costs and benefits associated with each possible strategy. Strategy selection is the result of a compromise between the desire to make a correct decision and the desire to minimize effort (Beach and Mitchell 1978; Johnson and Payne 1985; Klayman 1983; Russo and Doshier 1983; Shugan 1980).

A view of strategy selection as involving benefits and costs has several appealing aspects. The assumption of calculated rationality on the part of the decision maker (March 1978) can be maintained once the costs of the decision process itself are included in the assessment of rationality. In addition, the perspective of costs and benefits can potentially explain contingent decision behavior, because the costs and benefits of decision strategies will vary between tasks. Such factors as the importance of the choice or the need to justify the choice will affect how the trade-off between costs and benefits will be set in selecting a strategy. (See Simonson, 1989, for a demonstration of the sensitivity of consumer choices to the need to justify decisions.)

In our own work, we have taken a cost/benefit perspective which considers cognitive effort as the major component of cost and the accuracy of choice as the principal component of benefit. Effort is measured by decomposing strategies into a common set of component elementary information processes (e.g., reads, comparisons, and additions). (See Newell and Simon, 1972, and Chase, 1978.) Counts of these component processes are a measure of effort. Both simulation work and experimental results have demonstrated that this approach can explain contingent decision making (Johnson and Payne 1985; Payne, Bettman, and Johnson 1988, in press; Bettman, Johnson, and Payne, 1990). Simulations were used to characterize the expected levels of accuracy and effort for various heuristics in a variety of decision task environments. Based upon the results of such simulations, conclusions could be drawn about the performance of the heuristics. For example, in an environment with a good deal of dispersion in attribute importance weights (i.e., some weights are high and others low), such heuristics as elimination-by-aspects and lexicographic maintain fairly high levels of accuracy with substantial savings in effort. Experimental studies with human subjects showed that they switched to such attribute-based strategies for problems with greater dispersion in importance weights.

The previous discussion may seem to imply that consumers come to a decision situation with a repertoire of strategies, that they assess costs and benefits, and then choose a strategy. While such global, a priori analysis of costs and benefits may occur in some situations, it is very important to note that it is also possible for consumers to construct heuristics on the spot based upon cost/benefit trade-offs. That is, consumers may make more local, momentary, contingency-driven cost/benefit assessments that result in a realized or constructed heuristic. For example, a consumer may start to compare
alternatives on a particular attribute and discover that the values are all very similar. Then he or she may decide to look at another attribute but find that it is difficult to understand. Such spur of the moment shifts in processing direction can be based upon cost/benefit considerations, even though the consumer is building or realizing a heuristic rather than using one selected a priori. Recent research by Klein and Yadav (1989) seems more consistent with such a local, “bottom-up” approach to cost/benefit considerations than with a “top-down,” a priori approach.

A Perceptual Framework. Tversky and Kahneman (1981) prefer to explain contingent decision making in terms of basic principles governing human perception. They have shown, for example, how simple changes in the wording of a decision problem can reverse preferences because of the differences in response to gains and losses. For example, in one problem you are asked to imagine that the United States is faced with the outbreak of a certain Asian disease that is expected to kill 600 people. You are asked to indicate your preference between two alternative programs to combat the disease. In one wording of this problem, the first alternative is said to result in 200 people being saved. The second alternative is said to save 600 people with a probability of 1/3 and no people with a probability of 2/3. Most people prefer the first alternative. In a rewording of the problem, the first alternative is said to result in the death of 400 people. The second alternative gives a probability of 1/3 that none will die and a probability of 2/3 that 600 people will die. Most people in this case prefer the second alternative. Why the reversal in preference? Tversky and Kahneman argued that the first wording causes people to code the possible outcomes as gains, and the second wording causes the outcomes to be coded as losses. Furthermore, because people are often risk averse for gains and risk-seeking for losses, one observes the reversal in choice between two problems that are formally identical.

Similarly, Puto (1987) demonstrates in an industrial buying situation that decision makers' choices from the same set of alternatives are greatly influenced depending on whether individuals view the choices as offering potential gains or losses. He achieves this difference in views by manipulating the individual's reference point for the expected price of the item to be purchased.

Kahneman and Tversky (1979) argue that our perceptual apparatus is attuned to changes rather than absolute magnitudes. Hence, outcomes will tend to be coded as gains or losses relative to some reference point. Likewise, Tversky and Kahneman argue that different ways of framing a problem can lead to different choices or preferences in the same way that taking different perspectives can influence perceptual appearances. For example, Levin and Gaeth (1988) show that labeling beef as 75 percent lean leads to more favorable evaluations than labeling it as 25 percent fat, particularly before tasting the beef. There are several other instances in the consumer decision making literature where perceptual interpretations seem to be more compelling or more correct than cost/benefit notions (e.g., Bettman and Sujan 1987; Johnson 1988) or where cost/benefit predictions are not borne out (e.g., Klein 1983).

The perceptual framework clearly complements the cost/benefit framework because it is difficult to see how simple wording changes alone (e.g., as seen in “lives saved” versus “lives lost” in Tversky and Kahneman 1981) change either cognitive effort or the desire for accuracy. On the other hand, it is not clear how the perceptual framework would handle contingent behavior due to the number of alternatives, for example, yet that phenomenon fits nicely into a cost/benefit framework.

One major opportunity for integrating cost/benefit and perceptual frameworks may be to develop the notions of editing discussed previously. That is, in the course of constructing a heuristic, consumer decision makers may cycle between noticing aspects or characteristics of the choice set (e.g., extreme values across alternatives) and deciding how to exploit those aspects. Perceptual frameworks may be most relevant for the noticing process, whereas cost/benefit notions may be more relevant for deter-
remining what to do to take advantage of what has been noticed. That is, some task and context effects may operate perceptually, by influencing the likelihood with which various cognitions come to mind. This distinction is similar to that between interrupts and reactions or responses to those interrupts proposed by Bettman (1979). Interrupts may be more perceptually based, while reactions to the interrupts may be determined to a greater extent by cost/benefit concerns. A second opportunity for integrating the two frameworks would be to consider that individuals' assessments of costs and benefits for any heuristic may be greatly influenced by perceptual concerns such as how information is presented or how the problem is framed.

RESEARCH ON CONTINGENT CONSUMER DECISION MAKING

While we have both introduced the concept of contingent decision making and described frameworks for understanding contingent choices, we have only provided a cursory look at empirical findings. In the next sections, we review several factors that seem to affect consumer choice processes, using, where possible, examples from consumer research. We organize our review using the classification scheme presented earlier: problem factors, with two major subcategories of task variables and context variables; and person factors, with the two major subcategories of prior knowledge and ability.

Problem Factors: Task Variables

Problem Size. Many consumer researchers have found that increasing the number of alternatives causes consumers to use strategies that lead to early elimination of a number of alternatives (Payne 1976; Lussier and Olshavsky 1979; Johnson and Meyer 1984). Consumers use compensatory strategies to a greater extent for small numbers of alternatives and noncompensatory strategies for large numbers. Interestingly, changes in the number of dimensions or attributes do not appear to change the underlying decision strategies but may increase selective processing of the attributes (Payne 1976; Lussier and Olshavsky 1979; Olshavsky 1979).

If the consumer faces increases in both the number of alternatives and attributes, a natural question arises: Is there a point at which the consumer can be given too much information? This research topic has been of major and longstanding interest in consumer research. Both marketers and policymakers are greatly interested in the possibility that consumers may make less accurate decisions with more information. If there were deleterious effects on consumers' processing or choices as the amount of available information increased, then policies that required additional information to be given to consumers, such as new warnings, might perversely have an impact opposite to that intended.

The initial research on information load by Jacoby and his colleagues (Jacoby, Speller, and Kohn 1974 a,b) purported to show that consumers were overloaded by large amounts of information. Their conclusion was that consumers made poorer decisions with more information. This conclusion was quickly disputed by several researchers (Russo 1974; Wilkie 1974; Summers 1974), who noted that choice accuracy actually increased as more attributes were added. Accuracy only decreased when the number of alternatives was increased. Malhotra (1982) and Keller and Staelin (1987) have also shown decreases in accuracy of choices with increases in information load, but there is still controversy surrounding the interpretation of these findings (Keller and Staelin 1989; Meyer and Johnson 1989). For example, Meyer and Johnson point out that a major problem with this research area is identifying what constitutes a good decision. Most research uses subjects' ratings of attribute importance to determine the best alternative, and such ratings are subject to error. Because this error often covaries with the amount of information, defining an accurate choice in these studies seems extremely problematic. Hence, the information
load issue remains an important unresolved question in consumer decision research. One possible direction for such research would be to examine how consumers select their information load by deciding what information to examine. Such heuristics for selectivity could then be examined to determine if systematic effects on decision making result from their use.

**Time Pressure.** As we have described above, individuals appear to accelerate their processing, become more selective, and change strategies when time pressure becomes severe (Payne, Bettman, and Johnson 1988). Payne, Bettman, and Johnson (1988) also found that attribute-based heuristics such as EBA or lexicographic heuristics tended to be more robust under severe time pressure. When time pressure is severe, it appears that quickly examining at least some information on every alternative is an effective approach to coping. Wright (1974) and Wright and Weitz (1977) provided evidence for an additional effect of time pressure. They argued that decision makers simplify the task by placing greater weight on negative information about the alternatives, and they reported results consistent with this contention.

**Response Mode.** Many theories of decision making assume that preferences should not depend upon the methods used to assess them. This assumption, called *procedure invariance* (Tversky, Sattath and Slovic 1988), seems not to hold. Instead, different assessment methods show a marked influence on the nature of preferences. For example, Mowen and Gentry (1980) found that preferences between pairs of new product projects could be reversed depending upon whether the decision maker chose one project from the pair or assigned a price for the rights to each product. Such preference reversals are commonly found in a variety of contexts (Slovic and Lichtenstein 1983; Tversky, Slovic and Kahneman, 1990). A general principle seems to be that inputs are weighted more heavily the more compatible they are with the output (Tversky, Sattath, and Slovic 1988).

The studies showing response-mode contin-

gent processing are of great importance to marketing research. As Tversky et al. (1988) note, the classical economic view of preferences assumes that consumers have well-defined preference orders. When asked how much they like one product versus another, it is assumed that consumers read that preference from some master store of information about personal values. The problem for the marketing researcher is, therefore, simply one of efficiently measuring those preferences or values. The demonstrations of response mode effects, however, suggest another view of preferences. In many situations, it may be that preferences are actually constructed during the elicitation process, rather than just reported. Thus, observed preferences are likely to reflect both a consumer’s underlying values and the heuristics or fragments of decision rules used to construct the required response in a particular situation. This suggests that the marketing researcher’s task of measuring consumer values will be even more complicated than generally accepted. Using a judgment response to measure a consumer’s values, for example, may not be predictively accurate when the consumer actually makes choices among products. Marketing researchers will need to understand how a variety of seemingly minor changes in the task and context of consumer decisions will impact observed preferences.

**Types of Decision Task.** Several studies have examined the effects of different types of decision tasks on the resultant processes. For example, Biehal and Chakravarti (1982) placed subjects in conditions where they either learned information and then made choices or made choices and were then asked to recall the information. Subjects who learned the information first tended to organize that information in memory by brand, and they showed a greater tendency to process information by brand when they made choices that the subjects who make choices first. The subjects who made choices first, on the other hand, processed more by attribute and showed much greater attribute organization in memory than the subjects who
learned the information first. The choice-first subjects also showed much better recall for the chosen brand than for the rejected brands. (These results are also found in Johnson and Russo 1981, 1984.)

Biehal and Chakravarti (1983) also show how the interactions between memory and choice influence choices made over time. They examine a situation where subjects first either learn information or make a choice. Information on new alternatives and new attributes is then added, and a second choice is made. The added attribute information makes one of the original alternatives more attractive. The results show that if a choice is made first, the decreased memory for rejected alternatives makes it harder to reevaluate an alternative that had been rejected, even if that alternative would be attractive if processed. In conjunction, the Biehal and Chakravarti studies make important points about how memory and attentional processes constrain choice and about how the task has an influence on when memory and attentional factors come into play.

Johnson and Russo (1981, 1984) studied the effects of the type of decision task (judgment task or choice task) on memory. Work in behavioral decision theory has emphasized that judgment and choice are not equivalent (Einhorn and Hogarth 1981). In a judgment task, the subject makes an overall evaluation of each alternative, while in a choice task, he or she picks the most preferred alternative. A judgment task encourages a complete examination of all of the information for each alternative, whereas a choice task allows the subject to be much more selective (e.g., some alternatives may be virtually ignored if they have a bad value on one attribute). Johnson and Russo show that prior knowledge is positively related to memory for information about the alternatives for a judgment task, but that the subjects with the greatest prior knowledge show decreased memory for information about current alternatives in the choice task. If subjects process all information, as in the judgment task, then greater knowledge aids memory. However, in the choice task, subjects with greater knowledge appear to process information more selectively, and hence remember less (for related results see Bettman and Park 1980). Thus, memory and choice show interactions in both directions. What is in memory can influence future choice processes, and current choice processes can affect subsequent memory. Brucks (1985) also shows that experts appear to search more selectively and more efficiently than novices.

Lynch, Marmorstein, and Weigold (1988) have investigated choices where some or all of the alternatives had to be retrieved from memory. They show that consumers will use information in memory to make a choice if it is accessible and if it is perceived to be more diagnostic than other accessible information (Feldman and Lynch 1988).

**Information Format.** We have stressed that how information displays are organized can have a major impact on consumer decision making. A nice illustration of this is provided by Russo (1977). He showed that the use of unit price information increased when the information was presented to shoppers in the form of a sorted list where the available brands are ranked by increasing unit price. This list, when it appeared on the supermarket shelf, resulted in consumers saving about 2 percent, on average, as compared with consumers using a normal unit price display with separate tags for each item. Russo argues that the list display works because it makes price comparisons easier. Consumer decision making is aided in this case by making information easier to process. Attempts to duplicate this success using nutritional information have met with mixed results (Muller 1984; Russo, Staelin, Nolan, Russell, and Metcalf 1986).

Bettman and Kakkar (1977) demonstrate another display effect. They found that information acquisition proceeds in a fashion consistent with the display format. For example, if a display encouraged alternative-based processing, more alternative-based processing was observed. Biehal and Chakravarti (1982) have shown, however, that memory organization can interact with format to determine processing. For example, prior brand-based organiza-
tion of information in memory attenuates the effects of attribute-based formats in their research.

Problem Factors: Context Variables

Similarity. Recall that context effects refer to factors describing a particular set of alternatives, such as similarity (Payne 1982). Huber, Payne, and Puto (1982), Huber and Puto (1983), and Huber (1983) find that adding a dominated alternative to the set can increase choice of the alternative which is dominant, a violation of the principle of regularity fundamental to many formal choice models. (See Ratneshwar, Shocker, and Stewart, 1987, for another viewpoint on this research.) Huber and Puto (1983) and Huber (1983) extend these findings to nondominated alternatives and document the existence of an attraction effect (i.e., a new item can lead to increased choice of similar items) as well as the normal substitution effects (i.e., a new item takes choice from those items to which it is most similar). These findings provide important new constraints that viable choice models must meet.

As alternatives become less similar, the variance in the attributes across alternatives increases. Researchers have examined whether the importance weights given an attribute depend on this variation in scores. Meyer and Eagle (1982) report that weights did shift as a function of variance: Attributes with greater variance received more weight. In contrast, Curry and Menasco (1983) find that weights do not depend on the variation in scores. The difference in results may be partially due to Curry and Menasco's use of a judgment task, whereas Meyer and Eagle get their strongest results by using a choice task. More research is clearly warranted. Chakravarti and Lynch (1983) provide a conceptual framework for such research on context effects.

Correlated Attributes. A concept closely related to similarity is the correlation of the attribute scores across alternatives. If the alternatives are similar, the attributes will be positively correlated; if they are very dissimilar, the attributes are negatively correlated. Interattribute correlation is also related to dominance, because, when the number of attributes is small, removing dominated alternatives from choice sets results in a negative correlation between the attributes for the remaining alternatives (Curry and Faulds 1986; Krieger and Green 1988). Several normative models assume that consumers make choices from sets in which dominated alternatives are removed (e.g., Hauser and Gaskin 1984; Shugan 1987).

Several authors have speculated that the case where attributes are negatively correlated might be a particularly interesting variation in context. The major reason is that many simplified heuristics, when compared with a weighted additive model, become less accurate under these conditions (Newman 1977; McClelland 1978; Einhorn, Kleinmuntz, and Kleinmuntz 1979). Thus, a cost/benefit perspective would suggest that consumers might shift away from heuristics when faced with such choice sets. Research in this area is just beginning, but Johnson, Meyer, and Ghose (1989) report that their subjects did not appear to shift strategies when faced with negatively correlated attributes. One possible reason for this result is that the perception of correlation is notoriously inaccurate (Crocker 1981), suggesting that this may be an important context effect which is difficult for decision makers to detect.

Comparable versus Noncomparable Choices. Until the early 1980s, consumer choice research had concentrated almost exclusively on examining decision processes for comparable alternatives, such as the process of selecting among several brands of microwave ovens. Johnson (1984, 1986) for the first time examined how consumers may evaluate and choose among noncomparable alternatives (e.g., things to buy with a bonus). For example, the consumer might try to decide whether to take a vacation trip, to buy a new television set, or to buy several new outfits of clothing. Johnson (1984) shows that as alternatives become more noncomparable, consumers represent attributes at higher levels of abstraction (e.g., necessity or
enjoyment), so as to allow comparisons within attributes. At some point, however, consumers shift to a strategy where they form overall evaluations for each alternative and then compare the overall evaluations. Bettman and Sujan (1987) further showed that one fundamental distinction between noncomparable and comparable alternatives is knowledge of goals and goal-relevant attributes for making choices, rather than any inherent difference in the types of choices. When a goal was provided, decision processes for noncomparable alternatives more closely resembled the decision processes that consumers use when choosing between comparable alternatives. Thus, one aspect of knowledge—knowledge of goals—explained differences in decision processes between the two types of alternative sets.

The Quality of the Alternatives Available. Another important context factor that might affect consumer choices is the overall quality of the set of available alternatives. That is, choices may differ depending upon whether the options are mostly good or mostly bad. While this factor has not yet been studied in consumer choice contexts, Payne, Laughhunn, and Crum (1980, 1981) have shown that choices between pairs of investment options differ contingent upon whether the potential outcomes are above or below the decision maker’s aspiration level. The issues of aspiration levels, reference points, or target values are part of the more general question of the framing of consumer decisions.

Person Factors

Prior Knowledge. The degree of previous knowledge that a consumer brings to a choice task can have substantial impact on the resultant process. For example, Fiske (1982) and Fiske and Pavelchak (1986) have proposed that individuals may evaluate stimuli in two basic modes. In piecemeal processing, the evaluation of a stimulus is the combination of the evaluations of the individual elements or attributes of that stimulus. In category-based processing, if a stimulus is successfully categorized in an existing category, the evaluation associated with that category is associated with the stimulus. Fiske and Pavelchak hypothesize a two-stage process. If the first categorization stage succeeds, then category-based evaluation processing ensues. If categorization fails, piecemeal processing is invoked.

This categorization approach has been examined by Sujan (1985) in a consumer setting. Sujan shows that when the information in a print advertisement matches expectations, there is evidence of category-based processing: faster impression times, more category verbalizations, and fewer attribute verbalizations. When the information does not match expectations, there is evidence of piecemeal processing. These effects are more pronounced for experts than for novices in the product category used (cameras). Thus, there is some very interesting evidence that prior knowledge can affect the basic type of evaluative processing being carried out.

Another aspect of consumer decision making that may depend upon prior knowledge is making inferences. If a consumer does not know the value of a particular attribute for some alternative, he or she may infer that attribute’s value from other available information. Meyer (1981) developed a model that accounts for consumer uncertainty about attribute values and assumes that consumers make inferences if no information is available. His results showed that consumers infer a discounted value for a missing attribute value (i.e., a value which is less than the average value of that attribute across other alternatives). Huber and McCann (1982), Yates, Jagaciński, and Faber (1978), and Johnson and Levin (1985) obtained similar results. Ford and Smith (1987) find that consumers’ inferences about a missing value for a given brand are influenced more by information about other attributes of that brand than by information about the same attribute for other competing brands.

A final area in which the relationship between prior knowledge and decision processes has been examined is children’s judgments. Roeder (1981, 1982) and John and Whitney (1986) argue that one must consider whether the processing deficits observed in children are
due to the lack of ability or to the lack of learning the appropriate strategy. Her work indicates that lack of knowledge of procedures for comparing alternatives may be the basis of poor judgments (e.g., inconsistent attitude-behavior judgments) made by children (Roedder, Sternthal, and Calder 1983). This finding suggests education affecting the relevant knowledge base (e.g., decision-making strategies) may be a remedy for improving judgments among children. Note that these results imply that knowledge base, rather than age, may be most crucial in affecting children's processing. Other research supports this notion, showing that children can process more effectively than adults for categories where children have greater knowledge (e.g., Lindberg 1980).

Several of the results described above imply that characterizing consumer expertise and its effects could be an extremely important contribution. The early search for the supposedly more powerful problem-solving heuristics of experts has yielded to the study of the different knowledge structures of experts (Chi 1983). It is felt that the content and organization of knowledge is the crucial factor underlying expertise. For example, Hutchinson (1983) shows that subjects with higher expertise tend to group items more by their functional equivalencies than by their surface similarities. Alba and Hutchinson (1987) provide an extremely thorough review and a set of propositions about consumer expertise that may be very useful in achieving research progress in this area.

**Information Processing Abilities.** Several studies have demonstrated that individuals' information processing abilities are related to consumer choice processes. For example, Capon and Davis (1984) find that measures which tap systematic combination abilities (Inhelder and Piaget 1958) are correlated with more complex patterns of information acquisition and integration. Capon and Burke (1980) report that subjects lower in socioeconomic status acquire less information and used less attribute-based processing in their choice processes than subjects higher in socioeconomic status. Finally, Bettman, Johnson, and Payne (1990) provide preliminary evidence that a decision maker will use strategies to a lesser extent if those strategies utilize operations which that individual finds difficult.

**Implications of Contingent Decision Making**

The contingent perspective on consumer decision making outlined above has a variety of implications. In particular, such a perspective is extremely valuable for designing consumer information environments. As an example, one straightforward implication of an accuracy/effort conceptualization of contingent consumer decision making is that reductions in the effort required to use more accurate strategies will increase the usage of such strategies. This principle has been applied in studies that have attempted to reduce the required effort by manipulating information format. The change in formats can encourage or discourage certain forms of processing by making information easier to process. Recall a classic example of this approach, presented earlier, provided by Russo (1977). Russo was able to provide unit price information in a list format, which facilitated both processing and usage of that information. In general, the principle of increasing the use of more optimal strategies by making such strategies easier to use has important implications for policymakers wishing to provide information to the public (Bettman, Payne, and Staelin 1986).

Another example is provided by Payne, Bettman, and Staelin (1986), who note that particular formats and methods for organizing information can greatly influence the ease with which various types of processing can be carried out. Thus, the congruence between format and type of processing is crucial. It should be noted that there are two basic approaches to congruence. The first is reactive. That is, one can attempt to determine how consumers are currently processing information and develop formats to make existing types of processing easier. A second approach, particularly relevant for policy, is more proactive. The policy-maker determines how consumers should pro-
cess information (e.g., by making more comparisons across brands) and designs formats that facilitate such processing. As we noted before, there is some evidence that consumers tend to process information in the format in which it is provided rather than transforming it (Bettman and Kakker 1977). Therefore, the policymaker or marketer may be able to facilitate certain types of processing through judicious designs for information provision. For example, Bettman, Payne, and Staelin (1986) formulate general principles relevant for designing labels to present information about product hazards: (1) make important information more salient by using color and/or type size, (2) use a common organization for information on all labels, (3) design this common organization hierarchically and in a manner compatible with the scheme used by most consumers to store information about the product, (4) use symbols that quickly convey the concept, (5) collect information on benefits in one place on the label, (6) collect information on risks in one place on the label, (7) organize the label so that the information on benefits and risks are in close proximity, (8) provide information in a relative or comparative format, and (9) consider in-store comparative lists in addition to labels.

These examples illustrate the principle of passive decision support (Johnson, Payne, and Bettman 1988). In contrast to more active approaches, which replace human cognitive processes to aid decisions, better decisions can be encouraged by designing displays in ways that possibly encourage more accurate strategies by making them easier to execute. Such reduction in execution effort can be achieved, for example, by using formats that make operations such as comparisons easier or by making individual pieces of data easier to process.

To summarize, research has shown that consumers have limited information processing capacity. As a consequence, consumers often use heuristics in making decisions. A wide variety of heuristic decision strategies have been identified and characterized. The use of a particular heuristic in making a particular decision appears to be highly contingent on a number of variables related to task, context, and individual differences. From the perspective of a consumer researcher, the contingent nature of consumer decision behavior presents an exciting challenge. No single model appears adequate to predict and explain consumer decision processes. Instead, a researcher interested in better understanding consumer decision making must be prepared to investigate at a detailed level how specific types of consumers respond to a variety of decision situations. In the next section, we examine some of the methods that are useful for studying consumer decision processes.

METHODS FOR STUDYING CONSUMER DECISION MAKING

Input-Output Approaches

There are two basic classes of methods for studying consumer decision making: input-output methods and process-tracing approaches. Input-output methods do not attempt to directly measure the decision process. Instead, an underlying decision process is postulated, and factors are selected which should affect that process in certain ways. Then an experiment would be carried out that manipulated those factors (the input) and measured the result of the process (the output). If the effects were as predicted, the researcher might claim that the experiment provided support for the hypothesized process, even though no attempt was made to observe that process. Russo’s (1977) information format study is of this type. The observed monetary savings by consumers are consistent with the hypothesis that the new unit price format led consumers to process the unit price information to a greater extent. However, there is no direct evidence for this process.

Process-Tracing Approaches

In process-tracing approaches, the researcher attempts to measure the ongoing decision process more directly without disturbing that process. The basic idea is to increase the
density of observations about decision processes in a time-ordered fashion. We will discuss three major process-tracing methods: verbal protocols, information acquisition approaches, and, to a lesser extent, chronometric methods.

**Verbal Protocols.** Protocol analysis has been used in several consumer research studies (e.g., Bettman 1970; Payne 1976; Bettman and Park 1980a; Biehal and Chakravarti 1982a,b; 1983; 1986; 1988; Rosen and Olshavsky 1987; Park, Iyer, and Smith 1989). In using this method, the subject is instructed to think out loud as he or she is actually performing the task of interest, for instance, shopping or choosing among alternatives. This verbal record is termed a protocol. It may be distinguished from introspection or retrospective reports in that the subject is asked to verbalize thoughts as they occur in the course of problem solving. The protocol data are then used to gain insights into the processes being used. The major advantage of the method is that a great deal of data on internal events may be made available for inspection. Without these data available, details of the heuristics may be lost. Protocol data are then used to develop a model of the processes used by consumers in making judgments or choices. Bettman and Park (1980a,b) developed an extensive scheme for coding protocols. Their scheme was used and expanded upon by Biehal and Chakravarti (1982a,b; 1983; 1986; 1989).

There are disadvantages to protocol analysis, however. The collection of protocol data in the volume necessary for model inference is extremely time-consuming. Thus small samples have typically been used. In addition, the quality of the data has been questioned. Subjects’ protocols may not reflect what they are actually doing. The protocols could reflect biases or self-censoring of protocols as they are being reported, or they may simply show that subjects are unable to retrospectively verbalize internal processes (Nisbett and Wilson 1977). It is particularly difficult to obtain verbalization of currently occurring thoughts, instead of retrospective rationales, when protocols are taken during shopping trips for items about which the subject has some prior knowledge and experience. Also, protocol output is not obtained for all processing performed. There may not be output corresponding to all internal states (Lindsay and Norman 1972, pp. 517–520). Subjects may select which processing to verbalize based upon what they believe is important, and not verbalize precisely that data most valuable to the researcher (Frijda 1967). While selectivity in verbal reporting may be an issue, several researchers have provided convincing evidence that decision makers do have self-insight (e.g., Ericsson and Simon 1984; Wright and Rip 1984). For further discussion of these issues, see Lynch and Srull (1982) and Biehal and Chakravarti (1989).

The process of providing protocols may also affect the choice processing being carried out. Ericsson and Simon (1984) report many studies finding no effects of taking protocols on decision processes. In studies of consumer decision making, however, there are mixed results when the validity of verbal protocols has been examined. Smead, Wilcox, and Wilkes (1981) and Biehal and Chakravarti (1983) report no significant difference between protocol and no-protocol conditions for some measures. However, Biehal and Chakravarti (1989) present results showing differences in the extent of alternative-based processing and problem framing due to verbal protocols. Hence, while verbal protocols can provide valuable data regarding choice processes, the researcher must be cautious and attempt to control any effects of taking protocols. (See Biehal and Chakravarti, 1989, and Russo, Johnson, and Stephens, 1989, for suggestions.)

**Information Acquisition Approaches.** Initial attempts to monitor the sequence of information acquired (e.g., Jacoby 1975; Payne 1976) employed an information display board, essentially a matrix array (often with brands as rows and attributes as columns). Information cards were available in each cell of the matrix, giving the value for the particular attribute and brand appearing in that row and column (e.g., the price for Brand X). The subject was asked to choose a brand after examining as many cards as desired, one at a time. The sequence of cards
selected and the amount of information acquired became the major data provided by the method. This detailed record of the sequence of information examined was made available by directly controlling the selection process for information. This technique has been updated by using computer displays.

The major disadvantages of such information monitoring approaches concern the nature of the task. First, it is a relatively obtrusive process, with subjects perhaps biasing their information-seeking behavior since it is so obviously under observation. Second, internal processing is not studied directly, but only external information-seeking responses (i.e., which information is selected) are examined. Not all internal processing may be revealed explicitly in the information-seeking sequence. There is no observation of a possible search of internal memory that may take place in parallel with external search through the matrix. The time spent during an information acquisition may be some indication of the amount of internal processing, however. Third, the typical matrix structure of the information presentation makes it equally easy for a consumer to process by brand or by attribute. This is not similar to many actual consumer tasks in which information is often organized by brand (e.g., on supermarket shelves and in commercials), which hinders attribute processing. A matrix display also helps structure the decision problem for decision makers, which prevents the researcher from studying how consumers develop a structure for themselves.

This last problem has been addressed by a recently developed information search program (Brucks 1988). Brucks stored information about the attributes of several alternatives in a computer database. Subjects were able to access this database through a user interface that simulates a shopping situation. The alternatives and attributes are not presented in a matrix structure—in fact, the names of the attributes are not presented at all on the display. Rather, using their own words (which can be interpreted by artificial intelligence programs or unobtrusive human intervention), subjects make inquiries about the attributes of the alternatives of interest.

Analysis of eye movements has also been used to study information acquisition (e.g., Russo and Rosen 1975; Russo and Dosher 1983; Van Raaij, 1977). In using this method, the choice objects are displayed either on a screen in front of the subject, in tabular format (Russo and Dosher 1983; Russo and Rosen 1975), or perhaps as separate packages (Van Raaij 1977). The sequence of eye movements used by the subject in examining the choice objects is then recorded by a specialized apparatus. Often this entails some restrictions: Subjects' heads may be immobilized to prevent large head movements, or subjects who wear contact lenses or eyeglasses may not participate. Similarly the visual display must guard against the subjects' use of peripheral vision by providing relatively large separations between items.

The resulting eye movement data provide a very detailed and dense trace of the information search, and eye movements may be relatively more difficult for subjects to censor than verbal protocols. Eye movement data may be more useful in conditions when protocols may fail, such as when studying processes which occur rapidly or which involve nonverbal representations or automated processes (Eriksen and Simon 1984). In addition, eye movements have a major advantage over information display boards, because the eye movement requires much less effort than physically retrieving a card. Comparison between eye movement recording and information display boards show that eye movements show both more acquisitions and more reacquisitions (Russo 1978).

Eye movement data also have unresolved problems. First, collecting such data is very time-consuming, expensive, and usually uses small sample sizes. Also, since the apparatus often is quite obtrusive, subjects are obviously quite aware that their eye movements are being monitored (although more recently developed eye movement systems do not require restriction of the head). Second, the choice stimuli
used in eye movement studies have often been simplistic arrays because of the desire by researchers to localize eye movements. More detailed and complex visual stimuli, such as standard product shelf displays, have been examined using videotaping procedures, but these provide information only about the aggregate characteristics of the looking behavior (Russo 1978). Finally, the fixations are information-seeking responses, and they do not necessarily reveal the details of internal processing (see Russo, 1978, for more details on this method).

A middle ground between eye movement recording and information display boards is provided by a computer-based information display that employs a mouse to control information acquisition (Johnson, Payne, Schckade, and Bettman 1988). This acquisition system measures both the sequence and timing of information gathering in several different types of task environments. Because the mouse is a relatively effortless response, Johnson et al. argue that it approximates the detail provided by eye movements with much less cost. While the computer displays are still quite structured, environments other than brand by attribute matrices and responses other than choice can be used.

**Chronometric Analysis.** Analysis of response times, or chronometric analysis, has been used to study consumer choice (e.g., Johnson and Russo 1978; Gardner, Mitchell, and Russo 1978; Sujan 1985). The basic data collected in using this approach are the times taken to complete a response, usually measured as the time between the presentation of a stimulus and the response to that stimulus. Note that in a sense this is a form of input-output analysis where the output is total time. Measurement of such times can be carried out with varying degrees of sophistication, ranging from the use of tachistoscopes to the use of stop watches (Russo 1978). The assumption is usually made that this time directly reflects the amount of processing effort used in completing the task. By comparing the mean response times over different experimental conditions, it is hoped that one can learn about the information processing characterizing such tasks.

Various types of insights can be obtained from analyses of response times. Several authors have used such analyses to study the structure of memory (e.g., Johnson and Russo 1978). Other applications have included testing models of cognitive effort in decision processes (Bettman, Johnson, and Payne 1990) and attempting to distinguish exemplar-based versus rule-based processing in categorization (Cohen and Basu 1987). Lynch (1981) discusses how response times can be used to determine the sequence of cognitive processes in judgment.

A major advantage of response time analysis is that it can be used to study covert and rapid processes such as memory search. Other methods do not seem as generally powerful in exposing such memory phenomena. Some have argued that, although response time measures are very useful for studying such brief processes, they may be less useful for longer tasks (Russo 1978). The longer the duration of the task, the greater the chance that factors not manipulated by the experimenter may affect response times.

Response time analysis is a technically demanding approach that has certain disadvantages. Perhaps the most problematical is the trade-off between speed and accuracy. In almost all tasks, subjects can choose to sacrifice accuracy to attain greater speed, or they may take more time in order to improve accuracy. A discussion and an example of the problems created by the speed-accuracy trade-off are cogently presented by Pachella (1974). The usual technique for dealing with this trade-off is to attempt to have subjects perform at the same accuracy level in all experimental tasks. This strategy may be difficult to implement in consumer research settings in which there may often be no objectively correct response against which subjects' responses can be compared (Gardner, Mitchell, and Russo 1978).

A second disadvantage is that response time measures are very much aggregate measures, and, as such, may be difficult to interpret; that is, knowing only how long a process took does not directly lead to insights about the compo-
nents of the process. Initial theorizing about the process is essential for designing experiments using response time analysis if there is to be some hope of obtaining insights (Gardner, Mitchell, and Russo 1978). Finally, response time analysis can be an obtrusive method, with subjects usually aware that their response times are being measured. This is particularly true for cases where speed-accuracy trade-off instructions are used.

We have barely scratched the surface with this necessarily brief discussion of methods for studying consumer decision making. These approaches are described in more detail in Carroll and Johnson (in press) and in Ford, Schmitt, Schechtman, Hults, and Doherty (1989). It should be clear, however, that no one method is perfect. Each method has its own biases and disadvantages. Combinations of methods in which several complementary approaches are used in the same study seem to hold the greatest promise. Since the various methods have different strengths and weaknesses, multimethod approaches let us separate the effects of the research method from those associated with the phenomenon under study.

FUTURE RESEARCH OPPORTUNITIES

We have argued that consumers, faced with potentially complex decisions, use a variety of heuristics to simplify their task. As a result of processing limitations, consumers are contingent processors, using different strategies for different decision environments. Two conceptual frameworks for understanding such adaptivity were presented, and the research supporting the contingent approach was outlined. Finally, we examined methods for studying consumer decisions and some implications of these methods.

Consumer decision making remains rich in possibilities for future research. One particularly important area for study is the notion of constructive decision processes and editing. We know very little about how consumers notice properties of choice environments and adapt to such properties on the spur of the moment. Studies of how the focus of consumers’ attention varies as a function of attribute values, display formats, and other factors could shed light on these noticing processes. Monitoring information acquisition sequences and taking verbal protocols may help to uncover how consumers decide to react to what they notice. A related issue of great importance is how consumers assess how well they are doing. While consumers may have reasonable perceptions of the effort they are expending, how perceptions of accuracy are developed is an open and crucial question (Klein and Yadav 1989).

A related topic of substantial interest is how decision makers represent alternatives. Thaler and Johnson (1989), for example, demonstrate that how decision makers represent prior gains and losses can dramatically influence choices. Such questions as whether consumers view cents-off coupons and sales as an original price and a discount or as a final net price are examples of the sorts of representation issues that might be addressed. Another example of a representational issue in consumer choice is Loewenstein’s (1988) research on frames of mind in intertemporal decisions they face (e.g., whether a purchase at a particular point in time or as a two-stage decision that involves first the decision to purchase followed by a deliberation concerning when to purchase) may impact on the optimality of consumer choices. Such questions as impulse buying behavior and the negotiation processes used in reaching purchase settlements may reflect intertemporal framing effects. More generally, framing issues like those above are at the core of attempting to apply the perceptual framework to contingent decision making.

Since prior knowledge influences many consumer decision processes, consumer expertise represents another major area for research. In particular, conceptualizing and measuring different aspects of consumer knowledge (see Brucks, 1985, for one attempt) and studying how such knowledge influences decision processes is a promising direction for research. Another sort of individual difference variable that seems worthy of more research is the idea
of differences in need for cognition (Cacioppo and Petty 1982). The degree of need for cognition should be related to amount of information search and perhaps to the types of heuristics preferred.

Several potentially important areas within consumer decision making have seen virtually no research to date. For example, connections could be made from the literature on risky decision making to consumer choice. For example, to our knowledge no one has yet attempted to integrate notions from Kahneman and Tversky's (1979) prospect theory with the ideas about heuristics and contingent decision making presented in this chapter. More generally, the roles of such constructs as risk (as defined by theorists of risky choice) and ambiguity in consumer choice have not been explored fully. (See Kahn and Sarin, 1988, for an initial effort to consider ambiguity.)

Another area that has seen very little research is incentives. What effects do incentives have on decision processes? According to the cost/benefit approach, incentives should affect the trade-off between costs and benefits. Simonson (1989) reports results of having to justify choices to others, but there is room for much more research in the area of incentives. One potentially fruitful focus for such research may be the distinction between working harder versus working smarter. Tversky and Kahneman (1986), for example, argue that incentives work by focussing attention and prolonging deliberation. That is, incentives cause people to work harder but not necessarily smarter. However, if people do not change strategies but just work harder, this may have the paradoxical effect of increasing error in decisions through increased effort applied to executing a flawed strategy (Arkes, Dawes, and Christensen 1986). Finally, any shift in strategy due to incentives would seem to require awareness of alternative strategies. In some cases, incentives may have limited impact due to a lack of awareness of any better decision strategy than the one currently being used. Thus, an important direction for research on consumer decision making is to understand better when and how incentives will impact processing and choice.

Research on multiperson decision processes is also a wide-open area for research. Virtually nothing has been done in terms of process-tracing studies of group decisions. How information is shared and how inputs from various individuals are coordinated represent important and fascinating research areas.

Many of the research issues noted in this chapter place severe demands on methodology, since more detailed process-tracing analyses seem appropriate. As a result, research that refines or develops new process-tracing techniques is crucial. In particular, methods that allow consumers highly flexible and rapid access to information and keep a trace of the sequence and timing of such access seem necessary. Current information acquisition methodologies may be too slow and/or inflexible to examine issues of editing or constructive choice processes, for example.

Another research methodology issue, with more applied aspects, concerns the effects of different response modes on the elicitation of consumer preferences (see Johnson and Meyer 1984). As noted earlier, different response modes can affect stated preferences in systematic ways. Research characterizing the impact of such response modes are rating, ranking, and pick n on the processes consumers use to examine and evaluate alternatives could be very useful.

This set of opportunities for future research is of course very selective. Any of the areas discussed earlier in this chapter provide fascinating prospects for future research. We have attempted to highlight some of the more exciting possibilities in this section. We hope that this chapter helps to make those opportunities, new theories, and new methodologies salient and that it helps to stimulate exciting new research.

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